

Cumbria Wind Energy Supplementary Planning Document

Supporting the Local Development Frameworks of Cumbria



July 2007

This Supplementary Planning Document has been prepared jointly by

Cumbria County Council
Allerdale Borough Council
Carlisle City Council
Copeland Borough Council
Eden District Council
Lake District National Park Authority
South Lakeland District Council

It supports 'saved' Local Plan Policies, 'saved' policies in the Joint Structure Plan 2006-2016 and policies in the emerging Local Development Frameworks being developed by each of the above local authorities.

The Supplementary Planning Document was adopted by the Cumbrian Local Planning Authorities as a as set out below following a period of public consultation during October – December 2006.

Allerdale Borough Council – 23 January 2008
Carlisle City Council – 9 September 2008
Copeland Borough Council – 25 January 2008
Cumbria County Council – 13 September 2007
Eden District Council – 25 October 2007
Lake District National Park Authority – 16 October 2007
South Lakeland District Council – 5 December 2007

Barrow Borough Council is committed to the production of the Supplementary Planning Document and will consider adopting it following the development of the Core Strategy of the Local Development Framework. Until then this document will be a material planning document for Barrow as it provides guidance to strategic renewable energy policy in the Joint Structure Plan.

Front cover photographs courtesy of Cumbria County Council and South Lakeland District Council.

The County Council acknowledges inputs on landscape capacity assessment, landscape and visual impact assessment, cumulative effects and design guidance from Coates Associates, Chartered Town Planners and Landscape Architects, Kendal

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NINE STEPS TO DEVELOPING A WIND ENERGY PROPOSAL

This guidance has been developed jointly by the Cumbrian local planning authorities to support the implementation of renewable energy policies in the Local Development Frameworks¹ and provide consistent guidance for wind energy development across the County. This section summarises the main issues addressed by the SPD and acts as the Executive Summary.

1 Understanding Climate Change

The need to tackle climate change is firmly on the UK's agenda. The Government's energy strategy is seeking an energy mix in the future that will reduce harmful CO₂ emissions. This includes the need for 20% of our energy to come from renewable sources by 2020. Wind energy, is a proven technology, and a key renewable source and important to the future UK energy mix. This guidance helps to facilitate new wind energy development in Cumbria to meet climate change objectives.

Find out more in Part 1 Section 1.

2 Understanding the Policy Framework

The full range of national, regional and local policies and strategies need to be understood when dealing with renewable energy schemes. Targets have been set at national and regional levels for renewable energy production and wind is set to play a big part in achieving these. Schemes that do not cause significant harm to a range of environmental, economic and social issues should be favourably considered through the planning system.

Find out more in Part 1 Section 1.

3 Understanding Wind Energy and its effects

A range of planning related issues need to be taken into account when developing a wind energy proposal. These are all equally important and planning policy requires these issues to be given careful consideration. These include aircraft and radar, biodiversity, community, cultural heritage, highways, landscape and visual, local amenity, local economy, soils and hydrology and telecommunications.

Find out more in Part 1 Section 2
Key guidance is highlighted in bold.

4 Understanding Cumbria

Cumbria has a high wind resource and lends itself well to wind energy development in that regard. Cumbria also has a high quality environment containing wide ranging nature conservation sites and species, a diverse historic legacy, important landscape character and many dispersed settlements throughout the countryside. A clear understanding of the environmental, economic and social issues is needed to determine the best place for wind energy development.

Find out more in Part 1 Section 2, Maps 1 – 6 and Part 2

¹ and relevant saved and Cumbria Joint Structure Plan policies.

5 Understanding the Local Community and Stakeholders

Engaging with the local community and other stakeholders at the pre and post application stages can bring many benefits. Positive engagement and good quality information can result in the community understanding a scheme better, and potentially taking ownership of it. This could reduce the time spent considering a planning application and assist in identifying constraints and opportunities for a scheme.

Find out more in Part 1 Section 2.
Key guidance is highlighted in bold.

6 Understanding the Local Planning Authority

It is important to engage with planning officers from the relevant local planning authority at an early stage. They can provide signposting to relevant policies and background information, contact with other officers and assist in interpreting guidance when developing a scheme. Pre application scoping meetings with officers, held very early on in the process, can help ensure that all relevant issues are considered and can help with the iterative design process.

7 Understanding Landscape Capacity

It is important that future decisions are made against a robust assessment of the landscape capacity of Cumbria to accommodate wind energy development. A detailed landscape capacity assessment that specifically relates to wind energy development provides the foundation for future development and decisions. This is based on landscape character, sensitivity and value.

Find out more in Part 2.
Key guidance is highlighted in bold.

8 Understanding Cumulative Effects

Future wind energy schemes will need to consider cumulative effects and demonstrate the potential impacts on aircraft and radar, biodiversity, cultural heritage, highways, landscape character and visual effects, local amenity, local economy soils and hydrology and, telecommunications.

Find out more in Part 1 Section 3.

9 Understanding Site Characteristics and Good Design

When working on the design of wind energy schemes the full range of technical, environmental and other characteristics of a site need to be considered. A thorough assessment of the characteristics on and surrounding the site is needed. If a site is initially considered appropriate, careful design can ensure a scheme relates well to its environs and can assist in mitigating adverse effects. This process should be integrated with the Environmental Impact Assessment, if one is required. This guidance signposts to advice on a range of issues and includes more detailed advice on landscape issues.

Find out more in Part 1 Section 4 and Part 2 Section 3
Key guidance is highlighted in bold throughout the SPD.

CUMBRIA WIND ENERGY SUPPLEMENTARY PLANNING DOCUMENT

Part 1

General Planning Guidance

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PART 1

SECTION 1

WHY THE GUIDANCE IS NEEDED

1 Why the guidance is needed

Climate Change

- 1.1 The need to tackle climate change is firmly on the UK's agenda. There is a body of scientific evidence that demonstrates that human activities are contributing towards global warming and climate change through rising carbon dioxide (CO₂) and other green house gas emissions. The consequences of climate change will be profound with rising costs for global and national prosperity, people's health and the natural environment. Action is needed now to reduce CO₂ and other harmful emissions and mitigate against the effects of climate change.
- 1.2 The Government has developed a strategy for tackling climate change² that takes a comprehensive approach to
- minimising the demand for energy
 - increasing energy efficiency
 - developing renewable energy sources
 - developing cleaner energy sources
- 1.3 The spatial planning system can help minimise the demand for energy and increase energy efficiency through planning new homes, jobs and infrastructure. It also has a role to play in supporting new renewable energy production. This could be wind, biomass, photovoltaics, geothermal and hydroelectric, both at a commercial and micro scale.
- 1.4 Renewable energy is an integral part of the Government's Energy Strategy. It is committed to produce 10% of the UK's electricity from renewable sources by 2010, and is aiming to produce 20% by 2020. In 2004 3.6% of our electricity was from a renewable source. In order to achieve this target regional and local Government are taking action to support renewable energy schemes. This guide is one approach that Cumbria is taking on this. As wind energy development will continue to have a major role in delivering national and regional renewable energy targets this guidance will focus exclusively on this type of renewable technology.

The role of wind energy developments

- 1.5 Renewable energy has an important role to play as an alternative to the increased use of fossil fuels and nuclear energy generation. There are a range of renewable energy technologies that are being exploited and developed to help deliver more renewable energy supplies. The UK is the windiest place in Europe and the Government see wind energy as playing a major role in delivering renewable energy over the next decade and beyond.
- 1.6 Wind energy development is a proven, viable and rapidly developing renewable energy technology. It continues to offer significant potential in the region and across Cumbria, particularly in meeting targets set for 2010 (10% of energy from renewable sources). In 2004 it provided 4.4% of the national renewable energy production, with large scale hydroelectric contributing 10.5% and bio fuels contributing 83.8%. Through the development of up to date policies and advice we can help facilitate more wind energy development and assist in tackling climate change.
- 1.7 The environmental benefits of wind energy are mainly linked to the contribution it has towards reducing the harmful impacts of climate change, without action climate change will jeopardise the landscape, biodiversity and human activities

² Energy White Paper 2003, Energy Review 2006 and Meeting the Energy Challenge, 2007.

across Cumbria. Wind energy can also bring about social and economic benefits through job creation in the manufacturing, construction and maintenance industry. The offshore wind schemes around the coast of Cumbria have already contributed to new work for Cumbrian companies. It can also support rural diversification providing an opportunity for farmers to sell or rent land to commercial wind energy companies or support community owned projects. It can also provide opportunities to power homes, buildings and businesses off the grid and provide educational opportunities. The environmental, economic and social benefits of renewable energy schemes are material considerations when dealing with planning applications.

- 1.8 However, careful consideration also needs to be given to any effects that may arise from renewable energy schemes. Wind energy schemes are no exception to this. Schemes need to be well designed, reflect local circumstances and demonstrate how any environmental, social and economic impacts have been minimised through careful site selection, design and other measures. These are also material planning considerations and as such, these issues will need to be addressed on a site by site basis to determine the most acceptable scheme for a site.

Policy Guidance

National Guidance

- 1.9 Planning Policy Statement 22: Renewable Energy (PPS22), 2004 sets out the Government's planning policy on renewable energy. The guidance advises that policies in regional spatial strategies and local development documents should promote and encourage, rather than restrict, such development. It encourages renewable energy development across England where the technology is viable and environmental, economic and social impacts can be addressed satisfactorily. PPS22 acknowledges that of all the renewable energy technologies, "wind turbines are likely to have the greatest visual and landscape effects" and that consideration should be given to cumulative impact of wind energy schemes. This Guidance seeks to highlight the range of effects likely with regard to wind energy development, indicates the potential scale of wind development in relation to landscape character and sets out detailed guidance to assist in assessing landscape, visual and cumulative effects.
- 1.10 Planning Policy Statement 1 and its emerging guidance on climate change will also apply and supersede or strengthen some guidance contained in PPS22. This seeks to encourage development that supports Government policy on climate change and sets out further guidance on the role of renewable energy. It is considered that the landscape capacity approach set out in this guidance is compatible with this emerging guidance.

Regional Guidance

- 1.11 The North West Sustainable Energy Strategy, July 2006, sets out the action needed to tackle climate change for the North West. This suggests that the greatest cross cutting impact in our region is likely to be increased risks of flooding. Other issues will include sea level rise and an increase in annual temperatures. This could lead to heat waves, moorland fires and a change in biodiversity as some species fail to evolve to the new climate conditions and habitats. It sets out a hierarchy for action that reflects the Government's approach above.
- 1.12 The Regional Spatial Strategy (RSS) for the North West of England contains planning policy and targets for delivering renewable energy and the NW Sustainable Energy Strategy. The indicative capacity break down of the targets

demonstrate the importance of wind energy development in meeting such targets. For up to date information on the targets consult the RSS. This guidance aims to support the development of wind energy schemes in Cumbria, which will contribute towards meeting the regional targets established in RSS.

Cumbria and Lake District Joint Structure Plan

- 1.13 The Cumbria and Lake District Joint Structure Plan 2001-2016 (JSP) supports the increasing use of renewable energy and the need to encourage greater energy efficiency and energy conservation. The policies of the JSP will be valid until the Regional Spatial Strategy is adopted. This will then set the strategic policy for renewable energy production. However, it is anticipated that the following policies from the JSP will be saved beyond this period by the Regional Assembly as a transitional arrangement until policies in the Local Development Frameworks are developed. This guidance will then be adopted as part of the Local Development Frameworks.
- 1.14 The SPD provides guidance and interpretation against two key policies of the Joint Structure Plan - Policies R44 and R45³. These recognise that renewable energy projects, ranging from large scale commercial developments through to domestic or community projects, each have their own locational characteristics and requirements. The JSP recognises that the development of wind energy within the County has been the most emotive given the visual impact and the influence it has on the character of important landscapes and their settings. In addition to these several other policies of the JSP apply and proposals will be judged against these also.
- 1.15 Under Policy R44, renewable energy developments will be favourably considered if a number of requirements are met. These relate to the effect on landscape character, biodiversity and the natural and built heritage; the effect on local amenity, economy and highways, aircraft operations and telecommunications; and that the proposals take all practical steps to reduce any adverse impacts. It also requires for the environmental, economic, social and energy benefits to be given significant weight and for measures to show how a proposal will be dealt with once operation ceases.
- 1.16 Under Policy R45, developments within the Lake District National Park (LDNP) or Areas of Outstanding Natural Beauty (AONBs) have to show that their scale, form, design, materials and cumulative impacts can be satisfactorily assimilated into the landscape or built environment and wouldn't harm their appearance. They must also be shown not to impact on the local community, economy, nature conservation or historic interests. In these areas wind schemes requiring more than one turbine or a turbine with a ground to hub height of 25 metres or more is unlikely to be acceptable.
- 1.17 A technical study⁴ was undertaken in 2003 to identify the potential for further grid connected renewable energy development in Cumbria. This took into account economic, social and environmental factors as well as technical and viability considerations. The study identified broad 'Areas of Search' for renewable energy developments in the County (including wind) and assessed broad capacities for the development of this technology. This study was used to inform the development of policy in the JSP. It was not adopted as part of the JSP, nor used to set targets for renewable energy or identify locations for development as PPS22 advises against making assumptions on technical and commercial feasibility of renewable energy projects, and having planning policies that rule out or place constraints on the

³ Contained in Appendix 1

⁴ Technical paper No 6: Planning and Renewable Energy Development in Cumbria by AXIS, CCC and LDNPA, 2003.

development of all, or specific types of, renewable energy technologies. As a result this Guidance moves away from broad Areas of Search. It does not identify specific locations where development will be acceptable; however, it does provide an indication of landscape capacity at a county wide level. This is obviously only one factor that will be considered by developers as they consider the characteristics and potential effects of appropriate sites for future development.

Local Plans and Local Development Frameworks

- 1.18 This document provides detailed guidance and interpretation for several saved policies and the emerging policies of the Local Development Frameworks for the Cumbrian Local Planning Authorities. These are set out in appendix 1. It is adopted as a Supplementary Planning Document for the Local Planning Authorities as set out on the inside of the front cover. This guidance will be given significant weight when dealing with planning applications.

Scope of Guidance

- 1.19 This Guidance replaces previous supplementary planning guidance for wind energy development issued in 1997. It applies to schemes of less than 50MW, which are normally determined by local planning authorities, where one or more turbines provide energy either directly to an individual or a group of buildings or for the sole purpose of producing electricity to support the national energy network. It applies to new schemes and extensions to, and re-powering of, existing schemes. Schemes above 50MW are determined by the Department for Business, Enterprise and Regulatory Reform (BERR).
- 1.20 The guidance is divided into two parts.
- Part 1 – guidance on addressing environmental, social and economic effects when preparing wind energy proposals.
 - Part 2 – technical guidance on landscape capacity, landscape and visual effects and carrying out landscape and visual impact assessments.
- 1.21 This Guidance supports the implementation of a range of policies. It sets out a consistent approach to be applied across the County to assist developers in preparing wind energy developments. Key guidance on a range of issues is highlighted in bold to summarise steps that should be taken when developing a wind energy scheme. It should be noted that they do not constitute policy. They are referenced as G* in Part 1 to refer to ‘guidance’ and LG* in Part 2 to refer to ‘landscape guidance’.
- 1.22 It is important that we look favourably on wind energy development that does not cause unacceptable harm to our built and natural environment. When preparing wind energy proposals a range of environmental, social and economic effects need to be considered. The guidance provides general advice on range of issues that must be dealt with for planning reasons. This includes aircraft and radar, biodiversity, cultural heritage, landscape and visual, local amenity, local economy, soils and hydrology and telecommunications.
- 1.23 However, as landscape and visual effects are recognised in national planning guidance as being more important for wind energy schemes than other renewable energy development, more detailed information is provided on these interrelated issues in Part 2. It is our experience that these are often the most controversial aspects of any wind energy proposal, and can be more difficult to mitigate than other issues, such as biodiversity.

- 1.24 This document does not provide guidance on other renewable energy development, offshore renewable schemes or micro-generation. The nature of other renewable schemes is likely to be small with few strategic consequences, such as small scale hydroelectric schemes, or likely to be large and unique, such as large scale hydro electric or a biomass plant. Local planning authorities will deal with such schemes on their own merits in relation to the relevant policy. Offshore schemes are not covered by the land use planning system and it is therefore inappropriate to provide guidance on this. However, where associated infrastructure is proposed on land, this guidance would apply.
- 1.25 Micro-generation wind turbines, which are sited on buildings or within their proximity, provide electricity to be used on site with the potential to export any surplus, are becoming more popular. Cumbrian local planning authorities support the principle of micro-generation, and such proposals will be dealt with on their individual merits against relevant policies. The local planning authorities may provide further guidance on this in due course.

Cumbria's Context

Wind Resource

- 1.26 The wind resource in Cumbria is greatest on west facing upland sites and along the coast. Map 1 shows estimated mean wind speeds in metres per second for values over 6.5metres/second.⁵ This provides a generalised indication of Cumbria's wind resource. It does not take into account that wind energy developments are now being built in areas of lower wind speeds or the technical, environmental or cultural constraints that may affect land. Neither does it provide a basis for individual development decisions.
- 1.27 Many of the windiest parts of Cumbria fall within national landscape designations. The Lake District National Park and Yorkshire Dales National Park, Arnside and Silverdale, North Pennines and Solway Coast Areas of Outstanding Natural Beauty have the highest value landscapes in Cumbria. Policies have been put in place to protect the landscape value of these areas and their settings, which limits the level of wind energy development that is likely to take place there.

The Nature of Schemes and Experience in Cumbria

- 1.28 In recent years a significant increase in the size and proportion of individual wind turbines has prompted a re-evaluation of the criteria under which the landscape and visual impact of schemes is assessed. Trends in turbine design are summarised in Table 1.1 below. This shows the ranges of heights to the hub/nacelle level, the overall diameter of blades, the overall height to blade tip, the spacing between turbines, and the installed capacity for typical schemes proposed between 1991 and 2004. Clearly the larger the turbines, the more electricity they can produce. While earlier turbines had an installed capacity of 400-600 kW, a single turbine today has a capacity in the range of 1.3 – 2.5 MW. For a given output, fewer turbines are needed than in past schemes. However, as the size of turbines and electricity output increase, so does the amount of space needed between each turbine.

⁵ ETSU Energy Technology Support Unit

Table 1.1 Trends in Turbine Design

Dimensions (m)	1991-93	1994-99	2000-04
Height to Hub	25	40-45	60-70
Diameter of Blades	24-33	37-47	62-94
Overall height	37-41.5	58.5-68.5	91-117
Spacing ⁶	72 – 132	111 – 470	186 - 940
Installed capacity	700kW	1 MW	2 – 2.5MW

- 1.29 In the last decade the number of sites that are operational or have permission for non-domestic wind turbine developments has increased significantly outside the Lake District National Park, with a few small scale schemes being developed within the National Park. These are identified in Map 2. The map also shows proposals that have been submitted as planning applications and those that have been refused or dismissed at appeal. The map shows a clustering of schemes in areas where there is the highest wind resource i.e. along the coast of West Cumbria, along the northern fringes of the Lake District National Park, in the Furness area and in the uplands to the north and east of Kendal.
- 1.30 More recently development opportunities are being found in less exposed inland locations and, for single or twin turbine developments, within the grounds of existing industrial sites. Cumbria has also seen a trend towards the extension of existing schemes and development either directly adjacent to existing sites or in very close proximity.

Landscape Designation Boundary Review

- 1.31 Natural England is currently working towards designating extensions to the Lake District and Yorkshire Dales National Parks. This work follows agreement in 2005 by the former Countryside Agency on broad areas adjacent to the Lake District and Yorkshire Dales National Parks, Arnsdale & Silverdale and the North Pennines Areas of Outstanding Natural Beauty that meet the statutory criteria for designation. This decision was informed by a report by Alison Farmer Associates⁷. It will be some time before the designation process is complete and any such extensions designated. It is not considered appropriate for this guidance to pre-empt this process, and the landscape capacity assessment has been carried out to reflect existing designation boundaries only.
- 1.32 If the review process results in the designation of new areas of land as National Park or Area of Outstanding Natural Beauty changes would be made to the SPD to reflect this. The relevant planning policies would apply to any new additions to nationally recognised landscape designations.

⁶ Taken from PPS 22 companion guide – spacing 3-10 times the blade diameter.

⁷ Recommended areas of search for land worthy of national landscape designation in the North West Region, Alison Farmer Associates 2005.

PART 1

SECTION 2

GUIDELINES FOR WIND ENERGY SCHEMES

2 Guidelines for Wind Energy Schemes

- 2.1 Wind energy development may have an effect on a range of environment, social and economic issues. Those that relate to the spatial planning system are listed below and covered in this section. All of these issues are important and will be considered equally by the local planning authority. Developers must consider how their proposals affect such issues and address any significant impacts that may arise. It is important, however, that developers do not resolve adverse effects on one issue at the expense of another.
- 2.2 For schemes of two turbines or more, and those with a hub height that exceeds 15m, a full Environmental Impact Assessment is required in accordance with the Environmental Assessment Regulations. This should be integrated into the design process and a range of specialist advisors may be needed at the start of this process to ensure the full range of issues set out below are properly considered. For schemes below the EIA threshold information should be provided on such issues through a planning statement to support an application.
- 2.3 The issues covered in this section include:
- Aircraft and Radar
 - Biodiversity
 - Community
 - Cultural Heritage
 - Highways & Rights of Ways
 - Landscape and Visual
 - Local Amenity
 - Local Economy
 - Soils and Hydrology
 - Telecommunications

Aircraft and Radar

- 2.4 Wind energy developments may cause adverse impacts on the use of aerodromes and radar and other navigation systems used for air traffic control and aircraft instruments. Early consultation between developers and statutory authorities can help with siting and mitigation measures.
- 2.5 The movement of a wind turbine can interfere with radar as it may be interpreted as a moving object. This could cause it to be mistaken for an aircraft or reduce the ability to track aircraft by radar in the vicinity of a wind energy development. Developers will need to consult with radar operators if a proposal falls within a 15km consultation zone, or the 30-32km advisory zone around both civil and military air traffic radar, respectively. The British Wind Energy Association (BWEA) website combines a proforma to aid consultation with stakeholders. Developers should use this (www.bwea.com/aviation). If, as a result of the above consultation, a negative impact is likely a developer will need to prove whether or not there will be an adverse effect on aviation interests.
- 2.6 Currently such issues may prevent development from taking place around the north, east and some coastal locations within Cumbria due to MoD sites and aircraft activity, such as Spadeadam in the north and Warcop in the east, and Carlisle Airport. In these, and other areas, flight paths will need to be determined and consideration given to see if action can be taken to mitigate against collision risks. Developers must consult with the Civil Aviation Authority and MoD to determine such issues and liaise with airfield management at civilian airfields.

G1

Developers should enter into early dialogue with aviation stakeholders to identify any key issues that need to be addressed.

2.7 Developers should follow good practice advice found in the following resources:

- DTI AMS Feasibility Study, June 2005.
www.dti.gov.uk/renewables/publications/pdf/windenergyaviation.pdf
- Wind farm impact on aviation radar interests DTI
<http://www.dti.gov.uk/energy/page18050.html>
- Wind energy and aviation interests: an interim guide, DTI
<http://www.dti.gov.uk/files/file17828.pdf>

Biodiversity

2.8 Wind energy schemes support the goal to reduce climate change and reduce potential changes to biodiversity globally and in the UK. They also have the potential to both enhance or adversely affect biodiversity and nature conservation interests. Cumbria is noted for a wealth of nature conservation interests. Some of these may be particularly rare or form part of wider biodiversity networks important on more than a local scale. It is crucial for any development to take these interests into account, reducing adverse effects and considering opportunities for enhancement.

2.9 Cumbria has many international and national statutory designations, and regional and local designations both for habitats and species. National guidance and circulars, along with local planning policies, provide protection from inappropriate development for areas and features of international and national importance. Additional policies provide protection for other areas and features of nature conservation interest and for enhancement.

2.10 The key international and national statutory site designations in Cumbria are shown on maps 3, 4, 5 & 6 and comprise:

International

- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- Ramsar (wetlands) sites

National

- Sites of Special Scientific Interest (SSSIs)
- National Nature Reserves

For international sites, and features that they support, new schemes need to demonstrate that they will not adversely affect their conservation value. Schemes should not cause harm to habitats and species outside a designated site that may adversely affect the integrity of a site, or cause a significant decline in the size, distribution, structure or function of a population of a species for which a site was designated. In accordance with the Habitats Regulations an assessment needs to be carried out for each new development to determine if it would have a likely significant effect, alone or in combination with other plans or projects, on sites or features associated with an international designation. If likely significant effect is determined developers are expected to provide relevant information to the Local Planning Authority to enable it to carry out an Appropriate Assessment.

2.11 Any development that could have an adverse effect on the conservation objectives of a European or Ramsar wildlife site is not provided for in RSS Policy EM17, Policies R44 & R45, E34 and ST4 of the Joint Structure Plan 2001-2016 and policies in the emerging Local Development Frameworks and would not be in accordance with the development plan. It would not, therefore, have the benefit of S.38 of the 2004 Act at application stage. More guidance is contained in ODPM

Circular 06/2005⁸, PPS9 and PPS22 on this.

- 2.12 For national sites, wind energy schemes will need to demonstrate that they will not have an adverse effect on a SSSI. Strict measures would be taken to ensure that harmful effects on SSSIs are avoided or mitigated against. Exceptions will only be made where the benefits clearly outweigh the impacts on the interests of the SSSI and its contribution to the national network of SSSIs. More guidance is contained in ODPM Circular 06/2005, PPS9 and PPS22.
- 2.13 This guidance does not seek to set buffer zones around international or national designations; however developments proposed close to the boundaries of these designations will need to assess their effects on them.
- 2.14 In addition to international and national site designations there are a number of plant and animal species within England that are subject to special protection under the Habitats Regulations, the Wildlife and Countryside Act or their own legislation. Wind energy schemes will need to demonstrate that these are protected from adverse effects through the adoption of appropriate avoidance and mitigation measures.
- 2.15 There are also Regionally Important Geological/Geomorphological sites, County Wildlife Sites, and Local Nature Reserves. Development sited on or off such sites should not cause significant harm to these nature conservation interests.
- 2.16 It is also important for developers to consider the effects of development on non designated sites and species. Government policy seeks to protect priority habitats and species identified in the UK Biodiversity Action Plan and any additionally identified in the local Cumbria Biodiversity Action Plan. Many of these habitats and species extend outside protected sites, and consideration must be given to potential impacts when developing any scheme. If an assessment demonstrates harm a scheme could only be supported if the need for and benefits of the scheme clearly outweigh the harm and appropriate avoidance, mitigation and compensation measures are incorporated to protect and enhance biodiversity networks.
- 2.17 Habitats most likely to be affected are coastal habitats, upland habitats (acid grassland, heather moorland, blanket bog, flushes and mires), purple moor-grass and rush pastures, general open farmland, and connecting habitats such as hedgerows and small woods. A Key Species list is being developed for the county which will include protected, priority and Cumbria BAP species. It will be available from, and maintained by, the Cumbria Wildlife Records Centre.
- 2.18 Information on these interests should inform the early stages when selecting the location and designing a scheme. The maps at the back of Part 1 provide a broad indication of the international and national sites. There is a need to use information from Natural England, the Cumbria Biological Data Network through Tullie House Museum, Cumbria Wildlife Trust, RSPB, and local nature conservation groups
- 2.19 Effects on biodiversity can take place during the construction, operation or decommissioning phases of a wind energy scheme. They can arise from any element of the development including the foundations, access roads, moving turbines and ancillary buildings. Cumulative effects may also impact on biodiversity across a wide area arising from both wind energy and other development/activities; see more on this in section 3, Part 1. Such effects could cause negative impacts to habitats and species found within or outside a development site. Mitigation of such

⁸ Circular 06/05 Biodiversity and Geographical Conservation - Statutory Obligations and their impact within the Planning System.

effects would be required but in some circumstances a scheme might be so damaging that it may not be possible to mitigate or provide compensation against the effects.

- 2.20 New wind energy schemes may also provide the opportunity to enhance existing habitats and create new ones to support a range of species. These opportunities should be pursued where possible and be guided by biodiversity targets in the NW Regional Spatial Strategy and Cumbria BAP.
- 2.21 The experience of past wind energy development both in the UK and Europe has shown the main adverse effects on nature conservation to be:
- Direct habitat loss (eg for feeding, roosting, breeding etc)
 - Habitat damage (eg on site and off site due to hydrology impacts)
 - Interference with geological processes (eg slope profile)
 - Interference with hydrological processes (eg increased runoff, erosion)
 - Disturbance to, displacement of and collision with mobile species such as birds (eg for migration, feeding, nesting)
- 2.22 Once the habitats and species have been identified, developers need to consider the effect of the proposal on these, both alone and in combination with other developments. If adverse effects are identified appropriate mitigation needs to be considered. This could include moving the position or turbines, changing the height or number of turbines or, in some cases, seeking an alternative site. Consideration should be given to the opportunities for enhancing nature conservation with a site and its surrounds. In some cases compensatory habitat may be considered necessary to mitigate any potential habitat loss arising from a scheme. Developers will need to work closely with Natural England and others to ascertain the most appropriate approach to this. Further guidance on biodiversity issues can be found in 'Wind farm development and Nature Conservation, English Nature, RSPB, WWF and BWEA, 2001'.

G2

Developers should assess the effects of potential schemes, alone or cumulatively, on biodiversity sites, habitats and species and identify measures to avoid or mitigate harm to them and secure their conservation and enhancement.

Where a scheme, alone and in combination with other plans and projects, could have an impact on an internationally designated site, developers must carry out an assessment of the likely significant effect of the scheme in accordance with the Habitats Regulations.

Bats and Birds

- 2.23 The impact on bats and birds is of particular interest for wind energy development. All bats and some birds are protected species that need to be considered when developing a wind energy scheme. They are potentially at risk from wind turbines in the ways identified in paragraph 2.21 above.
- 2.24 For bats, in area where bat activity is likely, work will need to be carried out to establish roosts, flight lines, feeding areas, hibernation or swarming sites in the vicinity of a proposal as part of an EIA or planning statement. The results of such surveys should assist in identifying the appropriateness of the scheme, its design and layout. If a foraging habitat is likely to be affected by a scheme, then mitigation

measures would be expected to ensure additional habitat is provided for within the locality and to reduce the potential for harm, however it will take time to establish new habitat. Such work should be carried out in accordance with Bat Mitigation Guidelines, English Nature, 2005 and Bat Survey Guidelines, Bat Conservation Trust, April 2007.

- 2.25 The issue of birds and windfarms has been debated for more than a decade. Scottish National Heritage produced detailed guidance in 2005 on survey methods for assessing the potential impacts on birds from onshore wind farms. This provides guidance on how to determine the potential loss of habitat as a result of infrastructure, displacement of birds due to disturbance to feeding and breeding grounds, and the potential mortality due to collision with turbine blades. Such risks need to be determined for any wind energy development. Developers are expected to consider this guidance when drawing up schemes in Cumbria.
- 2.26 For birds an assessment will need to be carried out to establish any protected, priority or rare species in or within the vicinity of a site and any migratory routes and any habitats related to such species. Careful consideration needs to be given to SPA, SAC, and RAMSAR sites and species which are often associated with coastal and moorland/upland areas. Birds such as whooper swans, pink footed geese and greylag geese could be affected by wind energy schemes. Species are often associated with areas off the site for feeding, roosting and over wintering. This is particularly the case for Hen Harriers from the Newcastleton Hills SPA and others that over winter on moorland in the west of Cumbria. Areas close to international sites have had the greatest interest from wind energy development in the past and care needs to be taken to ensure there is no harm to these interests.
- 2.27 Assessments need to recognise that the species associated with such sites are often found elsewhere throughout Cumbria, particularly for over wintering. The RSPB is developing detailed information on areas such as these and developers should contact them early in the site selection process to determine if such species are likely to be associated with a site (www.rspb.org.uk/cumbriaspatialplanningguide). For example information is available for moorland areas in the west of the Cumbria that provide an over wintering habitat for Hen Harriers. In coastal locations attention also needs to be paid to issues of collision with migratory birds, as many fly along the coastal areas to reach feeding/breeding grounds in protected habitats around the Solway Firth, Duddon Estuary, Walney and Morecambe Bay areas. An assessment of potential impacts will need to be carried out and any mitigation measures determined to remove the potential for harm. These may relate to micro-siting and design or the creation of supporting habitat within the locality. This information should be part of the EIA or planning statement.
- 2.28 The cumulative impacts on bats and birds must also be assessed in relation to other proposed, approved or operational wind energy schemes. More information is provided on this in section 3, Part 1.

G3

Developers should pay particular attention to assessing the effects of wind energy schemes, alone and cumulatively with other developments, on bats, birds and other mobile species, both within and outside a site. Measure should be identified to avoid or mitigate harm to these species and secure their conservation and enhancement.

The role of the EIA

- 2.29 For schemes where an Environmental Impact Assessment is required it is the main tool used to look in detail at nature conservation interests both on and off site. The methodology used; analysis of data and assessment of impacts should be clearly expressed in the Environmental Statement. If a scheme does not require an EIA, but is in an area affected by such issues an assessment of impacts should still be carried out and included in the planning statement. Areas to address include:
- A habitat survey that describes in detail the plant communities present on the site highlighting areas of habitats with potentially high nature conservation value⁹.
 - Identification of habitats and species on site and within locality
 - Identification of protected and priority habitats and species, including those of local importance.
 - Migratory routes of any protected or priority bird/bat species.
- 2.30 When carrying out assessment and evaluation information from local nature conservation bodies and Cumbria Wildlife Records Centre will help with data collection and interpretation. However this will not replace the need for detailed site surveys to be carried out at the appropriate time of year.
- 2.31 Developers need to ensure they follow national guidance contained in:
- PPS 9 – Biodiversity and Geological Conservation
 - Planning for Biodiversity and Geological Conservation – A good practice guide
 - Circular 06/05 – Biodiversity and Geological Conservation – Statutory Obligations and their impact within the Planning System
- All can be found at www.communities.gov.uk
- 2.32 Developers should also follow good practice advice contained in:
- Survey methods for use in assessing the impacts of onshore windfarms on bird communities, Scottish National Heritage Guidance November 2005
www.snh.org.uk/strategy/renewable/sr-we00.asp
 - Wind Turbines and Sensitive Bird Populations, RSPB, 2007
 - Wind farm development and Nature Conservation, English Nature, RSPB, WWF and BWEA, 2001 www.bwea.com/ref/reports-and-studies.html
 - Scoping guidelines for the environmental impacts of projects, Environment Agency, 2002
www.environment-agency.gov.uk/commodata/acrobat/scoping_guidelines.pdf
 - Bat Survey Guidelines, Bat Conservation Trust, 2007
www.bats.org.uk/news_events/BatSurveys.asp
 - Bat Mitigation Guidelines, English Nature, 2005
<http://naturalengland.twoten.com/naturalenglandshop/docs/IN13.6.pdf>

⁹ Use of a Phase 2 Habitat Survey methodology and National Vegetation Classification survey

Communities

- 2.33 The benefits of renewable energy through the provision of wind turbines and the associated reduction in CO₂ emissions are shared by everyone in England. However, it is local communities that are directly affected by them.
- 2.34 Wind energy developments could have a range of positive or negative effects on nearby communities. They could provide landowners with the opportunity for rural diversification, provide local jobs and opportunities for community based schemes and educational resources. However, a range of planning related issues are often raised as concerns by the local community. These include landscape and visual effects, noise, shadow flicker and effects to the local economy. Although it is recognised that the concerns raised will often not be significant, and that negative effects may be localised in nature or could be mitigated against, in every case, developers need to consider if wind schemes will have a positive, negative or neutral effect on such issues. More guidance on what is expected is set out throughout the guidance. In addition to this, local communities often raise concerns relating to a reduction in house value; however this is not a relevant planning issue and is not addressed by this guidance.

Community engagement

- 2.35 It is important that developers engage with local communities early on, and throughout, the development process. Gaining an insight into local concerns early on in the process can help to identify community benefits, assist with planning the overall scheme and mitigate against any identified negative impacts.
- 2.36 Developers are expected to carry out positive engagement with community stakeholders early on in the process, both before a planning application is prepared and after it has been submitted to the local council for consideration. However, it is also helpful to continue liaison with the local community during the construction and operational stages too. As part of this process, developers might consider inviting people who live near wind energy development to meet with local communities to discuss the realities of living near them.
- 2.37 Local planning authorities also have a role in raising awareness of the potential for renewable energy through guidance such as this, training events with councillors and professionals, and supporting a range of community projects promoting renewable energy, such as Eden LA21 and local energy efficiency advice centres. Each planning authorities Statement of Community Involvement sets out how they will engage with communities affected by proposals for major development.
- 2.38 Community stakeholders could be involved in identifying constraints and opportunities such as landscape character, biodiversity enhancement, links to local schools and colleges, and community benefits that could result from a scheme. Information and examples showing how community concerns have been successfully dealt with elsewhere should be used. A package of exhibitions, newsletters, briefing packs and public meetings could be adopted. Community Liaison Groups could be set up with a representative sample of local stakeholders to discuss issues at the pre and post application stages. A dedicated person could be identified to carry out community liaison. Approaches such as this could help reduce the feeling that communities have no ownership of a scheme, which may be the case if they are presented with a finalised scheme at an exhibition or meeting. Recent studies have also suggested that lack of information or awareness on renewable energy can result in people feeling unable to give positive support¹⁰.

¹⁰ Community Benefits from Wind Power, Centre for Sustainable Development et al, 2005.

- 2.39 More advice on involving local communities is contained in the “Protocol for public engagement with wind energy development in England”, produced on behalf of the Renewables Advisory Board and DTI. Developers should follow this protocol when dealing with schemes in Cumbria.
- 2.40 Organisations and people to include in pre and post application engagement could include:
- landowners
 - local residents, businesses, schools, residents groups
 - local and Parish councils
 - other organisations that may be affected, eg MoD
 - local media (as they are often the mechanism that the local community receive information from)
 - local action group (particularly in areas subject to previous wind energy interest/applications)
 - local environmental, interest or other groups (who could also assist in disseminating information to the local community).

G4

Developers should engage with the local community early in the design process to help identify issues that could help influence the overall design of a scheme.

- 2.41 Developers should also follow good practice advice contained in:
- The Protocol for Public Engagement with Proposed Wind Energy Developments in England, for the DTI and Renewables Advisory Board, Centre for Sustainable Energy, October 2006, www.cse.org.uk/pdf/pub1079.pdf
 - Summary of recent research on public attitudes to wind development, Section 9, Wind Power in the UK, SDC 2005. www.sd-commission.org.uk/publications/downloads/Wind_Energy-NovRev2005.pdf

Benefits for communities

- 2.42 When developing a wind energy scheme developers should explore the potential for community benefits when engaging with the community. Although benefits that are not required directly as a result of a planning consent are not a material planning consideration, developers in Cumbria are encouraged to work more closely with local communities to explore how wind energy schemes can enhance community interests. However, it should be noted that such benefits will not outweigh any significant environmental harm that might be identified when considering an application
- 2.43 The Centre for Sustainable Development has recently published a good practice toolkit on benefits for communities, on behalf of the Renewables Advisory Board and DTI. Developers should follow the guidance in this toolkit when developing schemes in Cumbria. This builds on experience elsewhere in Europe where the provision of significant local benefits is built into the heart of wind energy developments. This may include community benefits, local taxes, creation of jobs and opportunities for local ownership. In the UK several developers have worked with the local community to provide them with voluntary contributions, often in the form of a community fund. The exact model followed and how the fund could be used for has varied across the UK. Developers could consider supporting the local community when engaging with community stakeholders and developing a

proposal, including opportunities for local cooperatives to purchase turbines as part of the development. This concept is supported and was pioneered in Cumbria. Experience should be taken from the Baywind scheme and its investment model. In addition financial contributions could support a range of other benefits, such as:

- site conservation and habitat creation
- improved footpath access
- job creation for site management/consideration initiatives
- educational visits to local schools/colleges
- grant funding for energy efficiency schemes

It should be noted that some of the above could be sought as part of a planning permission if they are considered relevant to the proposed development.

- 2.44 Although the current planning system does not support such community benefits as material planning considerations and the provision of community benefits is still voluntary it may help obtain community acceptance of a scheme, and reduce delays in the planning process due to community objections. In England community funds can be secured through a non planning legal agreement with a community group/trust. However, land management for biodiversity is a material planning consideration and could be agreed through a S106 agreement.

G5

The potential for community benefits should be explored with the local community and local planning authority.

- 2.45 More detailed advice can be found in the following resources:

- Delivering Community Benefits from Wind Energy Development Toolkit, Centre for Sustainable Energy, October 2006 www.cse.org.uk/cgi-bin/publications.cgi?publications
- Community benefits from wind power. A study of UK practice and comparison with leading European Countries, DTI 2005 www.dti.gov.uk
- Baywind Energy Cooperative www.baywind.co.uk

Cultural Heritage

- 2.46 The historic environment of Cumbria is one of the county's greatest assets. It includes a varied and beautiful landscape rich with a variety of monuments and diverse archaeology. The present landscape has been modified by man for over 10,000 years, helping to create the environment in which we live and work today. Archaeological remains could be vulnerable to destruction from wind energy schemes. When scoping and designing such development consideration needs to be given to potential effects on cultural heritage and the historic environment.
- 2.47 Designations of international and national importance currently include the World Heritage Site, Frontiers of the Roman Empire: Hadrian's Wall, St Bees Heritage Coast, North Pennines GeoPark, Grade I, II and II* listed buildings, conservation areas, registered historic parks or gardens, scheduled ancient monuments, and registered historic battlefields. The Lake District is currently under consideration for nomination as a World Heritage site and the National Parks and Areas of Outstanding Natural Beauty have cultural associations also.
- 2.48 For international and national designations and settings, schemes need to demonstrate that they would not compromise the objectives of the designation. If

any significant adverse effects on the qualities of the designation are identified the scheme would only be considered favourably if the harm is outweighed by an overriding need to meet local infrastructure needs and cannot be sited elsewhere, which is sited to minimise environment impacts and meets a high standard of design.

- 2.49 This guidance does not identify buffer zones around any international or national designations, but development proposed close to the boundaries of these designations will need to assess their effects on the their settings, including views associated with registered historic parks and gardens. Although PPS22 prevents the identification of buffer zones around international and national designations, World Heritage Sites can be more formally defined than other designations. This is the case for Frontiers of the Roman Empire: Hadrian's Wall which has been mapped and is linked to the Site's inscription on the World Heritage List. The effects of any scheme must be considered against this defined setting.
- 2.50 Experience suggests there is often flexibility in the design and siting of wind energy schemes which provides the opportunity to avoid direct damage to archaeological remains. However, when considering such issues, all other issues identified in this part of the guide also need to be taken into account. Any development should consider the effects it may have on the following aspects as part of the design and environmental assessment processes:
- Archaeological remains
 - Historic structures and buildings
 - Designed landscapes
 - Historic character and associations with the wider landscape
 - Designated and undesignated sites and areas
 - Effects on settings of significant designated and undesignated sites and areas
 - Effects on cultural landscapes such as National Parks and Areas of Outstanding Natural Beauty
- 2.51 Effects may occur through direct damage to any underlying archaeology from turbine foundations, access tracks, substation buildings and other associated structures. Development could also affect the settings of historic sites and compromise the visual amenity of a landscape. Due to the nature of wind energy developments they are often sited in open countryside, in high or exposed locations. Such areas may well be valued for their wildness, remoteness, tranquillity or well preserved historic remains and effects on these need to be assessed. Cultural features form part of the sensitivity analysis in the landscape capacity assessment in Part 2.
- 2.52 Developers are encouraged to contact the County Council's Historic Environment Records Section at an early stage of design to determine the extent of archaeological value of a site, and any potential impacts on the settings of historic buildings/remains/gardens and the wider landscape. In due course information will also be available from the Historic Landscape Characterisation work that is currently being undertaken.
- 2.53 In areas where particular sensitivities are expected, an archaeologist or historic specialist should form part of the design team and detailed surveys may be required. The EIA process, where required, should include an archaeological desk-based assessment of all the available documentary sources for the site together with a walkover survey. Depending upon the results of these surveys, it may also be appropriate to undertake an archaeological field evaluation comprising the

excavation of a series of trial trenches or the archaeological monitoring of any geotechnical test pits that may be dug, to allow for a fuller consideration of the presence/absence, nature, extent, quality and survival of archaeological remains within the development area. The design and siting of a scheme should avoid internationally and nationally important historic sites. If this is not possible mitigation measures will need to be explored. Conditions are likely to be attached to wind energy developments to ensure investigations are carried out during construction to record any archaeological value found on a site.

G6

An assessment of the effects of a proposal on international and national designations and their settings should be carried out. Negative effects should be reduced through appropriate mitigation.

2.54 Developers need to ensure they follow national guidance contained in:

- PPG15 Planning and the Historic Environment
- PPG16 Planning and Archaeology

These can be found at www.communities.gov.uk

2.55 Developers should also follow good practice advice contained in:

- Frontiers of the Roman Empire: Hadrian's Wall Management Plan www.hadrians-wall.org/WHS_management.aspx
- Wind Energy and the Historic Environment, English Heritage 2005, www.helm.org.uk

Highways and Rights of Way

2.56 The highways considerations associated with wind energy development are largely similar to those considered for other development. However, as stated in the design section later on in the guide, access to a site is an important consideration to ensure that the local network of roads can accommodate the large vehicles needed to transport the turbine components. Any scheme will need to satisfy the Highway Authority that it is acceptable.

2.57 An assessment of the full route to be used, including the site access, needs to be carried out in order to ensure that the road network can accommodate the loads and, where necessary, identify any measures that might be required. When considering such measures from a highway point of view consideration should also be given to any nature conservation interest on the route and landscape and visual effects. Cumbria has an extensive network of roadside verges of special nature interest and any effects on these should be assessed. More information on the roadside verges can be obtained from Cumbria County Council.

2.58 For public rights of ways care should be taken to ensure an adequate distance is provided between them and turbines. Fall over distance of a turbine is often considered an appropriate distance, but consultation with the local authority should be carried out to determine what is most appropriate on any scheme. The British Horse Society has recently issued new guidelines for bridleways that developers should take into account in any discussions.

G7

A formal transport assessment should be carried out for the route to a site and its access. When determining any improvement measure consideration should be given to biodiversity and landscape and visual effects.

The effect on all rights of ways and open access land should be considered and turbines should be sited at an appropriate distance from them.

Landscape and visual

- 2.59 Landscape and visual effects need to be considered when developing a wind energy development. Effects will vary depending on the size and number of turbines in a scheme, its location, the landscape characteristics and the sensitivity of view points or visual receptors. Effects may be minimised through careful siting and design.
- 2.60 This guidance contains detailed information on landscape and visual effects in Part 2. This level of guidance is included to provide an objective study on landscape capacity for the County and to ensure a strategic view can be taken on issues that can have an effect over several kilometres and a variety of landscapes.

Local Amenity

- 2.61 Noise and visual effects are widely agreed to be the main planning related issues that need to be considered with regard to local amenity. As visual effects are dealt with in more detail in Part 2, this section will only consider the issue of noise. Other local amenity issues could include shadow flicker and electromagnetic radiation, but any effects arising from these are rare and developers are guided to PPS22 Companion Guide for more advice on dealing with such issues.
- 2.62 Noise is produced from wind turbines in two ways:
- mechanically from the internal gearbox and generator, and
 - aerodynamically from the passage of the blades through the air.
- 2.63 Although it is commonly perceived that noise will cause an adverse impact on local amenity, well specified and designed schemes can be sited with sufficient distance from noise sensitive development to ensure increases in ambient noise levels are acceptable. Improvements in technology have significantly reduced the level of mechanical noise produced. The noise associated with most wind energy developments is usually low, and has been likened to the noise of wind in trees¹¹. It is also widely agreed that there will always be some background noise, even in rural areas, from farm machinery, local traffic, animals, the wind interacting with trees, and buildings etc.
- 2.64 When considering a proposal, developers should identify any noise sensitive development, such as residences, or quiet leisure based businesses, and carry out a noise assessment to determine whether or not there might be any potential impacts on them. In most cases, turbines can be sited at a suitable distance from such development so as not to cause undue harm. If this is not the case, developers should carry out design alterations to mitigate any unacceptable noise impacts. If necessary, the local planning authority may attach conditions to the consent for a scheme to ensure noise limits are not exceeded.
- 2.65 A noise assessment should be carried out against any existing background noise, in accordance with advice in the Companion Guide to PPS22 and ETSU-R-97 on

¹¹ PPS22 Companion Guide, P168, ODPM 2004

'The Assessment and Rating of Noise from Wind Farm'.¹² If, in the future, revised guidance is issued by the UK government on the assessment of noise, any development will be expected accord with this.

- 2.66 If consultation with the local community identifies that noise is a significant concern for a local community, developers could consider taking community members to visit one of the operational schemes in Cumbria.

G8

When determining the siting and design of turbines the proximity of noise sensitive developments must be considered along with appropriate mitigations to ensure that any turbine generated noise is at an acceptable level with other background noise.

A noise assessment must be carried out to ensure that any turbine generated noise is at an acceptable level with other background noise.

Developers must accord with guidance in

- PPG24 Planning and Noise
- The assessment and rating of noise from windfarms, ETSU-R-97, DTI:
<http://www.dti.gov.uk/energy/page21743.html>

More good practice advice can be found in the following resources:

- Guidelines for Community Noise World Health Authority:
www.who.int/docstore/peh/noise/guidelines2.html
- Health and Safety Executive Noise information: www.hse.gov.uk/noise

Local Economy

- 2.67 Consideration needs to be given to the local economy when developing a wind energy scheme. There is a diverse economy across Cumbria. Traditionally it has been characterised by manufacturing, agriculture, food processing, energy production, tourism, mining and quarrying. Some of these sectors, such as agriculture and manufacturing are in decline, but still make a significant contribution to the economy, whilst the service industries continue to grow.
- 2.68 Within Cumbria, economic benefits could arise for both the declining manufacturing and agricultural industries. Farmers could raise income from selling or renting land to commercial developers or by providing land for a community wind energy scheme. The manufacturing industries could benefit from providing components for the construction and maintenance of schemes. This has already been the case with the first offshore scheme near Barrow.
- 2.69 However, concerns are often raised by the local community with regard to potential adverse impacts on the local economy, and in particular the tourist economy. This accounted for 18% of total employment in 2005 and reflects Cumbria's high quality environment, landscapes and natural beauty. Concerns are often cited that any adverse impact to landscape character and visual quality could result in less people visiting Cumbria. Research is available to suggest that wind development could bring positive and negative benefits to tourism, however there is currently no evidence to suggest that the existing wind energy schemes in Cumbria, some of which have been built for a decade, have had a significant adverse economic effect on the tourist industry.

¹² And any subsequent revisions to this following research being undertaken by DTI in 2007 on the effects of aerodynamic modulation and health.

- 2.70 Consideration should also be given to employing local labour and using locally sourced and recycled materials, particularly for the construction of bases, access roads and other ancillary features. Investment could also be made in training the local workforce to help maintain developments over time. It is accepted that the interpretation of EU rules when tendering a scheme prevent a local preference, but steps should be taken to ensure local businesses are invited to tender for relevant aspects of a scheme.

G9

Developers should demonstrate the advantages and disadvantages for the local economy taking into account the local characteristics of the area and economy.

More advice on local resources can be found at:

- Envirolink North West www.envirolinknorthwest.co.uk/

Soils and Hydrology

- 2.71 Developers should consider the effect a scheme might have on the soils, hydrology and water quality of a site and its surrounding watercourses. Cumbria has areas of soils that can be easily harmed, be made unstable and that can take a long time to regenerate, such as peat. Disturbances to peat can release CO₂ into the atmosphere, however studies have shown that it is unlikely that this would be greater than the CO₂ saved by renewable energy production¹³.
- 2.72 Proposals that are being developed in areas with sensitive soils would need to demonstrate any harmful impacts and should avoid areas with such soil if they are identified as being of principal importance for the conservation of biodiversity¹⁴. It is important not to cause significant harm to the integrity of local watercourses as this could create harm to nature conservation interests in the vicinity of a proposal. Care needs to be taken when assessing such issues and should be included as part of the EIA or planning statement.

G10

Consideration should be given to effects on soils, hydrology and water quality in and around a site.

Development should avoid harming soils, hydrology and water quality that would negatively affect habitats of principal importance for the conservation of biodiversity, or other protected species or habitats.

Telecommunications

- 2.73 Developers need to consider the effects a scheme might have with radio signals, local TV reception and telecommunication systems as they have the potential to cause interference. This includes systems used by the police and emergency services.
- 2.74 Disturbance to TV reception may arise, particularly if wind turbines are sited between buildings and the local transmitter. Developers need to establish if this is likely to be the case and provide mitigation measures to reduce any negative impact. These might include the provision of satellite, cable or a more sensitive antenna to householders affected, repositioning of antennae to receive from a different source emitter, or the installation of a community re-broadcast facility. As technology advances and transmissions switch to digital TV then this issue may

¹³ Peat, Carbon Dioxide Payback and Windfarms, Renewable Energy Foundation, 2006

¹⁴ The list of habitats is available at www.defra.gov.uk/wildlife-countryside/habitats/habitats-list.pdf.

reduce further.

- 2.75 Many telephone and other communications systems rely on microwave radio links. These can be affected by wind turbines. The Office of Communications (OfCom) has information on licensed telecommunication systems and protects radio systems against interference. At the start of a scheme, developers are expected to contact OfCom to establish what systems might be affected by their proposal. Developers are also expected to contact all operators including the emergency services, such as police, ambulance, coastguard, fire and mountain rescue services, in an area to determine potential impacts and provide evidence of this to the local planning authority. Operators may impose a clearance zone around their systems or require re-routing to prevent interference. Generally careful micro-siting can mitigate against such impacts. Often the repositioning of a turbine by a few hundred metres can remove the interference. If this is not feasible, developers may be able to pay for the re-routing of a signal around a development. Conditions are likely to be attached to any consent to ensure the above issues are addressed during the construction phase. However, if negative impacts cannot be mitigated against it is unlikely approval will be given for a scheme. Again, as communications systems switch to digital links this issue may reduce.
- 2.76 There is often scope for the design and layout of a scheme to be amended to mitigate any adverse effects that might be identified from a technical evaluation of a site. However, care needs to be taken to ensure that other environmental impacts, and particularly landscape and visual impacts, are considered in tandem to this. Past experience has shown that technical constraints such as this often dictate the overall design and layout without equal regard being given to landscape and visual impacts, biodiversity and cultural heritage.

G11

Developers should contact OfCom at the outset of a project to determine any effects on telecommunications operators. This will assist with decisions on the final siting and design of a scheme and help identify any mitigation necessary.

Further guidance can be obtained from Ofcom by contacting windfarmenquiries@ofcom.org.uk

PART 1

SECTION 3

GUIDELINES FOR CUMULATIVE EFFECTS

3 Guidelines for Cumulative Effects

The importance of cumulative effects

- 3.1 Cumulative effect is a complex issue that will be increasingly relevant to the assessment of wind energy schemes. As there are already a number of wind energy developments across Cumbria, it is likely that increasing significance will be attached to cumulative effects in the future.
- 3.2 Although the geographic distribution of schemes in Cumbria is becoming more widespread (see Map 2), the focus of more and larger developments towards areas that have the best wind resource and the fewest technical constraints continues particularly across the Solway Basin/ West Cumbria and in Furness. Recent trends suggest that interest will increase in the Lune and Eden Valleys and around the Lake District National Park boundary. The combined effect of onshore schemes with offshore schemes also needs to be considered in coastal areas. Cumulative effects should also be considered with neighbouring areas outside Cumbria.
- 3.3 Cumulative effects may present an eventual limit to the extent of wind energy development in particular areas. PPS 22 firmly states the need to take account of cumulative impacts and it notes that: “*Such impacts should be assessed at the planning application stage and authorities should not set arbitrary limits in local development documents on the number of turbines that will be acceptable in particular locations*”. Such effects would need to be demonstrated. The case could arise where it can be demonstrated that cumulative effects are unacceptable and may, on its own, provide sufficient justification to refuse a scheme that is otherwise acceptable. Equally it could be demonstrated that new proposals could be located in proximity to other schemes without causing adverse cumulative effects.
- 3.4 The consideration of cumulative effects can only be undertaken on a case by case basis in the light of existing baseline conditions, accurate descriptions and visualisations of effects on key receptors, and relationships with other developments. These are impossible to predict at a broader level. This Guidance does not stipulate separation distances or the number of schemes that might be accommodated in the County as these are likely to vary depending on the details of a scheme and the issue being considered, such as landscape character or nature conservation interest.

What are Cumulative Effects?

- 3.5 Cumulative effect may occur as a result of more than one scheme being constructed and is the combined effect of all the developments, taken together. This may be in terms of their effect on landscape and visual amenity, bird populations and other wildlife, the historic environment, the local economy or any other matter. This section provides general advice that applies to a range of issues. More detailed advice on landscape and visual cumulative effects is contained in Part 2.
- 3.6 Where a scheme is being proposed in an area with another proposed, consented or operational scheme a cumulative assessment should be carried out to determine the overall effect on issues such as landscape character, visual amenity and nature conservation interest.
- 3.7 Scottish Natural Heritage has developed considerable experience in dealing with the cumulative effects of wind energy development and has published guidance dealing with this issue¹⁵. An earlier version of this informed the Companion Guide to PPS22¹⁶ and it is considered appropriate to draw on definitions from both of these sources. The advice in this section should be used to guide any cumulative impact assessment

¹⁵ Scottish Natural Heritage Guidance: Cumulative Effect of Windfarms, Version 2 revised 13.04.05
¹⁶ Planning for Renewable Energy: A Companion Guide to PPS22, ODPM 2004

carried out by developers.

G12

The cumulative effects should be assessed for all relevant planning issues set out in section 2:

- **Within an area already containing one or more operational or approved developments**
- **As an extension to an operational or approved development**
- **At the same time as one or more other developments are being proposed through a planning application within an area.**

Cumbria's experience

- 3.8 During the last decade the wind resource in and around Cumbria has been tapped by over 20 on and offshore schemes. There has been a marked clustering of schemes in areas with the highest wind resource, but this may change in the future as technology enables schemes to be built in areas with lower wind speeds. The following text highlights the range of issues that might need to be assessed as new scheme come forwards in these areas.

Solway Basin and West Cumbria

- 3.9 Across the Solway Basin and West Cumbria coastal belt considerable interest has focused on a sequence of landscape types from coastal margins and urban fringe through low rolling farmland to moorland and upland fringes. Cumulative issues affect landscape and seascape character across a substantial area between Carlisle and Whitehaven, some 50km long. A total of ten onshore schemes (61 turbines), from twin turbine to small wind farm size, have already been built or have planning approval. In addition there are seascape character effects arising from these and a scheme of 60 turbines, 12km offshore, at Robin Rigg. Several more onshore schemes are currently under consideration with scoping opinions being sought from prospective developers. . In a recent appeal decision the inspector recognised the perception that the Solway, on and offshore, is playing host to a significant number of wind turbines and “approaching the stage where the character across a number of types is shifting towards a distinct change”¹⁷. Some argue for a broader policy look at the environmental capacity of this area bounded by highly sensitive landscapes and nature conservation areas and species of international and national value, such as Frontiers of the Roman Empire: Hadrian’s Wall World Heritage Site, the Solway Coast AONB, Lake District National Park, St Bees Heritage Coast, Special Areas of Conservation, Special Protection Areas and protected species such as Hen Harriers.
- 3.10 Multiple developments across this area also raise issues of cumulative effects on visual amenity in respect of residents and tourists. Lower lying parts are heavily populated with a dense pattern of settlements and there is a need to ensure that schemes do not become too dominating or overbearing. The setting of Workington, already substantially surrounded by turbines, is an obvious example of this. However the sense of scale and character of smaller settlements and amenity of residents within them could be vulnerable. The experience of tourists in terms of both sequential views from routes such as Cumbria Coastal Way as well as static viewpoints from resorts, holiday parks and viewpoints need consideration. Prospects from popular open or elevated routes and viewpoints are particularly sensitive such as Hadrian’s Wall Trail and outer fell tops within the Lake District National Park.

¹⁷ Appeal Decision APP/G0908/A/05/1172183: Land at High Pow Farm, Bolton New Houses, Wigton

3.11 The high wind resource and proximity to the 33kv power lines provide good technical conditions for wind energy development along the coast. Developers will need to consider how best to design and site new schemes to be compatible with the characteristics of older schemes.

3.12 Issues that will need careful consideration by developers include:

- capacity for character change
- effects on international and national designations including landscape, nature and historic environment
- settings of international and national designations
- whether developments are overbearing/dominant
- effects on residents and visitors
- compatibility of small and larger newer turbines
- seascape character effects

Furness

3.13 In Furness the existing onshore pattern is a more clustered one focused on the open coastal urban fringe and moorland areas of this exposed peninsula, covering an area approximately 25km across. A total of five onshore schemes (32 turbines), of up to small wind farm size, have been built. A 30 turbine scheme is operational 7km offshore from Barrow and another hybrid gas and wind scheme has consent 7km off Walney Island. Three more offshore schemes are under consideration around 14.5km offshore, and interest in onshore schemes is set to continue. Cumulative effects that should be considered include skyline clutter, seascape capacity and effects on bird interests linked to the international and national nature conservation interests in the area. The coastal horizon naturally draws the eye in any peninsula landscape and onshore schemes on the coast, together with large offshore schemes, could result in a substantial portion of the horizon being developed. Any further schemes on the open moorland need to make sure they don't compromise the positive functional and sculptural image of the existing developments which are sufficiently spaced to form distinctive focal points in this open landscape. Picturesque estuarine compositions with fells in the Lake District National Park could be vulnerable as well as the sense of remoteness and wildness of dune belts and moorland.

3.14 Multiple developments here also raise the issue of cumulative effects on the visual amenity of residents and visitors. In an area striving to develop its tourism potential cumulative effects on views from popular coastal routes and attractions as well as the southern gateway into the Lake District National Park need serious consideration.

3.15 Issues that need careful consideration by developers include:

- effects on international and national designations including landscape, nature and historic environment
- settings of international and national designations
- effects on tourist experience
- skyline clutter
- maintaining sense of remoteness
- maintaining spacing between existing on/offshore schemes

- seascape character impacts

Lune Valley

3.16 Interest has also focused on the South Cumbria Low Fells with a string of applications west of the Lune Valley, and increasingly west of the Eden Valley. So far only one scheme has been successful on the fringes of the Lune Valley; 5 turbines at Lambrigg Fell. Further interest in this area is expected. The area of potential cumulative effects extends across the county border into Lancashire, stretching approximately 40km in total between Tebay and the existing development on Caton Moor, near Lancaster. Again skyline clutter is a key cumulative issue in the open receiving fells and moorland areas. Valley rims are especially sensitive in relation to scenic and relatively tight valley landscapes of the Lune and the setting of villages and towns within it such as Tebay, Sedbergh, Kirkby Lonsdale. Consideration of cumulative effects on the sense of remoteness and unspoilt qualities of the receiving uplands and the setting of adjacent national parks and prospects from them is also essential. This includes the views westwards from the Howgill Fells within the Yorkshire Dales National Park. This area also includes international and national nature conservation interests that should be considered.

3.17 Issues that need careful consideration by developers include:

- effects on international and national designations including landscape, nature and historic environment
- settings of international and national designations
- skyline clutter
- sensitivity of valley rim
- sense of remoteness

Greystoke and Inglewood

3.18 There has been growing interest recently in the area of limestone foothills and intermediate farmland fringing the north-eastern fells of the Lake District National Park. Two schemes at Lamonby and Skelton are awaiting decisions. Apart from the busy M6 and A66 corridors, along the western and southern boundaries, this area is relatively unspoilt with a peaceful backwater quality. Multiple developments could compromise these rural qualities. In the Inglewood area there may be some opportunity to complement repetitive patterns of geometric fields and shelterbelts. Developments might also correspond to character and occasional occurrence of other manmade verticals, such as the Skelton masts and electricity pylons, provided adequate separation ensures they have a simple image and visual conflicts of form and pattern with these existing verticals are avoided. However multiple developments across the more open and elevated foothills around Greystoke raise issues of visual clutter. Cumulative effects in respect of tourism and recreation should also be considered. Sequential views from the A66 north eastern 'gateway' into the northern Lake District National Park and the coast to coast national cycle route (NCR 71) demand consideration.

3.19 Issues to be considered include:

- effects on international and national designations including landscape, nature and historic environment
- settings of international and national designations
- relationship to repetitive patterns

- visual clutter
- impacts on recreation and tourism

Other areas within Cumbria

3.20 Although the above areas reflect the current experience of wind energy development in Cumbria it does not refer to all land within Cumbria. However, if in the future development extends beyond the above areas cumulative effects will need to be addressed in relation to both landscape and visual effects and other environmental, social and economic effects. The issues highlighted above may be relevant to these other areas, and other issues may become important.

Judging the acceptability of cumulative effects

- 3.21 This guidance does not seek to set thresholds that determine when cumulative effects are unacceptable. The local planning authority will need to make a judgement for each individual scheme following careful consideration of the information provided by a developer. When judging acceptability of a new proposal it is crucial to determine the “threshold” beyond which wind energy developments in a particular area become unacceptable. In other words, although the effect of a single scheme is limited, when added to the effect of other schemes in the area, operational, approved or proposed, it creates unacceptable cumulative impacts¹⁸. This information should be included as part of the Environmental Impact Assessment, where relevant, or be set out in a planning statement.
- 3.22 In order to meet government targets for renewable energy and help reduce negative climate change impacts multiple schemes may need to be accepted as a defining characteristic in some of Cumbria’s landscapes. However, landscape and visual effects, effects on certain bird populations, such as Hen Harriers, and other planning issues might limit the amount of wind energy development that can take place in some parts of Cumbria, unless overriding social, economic or environmental benefits are demonstrated.

G13

The limiting threshold for cumulative effects and wind energy developments should be based on a well-considered judgement informed by analysis of:

- **Degree or magnitude of change to an area, feature or species and the nature of the potential change reflecting the inherent sensitivity of the effected area, feature or species.**

¹⁸ Scottish Natural Heritage Guidance: Cumulative Effect of Windfarms, April 2005

PART 1

SECTION 4

GUIDELINES FOR SITING AND GOOD DESIGN

4 Guidelines for Siting and Good Design

Why is this important?

- 4.1 It is important for any scheme to take into account the full range of issues associated with wind energy development when determining site selection and the best design for a proposal.
- 4.2 The process of site selection, design and mitigation should be an iterative process informed by and responding to an ongoing environmental assessment. The full range of planning issues set out in section 2 should be considered by a developer, alongside economic and technical requirements from the outset of a project and throughout each stage of its development. However, economic and technical issues associated with wind energy development, such as the wind resource in the area and the cost of developing a project, are not material planning considerations and would not be taken into account when making a decision.
- 4.3 Part 2 provides more detailed guidance on siting and design with regard to landscape/townscape character and visual characteristics. It is considered important to focus on the landscape and visual impacts of wind energy developments in more detail due to their unique characteristics:
- prominently vertical,
 - significant movement
 - relative unfamiliarity in parts of Cumbria.

They are frequently located in open areas where they are highly visible and it is normally unrealistic to seek to conceal them. Individually or in groups, they will create distinctive features in the landscape.

Site Selection and Initial Sizing

- 4.4 When appraising a potential site's suitability and to help determine the most appropriate size and number of turbines it could accommodate the following issues will be considered by a developer at the outset:
- Can the site fit sufficient wind turbines to optimise energy production?
 - Is the site windy enough?
 - Is there grid infrastructure near the site?
 - Will large delivery vehicles be able to gain access to the site?
 - Is there enough distance between a site and dwellings, rights of way, roads?
 - Are aircraft, radar and telecommunications issues likely to arise?
 - Are there archaeological designations/sensitivities associated with the site?
 - Are there ecological designations/sensitivities associated with the site?
 - Are there landscape designations/sensitivities associated with the site and what is the landscape capacity?

The first three issues listed above are important technical issues that the developer will need to consider when determining the viability of a site. However, they are not relevant planning issues and will not be considered by the planning authority when it assesses an application. The effect of the development on the other issues will be considered fully by the planning authority.

G14

Developers should confirm the acceptability of a specific site and the appropriate size and number of turbines through a preliminary analysis of technical, environmental and local amenity issues.

Infrastructure and Ancillary Development

- 4.5 Infrastructure and ancillary development, including road access, foundations, transformers and substation buildings, fencing and electrical connections could effect a range of environmental issues. Sensitive vegetation and soil types such as heather, semi-natural grassland or peat may not readily recover from construction disturbance and could be vulnerable in both ecological and landscape terms. On sensitive soils such as peat ongoing consequences may arise from erosion or disruption to the integrity of natural drainage patterns.

G15

The effects of infrastructure need to be assessed as part of the overall design process in response to findings of more detailed environmental assessment.

Road access

- 4.6 Road access to a site needs to be able to accommodate trailers carrying the longest loads (blades are up to 45m long) as well as the heaviest and widest loads (generally cranes of 30 tonnes plus). In some rural locations these requirements can lead to significant 'indirect' impacts through the need to widen lanes (typically to 6m) or ease bends, necessitating in some cases the removal of boundary features such as stone walls or hedges or loss of roadside verges. These alterations may be left in place for the life span of the development or conditions may seek temporary remediation as there will be a requirement to reach the site for decommissioning, and possibly for repairs in the case of major component failure. This aspect should be considered at the start of the project.

G16

The effects of changes to roads and site access should be assessed throughout the lifetime of the development (construction, operation and decommissioning). Detail the nature and lifespan of any modifications to existing roads in the planning application and Environmental Statement.

- 4.7 On-site access tracks need to be constructed carefully, but need to meet the same weight and dimensional requirements as above. They are typically 5-6m wide. It may be possible to reduce some in width after construction (typically to 3-4m) sufficient to facilitate light maintenance vehicles however full width will inevitably be required as described above. Effects are likely to be greater where they have to negotiate steep slopes requiring zig zag routes, cut and fill and drainage channels above the track; or on cross wet marshy ground where more extensive foundations are likely to be required. They are also likely to be more visible in open featureless landscapes such as moorland. Access points to sites require large bell mouth entrances and appropriate visibility splays which will often involve the realignment of hedges or walls. Consideration of archaeology, ecology, hydrology and landscape and visual effects must also be taken into account as part of the design, during construction and the decommissioning phases of any development. Issues such as surface water run-off, negative impacts on sensitive soils and vegetation could be affected by a scheme.

G17

The effects of on-site access should be assessed throughout the lifetime of the development (construction, operation and decommissioning).

Bases

- 4.8 All wind turbines need to be mounted on reinforced concrete bases. These are likely to be left in situ once the development is decommissioned. As turbines become larger, these bases have increased in size and are now typically around 16-17m in diameter by 2-3m deep. Temporary features include a construction compound and hard standings next to each turbine which act as bases during turbine erection and component lay down areas (typically 50 x 50m). Although temporary they still have implications on sensitive soils and vegetation.

Transformers/Substations

- 4.9 Ancillary elements have the potential to compromise the design of a development and care is needed to minimise adverse effects on biodiversity and cultural heritage that might be associated with a site.

Electrical connection

- 4.10 Responsibility for the routing and design of the electrical connection from the site sub-station to the local electricity distribution network lies with the electricity Distribution Network Operator (DNO). This will be achieved by overhead power lines mounted on single or double poles or by lines laid underground. Since the latter are 6-20 times more expensive¹⁹ they may only be used for limited lengths or in special circumstances. The effects of connections should be regarded as material to the overall scheme design. Under grounding such power lines is preferable in landscape and visual impact terms, however, other environmental effects must also be considered when determining the best approach to take for a scheme. Infrastructure and ancillary developments should be carefully considered as part of the overall design of a scheme, using the following good practice principles:

G18

- **avoid sensitive soils and vegetation, eg peat bogs, heathers, grassland**
- **avoid changes with a negative impact on local hydrology**
- **provide construction and reinstatement method statements on sensitive sites**
- **integrate the layout with the grain of the topography/land patterns**
- **utilise existing tracks and access points**
- **minimise the length of tracks**
- **protect features such as trees or archaeological remains**
- **reinstate track verges with appropriate vegetation**
- **finish surface tracks to blend in with surroundings**
- **reduce extent and width of tracks after the construction phase**
- **remove tracks on decommissioning and reinstate appropriate vegetation**
- **locate and design ancillary elements in a way that minimises visual clutter**

¹⁹ Planning for Renewable Energy: A Companion Guide to PPS22, OPDM 2004

- utilise existing landform and vegetative cover to screen ancillary structures
- site and design the sub-station to appear as a simple element separated from the main development and characteristic of the receiving landscape
- enter into planning obligations to minimise the impact of consequential off-site electricity connections which could otherwise be severe

Mitigation, enhancement and compensation

- 4.11 Mitigation will primarily be achieved through careful siting and an iterative design process following the guidance above. However, in some cases it may not be possible to mitigate on site, and secondary mitigation measures may be employed to address residual impacts. These could include off-site planting to screen specific receptors or provide a compensatory habitat if a loss is likely as a result of a development. Experience has shown that wind energy developments present opportunities for enhancing both the development site and land outside the site, for example through restoration of hedgerows, stone walls and restoration and management of habitats such as heather moorland. When considering a planning application if appropriate mitigation, compensation or enhancement does not form part of the proposal, conditions may be attached to secure them and enable a development to go ahead.

G19

Consider environmental enhancement and compensation measures with reference to land management guidance set out in the Cumbria Landscape Strategy and, the Cumbria Biodiversity Action Plan.²⁰

Decommissioning and Site Restoration

- 4.12 Planning consent will require sites to be decommissioned following cessation of energy production. Restoration of a site should be considered as part of the decommissioning process. Details should be included within a planning application and should consider the pre development characteristics of the site and the landscape and nature conservation aims and objectives of the area.

G20

Consider restoration measures with reference to land management guidance set out in the Cumbria Landscape Strategy, the Cumbria Biodiversity Action Plan and other relevant guidance.²¹

²⁰ Cumbria Landscape Strategy, Cumbria County Council 1998, Cumbria Biodiversity Action Plan, Cumbria Biodiversity Partnership 2001.

²¹ Cumbria Landscape Strategy, Cumbria County Council 1998, Cumbria Biodiversity Action Plan, Cumbria Biodiversity Partnership 2001.

5 Description of a typical wind energy development and turbine

Wind turbines produce electricity by using the natural power of the wind to drive a generator. The wind is a clean, sustainable and free fuel source, it does not create emissions and it will never run out as it is constantly replenished by energy from the sun.

Wind energy development is characterised by one or more wind turbines. The average size of an onshore wind turbine installed in 2005 was approximately 2 MW. Wind turbines have an average working life of 20-25 years, after which the turbines can be replaced (repowering) with new ones or be decommissioned.

Utility scale turbines commonly average at between 70 – 125m in height when measured from the ground to the tip of an upright blade. The blades rotate around a horizontal hub. The hub is connected to a gearbox and generator, which are located inside the nacelle. The nacelle houses the electrical components and is mounted at the top of the tower. This type of turbine is referred to as a 'horizontal axis' machine.

An individual wind turbine will generate electricity for 70-85% of the time and its electricity output varies between zero and full output in accordance with the wind speed. The power available from the wind is a function of the cube of the wind speed. Therefore if the wind blows at twice the speed, its energy content will increase eight-fold. Turbines at a site where the wind speed averages 8 m/s produce around 75-100% more electricity than those where the average wind speed is 6 m/s.

Where there is more than one turbine, and particularly in a rural setting, they are linked together by access tracks. Ancillary infrastructure usually include crane hard standings during construction, a small single storey switch gear building, an anemometer mast to measure wind speed, and cables to transport the electricity to the electricity network.

Typical wind turbine features

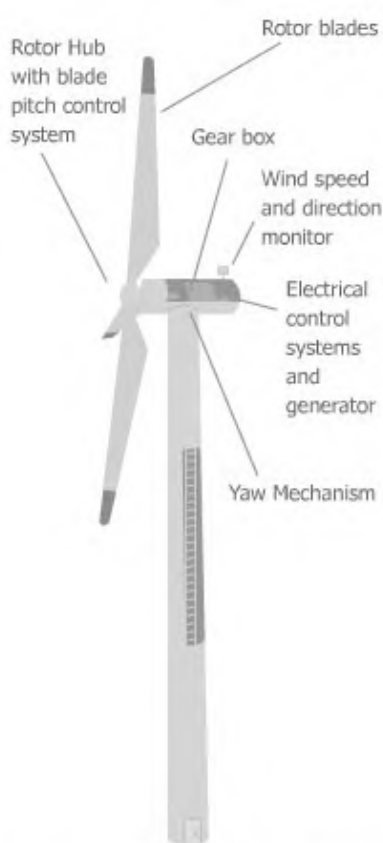


Figure 1 Diagram of a typical wind turbine

Rotor diameters range up to 80 metres, smaller machines (around 30 meters) are typical of the earlier turbines erected in Cumbria.

Blades are made of a fibreglass-reinforced polyester composite.

The blades can rotate at 10-30 revolutions per minute at constant speed, although an increasing number of machines operate at a variable speed.

Most wind turbines start generating electricity at wind speeds of around 3-4 metres per second (m/s), (8 miles per hour); generate maximum 'rated' power at around 15 m/s (30mph); and shut down to prevent damage at 25 m/s or above (50mph).

When the wind changes direction, motors turn the nacelle, and the blades along with it, around to face into the wind. The blades also 'pitch' or angle to ensure that the optimum amount of power is extracted from the wind.

Towers are mostly cylindrical and made of steel, though Lattice towers have been used in the past. Towers range from 25 to 75 meters in height. The height of the tower is usually referred to as height to hub.

Stand alone turbines usually range in capacity from a few hundred kilowatts to over 2 megawatts, with 5 Megawatt turbines in production. However, no power plant permanently operates at 100% of its capacity. The capacity factor of any power plant is the percentage of its generation against its theoretical maximum output. Were a 2MW turbine to be power limited to 1 MW; (becoming a 1 MW machine), the capacity factor would go up by 20%. The turbine however would deliver less energy, displace less carbon and have the same energy cost and environmental impact to build. Therefore, in the case of wind energy, where there are no fuel costs, capacity factor is not a reliable measure of efficiency.

The crucial parameter for energy output is the diameter of the rotor blades - the longer the blades, the larger the area 'swept' by the rotor and the greater the energy output.

Text adapted from information from the BWEA and the diagram is reproduced with its permission.

Map 1 Wind speed

Map 2 Wind development sites

Map 3, 4, 5 & 6 International & national wildlife sites

7 Glossary

Climate Change

A process of changes to weather patterns and temperatures largely caused by the emission of certain 'greenhouse gases' from earth, principally associated with the burning of fossil fuels.

CO₂ Carbon Dioxide

The main greenhouse gas formed by the combustion of all fossil fuels.

Compensation

The measures taken to offset or compensate for adverse effects that cannot be mitigated, or for which mitigation cannot entirely eliminate adverse effects.

Cumulative Effects

This is the result of more than one scheme being constructed and is the combined effect of all the developments, taken together. This may be in terms of their effect on landscape and visual amenity, bird populations, other wildlife, the local economy, tourism etc.

Energy Conservation

The reduction of energy consumed usually achieved by changing habits or patterns of use and not requiring significant investment.

Enhancement

To improve the quality of an area affected by a development.

Environmental Impact Assessment

The process used for describing, analysing and evaluating the range of environmental effects that are caused by a wind energy proposal.

Environmental Statement

The document supporting a planning application that sets out the findings of the Environmental Impact Assessment.

Greenhouse Gases

The six main gases contributing to climate change found in the upper atmosphere. They prevent some energy being re-transmitted into space. The gases include carbon dioxide CO₂, methane CH₄, nitrous oxide N₂O, hydroflourocarbons, perfluorocarbons and sulphur hexafluoride SF₆.

Landscape*

Human perception of the land conditioned by knowledge and identity with a place.

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 Capacity Assessment

The process of describing, analysing and evaluating the landscape capacity of an area.

Landscape Character

A distinct pattern or combination of elements that occurs consistently in a particular landscape.

Landscape Character Classification

The process of describing, classifying and analysing the character of landscape reflecting the distinct pattern or combination of elements that occurs consistently in a particular

landscape.

Landscape Sensitivity*

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

Landscape Value

The relative importance that stakeholders attach to a landscape for a variety of reasons including scenic quality, perceptual aspects such as wildness, remoteness or tranquillity that contribute to a sense of place, rarity, presence and influence of other conservation interests and special cultural associations.

Mega Watt

A watt is an electrical unit of power. A mega watt is a million watts.

Micro-generation

Very small scale power generation schemes, typically providing energy to a single household/office.

Mitigation

Measures, including any process, activity or design to avoid, reduce or remedy adverse effects of a development proposal.

Offshore

Location on the sea bed, below the mean low tide level, for a number of prospective renewable energy sources including wind, tidal and wave.

Ramsar Sites

Wetlands of international importance designated under the Ramsar convention 1971, which requires signatory countries to protect international important wetlands, especially those used by migratory water birds, and to use wetlands wisely.

Renewable Energy

Collective term for energy flows that occur naturally and repeatedly in the environment. It includes energy derived by the sun, such as wind, solar hot water, solar electric (photo-voltaics), hydro power, wave, tidal, biomass, biofuels, and from geothermal sources, such as ground source heat pumps. Energy from waste is not regarded as a renewable energy as it is not capable of being renewed by the natural ecological cycle.

Wind Energy Development

Development consisting of one or more wind turbines, access tracks, ancillary buildings, substation, anemometer masts and supporting infrastructure.

Zone of Visual Influence

The area within which a proposed development may have an influence or effect on visual amenity.

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

Abbreviations

AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
CO ₂	Carbon Dioxide
EIA	Environmental Impact Assessment
LCA	Landscape Capacity Assessment
LDD	Local Development Documents
LDNPA	Lake District National Park Authority
MW	Mega Watt
PPS	Planning Policy Statement
RSS	Regional Spatial Strategy
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
ZVI	Zone of Visual Influence

8 Appendix 1

Policies relevant to the Supplementary Planning Document

Allerdale Borough Council, Cumbria County Council, Eden District Council and the Lake District National Park Authority have adopted this SPD against the following policies of the Cumbria Joint Structure Plan 2005-2016:

Policy R44:

Renewable energy outside the Lake District National Park and AONBs

Outside the Lake District National Park and AONBs proposals for renewable energy, including any ancillary infrastructure or buildings will be favourably considered if:

1. there is no significant adverse effect on the landscape character, biodiversity and the natural and built heritage of the area either individually or cumulatively through their relationship with other utility infrastructure,
2. there is no significant adverse effect on local amenity, the local economy, highways or telecommunications,
3. the proposal takes all practicable measures to reduce any adverse impact on landscape, environmental, nature conservation, historical and local community interests.

In considering applications for planning permission in relation to the above criteria, and other policies in this plan, the environmental, economic and energy benefits of renewable energy proposals should be given significant weight. There are additional requirements in the following cases:

Wind energy development

4. measures should be included to secure the satisfactory removal of structures/related infrastructure and remediation of land following cessation of operation of the installation.

New plant for the commercial generation of energy from biomass

5. shall be sited on existing industrial/employment sites or previously developed land that is well related to the resource catchment. Where practicable, measures to transport fuel and waste by water or rail shall be made.

Proposals for the recovery of energy from agriculture waste within existing farm units or sewage sludge

6. shall be well related to the activity, scale and character of the existing business enterprise and/or setting.

Policy R45:

Renewable Energy in the Lake District National Park and AONBs

Within the Lake District National Park and AONBs, proposals for renewable energy developments, including any ancillary infrastructure or buildings will be favourably considered if:

1. their scale, form, design, materials and cumulative impacts can be satisfactorily assimilated into the landscape or built environment and would not harm the appearance of these areas, and
2. they would not impact adversely on the local community, economy, nature conservation or historical interests.

In the case of wind energy, the development of more than one turbine or of a turbine with a ground to hub height of 25 metres or more is unlikely to be acceptable.

Carlisle City Council has adopted this SPD against policy CP8 of the Carlisle District Local Plan 2001-1016.

**Policy CP8:
Renewable Energy**

Proposals for any renewable energy will be favourably considered provided that all of the following criteria are satisfied:

1. there is no unacceptable visual impact on the immediate and wider landscape and townscape;
2. there is no adverse impact on biodiversity;
3. any new structures would be sensitively incorporated into the surrounding landscape/townscape and/or habitat and respect the local landscape character;
4. measures are taken to mitigate any noise, smell or other nuisance or pollutants likely to affect nearby occupiers, amenities and/or neighbouring land uses;
5. any waste arising as a result of the development is minimised and dealt with using a suitable means of disposal;
6. there would be no unacceptable levels of harm to features designated as of local, national or international importance;
7. adequate provision can be made for access and parking and the potential impact on the road network;
8. there would be no unacceptable conflict with any existing recreational facilities and routes;
9. there would be no unacceptable cumulative effects when proposals are considered together with any extant planning approvals or other existing renewable energy developments.

Copeland Borough Council have adopted this SPD against the following policies in the Copeland Local Plan

**Policy EGY 1:
Renewable Energy**

Proposals for any form of renewable energy development must satisfy the following criteria:

1. That there would be no significant adverse visual effects
2. That there would be no significant adverse effects on landscape or townscape character and distinctiveness
3. That there would be no adverse impact on biodiversity
4. That proposals would not cause unacceptable harm to features of local, national and international importance for nature or heritage conservation
5. That measures are taken to mitigate any noise, smell, dust, fumes or other nuisance likely to affect nearby residents or other adjoining land users

6. That adequate provision can be made for access, parking and any potentially adverse impacts on the highway network
7. That any waste arising as a result of the development would be minimized and dealt with using a suitable means of disposal
8. There would be no adverse unacceptable conflict with any existing recreational facilities and their access routes
9. That they would not give rise to any unacceptable cumulative effects when considered against any previous extant planning approvals for renewable energy development or other existing/approved utility infrastructure in the vicinity.

Developers are expected to actively consult with local communities in developing their proposals and to deliver significant benefits to the community where the scheme is to be sited wherever possible.

Policy EGY 2: Wind Energy

Proposals for wind energy developments will be considered against the criteria of Policy EGY 1 with the additional requirement that:

There would be a scheme for the removal of turbines and associated structures and the restoration of the site to agriculture when the turbines become redundant.

South Lakeland District Council have adopted this SPD against the following policies of the South Lakeland Local Plan

Policy C26 Wind Energy

The acceptability of wind energy developments will be judged according to whether the number, size and design of proposals can be shown to satisfy the following criteria:

- (a) the proposal's energy contribution and other benefits outweigh any significant adverse impact on:
 - 1) the character and appearance of the landscape, nature conservation, archaeological or geographical interests;
 - 2) the amenity of residential properties by reason of visual impact, noise, shadow flicker or reflected light;
- (b) the proposal would not have a significant adverse impact on any nationally important landscape designation, including their visual amenity and setting;
- (c) the proposal would not cause significant damage to a site of international or national nature conservation importance;
- (d) effective measures are available to overcome any significant electromagnetic interference to transmitting or receiving equipment;
- (e) all power lines are placed underground or do not appear prominent in the landscape;
- (f) adequate access for construction traffic is available or could be provided without harm to highway safety, visual amenity or nature conservation interests;
- (g) the cumulative effect of the proposal, with existing, permitted or other proposed wind energy schemes, should not have a significant adverse impact on the character and

appearance of the area;

- (h) realistic proposals are in place for the removal of redundant wind turbines and the restoration of the site.

In assessing the proposals against the requirements of this policy, full account will be taken of proposed mitigating measures.

Policy C31

Cumulative Impact of Renewable Energy Projects

Assessments of new proposals for renewable energy developments shall take account of the cumulative effect of the development on the area if other similar renewable energy projects have been permitted within the same area.

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CUMBRIA WIND ENERGY SUPPLEMENTARY PLANNING DOCUMENT

Part 2

Landscape and Visual Considerations



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PART 2

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PART 2

SECTION 1

GUIDELINES FOR LANDSCAPE AND VISUAL ISSUES

1 Guidelines for Landscape and Visual Issues

Cumbria's Landscape Character and Capacity

- 1.1 Part 2 provides specific guidance on landscape and visual issues. For many other environmental and planning issues protection is provided through legislation, ie for protected species and habitats, and more detailed information is available from a range of sources to assist developers with assessing the potential effects of such issues. Key information sources are listed under each relevant section in Part 1. However, this is not considered to be the case when dealing with landscape and visual issues. A strategic landscape capacity assessment has been developed by Coates Associates. This did not exist elsewhere and is an important resource, providing baseline information to help determine the appropriate size and locations for new wind energy development across the County.
- 1.2 Landscape and visual issues are focussed on in this Part of the guidance because they continue to be important in all parts of the county, can cause significant controversy, and can be more difficult to mitigate against than other issues due to the general characteristics of wind turbines.
- 1.3 The guidance in this part covers both rural and urban areas. It contains the findings of the Landscape Capacity Assessment, guidance for siting, design and cumulative effects for landscape and visual issues and advice on carrying out a landscape and visual impact assessment (LVIA). It complements the guidance set out in sections 2, 3 and 4, Part 1 for other planning issues and should be read in conjunction with them. Key landscape guidance (LG) is highlighted in bold and the landscape capacity is summarised in Table 1.1 (LC).
- 1.4 When designing a wind energy scheme it is important for developers to employ landscape professionals to assist in determining the best site, size and layout for scheme and to carry out a landscape and visual impact assessment. The guidance contained in this part of the SPD should inform any such decisions.

Aims of the Landscape Capacity Assessment

- 1.5 A landscape capacity assessment has been carried out for each of the main landscape types in Cumbria. This considered the specific landscape characteristics that are sensitive to wind energy development along with their value. This enabled the potential capacity for each character type to be determined. This
 - indicates the relative capacity of the County's landscapes to accommodate wind energy development, and
 - defines the landscape criteria used to judge capacity.
- 1.6 This guidance aims to help developers when carrying out initial investigations to determine the possible capacity of a site to accommodate wind energy development. It intends to take a proactive approach to development, guiding it to the most appropriate locations and ensuring that the key characteristics and quality of Cumbria's landscapes are safeguarded.
- 1.7 However, it only provides an indication of the relative capacity of different landscapes. It should not be used in a definitive sense, ie to mean that a particular proposal would be acceptable or unacceptable on any given site. Every site is unique, and any proposal involving 2 or more wind turbines or those with a hub height exceeding 15m must be accompanied by an Environmental Impact

Assessment that includes a detailed landscape and visual impact assessment following to the guidance set out in section 3, Part 2. For other schemes below this threshold the effects of the proposal should be included in a planning statement.

Landscape Character

- 1.8 The capacity guidance builds upon earlier landscape character assessment work undertaken by the County Council. The Cumbria Landscape Classification¹ (CLC) identified 13 main landscape types ranging from Estuary and Marsh to Fells and Scarps. Whilst townscape character was not specifically assessed urban fringe sub-types were included and the main urban areas differentiated. For the purposes of this guidance it is necessary to consider Urban Areas and Fringes as a separate landscape type because of their unique urban characteristics and key sensitivities in relation to wind energy development. Consequently the landscape capacity assessment considered 14 landscape types. An exception has also been made for Type 9: Intermediate Moorland and Plateau dividing it into two groupings based on consistency of character, and specifically the key sensitivities in relation to wind energy development. These are set out in Map 7 and more information can be found in paragraph 2.29.
- 1.9 To date landscape character assessment and classification has not been undertaken in the Lake District National Park. This will take place during 2007 and the landscape capacity assessment in Part 2 may need to be amended as a result of this. As the Structure Plan does not cover the Yorkshire Dales National Park, the area of Cumbria within the Yorkshire Dales National Park is not covered by this guidance.

Scale of development

- 1.10 The potential capacity has been assessed in relation to six scales of development². These are:
- Single or twin turbines
 - Small group (linear or cluster arrangement of 3-5 turbines)
 - Large group (linear or cluster arrangement of 6-9 turbines)
 - Small wind farm (10-15 turbines)
 - Medium wind farm (16-25 turbines)
 - Large wind farm (25+ turbines)
- 1.11 This range reflects both the nature of schemes currently coming forward and an appreciation of the scale of the receiving landscape in Cumbria. Although small and large groups are referred to above they are considered to be wind farms for the purpose of interpreting PPS22 and its Companion Guide, and regional and local policy documents.
- 1.12 Turbine heights of 95 – 120m (to blade tip) have been assumed which are typical of the current generation of turbines. However this assumption should not preclude the possibility of using smaller turbines in order to ensure that they are in scale and proportion with the effected landscape. Turbines in the larger range might not be appropriate due to their scale.


¹ Cumbria Landscape Classification, Cumbria County Council 1995

² It should be noted that the guidance does not address small domestic micro generation installations

Summary of Potential Capacity for Cumbria

1.13 The overall capacity, determined by considering the sensitivity and value attached to each landscape type, is expressed on a five point scale on the following basis:

1.14

High		Low landscape sensitivity and landscape or key characteristics of low value. Indicates opportunity to accommodate wind energy development at an appropriate scale without significant adverse landscape effects
Moderate/High		
Moderate		
Moderate/Low		
Low		High landscape sensitivity and landscape or key characteristics of high value likely to be compromised. Indicates that any type of wind energy development would be likely to have a significant adverse landscape effect and would not generally be appropriate.

1.15 A summary of the capacity of each of the County’s landscape types to accommodate wind energy development is provided in Table 1.1 and illustrated in Map 8. An indication of the appropriate scale of development is also provided in the table. This information and Map 8 should not be used in isolation. They must be read in conjunction with the sensitivity and value assessment sheets set out in the next section and the rest of the guidance in Part 1 and Part 2.

Table 1.1 Summary of Cumbria’s Landscape Capacity Findings

	Landscape Type	Landscape Capacity	Appropriate Scale of Development
LC1	1: Estuary and Marsh	Low	All scales generally inappropriate
LC2	2: Coastal Margins	Low/moderate	Up to a small group, exceptionally a large group in most extensive parts and where unconstrained by settlement
LC3	3: Coastal Limestone	Low	All scales generally inappropriate
LC4	4: Coastal Sandstone	Low/moderate	Up to a small group beyond St Bees Head Heritage Coast
LC5	5: Lowland	Moderate	Up to a small group, exceptionally a large group
LC6	6: Intermediate Land	Moderate	Up to a small group, exceptionally a large group
LC7	7: Drumlins	Low/moderate	Single turbines or a small group
LC8	8: Main valleys	Low/moderate	Up to a small group, exceptionally a large group, in broader valleys
LC9	9i: Intermediate Moorland 9a Open Moorlands- Bewcastle Fells 9c Forests - Kershope and Spadeadam 9d Ridges - Furness	Moderate/high	Up to a large group, exceptionally up to a medium wind farm on a broad moorland plateau
LC9	9ii: Moorland Hills and Low Plateaux 9a Open Moorlands – West Cumbria 9b Rolling Farmland and Heath – Eden and Lakeland 9d Ridges – West Cumbria	Moderate	Up to a small group
LC10	10: Sandstone Ridge	Moderate	Up to a small group, exceptionally a large group
LC11	11: Upland fringes	Low/moderate	Up to a small group, exceptionally a large group on broader topographic sweeps
LC12	12: Higher Limestone	Low/moderate	Up to a small group, exceptionally a large group, in blander parts
LC13	13: Fells and Scarps	Low	All scales generally inappropriate
LC14	14: Urban Areas and Fringes	Moderate	Up to a small group, exceptionally a large group in coastal contexts

1.16 Table 1.2 refers only to the potential of the landscape to accommodate a single wind energy development of a certain scale. This doesn’t necessarily mean that only one more development would be acceptable in each landscape character type. It indicates the scale of development that might be suitable; however whether or not a scheme is acceptable on any given site would be determined by a full landscape and visual impact assessment and consideration of any cumulative effects. If cumulative effects are likely an assessment should follow the guidance set out in section 3 to determine if the proposal is acceptable. The scale of development suggests, for some landscape types, that in exceptional circumstances the characteristics of an area might support a larger development. Any proposal would need to demonstrate this through its Landscape and Visual Impact Assessment.

1.17 Due to the height of current turbines and their wide ranging visual influence any proposal will normally affect the landscape type where it is located and also neighbouring types. Due to the interwoven nature of Cumbria’s landscape, the capacity of neighbouring landscape types should also be considered by developers, and will be taken into account by the Local Planning Authorities in assessing specific

proposals.

- 1.18 In Cumbria the Lake District National Park, a small part of the Yorkshire Dales National Park, the Arnside and Silverdale, North Pennines and Solway Coast Areas of Outstanding Natural Beauty account for the County's national landscape designations. Both Arnside and Silverdale and the North Pennines AONBs cross the border into other counties. The Forest of Bowland AONB, in Lancashire and the rest of the Yorkshire Dales National Park, situated in North Yorkshire, are national landscape designations that might also be affected by proposals in Cumbria.
- 1.19 In Cumbria, within the boundary of the National Park and AONBs, as set out in Policy R45 of the Cumbria and Lake District Joint Structure Plan 2001 – 2016, it is likely that wind energy development will be restricted to single turbines of less than 25m to hub height. Anything larger is likely to be unacceptable in landscape character terms. However, proposals of a larger size may be considered, where appropriate, against other Structure Plan policies (for example Policy ST4) and in order to be considered favourably must meet a range of criteria. The landscape capacity sheets identify sensitivities associated with AONBs and the settings of national landscape designations. Although the assessment indicates that there may be some low/moderate and moderate capacity in areas that form part of the national landscape designations, developers will need to carry out landscape and visual impact that consider the landscape characteristics of an area and its relationship and proximity to neighbouring low capacity areas.
- 1.20 In accordance with PPS22, the settings of the national landscape designations also need to be taken into account. As these are not defined the extent and effect of such designations will need to be considered and evaluated on a site by site basis as part of the landscape and visual impact assessment. The potential effects of a proposal could have a greater significance to both designated areas and their settings. A detailed assessment of any proposal must pay particular attention to the reason the landscape was designated, the qualities that they are now valued for and any effects on their settings. The settings to such areas are often highly valued by local communities and visitors alike. The scale, form, design and cumulative impacts need to be assimilated into the landscape to accord with Policy R45 of the Structure Plan. If it is considered that unacceptable adverse effects would be caused to the settings it is unlikely that a scheme will be acceptable in accordance with Policy E34 of the Structure Plan. This must be demonstrated through the landscape and visual impact assessment on a site by site basis.
- 1.21 As a landscape capacity assessment has not yet been carried out for the LDNP, the information contained in Table 1.2 could provide an indicative capacity where the same landscape type is identified.

Cumulative Landscape and Visual Effects

- 1.22 As set out in Part 1, cumulative effect is a complex issue that is increasingly relevant to the assessment of wind energy schemes in Cumbria. As there are already many schemes across Cumbria the significance attached to cumulative effects is increasing. The geographic distribution of operational and consented schemes is identified in Map 2, Part 1.
- 1.23 As stated in section 3, Part 1, cumulative effects may present an eventual limit to the extent of wind energy schemes in some parts of Cumbria, particularly in landscape terms. However, in accordance with PPS22 this guidance does not seek to set arbitrary limits on the number of turbines that will be acceptable. Advice is contained in this section to help determine the effect of a development on a case by case basis in the light of existing baseline conditions, accurate descriptions, and

visualisations of effects on key receptors, and relationships with other development. These are impossible to predict at a broader level. Section 3, Part 2, provides further guidance for carrying out both cumulative landscape and visual impact assessments.

- 1.24 This Guidance does not stipulate separation distances or the number of schemes that might be accommodated in the County as these are likely to vary depending on the details of a scheme and the issue being considered, such as landscape character or nature conservation interest. The consideration of cumulative effects can only be undertaken on a case by case basis in the light of existing baseline conditions, accurate descriptions and visualisations of effects on key receptors, and relationships with other developments. These are impossible to predict at a broader level.
- 1.25 Cumulative landscape effects concern the degree to which onshore and offshore wind energy development change the:
- Physical Fabric of the landscape when two or more schemes affect the extent, condition or integrity of existing landscape components such as woodland, heather moorland or hedgerows (where gains are secured through enhancement measures or losses are incurred by removal or physical damage).
 - Landscape Character through the introduction of schemes as a new recurring element or feature in the landscape.
- 1.26 The degree of landscape change will depend on the net loss or gain to the physical fabric of the landscape and whether the wind energy development read as an isolated feature, a key characteristic in the landscape or a dominant characteristic by which the landscape may be defined ie they create a different character type in a similar way to large scale afforestation³.
- 1.27 Cumulative effects on visual amenity are concerned with the degree to which wind energy developments become a feature in particular views and the effect this has on the people experiencing those views.³ They can occur as:
- Combined visibility where the observer is able to see two or more developments from the same viewpoint either in combination (simultaneous visibility) where several schemes are within the observer's arc of vision at the same time or in succession (repetitive visibility) where the observer has to turn to see the various schemes.
 - Sequential visibility where the observer has to move to another viewpoint to see different developments say on a journey along a major road, long distance trail or cycle route. This type of cumulative effect may impact across a broad tract of landscape and not just within a particular locale.
- 1.28 The degree of visual change will depend on changes to the composition of the view brought about by the introduction of multiple wind energy developments. This will not only reflect the density, proximity and proportion of view occupied by developments but also their apparent prominence as determined by a number of modifying factors. These include the relative contrast or integration of each development reflecting the sensitivity of the affected landscape character and the siting and design of each scheme. Other factors relate to compositional structure for example skylining, relative elevation, framing and partial visibility. The dynamics of the view are also relevant, that is the physical nature, duration and frequency of combined and sequential views eg oblique, filtered or direct; glimpses or more

³ Further guidance should be taken from PPS22 Companion Guide paragraph 5.22.

prolonged views; frequent with short time lapses between views or occasionally with long time lapses between views depending on either the speed of travel or the distance between viewpoints.

- 1.29 Multiple wind energy developments can appear as separate individual entities in the landscape or where a new proposal either extends or is adjacent to an operational or approved scheme, the cumulative effect will principally be that of enlargement of the original scheme (ie where the distance between developments is less than the length of either scheme). Even if physically separated developments may be close enough (within approx. 6km) to appear as a single entity from some viewpoints. In both instances the combined visual effect is likely to be greater than the original scheme or for each development alone. Where developments appear together and overlap differences in design such as size, turbine height, layout and blade rotation speeds may also create a jarring effect and cumulative effects may be judged unacceptable on the basis of incompatibility in design (further design guidance follows).
- 1.30 Cumulative issues may also arise from the combined effects of turbines and other vertical structures such as pylons, telecom masts and transmitters in terms of the degree to which they dominate the landscape. Conflicts of form and function between verticals may also give rise to a compatibility issue. (see Table 1.2 Cumulative Sensitivity Criteria: Skyline)
- 1.31 As with any other type of environmental effect the significance of cumulative effects will be influenced by the sensitivity of the receptor. Significance is likely to be heightened if the landscape or visual receptor is sensitive by virtue of scarcity, special importance (eg designated landscapes, recognised viewpoints, popular trails, settings and ‘gateways’), underlying trends (eg recovery from another type of development like opencast mining), geographical extent and the number of people affected. The nature of change will not necessarily be adverse and will depend on siting and design, whether developments complement and consistently relate to key characteristics, and varying landscape perceptions or expectations of viewers.
- 1.32 Criteria for gauging the sensitivity of different landscape types to cumulative development are presented earlier in Table 1.2. These were developed by considering of the key characteristics sensitive to wind energy development that have been established for landscape capacity judgements (Part 2: Table 2.1 and Appendix 2.1) and the nature of potential cumulative effects based on experience in Cumbria and issues identified in the Companion Guide to PPS22 and SNH guidance⁴. They are intended as a tool for site specific assessment and informed the review of cumulative issues experienced in specific parts of Cumbria. The details of this are set out in Part 1.

Carrying out a cumulative effects assessment

- 1.33 The assessment of the cumulative effects of wind energy developments should be an integral part of the design process. Section 3 contains advice on the scope and content of such an assessment.
- 1.34 Cumulative assessment will normally be required where there is another development, proposed, approved or operational, within 30km of a scheme. A proposed development should be taken to mean those that are being dealt with as planning applications, either being formally registered or where an appeal has been lodged. These should include both on and offshore wind energy schemes. When carrying out a cumulative impact assessment, developers should also be aware of other prospective schemes in the area that may be at the scoping stage or

⁴ Cumulative Guidance 2005 & Environmental Impacts of Windfarms & Hydro Schemes, SNH, 2001.

development stage as these may also become registered planning applications by the time an application is submitted. In such cases the planning authority may require such schemes to be included in the cumulative impact assessment. The local planning authority would be able to provide advice on this.

- 1.35 The 30km minimum radius follows SNH guidance⁵. In some circumstances the Planning Authority may request an extension of the assessment area or inclusion of additional developments in order to address specific issues. For instance where an exceptionally important landscape or visual receptor is located midway between proposals but 18km from each (requiring an extension to 36km) or issues extend beyond a particular locale and where wind energy developments are sequentially seen from key routes across a broader geographical area.
- 1.36 As part of the cumulative assessment developers are advised to produce a 60km base plan showing the location of any constructed, consented or proposed schemes. The local planning authority might also request for other relevant prospective development to be mapped. This base plan should be produced at the scoping stage and taken to early meetings with the Planning Authority so that relevant issues can be identified. A full assessment will be required on schemes within 30km of the site, as set out above.
- 1.37 2.1, section 3, provides further information on the relationship between distance and the likely appearance of third generation wind energy developments (turbine blade tip height of 95-120m). It is likely that turbines can be seen as:
- Dominant as a key focus in close range views up to 2.4 km
 - Prominent as a key element in close to mid range views of the landscape, between 2.4-6km.
 - Conspicuous as a noticeable feature in mid to long range views of the wider landscape with blade movement perceptible, between 6-12km
 - Apparent as a visible feature in long range views of a wide landscape, turbines being perceived as a group rather than individual entities and blade movement only perceptible in clear weather conditions, between 12-18km
 - Inconspicuous as a minor feature in distant views of a broad landscape only seen in very clear visibility, between 18-30km
- 1.38 This assumes an open landscape and should not be used mechanistically, in practice visual interruption by a variety of screening features can limit visibility and likely appearance can be affected by a variety of modifying factors, as discussed in section 3, Part 1 above and Appendix 2.1, Part 2.
- 1.39 These distance bands form part of this guidance to help to envisage how effects of multiple schemes might accumulate in areas where their individual Zones of Visual Influence (ZVI) overlap and determine the radius of cumulative study areas. In theory a 60km radius would enable the consideration of a receptor midway between proposal A and proposal B at 30km from each. However at this distance both schemes are likely to appear inconspicuous and cumulative effects are likely to be insignificant unless the receptor is exceptionally important or there are also effects from several other schemes.

⁵ Scottish Natural Heritage Guidance: Cumulative Effect of Windfarms, April 2005

LG1

Submission of a cumulative landscape and visual impact assessment will normally be necessary where new development is being proposed:

- **Within an area already containing one or more operational or approved developments**
- **As an extension to an operational or approved development**
- **At the same time as one or more other developments are being proposed through a planning application within an area**

The assessment area should be a minimum radius of 30km from the centre point of the new proposal and accompanied by a Cumulative ZVI(s) covering all developments within that radius.

- 1.40 In the case of enlargements, extensions and siting new development adjacent an existing wind energy development, changes in scale need to be taken into account. The potential for the receiving landscape to accommodate the larger composite feature⁶ and any extended visual influence need to be considered. It will usually be necessary to provide a cumulative ZVI comparing the existing scheme and the extension or adjacent scheme

LG2

Where proposals are extensions or adjacent, the assessment of cumulative effects should include a consideration of both developments as a larger composite feature.

Judging the acceptability of cumulative effects

- 1.41 As set out above this guidance does not seek to set thresholds that determine when cumulative impacts are unacceptable. A judgement needs to be made for each individual scheme. It is usual for a landscape specialist to be employed by an applicant to identify the significance of effects and judge the acceptability of a scheme in relation to this. It is then up to the local planning authority to make a judgement on the effects against the policy framework. When judging acceptability of a new proposal it is crucial to determine the “threshold” beyond which wind energy developments in a particular area become unacceptable. In other words, although the effect of a single scheme is limited, when added to the effect of other schemes in the area, operational, approved or proposed, it creates unacceptable cumulative impacts⁷. This information should be included as part of the Environment Impact Assessment where relevant, or be set out in a planning statement.
- 1.42 As set out in Part 1 reasons are likely to arise where multiple schemes may have to be accepted as a defining characteristic in some of Cumbria’s landscapes. However a consistent and coherent approach to the siting, design, spacing and scale of schemes in relation to the receiving landscape type will be required to ensure that they make a positive contribution to the overall image. A succession of schemes with different designs and relationships to the landscape can appear confusing as well as raise questions about the visual rationale and suitability of each development. In order to demonstrate clearly where such circumstances might arise the cumulative landscape and visual assessment should refer to the criteria set out in Table 2.1 above when considering landscape value and change considerations.

⁶ Landscape Institute and Institute for Environmental Management and Assessment ‘Guidelines for Landscape and Visual Impact Assessment 2nd Edition 2002

⁷ Scottish Natural Heritage Guidance: Cumulative Effect of Windfarms, April 2005

Such information is necessary if the local planning authority is to judge whether or not a scheme is acceptable.

- 1.43 In assessing the cumulative effect on the landscape, it is important to bear in mind that landscape character does not generally occur in single homogeneous blocks. The characteristics of neighbouring landscape types and effects on these must also be taken into account. The Landscape Capacity Assessment in Section 2 identifies limited capacity for cumulative development within the visual setting of international and national landscape designations. Contribution of the setting to qualities recognised under the designations, wider landscape compositions and key views are particular sensitivities in the relevant capacity statements. These demand rigorous consideration in the context of cumulative assessments.

LG3

The limiting cumulative threshold for wind energy developments should be based on a well-considered judgement informed by analysis of:

- **Degree or magnitude of change (see definitions above)**
- **Nature of the potential change reflecting the inherent sensitivity of the effected landscape(s) character and visual context (see Table 1.2 Cumulative Sensitivity Criteria)**
- **Value attached to the effected landscape(s) or specific elements in it and key views (see Part 2 Capacity Statements)**
- **Landscape change objectives for the effected landscape(s) (see Landscape Strategy⁸ visions and relevant management plans for designated landscapes)**

⁸ Cumbria County Council 'Cumbria Landscape Strategy' 1998

Table 1.2 Cumulative Sensitivity Criteria

Key Characteristic	Attributes indicating lower sensitivity to cumulative wind energy development	↔	Attributes indicating higher sensitivity to cumulative wind energy development
Landscape Character			
Scale and Enclosure	Frequent broad scale elements to which multiple schemes might relate or complement eg ridges, woodland, settlements Wide views with room to accommodate multiple schemes	↔	Widespread presence of human scale indicators and older developments with smaller turbines where multiple large modern schemes are likely to exacerbate dominance and distort sense of distance Narrow views vulnerable to over crowding by multiple schemes
Complexity and Order	Structured landscapes with simple and repetitive patterns (eg geometric field pattern defined by strong framework of hedges or interlocking ridges in consistent alignment) which offer scope for multiple schemes to appear as just another recurring element in an ordered landscape	↔	Unstructured landscapes with complex and irregular patterns (eg fragmented mixed land uses on the urban fringe with weak run down boundaries or random undulating landform strewn with spoil heaps) where multiple schemes likely to compound visual confusion Simple featureless landscapes eg moorland where a solitary WED may illuminate vastness and emptiness whilst multiple schemes likely to dilute character
Manmade Influence	Frequent occurrence of large modern built or engineered elements and managed land use to which multiple schemes can relate and share a working or industrial image	↔	Wild, traditional or designed landscapes in which modern manmade aspects are absent or rare where multiple schemes likely to appear unrelated and incongruous
Skyline	Low density pattern of isolated existing vertical focal points (eg existing schemes, shelterbelts and silos) which multiple schemes could complement without impinging on space surrounding them Indistinctive skylines	↔	High density pattern of existing vertical focal points of varied size and form where schemes could exacerbate sense of clutter and confusion Bare undeveloped skylines vulnerable to clutter Skylines that draw the eye (eg coastal horizons, landmark fells valley rims) where multiple schemes likely to appear disproportionately dominant
Connections with Adjacent Landscapes	Broad tracts of the same or similar character types to which multiple schemes can consistently relate	↔	Tight sequences of contrasting landscape types which multiple schemes are seen against likely to appear incoherent and confusing
Remoteness and Tranquillity	Widespread movement and noise (eg network of transport routes or industrial activity)	↔	Strong sense of peace, space remoteness and solitude likely to be compromised by multiple schemes
Visual			
Visual Interruption	Frequent interruption by landform, vegetation or buildings whereby multiple schemes likely to appear individually and intermittently	↔	Exposed open landscapes where multiple schemes likely to be visible in same views and for prolonged periods
Settlement and Key Views	Inaccessible lowly populated areas Nucleated or introspective settlements Large industrialised edges unlikely to be intimidated by multiple schemes Unremarkable views	↔	Dense pattern of small historic settlements with vulnerable sense of scale and character Settlements with a distinctive orientation or context (eg linear looking to or set down below a resource area) likely to exacerbate dominance or sense of being surrounded by multiple schemes Attractive settings, 'gateways', vistas, or panoramas

The criteria in this table were developed by considering of the key characteristics sensitive to wind energy development previously established for landscape capacity judgements (Part 2, **Section 2:** Table 2.1 and Appendix 2.1) and the nature of potential cumulative effects based on experience in Cumbria and issues identified in the Companion Guide to PPS22 and SNH guidance.

Siting and Good Design for Landscape and Visual Issues

- 1.44 As with any other form of development siting and design are material planning considerations for wind energy development. The principle is underlined in PPS22. This section examines the issues arising from the unique visual characteristics of wind energy development and provides generic guidance based on experience and basic design principles. It is considered important to focus on the landscape and visual effects of wind energy developments due to their unique characteristics:
- prominently vertical,
 - significant movement
 - relative unfamiliarity in parts of Cumbria.
- 1.45 They are frequently located in open areas where they are highly visible and it is normally unrealistic to seek to conceal them. Individually or in groups, they will create distinctive features in the landscape. Their siting and design is therefore of primary importance and could avoid unnecessary adverse visual effects improve compatibility with landscape and help to create a positive image through attention to aesthetic qualities of development and turbines as entities in themselves.
- 1.46 The process of site selection and design is viewed as a primary mitigation measure and should be an iterative process informed by and responding to an ongoing environmental assessment. Landscape and visual aspects should be set alongside economic and technical requirements as well as other environmental considerations from the outset of a project and throughout all stages of its development. More guidance on landscape and visual assessment is set out later in section 3. Links between assessment and the different stages of the siting and design process are identified in Figure 3.1 therein.

Site Selection and Initial Sizing

- 1.47 At the project feasibility stage, when considering site selection and the initial number and size of turbines appropriate, the full range of technical and environment considerations listed in section 4, Part 1 should be considered. When considering the landscape and visual issues, the following approach should be taken:
- identify the landscape capacity as set out in the assessment sheets in Section 2.
 - carry out assessments for each landscape character type
 - carry out a preliminary survey and
 - analysis of the landscape character sensitivity and values
 - carry out a visual effects assessment
 - carry out a cumulative effects assessment
- 1.48 Every site is unique and local variations in character that heighten overall sensitivity or value may be so significant that, in some cases, they become determining factors to the principle of whether or not a wind energy proposal is acceptable. Careful consideration of the potential effects on local landscape value and associated contributions to recreation, tourism and image in relation to economic development should be made.
- 1.49 The capacity guidance contained in the next section considers visual amenity in general terms by reference to settlement patterns and key views. It does not specifically address potential visual dominance and intrusion. At the site selection stage this must be analysed by use of a preliminary ZVI, identification of key views

and preliminary survey. More information is provided in paragraphs 1.63 -1.70 below. Cumulative impacts also need to be considered at this stage. Having made these considerations initial decisions on sizing of the development may need to be revisited or, alternatively a different site sought.

- 1.50 For some sites it may be necessary to consider the use of turbines smaller than current industry standards as well as fewer turbines to achieve a comfortable fit with landscape elements such as small hills or drumlins and built forms on the urban edge. Consideration should also be given to close range human scale indicators such as hedges, trees and houses as these could be intimidated by the large industrial scale of today's turbines.

LG4

Confirm landscape acceptability of a specific site and appropriate sizing of development by weighing preliminary analysis of landscape and visual aspects against the landscape sensitivity and value criteria (Tables 2.3 and 2.4 of Part 2) and by considering potential cumulative effects.

- 1.51 Cumbria enjoys a wide variety of scenery often occurring in tight sequences or in interwoven patterns. Locations within a tight sequence of contrasting landscape types or sub-types may make it difficult to design a development that appears logical and clearly related to a consistent set of key characteristics. For example a location on a narrow coastal plain which backed onto low hilly farmland of glacial origin. Here the large scale open character and simple rectilinear field patterns of the coastal plain would tend to assist integration and suggest a geometric layout of turbines. However in relation to the low hilly farmland they would be likely to appear over dominant and incongruous against an irregular and small scale pattern of small undulations, farm houses, frequent trees, scrubby hollows, tarns and winding roads. This issue is recognised by Scottish Natural Heritage⁹

“The potential for visual confusion, where it is unclear how a windfarm development directly relates to the landscape characteristics of an area, is increased where a windfarm is sited within, or experienced from, different landscape character types.”

- 1.52 If a proposal could effect more than one landscape character type or sub type an assessment should consider the potential effects on all affected landscape types.

LG5

Seek to centre developments within discrete landscape types with broad separation from types of contrasting character in order to achieve a simple image.

Composition: General

- 1.53 After a site has been chosen and the issues set out in Part 1, section 4 considered, it is essential that landscape and visual considerations are primary in conceiving the overall form and composition of the development (much like designing and placing a piece of sculpture). The basic visual composition should be guided by common design principles such as balance, proportion, stability and image. These principles are summarised in Appendix 3 of the SNH guidelines⁹. A composition that responds to key characteristics is more likely to harmonise with the landscape and portray a positive rational image. Generally this will entail finding the most comfortable fit with the scale or pattern of the receiving landscape. However, it may include compositions where turbines contrast with key characteristics, for example where a single isolated

⁹ Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes, Scottish Natural Heritage 2001

development creates a vertical point of focus on a simple horizontal skyline or plain, and in doing so reinforces the compositional qualities of that landscape. When considering how a development will relate to key characteristics, it will be important to consider how these will be experienced and observed in the key views of the development.

- 1.54 The detailed design of the layout of turbines is likely to be influenced by the engineering constraints of yield, and other environmental constraints such as ecology, hydrology, noise and archaeology. This process of micro-siting may change any initial layout.¹⁰ Any layout changes should be informed by an understanding of the consequences on three-dimensional composition including the landscape and visual effects.

LG6

Consider wind turbine developments as three-dimensional objects within the landscape and investigate alternative compositions to find the optimum response to key landscape characteristics as appreciated from key views.

Composition: Scale and Proportion

- 1.55 The increased size of third generation wind turbines raises major issues in terms of the scale and proportion of developments in relation to settlements and other landscape elements. To help reduce carbon emissions and generate more electricity from renewable sources the size of developments is increasingly driven by available technology and maximising output. In some circumstances this has resulted in schemes that seek to fill a site with turbines without due regard to landscape fit. This can result in schemes overwhelming the scale of existing landscape elements. Due to the increased height of turbines, the consequent increase in separation distance between turbines and the trend towards extensions of developments next to existing ones and the re powering of existing schemes with larger turbines, careful consideration is needed to ensure that the resulting scale and spread of development is contained and 'controlled' within the landscape. The scale of turbines can be indiscernible in an open featureless landscape such as a moorland plateau or estuary mouth. However, generally, there will be elements or features against which the development can be directly scaled. The large scale of wind energy developments, in terms of both height and extent, tends to relate best to the broad shapes and main elements of the landscape, such as ridges, woodland or settlements, as appreciated in the middle distance (> approx. 2.4km) and beyond.
- 1.56 Instances may arise where landscape characteristics and elements may only support a small number of turbines or turbines of a certain height without adverse effects. Such issues should be considered at the initial site selection phase. For more guidance on this see section 4, Part 1.

LG7

Ensure that the scale of developments, in terms of height and extent, relate to and are in proportion with key landscape elements such as valleys, ridges, hills, field systems, woodland or settlements and achieve a sense of containment. In urban or industrial contexts ensure that developments respond to the scale of the built form and sit comfortably alongside existing large buildings or structures.

¹⁰ Windfarms in Scotland, Marc van Grieken et al, Landscape Design Journal Oct 2003

Composition: Order and Pattern

1.57 The rationale for the outline shape of the development needs to be clear. An arrangement of turbines that relates to some kind of order or hierarchy in the receiving landscape will be easier to comprehend and therefore more likely to portray a positive image. It may be more difficult to achieve in complex landscapes, comprised of a number of overlapping elements. Visual confusion needs to be avoided by careful placement within a hierarchy of visual dominance or visual separation of the developments from other elements in the landscape including other wind energy developments.

LG8

Complement distinctive patterns and organising elements within the landscape, such as the broad grain of the topography, geometric field systems or dominant lines along coasts or infrastructure corridors. Create a simple image by respecting the hierarchy of elements in any landscape composition or separating developments from other surrounding elements or features that compete for attention.

Composition: Stability and Balance

- 1.58 It is important for a wind turbine development to appear visually stable in relation to the visual dynamics of the landscape. A feeling of balance should be created with opposite visual forms and forces compensating each other. For instance if placed upon a hill it should not seem top heavy or precarious, further explanation and illustration can be found in the SNH guidance.¹¹ Consideration of the visual dynamics between individual turbines within a development is also important. For example twin turbine developments are likely to result in unresolved duality where the eye jumps from one turbine to the other, however this might be avoided if balanced against a form or structure of comparable visual weight.

LG9

Respect visual forces and weights to create a stable and restful composition between the wind turbines and the receiving landscape, and also between each other. In the context of built forms or structures seek to achieve a balanced composition that enhances any existing focal point.

Composition: Relationship between Turbines

- 1.59 While spacing is normally determined by the need to avoid 'shadowing' (by wake and turbulence effects) if it is excessively wide, the visual coherence of a turbine group can be damaged; the turbines appear 'disconnected'. This problem is often exacerbated by increased heights and consequent separation distances, (which have as much as doubled since the previous guidance on wind energy development was issued in 1997). The arrangement of turbines can also adversely affect cohesion with gaps appearing in the composition. For instance, from some aspects turbines in a triangular arrangement can appear offset and disconnected from the rest of the group; linear or grid arrangements can often result in turbine overlaps where the movement of blades seem to clash. Clearly the orientation of such groups could be critical in relation to key views.

¹¹ Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes, Scottish Natural Heritage 2001

LG10

Through careful spacing and arrangement of turbines and overall orientation of the group ensure that turbines read collectively to form a single cohesive element in the landscape particularly with regard to key views, whilst avoiding the disturbing effects of blade overlaps.

Composition: Image and Association

- 1.60 Association with manmade influences and the functional rationale of exposed sites are recognised as a favourable characteristic in terms of sensitivity or site selection criteria (see Table 2.1). The design of a turbine composition can further assist in creating a positive image by reinforcing associations and symbolism and appearing rational.
- 1.61 However, it is important to avoid adding to local visual clutter and confusion. Other vertical features common in the rural landscape, such as telecommunications masts are usually individual items or have linear links such as pylons and power lines. As well as being generally much larger in scale, wind turbines introduce movement and are therefore more akin to urban or industrial installations. It is important that they don't compromise landmark skylines.

LG11

Compositions should complement the form and function of settings which already exhibit engineered aspects, structures or land cover patterns and have a logical and sculptural quality in relation to exposed settings. Avoid diluting the value of existing symbolic landmarks and conflicts of form and function with other vertical structures.

Composition: Visual Amenity

- 1.62 Both the general development siting (see 1.48-1.51 above) and design should have regard to avoiding over dominance and visual intrusion. Dominance relates to the magnitude of change and intrusion concerns the nature of the effect involving two considerations:
- how it appears as a basic visual element in terms of compatibility with landscape character and in terms of the aesthetic qualities of the development composition such as stability, balance and cohesion as discussed above; and
 - how it is viewed in relation to other landscape elements in the composition of a view.
- 1.63 Computer modelling of alternative designs and analysis from key viewpoints that forms part of the design process is likely to assist in achieving the optimum solution.
- 1.64 The main physical parameter determining the apparent size is the proportion of the view occupied by the development which depends on the overall size of a scheme, distance from the viewpoint and breadth of existing view. Further information on the likely appearance in relation to distance can be found later in section 3: Appendix 2.4.
- 1.65 The arrangement and orientation of turbines may be manipulated relative to key views as part of the design process to lessen the apparent size. Due to the UK's prevailing south westerly winds viewpoints in the south to west and north to east quadrants are most likely to see the blades in full plane and therefore greatest

exposure to blade movement.¹² Sites with key views in these quadrants could be problematic but it may be possible to mitigate effects for example by narrowing the development profile relative to these views.

- 1.66 A large number of factors in the composition of views can modify the apparent size and sometimes also the nature of visual effects. These include background contrast, proportional visibility over intermediate horizons, elevation, and framing. Many are documented in the research carried out by the University of Newcastle¹².
- 1.67 Turbine height and bulk will have most influence on the degree of dominance within close range views. The perceived sense of dominance will be influenced by skylining or by positioning turbines on a hilltop above the viewer which can make them feel more dominant, as well as by the movement inherent in wind turbines.
- 1.68 The appearance of blades or the nacelle and blades above the horizon in close to mid range views tends to be eye catching and also disconcerting. Adjustment of turbine heights, positions and orientation may lessen such effects.
- 1.69 Turbines framed by other features such as buildings or trees close to the viewer can have a greater apparent size. This phenomenon is also known as 'netting' that is bringing the distant scene forward by drawing our attention to it¹³. On the other hand elements such as ridges or woodland within the development setting may offer screening potential from some aspects.

LG 12

Investigate alternative designs in order to find compositions of turbine groups to present best aspects and reduce dominance and visual intrusion relative to key views. In particular seek to:

- **site turbines with an adequate separation from smaller settlements and key views to avoid dominance and ensure visual separation**
- **reduce the apparent size of developments**
- **avoid turbine heights or locations that make developments feel overbearing**
- **avoid partial views of blades or the nacelle and blades above the horizon**
- **avoid effects on key views in south to west and north to east quadrants**
- **avoid framing effects**
- **maximise the benefits of existing screening elements by careful placement and height adjustments**

Turbine Design: Towers and Blades

- 1.70 Turbine design has now largely matured. The commonest types of 'standard' turbine used in Britain are three bladed and attached to a solid tower via nacelle housing. The towers may be polygonal or circular in section, and may be tapered or cylindrical. These are the preferred design for Cumbria.
- 1.71 The proportional relationship between the tower and the blade diameter is significant. If blade diameter is slightly less than the hub-height of the tower the turbine looks reasonably well proportioned. In lower wind speed areas, tower height may need to be increased without necessarily an equivalent increase in blade size.

¹² Visual Assessment of Wind Farms – Best Practice, University of Newcastle for SNH, 2002

¹³ The Concise Townscape' Gordon Cullen 1983

If blade diameter is increased without a similar increase in hub height, then the turbines may appear squat in relation to the receiving landscape.

LG13

The choice of tower structure, blade configuration, and relative proportions of tower height and blade diameter should be carefully weighed to minimise negative visual effects and improve compatibility with landscape character.

Turbine Design: Colour

- 1.72 Experience and studies in Europe have shown that a range of colours can be used to minimise the visual impacts of wind energy developments, depending on the background of land viewed from the majority of viewpoints.
- 1.73 It is important that the choice of colour for wind turbines takes account of the backgrounds against which the machines will be seen from key views. It may be appropriate to use a palette of pale colours to suit the majority of sites in elevated locations or on the coast where they are mostly seen against sky or sea, and a palette of darker grey colours for developments that will be mainly seen against a muted landscape background or against buildings.
- 1.74 There is some Scandinavian experience of grading the colour of turbine towers from a darker shade near the base, to a lighter one near the top. This might be appropriate say where the bases of turbines are seen against land and the tops against sky or sea.

LG14

Investigate a range of colour options for turbines taking into account the predominant background relative to key views of the development.

Turbine design: Movement

- 1.75 Blade movement is rotary and very regular. This is not a common type of 'natural' movement in the landscape, and especially not at the scale of a wind turbine. This kind of movement is highly noticeable, and enhances the visibility of wind energy development in the landscape up to distances of about 10km where blade movement is judged to be perceptible to the casual observer.¹⁴ The actual blades of turbines are rarely visible beyond this distance, though a slight 'pulse' in the intensity of the light can sometimes be seen as the blade passes across the tower. The slower rotation speeds of current turbines (approx. 13-19 rpm) compared to older turbines for example at Great Orton and Winscales (approx 28 rpm) can be more comfortably followed with the human eye and are less disturbing especially in remote and tranquil surroundings.
- 1.76 All turbines on a site should rotate in the same direction. (e.g. all clockwise, or all anti-clockwise). Sometimes slight variations in wind conditions and hence turbine orientation may nevertheless give the impression of contrary rotations from some viewpoints. Keeping the maximum speed of blade rotation as slow as possible can help reduce negative visual effects.

LG15

Take account of the visual effects of rotary blade movement as part of the overall design of the scheme. Ensure that the blades of all wind turbines in a

¹⁴ Visual Assessment of Wind Farms – Best Practice, University of Newcastle for SNH, 2002

single development rotate in the same direction and up to the same speed.

Infrastructure and Ancillary Development

- 1.77 Infrastructure and ancillary developments, including road access, foundations, transformers and substation buildings, fencing and electrical connections could have significant local landscape impacts in their own right particularly in open undeveloped landscapes, where a site's profile is raised on the side of a hill or where there are key views looking down on it. Sensitive vegetation and soil types such as heather, semi-natural grassland or peat do not readily recover from construction disturbance and will be particularly vulnerable in both landscape and ecological terms. On sensitive soils such as peat ongoing consequences may arise from erosion or disruption to the integrity of natural drainage patterns.

Road access

- 1.78 Road access to a site needs to be able to accommodate trailers carrying the longest loads (blades are up to 45m long) as well as the heaviest and widest loads (generally cranes of 30 tonnes plus). In some rural locations these requirements can lead to significant 'indirect' visual impacts through the need to widen lanes (typically to 6m) or ease bends, necessitating in some cases the removal of boundary features such as stone walls or hedges. These alterations may be left in place for the life span of the development or conditions may seek temporary remediation as there will be a requirement to reach the site for decommissioning, and possibly for repairs in the case of major component failure. If further issues arise during the planning process, for example in response to advice from the Highways Authority, landscape issues should still be taken into account as details are refined.

LG 16

As part of site selection avoid long access routes along narrow, twisting or steep rural lanes, through villages and tightly built up areas. Minimise modifications and downgrade or reduce them at the end of the construction period, on decommissioning reinstate road alignments and boundary features

- 1.79 On-site access tracks need to be constructed carefully, but need to meet the same weight and dimensional requirements as above. They are typically 5-6m wide. It may be possible to reduce some in width after construction (typically to 3-4m) sufficient to facilitate light maintenance vehicles however full width will inevitably be required as described above. Impacts will be heightened where they have to negotiate steep slopes requiring zig zag routes, if cut and fill and drainage channels are required above the track; or across wet marshy ground where more extensive foundations will be required. They are also likely to be more visible in open featureless landscapes such as moorland. Access points to sites require large bell mouth entrances and appropriate visibility splays which will often involve the realignment of hedges or walls. Hence access provisions can potentially scar the landscape, draw the eye towards the development and increase visual confusion. Careful consideration of the effects of access tracks is required and existing tracks should be used where acceptable.
- 1.80 Consideration of hydrology, ecology and archaeology impacts must also be taken into account as part of the design, during construction and the decommissioning phases of any development. Issues such as surface water run-off, negative impacts on sensitive soils and vegetation all have an intrinsic effect on landscape character.

Bases

- 1.81 All wind turbines need to be mounted on reinforced concrete bases. These are likely to be left in situ once the development is decommissioned. As turbines become larger, these bases have increased in size and are now typically around 16-17m in diameter by 2-3m deep. Temporary features include a construction compound and hard standings next to each turbine which act as bases during turbine erection and component lay down areas (typically 50 x 50m). Although temporary they still have implications on sensitive soils and vegetation.

Meteorological Mast/Substations

- 1.82 Ancillary elements may compromise the sculptural image of a development. The recent trend towards inclusion of lattice construction meteorological masts throughout the lifespan of the development similarly increases visual clutter. Transformers required to change the generating voltage to the common site voltage can increase visual clutter unless housed within the turbines. It is generally preferable for on-site cables to be buried underground as pole-mounted links can be visually unsatisfactory. Sometimes the appearance of an electrical sub-station and control building can appear irrational or incongruous particularly in high or exposed areas or increase visual complexity and emphasise the large scale of the wind turbines if sited amongst them. Care needs to be taken when siting these

Fencing

- 1.83 Fencing, lights and hard surfacing around sub-stations can exacerbate these problems. New fences over a wider area of the development say to enhance habitats or where a landowner desires greater control over grazing can create lines that conflict with the form and layout of the development and differences in vegetation that highlight its presence.

Electrical connection

- 1.84 Responsibility for the routing and design of the electrical connection from the site sub-station to the local electricity distribution network lies with the electricity Distribution Network Operator (DNO). This will be achieved by overhead power lines mounted on single or double poles or by lines laid underground. Since the latter are 6-20 times more expensive¹⁵ they may only be used for limited lengths or in special circumstances. Power lines may have considerable impact by creating visual confusion or appearing incongruous in exposed upland settings. If taken right up to the site they may create an industrial image for the development and compromise the designed composition. The implications of connections should therefore be regarded as material to the overall scheme design and under grounding such power lines is preferable in landscape and visual impact terms. However, other environmental impacts must also be considered when determining the best approach to take for a scheme.

LG17

Infrastructure and ancillary developments should be carefully considered as part of the overall design of a scheme, using the following good practice principles:

- **avoid sensitive soils and vegetation, eg peat bogs, heathers, grassland**

¹⁵ Planning for Renewable Energy: A Companion Guide to PPS22, OPDM 2004

- **avoid changes with a negative impact on local hydrology**
- **provide construction and reinstatement method statements on sensitive sites**
- **integrate the layout with the grain of the topography/land patterns**
- **utilise existing tracks and access points**
- **minimise the length of tracks**
- **protect features such as trees or archaeological remains**
- **reinstate track verges with and construction compounds with appropriate vegetation after the construction phase**
- **finish surface tracks to blend in with surroundings**
- **reduce extent and width of tracks after the construction phase**
- **remove tracks and crane hard standings on decommissioning and reinstate with appropriate vegetation**
- **locate and design ancillary elements in a way that minimises visual clutter**
- **utilise existing buildings, landform and vegetative cover to house or screen ancillary structures**
- **site and design the sub-station to appear as a simple element separated from the main development and characteristic of the receiving landscape**
- **locate borrow pits areas screened by existing landform or vegetation or within existing extraction areas**
- **enter into planning obligations to minimise the impact of consequential off-site electricity connections which could otherwise be severe**

Mitigation

- 1.85 Mitigation will primarily be achieved through careful siting and an iterative design process following the guidance above. Traditional landscape measures such as screen planting to ancillary elements, protecting trees or hedge planting and management may make a useful contribution to reducing on site impacts. Where useful, locally native species should be used. Aspects such as the composition of the turbine group as a whole will be more crucial.
- 1.86 Secondary mitigations measures may be employed to address residual impacts, for example off-site planting to screen specific receptors or the provision of compensation. Experience has shown that wind energy developments present opportunities for enhancing both the development site and the wider landscape, for example through restoration of hedgerows and stone walls or restoration of heather moorland. This may also provide improvements to the ecology of the site. This aspect is discussed in further detail in Section 3, Part 2.

LG18

Consider landscape enhancement and compensation measures with reference to land management guidance set out in the Cumbria Landscape Strategy.¹⁶

Compatibility

- 1.87 As set out previously enlargement of an existing scheme can be a particular form of cumulative effect. In addition when two or more schemes are visible simultaneously, differences in design may create a jarring effect. The closer the developments are, the greater the potential number of differences that may be evident. However

¹⁶ Cumbria Landscape Strategy, Cumbria County Council 1998

compatibility issues may also arise when developments are distinctly separated. For instance, a single wind turbine within one or two kilometres of an extensive site may look as though it has become lost or detached from the group. Differences in design can still be important for separations of up to 6km.

1.88 Proposals for extensions, adjacent developments and developments in close proximity can raise specific issues of design compatibility with an existing scheme(s); issues to consider include:

- *Turbine Size and Density:* Are the turbines a larger size and more widely spaced, if so, will this produce obvious visual discontinuity?
- *Turbine design:* Are there any awkward differences in turbine shape, blade/tower proportions, direction and speed of blade rotation, colour?
- *Layout:* Is the arrangement of turbines (eg linear, formal grid, organic cluster) consistent with the existing scheme (s)?
- *Cohesion:* Will the proposed development be seen as a disconnected part of the same visual entity?

1.89 These parameters should be explored through computer modelling and visualisations from key viewpoints to investigate how apparent any inconsistencies might be and to adjust the design accordingly.

LG19

In addition to general considerations of cumulative effect, where proposals are within 6km of any other existing or consented wind turbine, particular attention should be given to the compatibility of turbine size, density, design, layout and overall cohesion.

Where proposals are extensions or adjacent they should be designed as a single entity with the existing development.

PART 2

SECTION 2

LANDSCAPE CAPACITY ASSESSMENT

2 Landscape Capacity Assessment

Introduction

- 2.1 Cumbria County Council commissioned Coates Associates to an evaluation of the capacity of different types of landscape to accommodate wind energy development. The primary purpose of this study is to inform a joint Cumbria Wind Energy Supplementary Planning Document (SPD) which is to be incorporated into the District Councils' and Lake District National Park Authority's Local Development Framework. The study has been steered by officers from the Council's Environment and Spatial Planning Units who in turn have reported to a working group of planning officers representing the SPD partners. The study area encompasses the whole of Cumbria outside the National Parks totalling 4,637 km². The work was carried out between October 2004 and August 2006, and following public consultation on the Draft Cumbria Supplementary Planning Document, a review was carried out during February – July 2007.

The Brief

- 2.2 The SPD will replace previous supplementary planning guidance entitled 'Wind Energy Development in Cumbria – A Statement of Planning Guidance' (WESPG) published by the County Council in 1997. The new SPD is intended to assist in the interpretation and application of Development Plan policies by providing local planning authorities and developers with broad locational guidance for wind energy development in Cumbria.
- 2.3 The objectives of this study were to:
- i. Develop a new approach to judging landscape capacity to accommodate wind energy development as a crucial element in developing strategic locational guidance on wind energy development.
 - ii. Develop clearly defined landscape sensitivity and value criteria as a basis for judging landscape capacity.
 - iii. Through application of these criteria assess and evaluate the strategic landscape capacity of Cumbria's landscape types (as defined in the Cumbria Landscape Classification and Structure Plan Technical Paper 5) to accommodate wind energy development.

Application and Limitations of the Study

- 2.4 The study provides strategic guidance on the landscape factors influencing the location of wind turbines within Cumbria (outside the national parks) and is intended to set out a positive approach to guide development. It seeks to articulate the specific landscape characteristics that are sensitive to wind turbine development and from this together with an appreciation of how these are valued provide an overall understanding of capacity. The results should help guide the right type and size of development to the right location to ensure that the key characteristics of the landscape are not adversely affected. Additional work will be carried out as necessary following the landscape characterisation work of land within the Lake District National Park.
- 2.5 It is envisaged that it will have several applications:
- Inform planning policies and decision making in relation to wind energy

development.

- Assist developers at the site selection and project feasibility stage in determining the suitability of sites and identifying the initial size and composition of development in relation landscape character
- Assist developers and development control officers in the scoping of landscape and visual impact issues raised by specific proposals by review of the strategic assessments and application of the landscape sensitivity and value criteria at a local level. It is envisaged that the criteria will serve as a form of checklist for site specific survey and assessment.
- Facilitate stakeholder consultation and widen public understanding of the key landscape sensitivities to wind turbine development.

2.6 It should be noted that:

- This study only considers landscape and visual aspects, clearly consideration of cumulative impact, grid connection and other environmental issues such as ecology, archaeology, noise and hydrology will require careful consideration when seeking to locate wind energy developments. Details on this are set out in Part 1 of the SPD.
- The study does not negate the need to for assessment of individual applications where detailed site specific landscape and visual impact assessments will still be required.
- From the earliest stages of a project the capacity of neighbouring landscape types needs to be taken into account given the wide ranging visual influence of turbines and the tight sequences or interwoven nature of Cumbria's landscape types
- The study does not cover offshore development capacity or views from the sea.

2.7 The study has assumed turbines that have a blade tip height of approximately 95 - 120m and three blades which are typical of current proposals. However in order to find the best fit with the scale of the receiving landscape developers should not exclude the possibility of using turbines smaller than the current industry standard.

Methodology

Approach

2.8 A basic principle of good practice in landscape assessment is to adopt a methodology that is transparent, systematic and replicable. As the findings from this study will inform strategic planning guidance and subsequent planning policy and decisions likely to be tested at public inquiry it was recognised that the method had to be robust and defensible. The method was developed in close consultation with the Council's Landscape and Countryside Officer and was piloted on two landscape types. The results were reviewed by this officer and reported to the SPD working group and in the light of this the methodology was refined and then rolled out across all the types within the study area. The exhaustive consultation procedure required for the SPD has enabled feedback from wider audience including developers with the opportunity for some further refinement.

2.9 The methodology was also subject to a review following comments raised through public consultation on the draft SPD at the end of 2006. This review concluded that the overall methodology was robust and defensible but that some aspects of the methodology could be explained more clearly and fully to aid understanding and

transparency.¹⁷

2.10 The approach adopted for this strategic assessment draws on our considerable experience of wind energy capacity assessments dating back to 1994¹⁸ and current development control advice on wind energy schemes in Cumbria, a review of the previous approach used in the existing WESPG, a review of similar studies prepared for other planning authorities^{19 20} and published national guidance contained within:

- 'Landscape Character Assessment (LCA): Guidance for England and Scotland' The Countryside Agency and Scottish Natural Heritage (2002)
- 'Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity' The Countryside Agency and Scottish Natural Heritage (2003)
- 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA) 2nd Edition Landscape Institute and Institute for Environmental Management and Assessment (2002)

Figure 2.1 provides an overview of the main stages in the capacity assessment process.

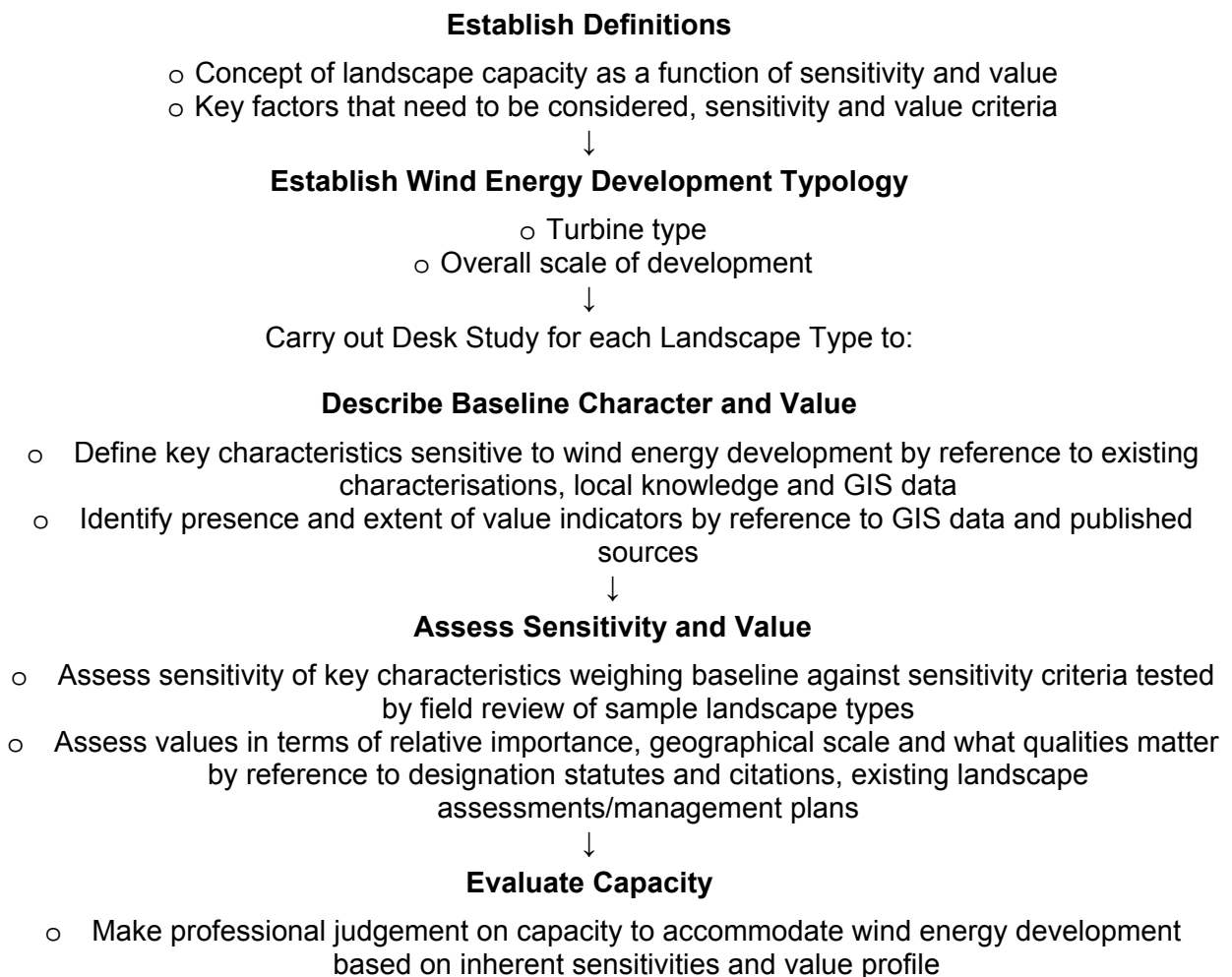


Figure 2.1: Methodology Overview

¹⁷ Schedule of Responses and Proposed changes, Cumbria County Council, July 2007

¹⁸ ETSU, Cumbria CC and South Lakeland DC 'Planning and Renewable Energy in Cumbria' 1994

¹⁹ Land Use Consultants for Breckland Council and King's Lynn and West Norfolk BC 'Wind Turbine Development: Landscape Assessment, Evaluation and Guidance' August 2003

²⁰ Lovejoy for Lancashire CC, Blackpool BC and Blackburn with Darwen BC 'Landscape Sensitivity to Wind Energy Development in Lancashire' February 2005

Definition of Landscape Capacity and Key Factors to Consider

- 2.11 The term landscape capacity is used to describe the ability of a landscape to accommodate different amounts of change or development of a specific type. For the purposes of this study the following definition of **capacity** has been adopted:

The extent to which a landscape is able to accommodate wind energy development without key characteristics being adversely affected and the values attached to it being compromised.

- 2.12 Judgements on the capacity of different landscapes to accommodate wind energy development have been made by consideration of the following factors:

- the inherent sensitivity of the landscape to wind energy development
- the value attached to the landscape or specific elements in it

- 2.13 For the purposes of this study the following definition of inherent **sensitivity** has been adopted:

The extent to which the character of a landscape is able to accommodate change brought about by the introduction of wind energy development.

- 2.14 Topic Paper 6 (5.1) explains that when making sensitivity judgements '*it is essential to think in an integrated way*' about the exact form and nature of the change and particular aspects of the landscape likely to be affected. The approach taken here has done this by recognising that the primary impact of wind energy development is the introduction of new manmade large scale vertical elements with moving parts which have visual effects on the character of the landscape and those experiencing it rather than physical changes to the landscape elements themselves. The key characteristics of the landscape which are likely to reflect sensitivity to wind energy development have been identified as follows:

- Scale and Enclosure
- Complexity and Order
- Manmade Influence
- Skyline
- Connections with Adjacent Landscapes
- Remoteness and Tranquillity
- Visual Interruption
- Settlement and Key views

The first 6 criteria relate to landscape character, and the last 2 relate to visual aspects.

- 2.15 Appendix 2.1 provides further detail on these key characteristics and discussion of how they relate to landscape sensitivity. In accordance with Topic Paper 6 (Section 5) they embrace a consideration of the following aspects and analysis of potential interactions with the type of change brought about by wind energy development:

- Impacts on landscape character aspects encompassing natural and cultural elements such as landform, land use, settlement, field enclosure and other interventions by man.

- Impacts on aesthetic aspects such as scale, visual enclosure, complexity, order, pattern, movement, form and line. Scenic dimensions or qualities such as skyline, focal points, landmarks, backdrops and views can also be regarded as aesthetic aspects (Topic Paper 6 4.2 and 5.3). Whilst these are more experiential aspects as indicated in the LCA Guidance (5.12) they can still be “*recorded in a rigorous and systematic, if not wholly objective way*”.
 - Potential visibility aspects such as visual interruption by landform, woodland etc, population density and patterns, settlement structures and key views appreciated by residents, communities or visitors.
 - Mitigation potential, whilst accepting that there is limited scope to screen development of this height recognising opportunities for achieving optimum compatibility with landscape character through design of the development composition etc
- 2.16 It is acknowledged that Remoteness and Tranquillity is generally considered to be a perceptual aspect and is more subjective with responses being more personal and coloured by the experience and preferences of the individual. As such Topic Paper 6 advocates its consideration under value. In the assessments that follow the descriptions of this key characteristic reflect the responses of professional assessors recorded in the Cumbria Landscape Classification²¹. However these judgements have also been informed by an element of objectivity reflecting the physical absence and movement of elements such as main roads and rail communication, large scale commercial and industrial development etc. In view of this and following the practice in a number of similar assessments it is included under sensitivity.
- 2.17 Some landscape types are able to accommodate wind energy development more easily than others. Often this can be governed by whether the intrinsic characteristics of wind energy development are compatible with their key characteristics and whether there is potential for a comfortable landscape fit, for example on a large scale, exposed or windswept hill. However there can also be potential for turbine development to contrast with key characteristics with scope for a well designed scheme to reinforce compositional qualities, for example on a simple and uncluttered horizontal plane.²²
- 2.18 A set of criteria was established for gauging sensitivity (Table 2.1). The criteria were primarily devised for the purposes of the current capacity assessment but they are also intended to have application at a site specific level. The table is structured according to the key characteristics sensitive to wind energy development and describes the attributes that would suggest a lower or higher sensitivity to wind energy development.
- 2.19 The criteria are often closely linked and on face value might appear contradictory. However this is inevitable because physical elements or features in the landscape can be relevant to more than one type of sensitivity. For example under the scale and enclosure criterion the presence of ‘*human scale indicators*’ is included as one attribute indicating higher sensitivity because turbines appear out of scale against human scale details such as farm buildings, walls, hedges, trees etc, however under the visual interruption criterion the presence of these very same features ‘*frequent vegetative or built features*’ is included as one attribute indicating lower sensitivity because they provide visual containment.

²¹ Cumbria County Council ‘*Cumbria Landscape Classification*’ 1995

²² Marc van Grieken et al ‘*Wind Farms in Scotland*’ Landscape Design Journal Oct 2003

Table 2.1 Landscape Sensitivity Assessment Criteria

Key Characteristic	Attributes indicating lower sensitivity to wind energy development	↔	Attributes indicating higher sensitivity to wind energy development
Landscape Character			
Scale and Enclosure	Large scale landform/land cover/development Featureless Coarse grained Open with broad views Exposed	↔	Small scale landform/land cover/development Human scale indicators Fine grained Enclosed with narrow views Sheltered
Complexity and Order	Simple Predictable Ordered and hierarchical Smooth and flowing Geometric with linear features Regular patterns	↔	Complex Unpredictable Confused and haphazard Rugged and intricate Organic with variable accents Irregular mosaics
Manmade Influence	Presence of utility, infrastructure or industrial elements Contemporary structures eg masts pylons, cranes, silos, industrial sheds with vertical emphasis Functional manmade land use patterns and engineered aspects	↔	Absence of manmade elements Traditional or historic settlements, buildings and structures Natural features and 'natural' forms of amenity parkland
Skyline	Reposeful skylines Simple predictable skylines Existing vertical focal points Discrete and well ordered verticals in coherent pattern with landscape Moderating features eg tiered horizons, low contrast with background	↔	Distinctive landmark skylines Complicated unpredictable skylines Bare uncluttered horizons Confusion of existing verticals of variable form and function Intensifying features eg framed vistas, valley rims, channelled views
Connections with Adjacent Landscapes	Gradual transitions in elevation Weak connections Neighbouring landscapes of low sensitivity Limited views into and out of landscape Simple large scale backdrops	↔	Sharp contrasts in elevation Contributes to broader scenic composition or setting Neighbouring landscapes of high sensitivity Prospects into and out from high ground or open edges Intricate or distinctive backdrops
Remoteness and Tranquillity	Busy and noisy Human activity and development Prominent movement	↔	Sense of peace and isolation Remote and empty No evident movement
Visual			
Visual Interruption	Rolling topography Frequent vegetative or built features	↔	Flat or gently undulating topography Few if any vegetative or built features
Settlement and Key Views	Unpopulated or sparsely populated Concentrated pattern of large settlements Introspective settlement Inaccessible Indistinctive or industrial settings	↔	Densely populated Dispersed pattern of small settlements Outward looking settlement Landscape focused recreation routes and/or visitor facilities Distinctive settings, 'gateways' or public viewpoints


- 2.12 For the purposes of this study the following definition of landscape **value** has been adopted:

The relative importance that stakeholders attach to different landscapes based on a range of criteria that may include the following: scenic quality; rarity; the influence and presence of other conservation interests; special cultural associations; associated recreation or amenity function or perceptual aspects such as remoteness and tranquillity. Value may be formally recognised through local or national designations on the basis of these criteria either individually or in combination. Alternatively or in the absence of designations there may be a long established consensus about the importance of a particular area encompassing one or more of these criteria which can be traced from views expressed by different stakeholders either nationally or locally.

- 2.20 As this capacity assessment is to be used for strategic locational guidance reference to designations has been restricted to those of sub-regional level and above eg Landscapes of County Importance, Areas of Outstanding Natural Beauty, Registered Historic Parks and Gardens, World Heritage Sites and National Parks etc.
- 2.21 The objectives behind those designations and the special qualities or attributes that justified designation need to be noted in order to judge whether they might be affected by changes brought about by wind energy development (see paragraph 2.33). It must be clearly recognised that a highly valued landscape, whether nationally designated or not, does not automatically, and by definition, have high sensitivity. It is entirely possible for a valued landscape to be relatively insensitive to wind energy development because of both the characteristics of the landscape itself and the nature of the development. The qualities for which a landscape is designated may not be compromised by change brought about by wind energy development (see paragraph 2.39). However a cautious approach needs to be taken in statutory protected areas since potential impacts within these areas will have heightened significance due to their widely recognised value at an international or national scale.
- 2.22 A set of criteria was established for gauging value (Table 2.2). The criteria were primarily devised for the purposes of the current capacity assessment but they are also intended to have application at a site specific level. The table is structured according to the key indicators of value and describes the attributes that would suggest a lower or higher value. Textual scales for landscape importance according to designation status and rarity were also devised to assist in the value assessment process. The threshold criteria for these are set out in 2.1.

Table 2.2 Landscape Value Assessment Criteria

Key Indicator	Attributes indicating lower value	↔	Attributes indicating higher value
Landscape Designation*	No specific designation	↔	National or regional designation reflecting scenic quality etc eg AONB
Designated elements or features	Few if any designations	↔	Frequent designations of national or regional importance eg Registered Historic Parks and Gardens
Rarity*	Common	↔	Unique
Conservation Interests	Weak interest	↔	Strong interests eg ecology geology/geomorphology, historic environment that affect peoples' perception and appreciation of landscape as well as having a value in their own right
Cultural Associations	No specific associations	↔	Strong associations with particular people, artists, writers, or other media or events in history
Scenic Quality*	Low visual appeal	↔	Strong visual appeal attributable to a particular combination of elements and the aesthetic qualities they produce
Perceptual Aspects	Weak sense of place	↔	Strong sense of place attributable to qualities perceived by visual and other senses eg scenic beauty or attractiveness, remoteness, tranquillity** and wildness
Associated Recreation or Amenity Function	Little or no recreation or amenity function	↔	Designated or well used for recreation or amenity such as public access, parkland or 'green' space

 Indicators not assessed individually in capacity assessment but may be reflected within designations identified and relevant to site specific assessment.

* At site specific level high value in terms of landscape designations, scenic quality or rarity at a local geographical scale may need to be recognised in making judgements about the significance of effects.

** Tranquil Area maps may be a useful reference on this aspect and are available on from the Council for the Protection of Rural England web site (www.cpre.org.uk).

Wind Energy Development Typology

- 2.23 Sensitivity assessment considers how wind energy development will potentially interact with the landscape. To do this it is first necessary to understand the form of development proposed and nature of change likely to take place. This is like describing the development in an Environmental Impact Assessment (EIA) except that it is generic rather than project specific. Hence generic typologies for individual turbines and different scales of development were identified to allow visualisation of the effect within the landscape and consideration of the most appropriate scale of development within each landscape type.
- 2.24 Turbines with a hub height of 60-75m and blade length of 35 – 45m giving a blade tip height of 95 to 120m and having an installed capacity of 1.3 – 3MW have been assumed. This reflects the type of turbines now most commonly available within the industry and coming forward in current applications and enquiries within Cumbria.
- 2.25 The following generic typology of six different scales of wind energy development is considered to represent the types of commercial or grid connected development likely to come forward as applications in Cumbria based on current interest and the scale of the receiving landscape in Cumbria:

Table 2.3 Development Typology

Category	No. Turbines	Installed Capacity
<i>Single or Twin</i>	1-2 turbines eg Vordian Factory, Siddick Pirelli Factory, Carlisle	1.3 - 6MW
<i>Small Group</i>	3-5 turbines eg Hoff Moor, High Pow, Fairfield Farm, Brownrigg Hall, Hellrigg, Lamonby	2.6 – 15MW
<i>Large Group</i>	6-9 turbines eg Winscales Moor	7.8 – 27MW
<i>Small Wind Farm</i>	10-15 turbines (no current examples)	13 – 45MW
<i>Medium Wind Farm</i>	16-25 turbines (no current examples)	20.8 – 75MW
<i>Larger Wind Farm</i>	25 or more turbines eg Whinash	62.5MW+

- 2.26 The study does not address small domestic installations or offshore developments.

Establish Baseline Character and Value

- 2.27 The existing generic landscape typology and character descriptions contained in the Cumbria Landscape Classification (CLC)²³ provide the primary basis for consideration of landscape sensitivity and subsequent evaluation of capacity for wind turbine development. This classification defines 13 landscape types and these are sub-divided into 37 landscape sub-types. It also identified the main urban areas but no character assessments were undertaken for these. Given that the current study is focused at a strategic level the main landscape types were considered to be an appropriate basis for the landscape capacity evaluation and subsequent locational guidance. This decision was also related to the scale of development being considered. Wind turbines of up to 120m have wide ranging visual influence and any development will affect not only the receiving sub-type but also neighbouring sub-types and types. This is particularly pertinent in Cumbria where

²³ Cumbria County Council 'Cumbria Landscape Classification' 1995

landscape types and sub-types are often in tight sequences or interwoven patterns.

- 2.28 Variations in character and value between sub-types was considered at the pilot stage and it was concluded that any such variations would not generally make a significant difference to the overall indicative capacity level of each landscape type ie they were relatively homogenous. However detailed variations in character and value between sub-types are picked out on the Capacity Assessment sheets to assist the site selection process. Localised geographical variations can also occur both within sub-types eg valleys and ridges and/or cut across them eg M6 corridor. These are relevant to siting considerations at a site specific level and are again identified in the Capacity Assessment sheets and highlighted in the Capacity Statements in terms of areas of greatest and least potential.
- 2.29 More significant sub-type and geographical variations have been dealt with by making exceptions to the landscape typology. An exception was made for urban areas and urban fringe sub-types (2d and 5d) which were abstracted from the classification and grouped as a separate 14th landscape type because of their unique character and key sensitivities in relation to wind energy development. An exception has also been made for Type 9: Intermediate Moorland and Plateau dividing it into two groupings based on consistency of character, and specifically the key sensitivities in relation to wind energy development. Type 9i: Intermediate Moorland covers higher and broader areas of very large scale and with weaker visual connections to adjacent landscapes. Type 9ii: Moorland Hills and Plateaus covers lower and smaller areas of medium to large scale, has a more mixed land cover pattern and stronger visual connections to adjacent landscapes and visual receptors of high sensitivity.
- 2.30 Landscape character information was also drawn from other sources including the existing Wind Energy Supplementary Planning Guidance, Structure Plan Technical Paper No. 5²⁴, Countryside Character Area descriptions²⁵ and AONB management plans. Reference to published information sources was also supplemented by accumulated knowledge from professional involvement in the preparation of the CLC and development control advice on current wind energy proposals.
- 2.31 The County Council's Geographical Information System (GIS) and hard copy 1:50,000 Ordnance Survey Maps were used to derive baseline information on settlement patterns, tourism facilities; strategic recreation trails and transport routes (see Appendix 2.3).
- 2.32 A systematic desk top review of the above information sources was undertaken. For each of the 14 landscape types worksheets were used to collate information on each of the 8 key characteristics identified above as being sensitive to wind energy. These were then analysed in order to derive a summary description to be recorded on Capacity Assessment sheets.
- 2.33 A number of information sources were used to build up a profile of strategic landscape values for each type. GIS was used to identify the presence and extent of strategic landscape designations and other designated conservation interests (see Appendix 2.3). Information on the objectives behind landscape designations and the special qualities for which they were designated was obtained from the Countryside Agency web site (www.countryside.gov.uk), consultation with AONB managers, AONB landscape assessments and management plans, relevant development plans and Structure Plan 1991-2006 Technical Paper No.4 –

²⁴Cumbria County Council 'Cumbria and Lake District Joint Structure Plan 2001-2016: Technical Paper 5: Landscape Character'


²⁵ Countryside Agency 'Countryside Character Initiative: North West' (www.countryside.gov.uk/cci)

Assessment of County Landscapes.²⁶ The Cumbria Landscape Classification provides information on the area of each landscape type and sub-type within Cumbria. It was therefore utilised as an indicator of rarity value of each landscape type within the county. Descriptions of associated geological, ecological, historic and cultural interests were primarily derived from descriptions in Structure Plan 2001-2016 Technical Paper No.5 – Landscape Character²⁷. These values were again summarised and recorded on the Capacity Assessment sheets.

Assessment of Sensitivity and Value

2.34 The sensitivity of each key characteristic was judged by weighing the baseline information against the criteria summarised in Table 2.1. In accordance with Topic Paper 6 (5.4) the assessments brought together four sets of considerations, as described in 2.15 above, so that the sensitivity of each landscape type to wind energy development could be judged. The level of sensitivity was expressed for each landscape type according to a five point scale as outlined below:

Level of Sensitivity

High	Key characteristic(s) of landscape very vulnerable and would be adversely affected by turbine development
Moderate/High	
Moderate	
Moderate/Low	
Low	Key characteristic(s) of landscape very robust and would not be adversely affected by turbine development

2.35 This level and a description of the particular sensitivity was recorded on the Capacity Assessment sheets together with the overall level of sensitivity for each landscape type determined by taking the average for all the key characteristics.

2.36 A field review was undertaken to test the findings on a sample of landscape types and the assessments were further informed and refined by this field exercise. The findings were also reviewed by the Council’s Landscape and Countryside Officer experienced in landscape and visual impact assessment and they therefore represent a consensus of professional opinion.

2.37 A further consideration was undertaken to identify the appropriate scale of wind energy development according to the typology defined above. This was determined by the scale of the landscape and elements within it together with settlement size and pattern as described in the key characteristics of Scale and Enclosure and Settlement and Key Views.

2.38 No attempt was made to express the overall level of value for each landscape type as it was considered that any such mathematical approach would disguise the subtleties inherent in the assessment. However key indicators of value were analysed against the criteria summarised in Table 2.1 to build up a value profile for each landscape type. Where relevant individual value grades were expressed in the capacity judgements. Value grading according to designation status could be

²⁶ Cumbria County Council ‘Cumbria and Lake District Joint Structure Plan 1991-2006: Technical Paper No. 4: Assessment of County Landscapes


²⁷ Cumbria County Council ‘Cumbria and Lake District Joint Structure Plan 2001-2016: Technical Paper 5: Landscape Character’

expressed fairly confidently because there is a reasonable consensus of professional opinion and examples of good practice such as the DETR scale (see Appendix 2.2). However due to the absence of a similar consensus or national guidance the grading of other value factors was more reliant on professional judgement.

Evaluation of Capacity

2.39 The capacity of each landscape to accommodate wind energy development was judged primarily on the basis of the assessment of sensitivities with an adjustment for landscape designation values and any other individual values that would affect the significance of potential impacts. Adjustments for value were based on professional judgement taking account the value profile of key indicators described above and relevance to the key characteristics sensitive to wind energy development ie the extent to which recognised qualities of designated landscapes or other values might be compromised by wind energy development. Capacity was expressed for each landscape type according to a five point scale as outlined below:

Level of Capacity

High	Low landscape sensitivity and landscape or key characteristics of low value. Indicates opportunity to accommodate wind energy development at an appropriate scale without significant adverse landscape effects.
Moderate/High	
Moderate	
Moderate/Low	
Low	High landscape sensitivity and landscape or key characteristics of high value likely to be compromised. Indicates that any type of wind energy development would be likely to have a significant adverse landscape effects and would not generally be appropriate.

In accordance with Topic Paper 6 (7.4) each of the component parts of the final judgement were recorded on a Capacity Assessment Sheet for each landscape type under the headings of:

- **Overall Sensitivity:** reflecting landscape character and visual sensitivity as set out in Table 2.1.
- **Value:** reflecting landscape designations, rarity, conservation interests and cultural associations as set out in Table 2.2

Capacity levels were recorded in a concluding statement on the Capacity Assessment sheets supported by a justification for this judgement, an indication of the most appropriate scale of wind energy development and a summary of the main factors favouring or limiting development.

2.40 It should be noted that the capacity levels indicate the ability of each landscape type to accommodate a certain scale of development according to its inherent character and value. They are not intended to indicate the extent to which the landscape has capacity to accept multiple developments of any type ie cumulative capacity. Consideration of cumulative effects is dealt with earlier in Part 2 and explains why this can only be undertaken on a case by case basis at the time of any specific planning application. Spatial extent and geographical distribution of each type will

also influence scope for multiple developments. Spatial extent determines capacity in a physical sense (space available) and is very different to rarity which is based on the relative sizes of landscape types or sub-types.

- 2.41 As also explained earlier in the SPD the visual settings of international and national landscape designations need to be taken into account when considering specific sites in accordance with PPS22 (paragraph 14) and policies R45 and E34 of the Joint Structure Plan. To assist in this wherever relevant particular sensitivities in relation to the setting of such designations are highlighted at the end of the Capacity Statements. These express potential for significant effects but recognise these will be dependent on the precise relationship between any proposed development and the designation as determined by the scale of a proposal, visual influence in relation to the designation, local screening, key receptors etc.

Landscape Capacity Assessment Sheets

LANDSCAPE TYPE 1: ESTUARY AND MARSH

Landscape Sub-Types	1a Intertidal Flats 1b Coastal Marsh
Key Characteristics	Sensitivity
Landscape Character:	
<p>Scale and Enclosure Large scale landscape of wide beaches and mudflats along exposed outer coastline and around estuaries mouths. Flat landform provides distant horizons, panoramic views and big skies. Enclosure behind beaches by low cliffs, sand dunes, raised beaches. Scale reducing in the sheltered inner estuaries and marshes (1b) with protecting enclosure of land and fells. Estuarine vistas featuring Lakeland or Scottish peaks. Enclosure behind marshes (1b) by sea dykes, railway embankments, gorse scrub and hedges. Small details such as the winding creeks reduce the sense of scale overall.</p>	<p>Moderate (3) Within estuaries medium to large scale suggests scope for group sized development. However may appear incongruous against small scale intricacies and inner estuaries are highly sensitive due to their intimate scale and narrowed zones of visibility. Expansive scale and exposure of broader outer estuaries suggests scope for a larger development evoking a rational, functional image.</p>
<p>Complexity and Order Unique attraction of this landscape centres on its dynamic nature with shifting patterns of texture, colour and play of light. Shimmering water gives way to golden sands or shining silt. Wide beaches are strewn with patches of boulders (scaurs) and have upper foreshores of shingle. Estuarine mudflats are etched by a maze of minor channels. Salt marshes (1b) comprise closely grazed turf with an intricate pattern of creeks, gorse scrub and remnant hedges on higher marshes. Prolific birdlife is integral to character offering feeding and roosting ground for waders (1a) and wildfowl (1b).</p>	<p>High (5) Vertical turbine structures would provide a strong contrast with the simple flatness of this landscape. However its intrinsic character lies largely in the fascinating and dynamic patterns either reflected or etched across its surface. Turbine development likely to relate poorly to irregular and intricate detail of these natural patterns. Turbine development out in the broader estuary mouths may avoid such difficulties and create a simple focal point.</p>
<p>Manmade Influence Essentially natural landscapes spoilt only by minor or distant eyesores. Marine litter and old industrial waste can spread along the beaches. A few isolated large structures are visible around margins including power stations, terminals, sea rigs, and transmission masts. Fishing on the mudflats for cockles etc and grazing marshes by sheep and cattle. Historical drove routes of 'waths' across inner estuaries but very few modern road and rail crossings.</p>	<p>High (5) The semi-natural land cover and associated birdlife creates a strong sense of 'wildness', which may be perceived as being compromised by turbine development. There are few opportunities to relate to existing man-made features and forms. However a distant and isolated turbine grouping could form a point of focus comparable to other large structures around the margins of this landscape.</p>
<p>Skyline Coastal skyline uninterrupted and smooth –giving way to wide open skies with only a few distant isolated large structures around the margins. Inner southern estuaries dramatically enclosed by Lakeland fells and limestone escarpments.</p>	<p>Moderate/High (4) Isolated turbine grouping could form a point of focus and clear contrast with simple and subdued coastal skylines. However likely to mar or compete with skylines defined by picturesque fells or distinctive limestone escarpments.</p>
<p>Connections and Adjacent Landscapes Estuaries stretch well inland and strongly interact with other landscapes to form picturesque compositions. Southern estuaries have strong links with neighbouring high ground including coastal limestone (3), the Lakeland fells and their foothills (11a) and moorland extensions (9d). These create significant backdrops to Type 1 as well as prospects of it. Slight elevation of neighbouring dunes (2a) also provides extensive vantage over this landscape.</p>	<p>High (5) Picturesque compositions and vistas vulnerable to turbine development. Open prospects from neighbouring fells and dunes also sensitive.</p>
<p>Remoteness and Tranquillity Essentially remote with disturbance limited to tourism and recreation pressures around the edges. Writers emphasise the stillness and tranquillity of the estuaries as an essential quality. Sense of remoteness attributable to absence of manmade features and open majestic scale makes viewer feel small and vulnerable and evokes a sense of freedom. Wild peaceful character of marshes reinforced by birdlife and grazing stock.</p>	<p>High (5) Noise and movement of turbines likely to compromise sense of peace, isolation and remoteness.</p>
Visual:	
<p>Visual Interruption Exposed landscape with no interrupting features. Landward edge of the marshes generally defined by dykes, beaches and estuary mouths by sand dunes, low cliffs or raised beaches.</p>	<p>High (5) Turbine development likely to be widely visible. Potential for visual confusion around low enclosure features due to partial visibility.</p>
<p>Settlement and Key Views Notably absent although development of coastal towns, villages and camp sites around the fringes has responded to vistas across the estuaries. Hadrian's Wall Trail, Cumbria Coastal Way and Cycle Way also offer extensive vantage over this landscape.</p>	<p>Moderate (3) Localised potential for over dominance and intrusion.</p>
Overall Sensitivity	Moderate/High

LANDSCAPE TYPE 1: ESTUARY AND MARSH

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting 1b and fringes of 1a in inner Solway Estuary (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting or buffer zone
Solway Coast AONB Majority of 1b in Solway Estuary	National: Conservation and enhancement of natural beauty attributable to: wild and remote qualities due to absence of large scale industrialisation, main roads and railways; rich presence of birdlife and expansive area of saltmarshes; distinctive contrasting sequence of coastal margins/ farmland and mossland; open and attractive views to Scottish coast and Lakeland fells; small distinctive villages.
Arnside and Silverdale AONB Part of 1a and 1b at head of Kent Estuary in Morecambe Bay	National: Conservation and enhancement of natural beauty attributable to its: scenic qualities including the distinctiveness of its Carboniferous limestone; mosaic of contrasting landscape types; dramatic views over Morecambe Bay; wildlife resources; cultural, archaeological and historic heritage; intimate scale and tranquillity.
Landscape of County Importance Remainder of 1a and 1b beyond AONBs apart from sections of 1a along outer West Cumbrian coast	County: Protection of distinctive character attributable to: dramatic unobstructed views; fascinating patterns across sands or water and channels etched in marshes; absence of detractors; unique and sublime compositions with adjacent fells and simplicity creating a strong positive response.
Rarity	Area of County
1a Intertidal Flats 1b Coastal Marsh	7.5%: common 1.0%: rare
Conservation Interests and Associations	Description
Geology and Geomorphology Dynamic processes of coastal erosion and deposition Small RIGGS near St Bees	Mudflats have greatly increased over centuries following progressive siltation. Sediments derive mainly from Irish Sea. River channels are constantly shifting and thereby affecting extent of salt marshes. Long shore drift operates on open coast. Features of marsh include dendritic creeks and erosion cliffs on seaward edge, terraces related to isostatic uplift and creek migrations and isolated water known as pans or flushes.
Ecology Extensive habitats and internationally important for bird life Extensive designation of 1a and 1b in main estuaries as SPA's, SACs and SSSIs No designations on beaches of outer coastline except SAC/SSSI at Drigg	Mudflats of Cumbria some of most important habitats in UK supporting huge numbers of invertebrates such as cockles and providing main feeding grounds for internationally important numbers of wintering and passage waders and wildfowl eg shelduck, dunlin and redshank. Boulder scaurs support mussel beds providing feeding grounds for eider duck, turnstone etc. Marshes also of international importance as feeding grounds for wildfowl and roosts for waders eg pink-footed geese, Bewick swans, curlew and golden plover. Peregrine falcon and merlin hunt over marshes in winter. Other birds breed there eg redshank. Marshes also support uncommon and rare invertebrates and natterjack toads and great-crested newts.
Historic Environment Some localised interest	Number of wrecks in Morecambe Bay. Throughout evidence of historical rights of way or waths, various cultural artefacts relating to shipping and trade. Good survival of organic artefacts eg prehistoric forests; fish traps due to waterlogged conditions. On marshes remains include settlements lost to sea, former quays and salt pans.
Cultural Scenic qualities and historic routes have inspired poets, painters and writers. Solway associated with historical characters and events.	Routes across estuaries described by numerous writers eg Elizabeth Gaskell in "Sextons Hero". Estuaries also well documented through work of artists and poets eg Wordsworth, JNW Turner, David Cox, Norman Nicholson, Paul Nash and Thomas Sutherland. Invasion of Scotland via Solway anticipated by Edward 1 st in 1307 and Mary Queen of Scots fled rebellion in Scotland by boat down Solway Firth in 1568.

LANDSCAPE TYPE 1: ESTUARY AND MARSH

Capacity Statement

Overall the Estuary and Marsh landscape is judged to have **low** capacity to accommodate turbine development. Potential is limited by the high sensitivity of many of its inherent and unique characteristics, moderate/high to high landscape value recognised by LoCI and AONB designations*, and strong ecological interest and cultural associations.

Any type of turbine development would have the potential to impinge on the natural character and strong sense of remoteness, tranquillity and wildness for which this landscape is valued. Its flat openness affords panoramic views which would be compromised, particularly where the estuaries combine with neighbouring dunes, mossland, farmed coastal plain and fells to create unique and picturesque estuarine compositions. Turbine development would also detract from the dynamic spectacle of shifting patterns of texture colour and play of light across sea, sand, marsh and sky.

There appears to be limited potential in the broad estuary mouths for isolated turbine development to create a focal point, comparable to other isolated structures around the margins of this landscape and in simple contrast with flat or subdued coastal skylines. The expansive scale and exposure here suggests that development up to wind farm size might be accommodated and benefit from a strong sense of purpose and rationality in such a location. However existing permissions for nearby off-shore developments suggests these areas are at or near capacity.

Particular sensitivities in relation to the setting of international and national designations include:

- *contribution of open sea, foreshore and salt-marshes to a sense of wildness, the sequence of contrasting landscapes and uninterrupted views across to Scotland in the Solway Coast AONB*
- *open sequential views from recreation and tourist routes along the coastal edge of the Solway Coast AONB and Frontiers of the Roman Empire: Hadrian's Wall across the Solway Firth to Scottish mountains and across the coastal plain towards the Lakeland fells most notably from Cumbria Coastal Way, the B5300, National Cycle Route 72, Hadrian's Wall Trail and from viewpoints at coastal forts associated with the Wall*
- *contribution to tranquil and picturesque compositions with fells in the Lake District NP and limestone hills of the Arnside and Silverdale AONB around the southern estuaries*
- *key views to and from the Furness Fells within the Lake District NP most notably sequential views from the trunk road and tourist route skirting the edge of the Park, Cumbria Way and National Cycle Route 72*

* For those areas that fall within the Solway Coast or Arnside and Silverdale Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 2: COASTAL MARGINS

Landscape Sub-Types	2a Dunes and Beaches 2c Coastal Plain 2b Coastal Mosses
Key Characteristics	Sensitivity
Landscape Character:	
<p>Scale and Enclosure Variable largely flat open large scale landscapes with big skies, long views and large rectangular fields where vertical features stand out. Hummocky dunes (2a) offer shelter and small scale interest. On glacial till farmland/mosses (2b/2c) can be undulating, more enclosed and intimate with smaller irregular fields. Some localised enclosure and scale indicators include dunes, sea dykes, rail embankments, plantations, moss woodland, gorse and willow scrub, hedges and copses (increasingly scarce and wind shaped towards coast).</p>	<p>Moderate (3) Large group would not intimidate broader scale of flat open farmland, whilst in more contained undulating terrain a small group would be more appropriate. In close range large turbines may appear incongruous against small scale landforms and land cover features of dunes, mosses and more marginal undulating areas. Exposed coastal margins of Solway Plain and Walney fringes evoke a strong design rationale.</p>
<p>Complexity and Order Soft organic forms and textured detail of dunes and beaches (2a) contrasts with simple flatness and rectilinear patterns of coastal plain (2c). Large square fields of improved pasture with some arable cropping are divided by hedges or fences and bordered by ditches and straight roads. Blocks of conifers common at head of estuaries. Varies to more irregular patterns and richer variety of textures and colours in undulating areas and mosses (2b) with mosaics of heath, willow/birch scrub and rough pasture with rushes/ gorse and into smaller narrow fields</p>	<p>Moderate (3) Opportunities for ordered grouping of turbines to mirror geometric regular field patterns and form a simple contrast with the horizontal plane. Sensitivity increases where landscape varies to more irregular forms and complex mosaics with natural vegetation.</p>
<p>Manmade Influence Mix of farmland and semi-natural areas with isolated farmsteads and small villages. Strong local vernacular of cobblestone or clay built buildings, walls and banks. Heritage of Roman wall and forts and dismantled railways. Occasional modern structures include hard sea defences, drainage channels, pylons, masts, industrial buildings and hangars near urban fringe, farm sheds and silos. Tourism development on outer coast eg caravan parks, golf courses. Land management eg intensive farming, forestry and large scale peat cutting.</p>	<p>Moderate/High (4) Limited scope to relate to similar man-made structures. Some potential to relate to 'working' character of intensively farmed areas with engineered aspects and integration with larger scale geometric manmade land cover patterns. However likely to appear incongruous against heritage and vernacular features.</p>
<p>Skyline Landform generally has horizontal emphasis producing open views, strong coastal horizons and big skies. Smooth towards coast rougher inland with woodland cover and backdrops of higher ground. Attractive Distinctive backdrop of fells to inner margins of southern estuaries. Occasionally villages, farmsteads, copses or masts stand out as prominent features.</p>	<p>Moderate (3) Opportunity for isolated turbine grouping to form a predictable and simple contrast with horizontal plane. However there are issues related to maintenance of clear simple horizons and conflict with more complex skylines around southern estuaries.</p>
<p>Connections and Adjacent Landscapes Quite complex due to configuration. Margins of southern estuaries benefit from picturesque backdrop of Lakeland fells, limestone escarpments, foothills and moorland (3, 11a, 9d). Contrast with Solway plain intertwined with low farmland ridges (5a) which interrupt views but also offer occasional prospects. Dunes (2a) offer prospects of estuaries (1) and coastal plain (2c). Elsewhere coastal plain tends to bleed into coastal urban fringe (2d).</p>	<p>Moderate/High (4) Contribution to picturesque compositions, fine vistas and setting of LDNP around southern estuaries and sequence of Solway AONB landscapes both vulnerable. Open prospects from neighbouring higher ground of ridges fells and dunes also sensitive. However visual interruption created by neighbouring ridges around Solway coastal plain may assist turbine development depending on height.</p>
<p>Remoteness and Tranquillity Dunes and beaches (2a) enjoy a sense of peace and remoteness apart from fringes disturbed by tourism. The mosses and coastal plain (2b and 2c) are generally peaceful backwaters relatively untouched by modern development.</p>	<p>Moderate/High (4) Noise and movement of turbines could detract from peaceful backwater characteristics.</p>
Visual:	
<p>Visual Interruption Largely open, flat or undulating farmland or mosses. Some containment features increasing inland including tall windbreak hedges, engineered railway and flood defence embankments, buildings, scrub woodland and plantations.</p>	<p>Moderate/High (4) Turbine development on exposed outer margins with greatest wind resource likely to stand out. Some localised screening but also potential for visual confusion around low enclosure features due to partial visibility.</p>
<p>Settlement and Key Views Dispersed pattern of small villages and isolated farmsteads connected by network of minor roads across 2c and outer Solway part of 2a. Tend to be nucleated in form although becoming more linear due to recent ribbon development especially along coast. Tightly knit with stone walls for shelter on outer coasts. Can occupy higher ground: tops of hills; raised beaches and sites along Frontiers of the Roman Empire: Hadrian's Wall or lower lying around fringes of the mosses. Caravan sites and tourist routes around outer coast. Hadrian's Wall Trail, Cumbria Coastal Way and Cycle Way, NCR 72 and B5300 also offer extensive vantage.</p>	<p>High (5) Limited scope to site development away from settled areas or tourism facilities. Size of development constrained by small scale nature of existing settlements with potential for over dominance.</p>
Overall Sensitivity	Moderate/High

LANDSCAPE TYPE 2: COASTAL MARGINS

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting Around inner Solway fringes of 2c (site and setting) and along outer Solway 2b and fringes of 2c (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
Solway Coast AONB Dunes (2a) and seaward edges of Solway Plain (2c and 2b)	National: Conservation and enhancement of natural beauty attributable to: wild and remote qualities due to absence of large scale industrialisation, main roads and railways; rich presence of birdlife and expansive area of saltmarshes; distinctive contrasting sequence of coastal margins/ farmland and mossland; open and attractive views to Scottish coast and Lakeland fells; small distinctive villages.
Landscape of County Importance Most of 2a and b. 2c on Walney Island and around Duddon and Leven Estuaries (Solway and South Lakeland parts excluded)	County: Protection of distinctive character attributable to unusual landforms of dunes and plain with rocky outcrops; rich variety of natural textures and colours; absence of detractors; impressive views with backdrop of Lakeland fells; vernacular features eg cobble banks, early field enclosure patterns and quietness creating a strong positive response.
Registered Historic Parks and Gardens Holker Hall	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Generally absent some blocks around Leven Estuary	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
2a Dunes and Beaches 2b Coastal Mosses 2c Coastal Plain	0.2%: rare 0.9%: rare 3.8%: ordinary
Conservation Interests and Associations	Description
Historic Environment Diverse interest with concentration along internationally important Hadrian's Wall, on the mosses and in villages. Conservation Areas: Several villages across Solway coastal plain (2c) and Biggar on Walney Island	Volatile environment in dunes (2a) remodelled by wave and wind action, erodes have revealed evidence of prehistoric settlement. Mosses (2b) contain evidence of reclamation associated with abbeys, evidence of peat rooms in long narrow enclosures, traditional field patterns of small irregular enclosure and later larger more regular enclosure. Also important for 20 th century military sites. Highly nucleated settlement pattern on coastal plain (2c) with evidence of late enclosure outfields. 17 th and 18 th century vernacular buildings of local red sandstone in north and clay buildings on Solway Plain. Most significant archaeological feature is Frontiers of the Roman Empire: Hadrian's Wall and associated forts. Some villages occupy sites of former forts eg Burgh-by-Sands.
Ecology Dunes and mosses important habitats extensively designated for international or national importance, localised interest across coastal plain Most of 2a dunes designated as SSSIs sometimes as SACs and around Walney Island as SPAs. Extensive designation of 2b mosses around Solway as SACs, SSSIs and NNRs, but around Duddon only partial coverage. 2c mostly undesignated occasional small sites including outlying mosses, moss and saltmarsh fringes and LPOs on east side of Leven Estuary.	Dunes and slacks (2a) support natterjack toads, plus breeding colonies of great crested –newts eider duck, terns and gulls. Also important for rare plants eg coralroot orchid. Wetter areas of lowland raised bogs or mires that dominate mosses (2b) support sphagnum moss and cotton grass whilst drier areas support heather, birch and Scots Pine and drained margins can support large areas of rush and purple moor grass pasture. Wildlife interest on mosses includes rare butterflies, lizards, dragonflies, reed bunting, skylark and redshank. Most of coastal plain (2c) agriculturally improved with interest confined to wooded remnant mires important for red squirrel, wintering wildfowl and farmland birds eg corn bunting in fields and otter, Atlantic salmon and sand martins along rivers.

LANDSCAPE TYPE 2: COASTAL MARGINS

Capacity Statement

Overall the Coastal Margins landscape is judged to have **low/moderate** capacity to accommodate a small turbine group and exceptionally a large group. Potential is limited by the overall moderate/high sensitivity of its variable landscape character, moderate/high to high landscape value of parts recognised by LoCI and Solway Coast AONB designation*, rarity of dunes and mosses and strong ecological and historical interests.

The Solway Coast is distinguished by a remarkable sense of wildness and remoteness, due to the presence of extensive wildlife habitats, lack of large scale industrialisation and absence of main roads and railways. Overall scenic quality is based on a diverse sequence of open sea, foreshore, salt-marshes, dunes and heath contrasting with inland landscapes of farmed coastal plain and mossland. These are both essential qualities of the AONB and are likely to be compromised by any scale of wind energy development.

Elsewhere much of the coastal plain landscape is large scale and open with simple rectilinear field patterns that would aid the integration of a small – large group of turbines in a geometric layout. The ‘engineered’ character of the drained coastal plain and mosses would provide an appropriate context for turbine development. However there are some characteristics of the landscape that are more sensitive to turbine development and which substantially reduce capacity in the landscape as a whole.

A primary constraint is the limited extent of flat coastal plain and configuration into narrow strips. In the south around the Duddon and Leven it combines with neighbouring fells and intertidal flats to form picturesque estuarine landscapes vulnerable to the intrusion of turbine development. Around the Solway it is fragmented by patches of more contained undulating terrain and irregular mosaics of semi-natural vegetation found on undulating boulder clay and remnant mosses where turbines could be over dominant and less readily integrated.

The flat coastal horizons, big skies offer opportunities for simple contrast and the outer exposed coasts to evoke a strong sense of purpose and rationality. However the protection of the open and largely undeveloped skyline, peaceful backwater character, powerful contrasts with soft organic forms and rich textures of fringing dunes are major restrictions to turbine development. Further limiting factors are the heavy but dispersed patterns of visible vernacular and heritage features and small rural settlements which would make it difficult to site development sufficiently distant so as not to compromise their scale and character. Settlement size and pattern suggest that up to a small group of turbines would generally be appropriate.

Particular sensitivities in relation to the setting of international and national designations include:

- *contribution to tranquil and picturesque compositions with fells in the Lake District NP and ~~fine~~ distinctive vistas to and from them around the southern estuaries*
- *contribution to a sense of remoteness and the sequence of contrasting landscapes in the Solway Coast AONB (as mentioned above)*
- *open sequential views from recreation and tourist routes along the coastal edge of the Solway Coast AONB and Frontiers of the Roman Empire: Hadrian’s Wall across the coastal plain towards the Lakeland fells most notably from Cumbria Coastal Way, the B5300, National Cycle Route 72, Hadrian’s Wall Trail and from viewpoints at coastal forts associated with the Wall*
- *open prospects across the coastal plain from the eastern side of the Arnside and Silverdale AONB, from Farleton Fell back to the AONB and the Limestone Link recreation route between them*

* For those areas that fall within the Solway Coast Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 3: COASTAL LIMESTONE

Landscape Sub-Types	3a Open Farmland and Pavements 3b Wooded Hills and Pavements	3c Disturbed Areas
Key Characteristics	Sensitivity	
Landscape Character:		
<p>Scale and Enclosure Medium to large scale rolling hills with limestone pavement and rocky outcrops. Sometimes rising abruptly as distinctive escarpments above the surrounding countryside (3a/b S. Lakeland) with cliffs and screes. In 3c superimposed with spoil heaps and pits of former iron ore mining creating a small scale hummocky landscape (3c). Land cover varies from open commons or fell tops with wide views and farmland divided into small-medium sized fields (3a Furness) to much more intimate enclosed well wooded hills interspersed with pasture and drained mossland (3b Arnside/Silverdale). Frequent scale indicators eg historic buildings, farms, stone walls, hedges.</p>	<p>Moderate/High (4) Single or small cluster development would not intimidate broader scale and wider horizons of open hills and small fells. Lower wooded hills and hummocky land disturbed by mining highly sensitive due to intimate scale and potential for over dominance in restricted zone of visibility. Turbines likely to appear out of scale in context of small scale field patterns and frequent natural and built scale indicators. Exposed coastal summits suggest a strong design rationale.</p>	
<p>Complexity and Order Complex with a rich variety of features and textures. Generally intricate but well balanced patterns of pasture fields divided by walls or hedges, limestone pavements and woodland - extensive in 3b but mostly restricted to steep scarp slopes in 3a. Harmony sometimes disrupted by major quarries and plantations. In contrast irregular manmade landforms and patchy naturalisation by scrub woodland in 3c creates a rich but visually confusing landscape. Features include tarns, historic buildings, parkland, and winding lanes.</p>	<p>High (5) In core limestone areas turbines likely to disrupt harmony of scenic compositions between open pastureland, pavements and woods. Likely to appear incongruous and sit uncomfortably against natural and manmade intricacies and accents. In areas disturbed by mining likely to compound visual confusion.</p>	
<p>Manmade Influence Strong sense of history derived from prehistoric sites, medieval buildings/remnant field patterns and old mine workings. Some parts largely managed agricultural land with distinctive field patterns. Others more mixed and naturalised with rougher textures of bare rock, rough pasture, scrub and ancient woodland. Some signs of reduced variety due to loss of boundary features; grazed woods etc. Large modern developments/roads generally absent. Localised manmade elements eg housing, quarries, small scale industry farm sheds.</p>	<p>High (5) Little or no scope for association with large scale modern development or regular patterns of management. Turbines likely to appear incongruous in context of historic field patterns and visible remains. Also likely to stand out as alien structures and be perceived as compromising unspoilt character and natural qualities.</p>	
<p>Skyline Distinctive craggy escarpments sometimes locally dominant eg Scout Scar, Farleton Knott, Arnside Knott. Elsewhere rolling hills create multiple horizons (3a, 3b) sometimes textured by trees. Hummocky terrain of 3c tends to produce multiple and less distinctive skylines with pylons/masts conspicuous.</p>	<p>High (5) Distinctive landmark skylines vulnerable. Potential for unpredictable relationship with complex skyline of hilly terrain, disturbing intermittent and partial turbine views, framing by hills and woods. Maintenance of uncluttered horizons is also an issue. Visual confusion with pylons/masts likely in 3c.</p>	
<p>Connections and Adjacent Landscapes Strong connectivity to simple foil of Morecambe Bay (1a,1b) and LDNP. Contributes to setting of coastal resorts, popular public viewpoints eg Hoad and routes into Lakes eg M6, A590. Abrupt elevational changes between scarps and open lowland (8b,2c,7a) create dramatic vistas.</p>	<p>Moderate/High (4) Turbines likely to jar against harmonious-estuarine compositions around Morecambe Bay and picturesque views from coastal resorts, public viewpoints, and strategic route ways. Striking contrasts/vistas from adjacent lowlands particularly vulnerable. Potential intrusion on townscape settings/valley rims.</p>	
<p>Remoteness and Tranquillity Core agricultural areas remote from main roads generally perceived as quiet and calm, particularly in Furness (3a,c). Others affected by proximity of urban areas, M6 and railway generating noise disturbance and recreation pressures. Internal roads mostly lanes but often busy. Extensive network of popular paths to fell tops and through woods (3a,b).</p>	<p>Moderate (3) Noise and movement of turbines likely to reduce sense of calm and peace of rural backwaters and semi-natural parts valued for quiet recreation. Busier parts close to urban fringes and major through routes less sensitive.</p>	
Visual:		
<p>Visual Interruption Rolling relief generally offers containment. Barer fell tops and farmland of 3a relatively open with limited containment by woodland and buildings. In 3b interruption by supplemented by hedges and blocks of woodland. Hummocky and wooded nature of 3c creates local enclosure</p>	<p>Moderate (3) Variable but absorption of turbine development generally assisted by rolling topography. Dense woodland cover in parts assists further but turbines likely to stand out more on barer farmland and summits.</p>	
<p>Settlement and Key Views Main settlements of Grange and Arnside developed rapidly as Victorian/Edwardian seaside resorts stimulated by Furness Railway. Late 20th century expansion onto flanks of fells to meet holiday/retirement home demand. Elsewhere fairly dense pattern of nucleated villages, scattered farms and hamlets with a strong limestone built character developing around farms in valleys or on hillsides next to springs. Trails eg W2W Cycle Route, Cumbria Cycle Way, caravan sites and viewpoints present.</p>	<p>High (5) Limited scope to site development away from settled areas or tourism facilities. Size of development constrained by small scale nature of nucleated historic villages with potential for over dominance especially where arc of view is restricted between hills.</p>	
Overall Sensitivity	Moderate/High	

LANDSCAPE TYPE 3: COASTAL LIMESTONE

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Arnside Silverdale AONB All of sub type 3b	National: Conservation and enhancement of natural beauty derived from the special qualities of: distinctive Carboniferous limestone scenery; mosaic of contrasting landscape types; dramatic views over Morecambe Bay; wildlife resources; cultural, archaeological and historic heritage; intimate scale and tranquillity.
Landscape of County Importance All of 3a	County: Protection of distinctive character attributable to distinctive limestone landforms, scenic variety, abundance of natural/built/cultural features, views and strong historic interest creating a strong positive response.
Registered Historic Parks and Gardens Dallam Tower and Sizergh Castle	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Large parts of 3b most notably Arnside Park, Middlebarrow and Major Woods Elsewhere localised notably Brigsteer Park, Eggerslack Wood, Kirkhead Wood, Grange, Humphrey Head Wood, Dalton Craggs, Hutton Roof, Clawthorpe and Curwen Woods (3a) Sea Wood and Bardsea Park (3a Furness) and Roanhead (3c)	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
3a Open farmland and Pavements 3b Wooded Hills and Pavements 3c Disturbed Areas	1.5% - Unusual 0.4% - Rare 0.1% - Unique
Conservation Interests and Associations	Description
Historic Environment Rich and diverse interest Conservation Areas: Kents Bank/Grange/The Slack (3a) and Beetham (3b)	Nucleated settlement pattern and mixed field patterns characterised by dry-stone walls with farm buildings mainly traditional and limestone built. Much evidence of quarrying and numerous limekilns. Archaeological remains include evidence of past iron working, Iron Age and Romano-British settlement sites with well preserved extant earthworks, caves containing evidence of prehistoric occupation (3a, 3b) and medieval fortified sites, pele towers and priories. Much of the woodland is ancient coppice wood and contains evidence of former woodland management and industries. 3c comprises an industrial landscape with evidence of former late 19 th /early 20 th century iron mining and limestone quarrying. Stately homes and parklands are also characteristic.
Ecology and Geology A richness of semi-natural habitats Designation extensive across 3b AONB and Farleton areas with SACs, SSSIs, and LPOs. Rest of 3a mostly undesignated but patches include SAC/SSSI at Helsington Barrows, LPOs around Grange and in pockets across Furness. Designations limited in 3c to small RIGGS and estuarine fringe.	Habitats largely determined by the underlying limestone geology. Open limestone pavements support a range of characteristic and rare species. Thin soils support limestone grassland, including nationally scarce blue moor-grass grassland type. In turn this supports a range of uncommon plants and rare butterflies. Woods often overlaying limestone pavement are upland mixed ashwood type and support a rich flora and fauna, including mezereon, yew, red squirrel and dormouse (3a,b). Juniper scrub and species rich hedgerows are also characteristic. Rich diversity of semi-natural habitats in 3c and valuable wildlife refuge bounded by pasture or built up areas. Habitats include open water, woodland, carr, gorse and hawthorn scrub and patches of unimproved, herb rich limestone grassland. Ponds used by mallard, moorhen, and gulls.
Cultural Diverse, including Scheduled Ancient Monuments, and related to heritage.	Areas within 3a are rich in Neolithic remains, many artefacts such as bracelets and axe heads have been found. Several sacred sites are present. A stone circle exists at Birkrigg Common. Pele Tower on Arnside Knott is a medieval townhouse. Limekilns produced quick lime to improve soil fertility in 18 th /19 th centuries. 3c has a heavy industrial mining heritage celebrated through Norman Nicholson's poetry.

LANDSCAPE TYPE 3: COASTAL LIMESTONE

Capacity Statement

Overall the Coastal Limestone landscape is judged to have **low** capacity to accommodate turbine development. This reflects moderate/high sensitivity overall, moderate/high to high landscape value recognised either by LoCI or AONB designation* of most parts, rarity and strong geological, ecological and historical interests-.

Any type of turbine development would have potential to compromise the picturesque coastal limestone scenery around Morecambe Bay. This landscape is valued by both residents and visitors for its varied but generally harmonious and unspoilt character. This is attributable to intricate sometimes complex compositions between hills, pastureland, limestone pavements, woodland and winding lanes, a strong sense of history and naturalness derived from a wealth of wildlife habitats, visible archaeological remains, historic buildings and field patterns and absence of major roads or built developments. Any scale of turbine is liable to upset this sensitive balance and appear incongruous with little or no scope for visual linkage or association with comparable structures or regular land cover patterns.

Turbines would also detract from the landmark skylines of limestone escarpments featuring cliffs and screes that often add drama within this landscape. Whilst the scale of some larger hills appears favourable turbine development is likely to conflict with small to medium sized field patterns, small nucleated villages and frequent scale indicators such as dry stone walls and trees. Other issues include limited scope to site development away from residential and tourism receptors; potential to erode the sense of tranquillity in rural backwaters and semi-natural areas; over dominance in relation to restricted views from valleys and disturbing effects of partial turbine views over settlements, woods and valley rims.

Whilst internally interruption by hills and woodland would assist in visually containing turbine development the configuration of this landscape into relatively small pockets set within contrasting open estuarine, drained mossland or drumlin landscapes tends to heighten its sensitivity. Potential conflicts with inherent landscape characteristics and wider scenic compositions would be exposed in a variety of important vistas enjoyed from the coastal resorts, public viewpoints and strategic route ways around the Bay.

Particular sensitivities in relation to the setting of national designations include:

- *contribution of the open pavements and farmland to picturesque compositions between the Lake District NP and the Arnside and Silverdale AONB across the Kent estuary visible from popular public viewpoints such as Hampsfell, Scout Scar and Arnside Knott and coastal edge of the AONB*
- *open prospects across the coastal plain between the eastern side of the Arnside and Silverdale AONB and Farleton Fell and from the Limestone Link recreation route between them*
- *contribution of the open pavements and farmland to picturesque coastal limestone landscapes which extend south from within the Lake District NP and to dramatic contrasts between the imposing limestone escarpments and flat drained mosslands around the Kent and Lyth valleys as viewed from the major A590 and A591 'gateways'*

* For those areas that fall within the Arnside and Silverdale Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 4: COASTAL SANDSTONE

Landscape Sub-Types	4a Coastal Sandstone
Key Characteristics	Sensitivity
Landscape Character:	
<p>Scale and Enclosure Large scale rolling coastal hills culminating in exposed high cliffs of St Bees Head but progressively lower and undulating towards the south. Generally open character with wide views featuring focal points such as cliffs, lighthouse, caravan sites, and Sellafield complex. Occasionally intimate and enclosed along incised valleys. Large bare pasture fields predominate; limited features include low hedges (sparse and poor on exposed coastal tops, prominent hedge banks to south), buildings and occasional woods on valley sides.</p>	<p>Low/Moderate (2) Large group would not intimidate large scale of broader hilltops where exposure suggests a strong design rationale. On smaller hills and lower undulating terrain a single/twin or small group development would be more appropriate. Incised valleys highly sensitive due to more intimate scale and potential for over dominance in narrow zone of visibility.</p>
<p>Complexity and Order Strong grain of north-south ridges in higher northern part. Drama of natural sandstone cliff faces, cliff top heath and species rich grassland contrasts with settled pastoral farmland. Generally simple improved pastureland with occasional arable fields divided by low hedges provides a managed ordered landscape. Frayed around urban edges and coastal developments. Occasional natural accents of woodland and wetland habitats. Strong linearity along southern shoreline reinforced by railway and coast road.</p>	<p>Moderate/High (4) Opportunities for organic cluster to relate to strong ridgelines or simple line of turbines behind southern shoreline. Turbines likely to sit less comfortably on irregular undulating terrain. Rugged natural cliff scenery of St Bees Head highly sensitive.</p>
<p>Manmade Influence Generally farmland with remnants of monastic landscape around St Bees created by the 12th century priory there and medieval strip fields around other villages. Vertical and engineered elements include transmission masts, pylons, and railway. Northern fringe with Whitehaven affected by encroaching industry and southern shoreline by some tourism developments eg camp sites and caravan parks, golf courses.</p>	<p>Moderate/High (4) Some potential to relate to 'working' character of improved farmland areas and engineered aspects such as the railway or industrial fringes. However likely to appear incongruous against vernacular and heritage features in and around villages and distinctive natural forms/character of St Bees headland and rural coastline to south.</p>
<p>Skyline Open coastal hills create smooth sometimes layered horizons with intermediate ridges and incised valleys. Occasional vertical structures stand out such as hilltop transmission masts and lighthouse. Sheer cliffs of St Bees Head create a dramatic landmark.</p>	<p>Moderate/High (4) Isolated turbine grouping could form a focal point in contrast with a strong ridge top or coastal horizon. However there are major issues related to potential dilution of the St Bees Head landmark, maintenance of clear uncluttered horizons, vulnerability of valley rims to disturbing effects of partial views and blade flash and setting of historic town of St Bees.</p>
<p>Connections and Adjacent Landscapes Strong connections with the sea. Important backdrop to open beaches (1a). Sellafield complex and industrial areas of Whitehaven (U- urban areas) are dominant features at ends of this type. Weaker connections inland tending to bleed into low farmland (5b) and urban fringes of Whitehaven (5d).</p>	<p>Low/Moderate (2) Near to coast large scale context of seascape likely to assist in absorption of turbine development. Potential for some assimilation against large scale industrial backdrops at northern and southern ends. There are issues related to intrusion on open prospects from popular beaches and extending visual clutter of urban fringe.</p>
<p>Remoteness and Tranquillity St Bees headland enjoys a sense of remoteness, freedom and wildness attributable to the absence of development, drama of the cliffs and sea, natural windswept habitats and seabird colony. Remaining area is a mix of peaceful backwaters and busier parts on the fringes of Whitehaven and around the coastal resort of St Bees.</p>	<p>Moderate/High (4) Noise and movement of wind turbines likely to compromise essential qualities of St Bees headland but could relate to busier parts.</p>
Visual:	
<p>Visual Interruption Relief of rolling or undulating coastal hills offers some localised screening. However the land cover is predominantly open with only occasional vegetative or built visual containment features.</p>	<p>Moderate/High (4) Turbine development likely to stand out and be widely visible.</p>
<p>Settlement and Key Views Beyond St Bees Head dispersed pattern of villages and hamlets connected by network of minor roads. In north these have tended to spread out along sheltered incised valleys and are now affected by urban expansion. Along undulating coastal strip tend to be more nucleated. Also scattered houses and farmsteads, some on hilltops. Many buildings are in local vernacular and built of sandstone. Views from caravan parks/camp sites along the coast and recreation routes eg Cumbria Coastal Way and C2C cycle route near Whitehaven.</p>	<p>High (5) Limited scope to site development away from settled areas or tourism facilities. Size of development constrained by small scale nature of existing settlements with potential for over dominance.</p>
Overall Sensitivity	Moderate/High

LANDSCAPE TYPE 4: COASTAL SANDSTONE

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Heritage Coast St Bees Head	National: Protection of natural beauty of special coastlines and appropriate enhancement of public enjoyment. Special qualities: red sandstone headland, fissured cliffs, breeding seabirds and gem strewn beach, most conspicuous natural feature on entire west coast between N Wales and Scotland, cliff edge path part of Cumbria Coastal Way and Wainwright's Coast to Coast walk.
Landscape of County Importance Remaining area beyond St Bees Head	County: Protection of distinctive character attributable to dramatic sandstone cliffs, hills and Pow Beck valley and absence of detractors (north); natural /built features; cultural features (south); wide views and overall 'attractive' impression
Ancient Woodland Linethwaite Woods near Whitehaven Small valley woods around St Bees	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
4a Coastal Sandstone	0.7%: rare
Conservation Interests and Associations	Description
Historic Environment Varied interest Conservation Areas: St Bees village	Remnants of monastic landscape around St Bees created by 12 th century priory. Nucleated settlements surrounded by fossilised strips of former medieval field systems. Many buildings in local vernacular tradition and built of sandstone. St Bees Head lighthouse built in 1867.
Ecology Pockets of interest some outstanding Cliff edges of St Bees Head SSSI and small RIGGS. To south small site of Silver and Harney Moss SSSI and RIGGS.	Outstanding geological exposures and seabird colony of St Bees Head cliffs. Provide only breeding site on Cumbrian coast for a variety of seabirds including razorbill, guillemot, puffin and kittiwake. Cliffs here and to south also support coastal heath and species rich grassland. Inland landscape largely agricultural apart from wetland habitats associated with glacial deposits in south and valleys in north which also hold some small oak woodlands.
Cultural	Thomas Carlyle described the cliffs at St Bees Head as 'that sappyre promontary'.

LANDSCAPE TYPE 4: COASTAL SANDSTONE

Capacity Statement

The Coastal Sandstone landscape is judged to have **low/moderate** capacity to accommodate turbine development. Potential is limited by moderate/high sensitivity overall, the high value and nationally recognised landscape of St Bees Head and moderate/high landscape value recognised by LoCI designation elsewhere, rarity value of this landscape type within Cumbria as well as moderately strong ecological, geological and historical interest.

At St Bees Head sheer cliffs create a dramatic landmark punctuating the otherwise subdued Cumbrian coast and together with the cliff tops offering a rare sense of remoteness, wildness and unspoilt scenic quality. These essential qualities, reflected in Heritage Coast and SSSI designations, are likely to be compromised by any scale of turbine development.

Beyond this headland there may be scope to accommodate a single turbine to small group sized development relating to the rounded coastal hills and undulations or straighter southern shoreline with engineered features. Such development should not over dominate the wide views available in this open landscape and could create a simple focal point in contrast to a strong ridge top or coastal horizon. Along the immediate coast absorption would be further assisted in the context of vast open sea backdrops and sense of exposure that would evoke a strong sense of purpose and rationality. Whilst broader ridge tops in north seem to offer potential for a larger group of turbines there are other overriding constraints on development of this size.

The dispersed pattern of small traditional settlements surrounded by remnant monastic or medieval landscapes would make it difficult to site developments sufficiently distant so as not to adversely affect their sense of scale and character. Villages in the incised valleys to the north of this type are particularly vulnerable to over dominance in a restricted zone visibility and disturbing effects of partial views over valley rims. Other issues include erosion of unspoilt rural coastline and uncluttered horizons, vulnerability of the open setting to St Bees Head and conflicts with the scale and character of natural and cultural accents such as wetland habitats, coastal heath and hedge banks.

Particular sensitivities in relation to the setting of national designations include:

- *open prospects between Whitehaven and the St Bees Heritage Coast and integrity of the dramatic sandstone cliff scenery that extends beyond the boundary of this designation as viewed from the northern approaches via Cumbria Coastal Way*

LANDSCAPE TYPE 5: LOWLAND

Landscape Sub-Types	5a Ridge and Valley 5b Low Farmland	5c Rolling Lowland 5e Drained Mosses
Key Characteristics	Sensitivity	
Landscape Character:		
Scale and Enclosure Medium to large scale landform varying from undulating to rolling to ridge and valley terrain. Enclosure and interruption increasing with degree of relief but long wide views from summits. Field units generally medium to large. Some vegetative enclosure and local scale indicators through presence of occasional valley woodlands, small plantations or shelterbelts, hedges and hedgerow trees but becoming sparser in higher areas and towards coast.	Low/Moderate (2) Small group would not intimidate this rolling landscape and exceptionally a large group might be absorbed on a broader ridge or open flatter area. Undulating fringes and occasional narrow valleys highly sensitive due to intimate scale and potential over dominance in narrow zones of visibility.	
Complexity and Order Fairly simple agricultural patterns dominated by improved pasture with limited features, variation related to grain of topography and exposure. Flatter areas and broad ridge tops - regular pattern of oblong or squarish fields often perpendicular to prevailing wind enclosed by hedges, straight roads, linear settlements along ridge tops, punctuated by farmsteads with associated tree clumps and shelterbelts. Rolling terrain and sheltered valleys – irregular fields, river/streamside woodland and trees, winding roads, more nucleated settlements and remnant mossland (5e, 5b).	Low/Moderate (2) Opportunities for turbine development to relate to strong ridgelines or mirror regular field patterns and create new focal points in sparser areas with strong siting rationale due to abundance of wind. More irregular patterns present fewer opportunities to link or connect turbine development.	
Manmade Influence Intensively managed and heavily settled 'working' countryside. Associated development and land cover patterns generally traditional and rural in character. Some larger modern development features including existing turbines, pylons, masts, major roads and railway, farm sheds and mineral workings and on urban edges industrial buildings, housing estates and golf courses. In West Cumbria legacy of immature and uniform landscapes from open cast coal mining (5a).	Moderate (3) Some potential for positive association with 'working' character and integration with regular manmade field patterns. However likely to appear incongruous against traditional rural development features. Could be less conspicuous near urban edges or where related to key manmade features sharing similar characteristics. May be perceived as further despoliation on restored areas that already have a negative image.	
Skyline Landform generally has horizontal emphasis but relief creates multiple horizons and intermediate ridges frequently broken by trees and woodland. Dissected by numerous valleys. Relatively few vertical structures, pylons sometimes locally dominant but otherwise occasional silos, existing turbines, chimneys or industrial buildings on urban edges, and transmission masts on neighbouring coast or high ground.	Moderate/High (4) Variable and unpredictable relationship with skyline and partial visibility likely to result in confused image. Valleys rims vulnerable to disturbing effects of partial views and blade flash. Limited opportunity to correspond to other vertical structures. Scope for confusion of form and function in proximity to pylons.	
Connections and Adjacent Landscapes Strong relationships with neighbouring high ground especially where the transition is sudden eg North Pennines (13), Sandale, High Park escarpments (12). These create a large scale context and significant backdrop in terms of views out of type 5 as well as prospects of it. Neighbouring coastal landscapes have similar although more localised effects. Type 5 also contributes to the setting of important valleys eg Eden and Derwent, towns within them eg Workington, Solway Coast AONB (2) and LDNP.	Moderate/High (4) Whilst large scale contexts of adjacent landscapes may assist in absorption of turbine development potential for intrusion in open prospects from high ground and coast, often of national importance, are increased. Also potential for localised intrusion on townscape settings and valley rims.	
Remoteness and Tranquillity Busy well populated working countryside especially around main settlements and transport corridors radiating out from Carlisle. However much quieter hinterland perceived as a rural backwater and pockets of remoteness/tranquillity around relic mosslands.	Moderate (3) Noise and movement of turbines could relate to busier areas but would be less suited to more peaceful parts.	
Visual:		
Visual Interruption Generally interrupted by relief, woodlands, hedges and buildings.	Low/Moderate (2) Turbine development likely to be more easily absorbed in wider landscape due to presence of interruptions resulting in glimpsed or intermittent views.	
Settlement and Key Views Heavily settled lowland crossed by major transport corridors into West Cumbria notably the A66, A69 A595. Numerous small market towns, villages, hamlets and isolated properties in a dispersed pattern right across type 5, linked by minor roads and lanes. Also crossed by Hadrian's Wall Trail, NCR 72 and C2C cycle route.	High (5) Limited scope to site development away from settled areas. Size of development constrained by small scale nature of existing settlements, with potential for over dominance.	
Overall Sensitivity	Moderate	

LANDSCAPE TYPE 5: LOWLAND

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting Carlisle to Newtown nr Brampton S part of 5b (site and setting) and seaward parts of 5a/b between Maryport and Silloth (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
Solway Coast AONB Covers small parts of 5b	National: Conservation and enhancement of natural beauty attributable to: wild and remote qualities due to absence of large scale industrialisation, main roads and railways; rich presence of birdlife and expansive area of salt-marshes; distinctive contrasting sequence of coastal margins/ farmland and mossland; open and attractive views to Scottish coast and Lakeland fells; small distinctive villages.
Registered Historic Parks and Gardens Workington Hall (5a)	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Sparse concentrations alongside the Rivers Lyne (5b) and Petheril (5b) nr Carlisle, gill woodlands in Allerdale below Sandale escarpment and sides of Broughton Moor (5a) and Greenscoe Valley Barrow (5c)	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
5a Ridge and Valley 5b Low Farmland 5c Rolling Lowland 5e Drained Mosses	6.8%: common 9.3%: common 2.1%: unusual 0.4%: rare
Conservation Interests and Associations	Description
Historic Environment Varied interest Conservation Areas: Numerous small towns and villages across Solway Basin (5a/b), Settle Carlisle Railway and handful of small towns/villages E of Carlisle around Eden Valley (5b/c). Elsewhere only occasional villages including Greysouthen and Beckermeth W Cumbria (5b/c), Longtown in Borders (5b) and Lindal-in-Furness (5c).	Evidence of Roman occupation prolific in places. Traditional field systems round settlements/fossilised strips of medieval origin (5a, 5c). Remains of former industries-iron/coal workings, quarrying (5a). Land improvement and mineral exploitation by Cistercian monks (5b). To north medieval fortified sites associated with Anglo-Scottish border (5b). Ancient hedgerows, red sandstone buildings, some stately homes and parks (5c). North of Carlisle regular field patterns characteristic of late enclosure (5b).
Ecology Largely an agricultural landscape with isolated areas of semi-natural vegetation Occasional small SSSIs, RIGGS and NNRs	Upland oak woodland (5a, 5b) Lowland raised bog (5b,5e) Rush pasture /purple moor-grass (5a, 5b, 5e) Rivers and streams (5a, 5b,5c) Species rich hedgerows and basin mire (5c)
Cultural Limited interest	Charles Dickens/Wilkie Collins 'The Lazy Tour of Idle Apprentices' (journey from Carrode Fell to Allonby) Wigton area settings for novels by Melvyn Bragg

LANDSCAPE TYPE 5: LOWLAND

Capacity Statement

Overall the Lowland landscape type is judged to have **moderate** capacity to accommodate turbine development. This reflects moderate sensitivity overall and moderate value as a largely undesignated landscape. A significant exception is the small area of lowland that falls within the Solway Coast AONB designation*. Here high value and sensitivity attributable to a sense of remoteness, lack of large scale development and contribution as a backdrop and contrast to wilder coastal edge landscapes indicate that any scale of wind energy development is likely to be inappropriate. Whilst this type has moderately strong historical interest this is attributable to the presence of conservation areas, Roman remains, medieval field patterns, historic parks etc. It is considered that wind energy development could be accommodated provided it does not impinge on the site or setting of these valued features and therefore this value should not reduce capacity in the landscape as a whole. Elsewhere some notable localised geographical variations in the sense of enclosure created by the undulating and rolling topography and regularity of land cover patterns affect appropriateness.

Greatest potential occurs in the open flatter areas and broad ridge tops where small or, in exceptional circumstances, large turbine groups could relate to the medium to large scale landform without dominating wide views and integrate with regular field patterns. The sense of exposure in these areas would also evoke a sense of purpose and rationality. In the more sheltered and enclosed valleys or undulating fringes turbine development would feel over dominant and conflict with more irregular land cover patterns.

Whilst significant interruption by relief and vegetation would assist absorption in the wider landscape these same features are likely to result in unpredictable relationships between turbines and a variable skyline with intensifying or disturbing effects such framing or blade flash over valley rims. A key characteristic limiting capacity is the dispersed pattern of numerous small rural settlements making it difficult to site developments sufficiently distant so as not to adversely affect their sense of scale and character. Settlement size and pattern suggest that up to a small group of turbines would generally be appropriate. Other more localised sensitivities include potential erosion of peaceful rural backwater qualities and impact on valued views from neighbouring high ground or coast, important valleys and towns such as Workington within them.

Particular sensitivities in relation to the setting of international and national designations include:

- *contribution of the quieter hinterlands to a sense of remoteness and the sequence of contrasting landscapes in the Solway Coast AONB*
- *open sequential views from recreation and tourist routes along the coastal edge of the AONB and along Frontiers of the Roman Empire: Hadrian's Wall across the lowland ridges towards Lakeland fells most notably from Cumbria Coastal Way, the B5300, National Cycle Route 72, Hadrian's Wall Trail and from viewpoints at forts and milecastles associated with the Wall*
- *distinctive vistas to and from the northern and western fells of the Lake District NP and open estuarine views from the Ravenglass and Eskdale 'gateway'*
- *vistas of the north-western tip of the North Pennines AONB*

* For those areas that fall within the Solway Coast Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 6: INTERMEDIATE LAND

Landscape Sub-Types	6a Intermediate Land
Key Characteristics	Sensitivity
Landscape Character:	
<p>Scale and Enclosure Mainly broad scale open landscape of gentle ridges and wide valleys. Terrain varies from rolling highland with wide views and few hedges to undulating land enclosed by hedges and walls. Borders area dissected by deeply incised well wooded valleys and Vale of Eden features narrow gill like valleys and some more enclosed landscapes associated with villages in protected locations. Fabric defined by walls and hedges, plantation blocks, valley woodlands with details of hedgerow trees, walls, stone buildings.</p>	<p>Low/Moderate (2) Small to large turbine groups would not intimidate broad ridges of more open higher ground provided they relate to scale of fields and woodland blocks. Undulating enclosed land and incised valleys more sensitive due to more intimate scale and potential for over dominance in narrow zones of visibility. Turbines likely to appear over dominant in context of minor valleys or gills, and in close range against features such as hedgerow trees, small gill woods and traditional stone buildings.</p>
<p>Complexity and Order Mostly fairly simple with a few strong features but generally balanced. Predominantly improved pasture bounded by hedges often with trees or sometimes stonewalls. Field size variable medium to large breaking down into smaller strip fields close to settlements. Plantations and semi-natural valley woodlands often important elements. Inglewood Forest has distinct simple well regulated estate pattern of rectilinear fields, straight roads, and shelterbelts divided by M6 motorway/ mainline railway corridor. More variety and irregular patterns of woods and rush pasture around narrow valleys and gills</p>	<p>Moderate (3) Opportunities for ordered turbine groupings to mirror rectilinear patterns of larger fields, plantation blocks and straight roads particularly in Inglewood Forest area. Patterning in other areas indistinct offering less scope for visual linkage. In higher rolling areas simple lines of evenly spaced turbines along contour lines could complement grain of gentle ridges. Irregular patterns of narrow valleys and remnant strip fields round settlements highly sensitive.</p>
<p>Manmade Influence Managed 'working' countryside with a number of visible historical elements such as planned villages of medieval origin surrounded by remnant open common and strip fields, prehistoric and medieval earthworks and Roman remains, late enclosure patterns of Inglewood. Largely unaffected by modern development pressures apart from M6/rail corridor which attracts commercial developments and increasing numbers of large farm buildings.</p>	<p>Moderate/High (4) Some potential for positive association with 'working' farmland character and integration with regular late enclosure patterns. Likely to appear incongruous in context of more irregular heritage patterns, stone structures and earthwork features. May be perceived as compromising generally unspoilt rural character.</p>
<p>Skyline Wide views across valleys to broad horizons often textured and tiered by woodland bands and intermediate ridges. Occasional vertical manmade structures include pylons and Skelton radio mast complex. Some narrow and incised valleys with distinct rims.</p>	<p>Moderate (3) Opportunity for linear turbine groupings to integrate with broad banding of tiered horizons and predictable relationship in context of broad open valleys. Scope for confusion of form and function in proximity to pylons and radio masts. Some valley rims vulnerable to disturbing partial views.</p>
<p>Connections and Adjacent Landscapes Relationship with neighbouring high ground especially where transition sudden as east side Vale of Eden with North Pennines AONB escarpment and to lesser extent Inglewood with Caldbeck Fells of LDNP and Lazonby sandstone ridge (10) and Borders with Bewcastle Fells (9). These create large scale backdrops to parts of Type 6 as well as prospects of it. Also contributes to setting of Eden Valley and in Borders Irthing Valley with Frontiers of the Roman Empire: Hadrian's Wall along its northern rim.</p>	<p>Moderate/High (4) Whilst large scale backdrops may assist in absorption of turbine development potential for intrusion in open prospects from high ground, often of national importance, are increased. Imposing views of dramatic North Pennine scarp from Vale of Eden vulnerable. Also potential for intrusion on neighbouring major valley rims and setting of internationally important Hadrian's Wall.</p>
<p>Remoteness and Tranquillity Rural mostly settled landscape which feels balanced and calm. Busier around M6/rail corridor, A and B roads. Borders area is more sparsely inhabited and has a feeling of remoteness.</p>	<p>Moderate (3) Noise and movement of turbine development maybe appropriate adjacent to through routes. Elsewhere turbines, especially larger groupings, likely to reduce sense of calmness and remoteness.</p>
Visual:	
<p>Visual Interruption Rolling farmland significantly interrupted by woods, plantations, hedges and hedgerow trees, walls, villages and undulations.</p>	<p>Moderate (3) Although there are wide views across broad valleys variety of screening features likely to assist absorption and create glimpsed or intermittent views.</p>
<p>Settlement and Key Views Fairly heavy but dispersed pattern of small settlements crossed by major through routes. Planned villages with greens and sandstone buildings frequent around Penrith, within Vale of Eden and marking foot of North Pennines. Variable form responding to shape of river or beck side settings. String of linear villages along A6 (former Roman Road) through to Carlisle. Elsewhere pattern of small hamlets and isolated properties and farms across Inglewood Forest and Borders although sparser away from Lyne valleys. Hadrian's Wall Trail close to southern boundary of Borders area. Settle/Carlisle railway and Eden Valley Cycle Route offer extensive vantage over Vale of Eden to dramatic N Pennine scarp. C2C also crosses this area and Inglewood area.</p>	<p>Moderate/High (4) Limited scope to site development away from settled areas. Size of development constrained by small scale nature of historic and distinctive planned villages with potential for over dominance. Sparser parts with isolated properties present fewer problems.</p>
Overall Sensitivity	Moderate

LANDSCAPE TYPE 6: INTERMEDIATE LAND

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting Southern fringe of Borders area (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
North Pennines AONB Small areas on fringes	National: Conservation and enhancement of natural beauty derived from the special qualities of: a unique landscape unit with a distinctive geology and unusually large extent of high, exposed semi-natural moorland which has outstanding wilderness qualities; scenic contrasts and unfolding sequence of simple moorland, sheltered dales and dramatic scarp as well as spectacular individual features; moorland landscapes valued for their long views and western scarp affords panoramic views; special interests of historic mining landscape, unique flora and fauna, unusual range of geological and geomorphological features and wealth of archaeological and historical remains which contribute to landscape character.
Registered Historic Parks and Gardens Hutton-in-the-Forest	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Numerous along R Lyne and its tributaries in Borders and concentration in NW corner of Inglewood Forest area	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
6a Intermediate Land	9.4%: common
Conservation Interests and Associations	Description
Historic Environment Rich and diverse Conservation Areas: Settle/Carlisle Railway Several villages at foot of N Pennines and Vale of Eden	Characterised by planned villages probably originating from 12 th century, with greens, large churches, sandstone buildings, traditional farm buildings within them and surrounded by former open common fields (and remnant medieval strip fields). Prehistoric and medieval earthworks and Roman remains eg roads, camps, forts (A6 between Penrith and Carlisle). Inglewood Forest distinct from much of rest, in part of Barony of Greystoke created in 1120 and in Norman times former Royal Forest hunting ground only enclosed in late 19 th century hence rectilinear fields and straight roads and characterised by post medieval squatter settlements.
Ecology Wide range of localised ecological interest Designations limited to main rivers and becks generally SSSIs sometimes SACs Few small pocket SSSIs over woods, pastures or moss some also SACs	Improved pasture with species-rich hedgerows, occasional areas of rush pasture and purple moor grass. Couple of mire basins and occasional species rich road verges near Penrith. Small woodlands in Eden valley and more extensive ones in White and Black Lyne valleys of Borders area with range of upland oak and wet woodland communities.
Cultural	Vale of Eden supposed links to legends of King Arthur eg name 'Lyvenett' possible connection with 'last King of the kingdom of Rheged who lived at Llwyfenwydd.

LANDSCAPE TYPE 6: INTERMEDIATE LAND

Capacity Statement

Overall the Intermediate Land is judged to have **moderate** capacity to accommodate small to large turbine groups. This reflects moderate sensitivity overall and moderate value as a largely undesignated landscape. Whilst this type has moderately strong historical interest this is attributable to the presence of conservation areas, medieval villages and field patterns, Roman remains etc. It is considered that wind energy development could be accommodated provided it does not impinge on the site or setting of these valued features and therefore this value should not reduce capacity in the landscape as a whole. Notable localised geographical variations in character and higher landscape values within and close to international and national designations affect appropriateness.

Greatest potential occurs across the broad valleys and gently rolling areas benefiting from visual interruption by tree cover and ridges. Here small – large groups of turbines could relate well to the medium to large scale of landform, fields or woodland without over dominating wide views. Ordered groupings would integrate well with rectilinear field patterns and plantation blocks, particularly in the Inglewood Forest area. Elsewhere simple lines of turbine could flow with the grain of topography and highlight intermediate ridgelines.

A key characteristic limiting capacity is the rich and diverse historic environment and general absence of large modern development structures. Across the Vale of Eden any type of turbine development would compromise the distinctive pattern of planned villages and surrounding fields of medieval origin. Elsewhere the widespread occurrence of prehistoric or medieval earthworks and Roman remains present problems.

Other limiting factors include the dispersed pattern of small settlements making it difficult to site development sufficiently distant without affecting their sense of scale and character, conflicts with a sense of remoteness in the Borders area, potential for over dominance and incongruity with the detailed natural variety of gills and incised valleys, visual intrusion on neighbouring upland prospects and major valleys such as the Irthing and Eden. Settlement size and pattern suggest that up to a small group of turbines would generally be appropriate.

The close interrelationship and dramatic contrast between the North Pennines AONB scarp and the Vale of Eden indicate that any scale of turbine development would be difficult to accommodate in this area. A small area of Type 6 clips the edge of the AONB* encompassing a string of vulnerable historic sandstone villages along the foot of the western scarp.

The setting of the AONB is also vulnerable in terms of views in and out including:

- *inspiring views over the Vale towards the Lakeland fells provided from the western scarp most notably from the A686 pass, Hartside Cross viewpoint, the Maiden Way and the Coast2Coast (C2C) Cycle Route (NCR 7) and further south from the Pennine Way around High Cup*
- *views from below where the scarp forms an imposing wall above the Vale visible from the A66, A686, Settle Carlisle Railway and C2C and Eden Valley Cycle Routes (NCR 7 and 68)*

Particular sensitivities in relation to the setting of other national and international designations include:

- *sequential views of the southern fringe of the Borders area from Hadrian's Wall Trail and Cycle Route (part of NCR 72) and from viewpoints at the turrets, forts, milecastles and camps between Castlesteads and Birdoswald*
- *sequential views towards Frontiers of the Roman Empire: Hadrian's Wall from the south with the Borders area behind from the Pennine Way as it descends into the Irthing Valley and from the A69*
- *views to and from the Caldbeck Fells on the north-eastern fringe of the Lake District National Park and views from the C2C Cycle Route (NCR71) 'gateway' into the Park near Greystoke*

* For those areas that fall within the North Pennines Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 7: DRUMLINS

Landscape Sub-Types	7a Low Drumlins 7b Drumlin Field	7c Sandy Knolls and Ridges
Key Characteristics	Sensitivity	
Landscape Character:		
<p>Scale and Enclosure Small to medium scale landscapes defined by hummocky patterns of small hills, ridges and valleys moulded by glacial processes. Pronounced relief (7b, c) creates enclosure becoming more open on edges: around Carlisle merging with rolling lowland (5c) and in South Lakeland and Furness low drumlins towards coast becoming barer, more isolated and subdued (7a). Features include streams, hedges, hedgerow trees, walls and small woods. Exposed hill tops afford long views.</p>	<p>Moderate / High (4) Single or small group development would not intimidate broad hilltops or dominate wider views on open edges of this type. Towards coast exposure also suggests a strong design rationale. More pronounced rolling terrain highly sensitive due to intimate scale and potential for over dominance in narrow zones of visibility. Potential conflicts of scale between turbines and size of receiving hills and frequent land cover features in more sheltered inner areas.</p>	
<p>Complexity and Order Balanced well managed working countryside distinguished by topographic patterns. Consistent alignment of drumlins (7a, b) creates a strong topographic grain overlain by regular geometric grid of fields enclosed by hedges. Generally improved pastureland with occasional arable fields. Winding becks and tarns in valleys. Bare on coast (7a) increasingly varied inland with natural accents of woodland and hedgerow trees. Small mature woodlands and plantations combine with more irregular field pattern of 7c to create parkland appearance. Patterns and grain sometimes disrupted by motorway and power lines.</p>	<p>Moderate (3) Opportunities for organic cluster configured in response to particular shape of hill or ridge and topographic grain. Likely to read reasonably well as a simple contrast in barer areas. In more complex but ordered parts turbines likely to disrupt harmony of scenic compositions between hills, small woods and winding valley features.</p>	
<p>Manmade Influence Intensively farmed 'working' countryside modified by field enlargement and new farm buildings. Some historical features such as historic village cores, industrial archaeology, medieval sites and castles, Roman road (7c) and Lancaster Canal (7a/b). Development and recreational pressures associated with proximity to urban centres include village expansion, barn conversions, farm diversification, golf courses and public access. Large modern structures include isolated industrial developments, pylons, and major route ways.</p>	<p>Moderate/High (4) Some potential to relate to 'working' character of improved farmland and integration with regular field patterns. However turbines likely to appear conspicuous in absence of similar man-made structures particularly on hilltops and may be perceived as further urbanisation. Potential for localised conflict with character of heritage features.</p>	
<p>Skyline Varying from discrete bare and rolling hills to complex tapestry of interwoven ridges, woodland and trees. Vertical manmade structures limited to pylons. Occasionally hilltop woods stand out as landmarks in barer areas. From enclosed valleys hills create immediate and dominant skylines whilst hilltops afford long views.</p>	<p>Moderate/High (4) Limited scope for isolated development to punctuate discrete hilltops and form a clear contrast with barer skylines. In areas of pronounced relief hilltop turbines likely to have confused image due to incoherent relationship with skyline and partial visibility; appear overbearing from enclosed valleys and hollows; be emphasised by framing effects of hills and trees.</p>	
<p>Connections and Adjacent Landscapes Generally weak connections due to visual interruptions and gradual transitions in elevation. Inter-visibility between drumlins and neighbouring (7a/b) limestone hills such as Birkrigg and fells including Arnsdale/Silverdale AONB (3b), LDNP, North Pennines AONB (11/13) and Farleton (3a). Contributes to setting of important valleys of Irthing, Kent, Goldmire.</p>	<p>Low/Moderate (2) Some potential for localised intrusion in open prospects from neighbouring limestone hills or fells often of national importance, setting of Hadrian's Wall, Barrow, Furness Abbey and important valley rims.</p>	
<p>Remoteness and Tranquillity Rural heavily settled landscape. In lower open edges (7a) noise and movement along main roads, motorway and railway. Elsewhere more contained by pronounced relief. On fringe of urban centres village expansion, barn conversions and recreation generate traffic and create busier feel whilst other areas retain a sense of calm.</p>	<p>Moderate/High (4) Noise and movement of turbines may be assimilated against context of existing infrastructure development. However elsewhere could further erode sense of pastoral calm which is valued for recreation.</p>	
Visual:		
<p>Visual Interruption Hummocky landscape significantly interrupted by variety of small hills or ridges, woods, hedges, walls, plantations and villages. Reducing towards coast where drumlins subdued and have fewer features.</p>	<p>Moderate (3) Generally absorption in wider landscape would be assisted by presence of frequent interruptions; in barer areas of subdued relief turbines would be more widely visible.</p>	
<p>Settlement and Key Views Dispersed pattern of small settlements, heaviest in South Lakeland sparser in Furness and Brampton areas. Linked by network of winding lanes and crossed by major through routes. Many retain a strong historic structure either nucleated within hollows with houses grouped around squares, greens or tarns or linear along the side or hills or important route ways. W2W Cycle Route crosses Furness and S Lakeland (7b).</p>	<p>High (5) Limited scope to site development away from settled areas particularly in South Lakeland. Size of development constrained by small scale nature of existing settlements with potential over dominance especially where views are restricted between hills.</p>	
Overall Sensitivity	Moderate/High	

LANDSCAPE TYPE 7: DRUMLINS

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting N tip of 7c nr Naworth Castle (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
Landscape of County Importance Sub-type 7c and South Lakeland part of 7b	County: Protection of distinctive character attributable to distinctive rolling topography; variety of attractive features such as woods, small fields, hedges and trees, streams, and tarns; varied views (7b); woodland and historic character (7c) creating a strong positive response.
Ancient Woodland Absent across 7a and only small isolated woods across 7b Concentration around Gelt Valley/Naworth Park/Talkin Tarn in 7c	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
7a Low Drumlins 7b Drumlin Field 7c Sandy Knolls and Ridges	0.4%: rare 1.8%: unusual 0.4%: rare
Conservation Interests and Associations	Description
Historic Environment Varied interest especially 7c Conservation Areas: Milnthorpe (7a) Burton-in-Kendal and Lindal-in Furness (7b)	Dispersed settlement pattern generally with historic core of buildings are constructed of limestone of variable form responding topographic or important route ways. Number of traditional large village market centres. Features include medieval fortified sites and castles, Roman road (7c) and some parkland/ estates eg Naworth. Recently modified traditional field patterns, some fossilised strips (7c). Industrial heritage (7a/7b) with evidence of former iron works around Barrow, corn or paper mills and gun powder works in valleys around Kendal and northern reaches of Lancaster Canal.
Cultural Landscape popular subject for artists	Sandy knolls and ridges of 7c popular location for variety of artists such as Ben Nicholson, Winifred Nicholson, George Howard, Christopher Wood and Donald Wilkinson. Drumlins with nestling farms of 7b painted by artists such as William Collingwood, Arthur Tucker and Herbert Coutts.
Geomorphology Important evidence of glacial processes	Drumlins of boulder clay (7b) and outwash sands and gravels moulded by and reflecting direction of ice sheet movements. Kettle tarn features formed in basins by melting ice. Gravel ridge east of Brampton is a 'kame' formed by glacial meltwater.
Ecology and Geology Agricultural improvement limits ecological interest Designations absent across 7a. Largely absent across 7b apart from occasional SSSIs along rivers and odd LPO and RIGGS. River Gelt SSSI/SAC/SPA and RIGGS dissect 7c.	Improved pasture with species rich hedgerows. Occasional interest in small semi-natural woodlands, tarns and rush pasture in hollows, rivers, streams and roadside verges, and in 7c frequent upland oak woodland eg Gelt valley. Lancaster Canal supports range of aquatic plants.

LANDSCAPE TYPE 7: DRUMLINS

Capacity Statement

The Drumlins landscape is judged to have **low/moderate** capacity to accommodate single turbines or small cluster sized developments. This reflects a moderate/high sensitivity overall, moderate/high landscape value of parts recognised by LoCI designation, rarity and moderately strong historical and geomorphological interests and cultural associations. Variations in the degree of relief, proximity to the coast and settlement density affect appropriateness.

Pronounced relief is the defining characteristic of this landscape and a key factor limiting capacity. Turbine development is likely to intimidate the small scale nature of the component hills and ridges, not only in terms of its overall development size but individual turbines, with current heights of around 100m likely to appear out of scale. The restricted views created by this relief are vulnerable to visual dominance, an issue likely to be of heightened significance in areas such as South Lakeland which have a heavy pattern of small dispersed settlements. In sheltered areas scenic compositions of hills, woods and winding valley features similar to parkland and valued as Landscapes of County Importance are vulnerable to disruption. The outer subdued and more open hills, particularly towards the coast, present fewer problems and benefit from positive associations with exposure and opportunity to create simple contrasts with barer skylines.

Whilst significant interruption by relief and vegetation (across inland parts) would assist absorption in the wider landscape these same features are likely to result in unpredictable relationships with a variable skyline and intensifying or disturbing effects such as framing and blade flash. Other issues include absence of similar manmade vertical features; potential erosion of rural qualities and calmness valued for recreation by residents of nearby towns and localised intrusion on open prospects from limestone hills and important valley rims.

Particular sensitivities in relation to the setting of international and national designations include:

- *sequential views from Hadrian's Wall Trail and National Cycle Route (NCR 72) and from viewpoints at the turrets, forts, milecastles and camps between Castlesteads and Birdoswald*
- *vistas to and from the north-western tip of the North Pennines AONB most notably from parkland and recreation routes such as NCR 72 as it descends from the Tindale Fells*
- *contrast at the Kendal 'gateway' into the Lake District National Park between the rich managed drumlins and the sparse, rugged and wilder limestone scars as viewed from the A591, National Cycle Route 6, the Dales Way and popular viewpoints on the scars*
- *open prospects across the low drumlins from the eastern side of the Arnside/Silverdale AONB, from Farleton Fell back to the AONB and the Limestone Link recreation route between them*

LANDSCAPE TYPE 8: MAIN VALLEYS

Landscape Sub-Types	8a Gorges 8b Broad Valleys	8c Valley Corridors 8d Dales
Key Characteristics	Sensitivity	
Landscape Character:		
<p>Scale and Enclosure Variable depending on height and location. Range from intimate tightly enclosed gorges(8a) with views channelled along valley through to broad and open large scale valleys with extensive views but narrow and winding in parts (8b,c,d). Variety of scale indicators including small woods, ghylls, scrub, hedges, stone walls, plantations, individual trees and buildings. Broader valleys feature large scale infrastructure.</p>	<p>High / Moderate (4) Gorges and narrower valleys highly sensitive due to intimate scale and/or potential for over dominance in narrow zones of visibility. Broadest valleys maybe able to accommodate small or large groups on flatter floodplains or valley sides related to larger fields and plantations. Turbines often likely to appear awkward and out of scale against wide variety of small scale features. No obvious functional rationale in shelter of valleys.</p>	
<p>Complexity and Order Generally harmonious but variable in character. In gorges (8a) and narrower parts of other valleys semi-natural hanging woodlands featuring rocky outcrops and cliffs and fast flowing rivers create scenic compositions. Lower valleys (8b,c) have soft managed character derived from mixed pattern of improved pasture, small woods/plantations, parkland, hedges, frequent trees in hedges, by roads and meandering rivers. Harmony sometimes disrupted by infrastructure. Dales (8d) and Lune Gorge (8c) higher with wilder more rugged character derived from rough pasture, barns, ghylls, waterfalls, rocky scarps on valley sides and strong pattern of stone walls.</p>	<p>High (5) Scenic harmony vulnerable to disruption. Would be difficult to relate turbine groupings to variety of irregular landforms shapes, meandering rivers and complex patterns of natural and historic features. Arrangements aligning the course of meandering rivers unlikely to read clearly.</p>	
<p>Manmade Influence Varies from largely natural landscape of Eden Gorge (8a) to semi-natural historic landscape of dales (8d) to rural mixed character of broad valleys (8b) to urbanised corridors containing frequent man-made structures such as roads, motorways, railways, pylons and scattered development (8c). Common pressures include afforestation and recreation. Heritage features widely visible including Roman remains; medieval castles/abbeys; early mining; 18th century industrial sites related to waterpower; parkland and historic houses.</p>	<p>Moderate/High (4) Variable but turbines likely to be most incongruous in gorges and dales. Elsewhere may be limited scope for positive association with intensively farmed areas in lower valleys and integration with occasional geometric field and plantation patterns or large scale infrastructure. However conflict with character and scale of historic features difficult to avoid and turbines likely to exacerbate visual confusion in more urbanised parts.</p>	
<p>Skyline Broad sometimes distant horizons in wider valleys interrupted by woods. Narrow valleys or gorges have more immediate dominant skylines that can be textured or stark. Intermediate horizons frequently created by valley bottom undulations or stepped valley sides. Vertical features scarce apart from historic castles, mansions or abbeys and occasional pylons. Cliffs and angular limestone scarps create landmarks.</p>	<p>Moderate/High (4) Turbines likely to dominate and interrupt distinctive rims and intermediate horizons of narrower valleys and feel over bearing. Wider more distant horizons of broadest valleys less vulnerable but development likely to have confused image due to unpredictable relationship with skyline and partial visibility. Turbines may also compromise or compete with natural landmark skylines and historic punctuations.</p>	
<p>Connections and Adjacent Landscapes Sometimes dramatic backcloths of adjacent limestone escarpments (3, 12), sandstone ridge (10) and fells or moors including Howgills and N. Pennines (13) with strong inter-visibility. Elsewhere views into adjacent lower farmland and hills restricted by ridge marking edge of valley. However valley rims can still feature strongly in views from surrounding ridge tops and larger valley towns (U).</p>	<p>Moderate (3) Whilst large scale backdrops of fells, moors and scarps may assist absorption potential for intrusion in open prospects across valleys and within wider compositions or dramatic contrasts with neighbouring high ground, sometimes of national or international importance. Elsewhere valley rim development could sometimes compromise townscape settings eg Workington or local vantage points.</p>	
<p>Remoteness and Tranquillity Lower valleys (8b,c) generally calm with little movement except where main roads present. Kent valley seen as busier. Beyond key villages Eden gorge and dales (8a,d) have a quieter sometimes remote character.</p>	<p>Moderate (3) Noise and movement of turbine development maybe appropriate adjacent to main roads. Elsewhere turbines, especially larger groupings, likely to reduce sense of calmness and remoteness.</p>	
Visual:		
<p>Visual Interruption Views often frustrated by variety of features including undulations, woods, scrub, hedges, walls, plantations and individual trees.</p>	<p>Moderate (3) Generally absorption in wider landscape would be assisted by presence of frequent interruptions</p>	
<p>Settlement and Key Views Lower valleys have heavy but dispersed pattern of settlements ranging from isolated farmsteads to small market towns often with historic stone built core but affected by urban expansion and accommodating major transport routes (8b,c). In Eden gorge and North Pennines concentrated into a few large villages with an industrial past (8a/8d). In southern dales settlement generally absent. Tourist facilities include riverside walks, historic sites and parks and trails along the valleys: Hadrian's Wall Trail (Irthing); Pennine Way (South Tyne), Settle to Carlisle railway (Eden); Eden Valley Cycle Route. Some valleys are crossed by the Pennine Bridleway and C2C and W2W Cycle Routes.</p>	<p>High (5) Limited scope to site development away from settled areas in lower main valleys. Size of development constrained by small scale nature of existing settlements with potential for over dominance especially where views restricted in narrower valleys. Widespread potential for intrusion on important landscape settings and sequential views.</p>	
Overall Sensitivity	Moderate/High	

LANDSCAPE TYPE 8: MAIN VALLEYS

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting 8b Irthing Valley (site and setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
North Pennines AONB North Pennine dales (8d)	National: National: Conservation and enhancement of natural beauty derived from the special qualities of: a unique landscape unit with a distinctive geology and unusually large extent of high, exposed semi-natural moorland which has outstanding wilderness qualities; scenic contrasts and unfolding sequence of simple moorland, sheltered dales and dramatic scarp as well as spectacular individual features; moorland landscapes valued for their long views and western scarp affords panoramic views; special interests of historic mining landscape, unique flora and fauna, unusual range of geological and geomorphological features and wealth of archaeological and historical remains which contribute to landscape character.
Landscape of County Importance All outside AONB except Derwent and Barrow (8c)	County: Protection of distinctive character attributable to distinctive landform; variety of natural and cultural features; absence of detractors and in parts mixed land cover patterns; views and peaceful quality creating a strong positive response.
Registered Historic Parks and Gardens Workington Hall, Corby Castle, Appleby Castle and Levens Hall	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Numerous in Irthing Valley (8b) and Eden Gorge (8a)	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
8a Gorges 8b Broad Valleys 8c Valley Corridors 8d Dales	0.2%: unique 5.1%: ordinary 0.6%: rare 1.1%: unusual
Conservation Interests and Associations	Description
Historic Environment Rich and diverse interest sometimes exceptional Conservation Areas: Settle/Carlisle Railway and several villages and towns along Eden Valley. Ravenstonedale and Kirkby Lonsdale in Lune Valley. Alston and Garrigill in N Pennine dales. Heversham in Kent Valley and Furness Abbey, Barrow.	Varying building styles with sandstone in north / limestone in south. Water powered 18 th and 19 th century industrial sites on Kent and Eden Gorge, corn mills on others. Historic weirs and bridges. Roman sites and route ways particularly on Eden and Lune, Frontiers of the Roman Empire: Hadrian's Wall and forts in Irthing Valley. Medieval defensible structures eg Pendragon Castle, Mallerstang (8d) and abbeys/priories eg Furness (8c). Ornamental landscape /parks and historic houses especially in S. Lune; Kent (8b) and Eden Gorge (8a). Historic field pattern defined by drystone walls in dales (8d) featuring ring garths intakes and field barns. Rich coal quarrying and lead mining heritage and associated villages in N. Pennines (8d).
Cultural Scenic qualities often inspirational	Popular location for artists/writers/sculptors eg Ruskin, JMW Turner, Norman Adams, David Morris and Andy Goldworthy. Settle to Carlisle railway in parts runs along the Eden Valley and is regarded as most scenic railway in England.
Ecology Rich and diverse interest sometimes exceptional Designations generally limited to rivers themselves. Most rivers extensively covered by SSSI and sometimes SACs, except Lune and Esk. Gorges and rocky sections often covered by RIGGS,	Central interest in rivers eg otter; Atlantic salmon; lampreys; crayfish; bats; birdlife and shingle banks giving rise to national and international designations. Upland oak woodland also of high interest especially ancient woods in Eden Gorge where damp cliffs also support diverse assemblage of mosses etc. (8a). Wet woodland also important in other valleys together with rush pasture. Further interest in small remnants of lowland raised bog and grazing marsh in lower valleys (8b, c); species rich roadside verges and hedgerows. Dales (8d) also feature hay meadows and black grouse habitat in North Pennines.

LANDSCAPE TYPE 8: MAIN VALLEYS

Capacity Statement

Overall the Main Valleys landscape is judged to have **low/moderate** capacity to accommodate turbine development. Potential is limited by the overall moderate/high sensitivity of the valleys landscape character and because of their moderate/high or high landscape value recognised by LoCI and North Pennines AONB designation*, and strong historic and ecological interests and cultural associations.

Any type of turbine development is likely to disrupt the scenic richness and harmony for which the valleys are valued. Character varies according to height, degree of enclosure and urban influence but all valleys exhibit a variety of natural and historic features and complex irregular land cover patterns and this limits opportunity for integration of turbines. Potential for visual intrusion and dominance is also a major issue due to the pattern of frequent small scale settlements and concentration of route ways and tourist facilities in the valleys. Dominance is likely to be exacerbated by the tightly enclosed character of many valley landforms where the zone of visibility is restricted and potential for turbines sited on exposed upper valley slopes to feel overbearing.

Whilst the intimate character of narrower valleys would be threatened by turbines there may be limited scope for groups of turbines in broader valleys with sufficient wind resource such as in the uplands or near the coast. Generally up to a small group would be appropriate but exceptionally a large group might be accommodated where unconstrained by small scale settlement. However they would still be likely to appear out of scale against the wide variety of small features typically found in this landscape type. Other issues include the absence of comparable vertical structures; intrusion and blade flash over distinctive valley rims; vulnerability of historic monument and townscape settings and landmark skylines of adjacent fells, limestone escarpments and sandstone ridges.

Within the North Pennine dales recognised qualities of enclosure, diversity, intricacy and sense of history, with a wealth of traditional built features and the scattered remains of lead mining activity, are vulnerable in terms of overall harmony, dominance, scale and character. Potential intrusion on sequential views from the Pennine Way which passes along South Tynedale, the setting of Alston and connecting A roads is a further issue. The dales also make a vital contribution to the wider identity of the North Pennines through contrast with adjacent moors, amplifying their sense simplicity, extent and wildness. These sensitivities indicate that any scale of wind energy development is likely to be inappropriate within the AONB.

Particular sensitivities in relation to the setting of international and national designations include:

- *key views across and from the Irthing Valley in relation to both Frontiers of the Roman Empire: Hadrian's Wall and the northern edge of the North Pennines AONB most notably from Hadrian's Wall Trail and Cycle Route (NCR 72) and from viewpoints at the turrets, forts, milecastles and camps between Castlesteads and Birdoswald, the Pennine Way as it descends into the valley and the A69*
- *contribution of the Eden Valley to panoramic views towards the Lakeland Fells across the Vale of Eden from the western scarp of the North Pennines AONB*
- *the Mallerstang (Eden Valley) 'gateway' into the Yorkshire Dales NP featuring the Settle Carlisle Railway and National Cycle Route 68*
- *contrast between the enclosed and diverse Tebay Gorge and the Lune Valley landscapes with the open and sleek Howgill Fells on the western side of the Yorkshire Dales NP as viewed from the M6, W2W Cycle Route (NCR68) and A683/4 Sedbergh 'gateway'*
- *contribution of the lower Kent and Lyth Valleys to picturesque estuarine compositions between the limestone escarpments of the south-eastern Lake District NP and the Arnside/Silverdale AONB and dramatic contrast at the Gilpin Bridge 'gateway' between flat drained mosslands and imposing limestone scars as viewed from the A590, A5074, and the W2W Cycle Route (NCR 72) and National Cycle Route 6*

* For those areas that fall within the North Pennines Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 9i: INTERMEDIATE MOORLAND

Landscape Sub-Types	9a Open Moorlands (Bewcastle Fells) 9c Forests (Kershope and Spadeadam) 9d Ridges (Furness)
Key Characteristics	Sensitivity
Landscape Character:	
Scale and Enclosure Mainly large scale moorland but varies to vast (9c). Landform of rolling or undulating high plateaus with dissecting small valleys, steep sides and lower undulating fringe (9a,c). Varies to broad ridge dividing into individual hills or moors with rounded tops and steep sides (9d). Generally open and exposed with wide views. Can be locally enclosed within valleys or extremely enclosed within extensive forest cover (9c). Generally unfenced moorland or divided into large fields or lots. Limited scale indicators include isolated buildings, peripheral villages, field boundaries, pylons and trees.	Low (1) High plateaus might accommodate medium to large wind farms whilst undulating fringe suggests scope for large group development (9a,c). Higher moors on the broad ridge might accommodate small wind farms whilst small groups would be more appropriate to individual scale of hills and villages at lower levels (9d). In close range turbines may appear incongruous and out of scale against detailed features of relief and land cover on lower slopes. Upland exposure presents a strong design rationale.
Complexity and Order Simple moorland plateau forms of rounded moors or hills. Ridge has distinctive NE-SW grain (9d). Core areas at higher elevation retain an untamed character created by rough grassland with areas of rush, heath or bog. Land unenclosed or in large lots or fields. Underlying detail and relief blanketed by coniferous forest in 9c. Firebreaks, cycles of felling and replanting create discordant patterns. Irregular field pattern of semi-improved pasture enclosed by ragged hedges or fences on lower fringe (9a). Improved pasture enclosed by stone walls on lower part of ridge (9d). Features scarce/decreasing with altitude including stone walls, crags (9a, d), woods in valleys or small belts and reservoirs (9d).	Low/Moderate (2) Opportunities for organic configurations in response to particular form of individual hills, moors or grain of overall ridge (9d). Simple moorland canvas presents scope for a sculptural image illuminating emptiness of this landscape (9a,c) or acting as a counterpoint to reservoirs (9d). Potential for turbines to exacerbate discordant forest patterns (9c) and limited scope for visual linkage with more irregular field patterns on lower undulating fringes (9a).
Manmade Influence Commercial forestry dominant manmade influence (9a,d). Large scale development absent in 9a, localised presence elsewhere: quarries, reservoirs, masts, wind turbines (9d) and military development (9c, Spadeadam). Isolated historic features eg Bewcastle Roman fort, prehistoric earthworks and villages (9d). General trend towards more managed character in late 20 th century through degradation or loss of rough moorland due to overgrazing, drainage and conversion to improved pasture or commercial forestry.	Low/Moderate (2) Turbine development has potential to erode integrity of untamed and featureless character of core moorland areas. However a well designed isolated group could be perceived as a complementary contrast. Potential for positive association with working character of intensively farmed or afforested areas and large scale engineered aspects such as reservoirs and quarries. Likely to appear incongruous in context of historic features.
Skyline Simple reposeful skylines in parts lacking strong foci or drama (9a,c). Forest can mask hills, crags and dissecting valleys (9c). Occasional features such as crags, isolated woods and buildings can stand out. Some parts feature manmade verticals eg masts, poles, pylons and existing turbines (9c Spadeadam and 9d).	Low/Moderate (2) Opportunity for isolated turbine groupings to create a new focal point in clear visual contrast to simple moorland or forested skylines although maintenance of a predominantly uncluttered skyline and confusion with other manmade verticals (9d) are issues. Also potential for competition with historical or natural punctuations such as crags.
Connections and Adjacent Landscapes Gradual transition into lower farmland (6,5) for Bewcastle area (9a,c). Southern edges (9a,c Spadeadam) views from Hadrian's Wall and associated trail and cycleway NCR 72. Ridge (9d) has sharp elevational contrast with adjacent coastal landscapes (1,2) important to open and scenic estuarine vistas with Lakeland fells. But close range views often restricted by shoulders of ridge. Some inter-visibility with adjacent Furness Fells and visitor routes.	Low/Moderate (2) Transitional character likely to assist absorption and broad ridge offers scope to site development at a distance from sensitive estuarine views. Potential for localised intrusion on setting of Hadrian's Wall (9a,d), fells of national value (9d) and visitor route ways.
Remoteness and Tranquillity Feeling of remoteness and space derived from wide horizons and absence of settlement on high plateaus and ridge tops. Lightly settled lower areas retain a peaceful backwater character. Localised noise and movement from existing turbines, quarries, main routes on edges (9d) and military uses (9c Spadeadam).	High (5) Noise and movement of turbines likely to compromise sense of remoteness and peace.
Visual:	
Visual Interruption Varies from open moorland and ridges (9a,d) to forested moorland with significant visual containment but also some prominent underlying hills and open edges (9c). Significant containment between hills and towards centre of high plateaus or ridge.	Moderate (3) Turbine development on edge of high plateaus and ridge likely to stand out and be widely visible. Higher degree of visual containment towards centre of plateaus or ridge, between hills and within forested areas likely to assist absorption.
Settlement and Key Views Absent across much of high moorland plateaus, forested areas and ridge tops. Sparse settlement of isolated farmsteads, houses and occasional hamlets/small villages occurs in valleys or along spring lines at foot of scarps.	Low/Moderate (2) High moorland plateaus, forested areas and ridge tops offer scope to site development well away from settlements. Localised potential to be over bearing and intrusive in relation to settlement around edges.
Overall Sensitivity	Low/Moderate

LANDSCAPE TYPE 9i: INTERMEDIATE MOORLAND

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting Southern fringe of 9c Spadeadam (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
Landscape of County Importance All except 9c	County: Protection of distinctive character attributable to absence of detractors, natural moorland land cover, views and natural or built features of interest, striking views (9d) creating a strong positive response.
Ancient Woodland Generally sparse. Few scattered remnants on plateau sides in (9a), Several around Gilgarran gill and small block woodlands on side of moors (9d)	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
9a Open Moorlands 9c Forests 9d Ridges	1.8%: unusual 3.6%: ordinary 1.1%: unusual
Conservation Interests and Associations	Description
Historic Environment Localised interest Conservation Areas: Ireleth in Furness (9d)	Dispersed settlement pattern and enclosure of higher areas post-medieval in origin. Nucleated settlement on lower edges of ridge (9d) earlier in origin. Earthworks including prehistoric settlements and burial cairns and medieval shielings (9a). Number of farms originated as fortified castles in 16/17 th century (9c). Roman roads and fort (9a). 20 th century heritage includes Blue Streak missile/satellite launcher testing Spadeadam (9c) and large scale quarrying (9d).
Ecology Strong interest in parts Several large SSSIs on moorland tops or flows (9a,c) including Caudbeck Flow, Kielder Mires (Part), Christianbury Craggs, Butterburn Flow, Spadeadam Mires all part of the Border Mires SAC and a few small SSSIs (9a) eg Mollen Woods Kirkby Moor SSSI extending south along ridge top to Bank House	Moorland landscape of rough pasture with areas of rush and purple moor-grass, acid grassland and upland heath, extensive blanket bog (9a,d) and small raised bogs (9b,c) characterised by sphagnum moss. Moorland important for a variety of butterflies, moths and breeding birds such as skylark, lapwing, and curlew, short eared owl and grouse. Rush pasture in West Cumbria supports internationally important numbers of hen harrier (9a,d). Other habitats include species rich springs and flushes (9a,d); upland oak woodland present in steep river valleys (9a,d) and alder wet woodland (9a,c); species rich roadside verges (9b Eden); coniferous plantations supporting goshawk (9c) long-eared owl (9b).
Geology 9a: 3 no. RIGGS 9c Spadeadam: 2 no. 9d: 4 no. RIGGS	Boulder clay with occasional outcropping of limestone and sandstone crags (9a,c) Silurian grits and flags (9d)

LANDSCAPE TYPE 9i: INTERMEDIATE MOORLAND

Capacity Statement

Overall the Intermediate Moorland landscape is judged to have a **moderate/high** capacity to accommodate turbine development. This reflects low/moderate sensitivity overall. Whilst the Bewcastle Fells and Furness areas (9a and 9d) have moderate/high landscape value as LoCIs on balance the attributes recognised are considered unlikely to be significantly compromised by wind energy development. Their distinctive character is mainly attributable to simple moorland forms and land cover indicating lower sensitivity as discussed below. Natural and cultural features in both areas and striking views in Furness (9d) are also recognised under this designation but for the most part are localised and should influence siting and design rather than reduce capacity in the landscape as a whole. The only other significant value associated with this type is moderately strong ecological interest which is mainly attributable to tracts of nationally or internationally important moorland habitat. It is considered that this value should influence siting rather than reduce capacity in the landscape as a whole.

The key factor favouring development is a moorland character typified by broad tracts of elevated, windswept and largely empty land covered by rough grass and heather. If isolated and well designed in response to the scale and shape of landform such a development could create a symbolic focal point in clear visual contrast to the simple moorland vegetation canvas and smooth skylines. There is potential for positive association with the 'working' character of afforested areas (9c) and large scale engineered elements such as quarries and reservoirs (9d).

The very large to vast scale of the high plateaus and forests around Bewcastle (9a,c) suggests scope for medium to large wind farm development with opportunity for organic configurations in response to the form of individual hills or broad moorland sweeps. The absence of settlement and visual containment offered by large scale forest backdrops are also likely to assist absorption here. The lower undulating fringe (9a,c) suggests scope for large groups of turbines but the terrain and irregular field patterns offer less scope for positive visual linkage.

Small to large groups of turbines responding to the shape and scale of individual hills would be appropriate in Furness (9d) exceptionally a small wind farm might be accommodated on the higher moors responding to the overall grain of the ridge.

There are some limiting factors, most notably the potential for turbine development to erode a sense of remoteness and wildness. Other issues include protection of largely uncluttered pristine skylines around Bewcastle (9a) and visual clutter and confusion with existing turbines and masts on the ridge in Furness (9d). There is also localised potential for turbines on the open edges of the high plateaus or ridge to be overbearing or intrusive in relation to settlements, visitor routes and prospects from neighbouring landscapes of high sensitivity.

Particular sensitivities in relation to the setting of international and national designations include:

- *backdrop to Hadrian's Wall WHS provided by moorland around Spadeadam (southern edges of 9a and 9c)*
- *contribution to tranquil and picturesque compositions with Lakeland fells around the Duddon estuary and views from the Furness Fells and trunk road the skirting edge of Lake District NP (9d)*

LANDSCAPE TYPE 9ii: MOORLAND HILLS AND LOW PLATEAUS

Landscape Sub-Types	9a Open Moorlands (West Cumbria) 9b Rolling Farmland and Heath (Eden, South Lakeland) 9d Ridges (West Cumbria)
Key Characteristics	Sensitivity
Landscape Character:	
Scale and Enclosure Medium to large scale rolling hills (9b Eden, d) or low plateaus (9a,b S. Lakeland). String of long hills or 'riggs' combine to form distinct High Park ridge (9d) in W. Cumbria. Medium to large sized fields. Generally open can be enclosed by small-medium sized plantations, within valleys between hills or hummocky relief (9b S. Lakeland). Scale indicators include small woods, gill features, tarns and rocky outcrops (9b S. Lakeland), walls, isolated buildings, hamlets, villages, pylons and trees.	Low/Moderate (2) Scale of topography, land cover and settlement and degree of enclosure generally suggest scope for up to a small group development. In close range turbines may appear out of scale against detailed features of relief and land cover.
Complexity and Order Distinctive topographic grain to ridges or hills. Generally simple and balanced combination of elements often transitional land cover large rectangular fields of rough pasture giving way to of improved pasture on lower slopes sometimes in smaller narrower fields (9d W. Cumbria). Conifer or mixed plantation blocks and remnant broadleaved woodland often in gills feature quite strongly in all parts. Patterns can be more diverse, patchy cover of marshy hollows, heath, rocky outcrops, tarns (9b S. Lakeland higher parts) and recently restored opencast areas (9a). Power lines or motorway can cut across topographic grain (9a, 9b S. Lakeland).	Low/Moderate (2) Opportunities for organic configurations in response to particular grain of hills or ridges. In lower managed areas more ordered arrangement might relate to regular field patterns and compare visually with plantation blocks. Varied land cover patterns offer less scope for visual linkage. Potential for turbine arrangements to exacerbate discordant linear utility or infrastructure features.
Manmade Influence Higher parts have rough untamed texture as mainly rough moorland. Improved parts and plantation blocks convey a more functional character. Localised presence of manmade elements eg motorway, masts, small reservoirs in 9b S. Lakeland, pylons in 9b S. Lakeland and 9a W. Cumbria and opencast coal mining in W. Cumbria. Narrow wooded gill/valley features in all parts, variety of natural features such as marshy hollows, rocky outcrops, tarn etc in 9b S. Lakeland and historic mining villages present in 9a.	Moderate (3) Turbine development has potential to erode integrity of untamed and featureless character of rough moorland areas. However a well designed isolated group could be perceived as a complementary contrast. Potential to correspond to other manmade elements and positive association with working character of improved farmland or plantation blocks. However also potential to appear incongruous in context of natural features eg wooded valleys/gills or historic mining villages.
Skyline Mostly smooth with multiple summits sometimes broken by plantations. More reposeful plateau skylines in 9a and 9b S. Lakeland. Latter hummocky in outline at northern end. Skyline often featureless although isolated buildings and woods (9a,d W. Cumbria), or masts and pylons (9a, 9b s. Lakeland) can stand out.	Low/Moderate (2) Opportunity for isolated turbine groupings to create a new focal point in clear visual contrast to simple moorland skylines although maintenance of a predominantly uncluttered skyline is an issue. Other issues relate to potential for localised confusion of form and function with other manmade verticals and competition with natural or historic punctuations.
Connections and Adjacent Landscapes Sharp elevational contrasts create strong visual connections with heavily settled coastal strip (5,2) for 9a,d W. Cumbria and broad valleys (8b) for 9b both containing some important towns and recreation routes. Views often restricted by steep ridge or plateau sides. Inter-visibility with nearby fells most of which are nationally valued which can create dramatic backdrops (9b and d).	Moderate/High (4) Potential for intrusion on sensitive coastal strip and valleys, setting of important towns, recreation routes and prospects from and to adjacent fells of high sensitivity. Plateaus (9a, 9b S. Lakeland) offer some scope to site turbines away from sensitive edges. Large scale backdrop and visual containment of High Park ridge to 9a may assist absorption of turbines.
Remoteness and Tranquillity Generally lightly settled areas that retain a peaceful backwater character. Occasional noise and movement eg M6 on edge of 9b S. Lakeland, Settle/Carlisle railway (9b Eden), local commuter/recreation routes, off road activity parks.	Moderate/High (4) Noise and movement of turbines likely to compromise peaceful backwater character.
Visual:	
Visual Interruption Visibility interrupted by rolling or hummocky terrain, shoulders of scarp slopes and plantations. More limited containment on open High Park ridge (9d) and plateau edges.	Moderate (3) Degree of containment likely to assist absorption. Turbine development on plateau edges and ridge (9d) likely to be more widely visible. Higher degree of visual containment towards centre of plateaus and where plantations present.
Settlement and Key Views Lightly settled with dispersed pattern of isolated farmsteads, houses and occasional hamlets/small villages. Views in Eden across 9b near Appleby from Eden Valley Cycle Route and Settle/Carlisle Railway, in S. Lakeland M6 Killington viewpoint, in W. Cumbria panoramas of coast and Lakeland Fells from local roads and open access area (9d)	Low/Moderate (2) Dispersed settlement and key views present some limitations on siting and size of development.
Overall Sensitivity	Moderate

LANDSCAPE TYPE 9ii: MOORLAND HILLS AND LOW PLATEAUS

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Landscape of County Importance 9b South Lakeland and 9d West Cumbria	County: Protection of distinctive character attributable to 9b: varied land cover, natural and built features eg patches of heather and rush pasture on ridge tops, marshy hollows, tarns streams, stone walls, rocky outcrops, hamlets and views of surrounding fell tops and into adjacent valleys creating a strong positive response. 9d: distinct land form of ridge, natural moorland land cover, striking views of adjacent fells, coast or estuary, absence of detractors and woodland and stone wall features of interest creating a strong positive response.
Ancient Woodland Generally sparse: 9a: few around Gilgarran in W. Cumbria largely re-planted 9b: Hoff Lunn Eden and Lune Valley fringes S. Lakeland 9d: block at Branthwaite in W. Cumbria	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
9a Open Moorlands 9b Rolling Farmland and Heath 9d Ridges	1.8%: unusual 2.3%: unusual 1.1%: unusual
Conservation Interests and Associations	Description
Historic Environment Localised interest Conservation Areas: Settle/Carlisle Railway in Eden (9b)	In W Cumbria (9a,d) settlement pattern dispersed some clusters of 19 th century industrial workers housing (9a). Earthworks including prehistoric settlements and burial cairns and medieval shielings. Fields often large and formed by late moorland enclosure. Lower down on ridge (9d) at Weddicar Rigg long narrow fields defined by stone walls. In South Lakeland dispersed settlement pattern with limestone built farmsteads. In general buildings date from 17 th century onwards. The field system is late and often originated in the 19 th century. In Eden the settlement pattern is based on nucleated villages with a field pattern of early enclosures often containing fossilised strips. Settlement is sparse, in lower areas nucleated, higher areas dispersed and later in origin. Lower down fields are irregular often small but on higher land generally regular and product of late enclosure. Prehistoric settlements and burial cairn remains.
Ecology Interest across rough moorland, locally strong 9b: In Eden SSSIs along Hoff Beck and Helm Beck and 2 small pockets, in S. Lakeland SSSIs limited to isolated wetland pocket	Moorland of rough and improved pasture containing areas of rush pasture and purple moor-grass, upland heathland and acid grassland. In South Lakeland of note south of Killington presence of a series of small raised bogs characterised by sphagnum moss whilst coniferous plantations support long-eared owl. In Eden species rich roadside verges occur south of Appleby. In W. Cumbria rush pasture and purple moor grass dominant on High Park ridge (9d). Lower slopes support rush pasture and swamp, together with improved grassland. Steeply incised valleys support small upland oak woodlands. Moorland important for a variety of butterflies, moths and breeding birds such as skylark, lapwing, curlew, short eared owl and grouse. Rush pasture in West Cumbria supports internationally important numbers of hen harrier (9a,d).
Geology Isolated pockets of interest: 9a W. Cumbria: 2 no. RIGGS 9b Eden: 2no. small RIGGS 9b S. Lakeland: 2no. small RIGGS 9d W. Cumbria: 2no. small RIGGS	Significant exposures of Permian rocks in Eden including Penrith Brockram.

LANDSCAPE TYPE 9ii: MOORLAND HILLS AND LOW PLATEAUS

Capacity Statement

Overall the Moorland Hills and Low Plateaus landscape is judged to have a **moderate** capacity to accommodate turbine development. This reflects moderate sensitivity overall. Whilst the South Lakeland (9b) and West Cumbria (9d) areas have moderate/high landscape value as LoCIs on balance the attributes recognised are considered unlikely to be significantly compromised by wind energy development. Their distinctive character is mainly attributable to simple moorland forms and land cover indicating lower sensitivity as discussed below. Natural and cultural features and striking views in both areas are also recognised under this designation but for the most part are localised and should influence siting and design rather than reduce capacity in the landscape as a whole.

Whilst mixed or transitional in character these areas retain a moorland character typified by elevated, windswept and largely empty land covered by rough grass and heather. These core moorland characteristics suggest scope to accommodate turbine development. If isolated and well designed in response to the scale and shape of landform such a development could create a symbolic focal point in clear visual contrast to the simple moorland vegetation canvas and smooth skylines. The medium to large scale of this landscape suggests scope for up to small groups of turbines either in organic configurations in response to the form of individual hills or ridges and their overall grain or more ordered arrangements related to regular field patterns or plantation blocks. Turbine development would sit less comfortably where land cover patterns become patchier and varied in character as they offer less scope for visual linkage. In South Lakeland (9b) this problem tends to be exacerbated by the hummocky nature of the rolling farmland and heath near Kendal.

A key constraint is the potential for turbine development to erode a peaceful backwater character. Another is the potential for intrusion on adjacent major valleys and coastal strip and the setting of important towns and popular recreation routes within them as well as prospects to and from nearby fells of national value. Other issues include protection of largely uncluttered pristine skylines (9b Eden and 9d West Cumbria), potential for localised visual confusion with the form and function of masts and pylons (9a West Cumbria and 9b South Lakeland) and competition with natural or historic punctuations.

Whilst there is potential for positive association with the 'working' character of improved farmland or plantations there is also localised potential for turbines to appear incongruous and out of scale in the context of natural and historic features such as wooded gills, tarns, smaller historic field patterns and historic mining villages.

Particular sensitivities in relation to the setting of international and national designations include:

- *in West Cumbria contribution of the High Park ridges and moors to vistas and coastal panoramas from the C2C Cycle Route (NCR 71), the Ennerdale and Loweswater Fells and 'gateways' to the Lake District NP off the A5086*
- *views from the western Howgill Fells in the Yorkshire Dales NP and Sedbergh 'gateway' towards the rolling farmland and heath near Kendal and back towards the Park from the A684, M6 and Killington Reservoir viewpoint*
- *contribution of the rolling farmland and heath near Appleby to panoramic views of the Vale of Eden and Lakeland fells beyond from the western scarp of the North Pennines AONB, most notably from the Pennine Way as it descends from High Cup Nick, and views back towards the imposing scarp from National Cycle Routes 68 and 71 and the Pennine Bridleway.*

LANDSCAPE TYPE 10: SANDSTONE RIDGE

Landscape Sub-Types	10a Sandstone Ridge
Key Characteristics	Sensitivity
Landscape Character:	
<p>Scale and Enclosure Distinctive large scale ridge generally open and steep sided running north from Penrith. Breaks up into a series of hills at north end and Whinfell forms an outlier at southern end. Higher parts rolling with individual fell summits. Long distance and expansive views west to Lake District fells and east to North Pennines. Broad elements of improved farmland, conifer plantations and heathland. Detailed features limited apart from stone walls, hedges and occasional buildings.</p>	<p>Moderate (3) Large group would not intimidate overall scale of ridge, especially in context of large fields and plantations. However in close range scale of receiving hills and individual fell tops on the ridge suggest single turbine to small group developments more appropriate. Exposure suggests a strong design rationale.</p>
<p>Complexity and Order Sometimes varied and picturesque in character but generally balanced and managed. Distinguished by prominent north-south grain of ridge containing some sweeping lines and angular scarps around individual summits. Overlain by a patch work of improved grassland and conifer plantations with some isolated areas of heathland. Regular patterns of late enclosure fields defined by stone walls and plantation blocks. Agricultural improvement has reduced variety particularly in northern half.</p>	<p>Moderate (3) Opportunities for ordered turbine grouping to flow along overall grain of ridge and relate to rectilinear elements in land cover pattern. Picturesque and balanced compositions around distinctive summits vulnerable and hilly more varied parts offer less scope for visual linkage.</p>
<p>Manmade Influence Substantial change to more managed character in late 20th century due to afforestation and agricultural improvement. Most of area was previously dry heathland and rough pasture. 'Open range' and more intensive farming methods have also led to removal or neglect of field boundaries and presence of large modern farm buildings. Other manmade development limited to pylons at foot of ridge and telecommunication masts on some ridge tops and Oasis holiday complex in Whinfell Forest.</p>	<p>Moderate (3) Some potential for positive association with 'working' intensively managed character and integration with regular patterns. However may be perceived as exacerbating recent deterioration of natural qualities although scope for development to contribute to restoration through appropriate land management.</p>
<p>Skyline Strong simple flowing horizon that is either smooth or textured by forestry. Individual fell tops can stand out and ridge becomes fragmented and more complicated at hilly northern end. Pylons generally inconspicuous due to location at foot of slopes and masts restricted to ends of ridge.</p>	<p>Moderate(3) Likely to read reasonably well in simpler parts as a new focal point contrasting with the extended horizontal emphasis of ridge. More confused unpredictable relationship likely in hilly parts. Other issues relate to maintenance of an uncluttered skyline in central part and confusion of form and function in proximity to pylons and masts.</p>
<p>Connections and Adjacent Landscapes Relative elevation and narrow configuration produces strong and protracted connections. Forms distinctive skyline along its length to Petheril Valley and M6 corridor (6), Eden Valley and A66 (8b). Beacon Hill at southern end forms distinctive backdrop to Penrith. Elsewhere tends to bleed into adjacent low (5) and intermediate farmland (6). Important western backdrop to Eden gorge (8a).</p>	<p>Moderate/High (4) Potential for intrusion on setting of Penrith and sensitive rim of Eden Gorge and setting of villages within it. Any development likely to be prominent but not necessarily intrusive from major roads given breadth of views towards the ridge and low sensitivity of travellers.</p>
<p>Remoteness and Tranquillity Rural lightly settled landscape which feels balanced and calm.</p>	<p>Moderate/High (4) Noise and movement of turbine development likely to reduce sense of calmness.</p>
Visual:	
<p>Visual Interruption Open with a low incidence of visual interruptions. Some containment by conifer plantations, undulations/folds and individual summits within the ridge.</p>	<p>Moderate/High (4) Turbine development likely to be widely visible. Some localised screening but also potential for some disturbing effects due to partial visibility.</p>
<p>Settlement and Key Views Dispersed low density pattern of isolated farms and houses and a few small nucleated villages/hamlets at northern end. Clipped by A6, Settle/Carlisle railway and C2C Cycle Route.</p>	<p>Moderate (3) Some areas of land sufficiently distant from settlement so as to avoid over dominance by turbines. Elsewhere development constrained to single/twin or small group size in context of small villages/hamlets.</p>
Overall Sensitivity	Moderate

LANDSCAPE TYPE 10: SANDSTONE RIDGE

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Landscape of County Importance Small part: outlying area E of Lune Gorge	County: Protection of distinctive character, area included in 1996 through Eden Local Plan justification and main attributes unclear
Ancient Woodland Generally sparse but include Whinfell Forest (replanted), Barrock Park and Baronwood	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
10a Sandstone Ridge	1.7%: unusual
Conservation Interests and Associations	Description
Historic Environment Limited interest Settle/Carlisle Railway Conservation Area clips E fringes of main ridge	Part of Inglewood Forest belonging to Barony of Greystoke created in 1120 and in Norman times former Royal Forest hunting ground. Field pattern is regular of 19 th century origin. Settlement is sparse but mainly nucleated.
Ecology Interest in parts and most notably heathland Designations limited to SSSIs of Wan Fell, Lazonby Fell, Cliburn Moss and small RIGGS site	Main areas of lowland heathland in Cumbria on Wan fell and Lazonby Fell. Conifer plantations south of Penrith support range of uncommon plants associated with native Scot's pine woodland eg northern bilberry and red squirrels. Also occasional interest of basin mire (south end); rush pasture; ponds and wetlands formed by mineral extraction (north end) which support swamp and fen communities.
Geology Isolated sites of interest	Scientifically important exposures of Permian sandstone occur

LANDSCAPE TYPE 10: SANDSTONE RIDGE

Capacity Statement

Overall the Sandstone Ridge landscape is judged to have **moderate** capacity to accommodate turbine development reflecting moderate sensitivity overall and moderate value as a largely undesignated landscape. Whilst it also has moderately strong ecological interest this is mainly attributable to isolated patches of nationally important heathland, moss and wetland. It is considered that this value should influence siting rather than reduce capacity in the landscape as a whole.

The overall scale of the ridge coupled with a regular land cover pattern of large fields and plantation blocks suggests scope to accommodate a large group. However in the context of individual fell tops and hills or small villages and hamlets single turbines to small group sized development would be more appropriate. A strong skyline presents the opportunity for a linear or elongated group of turbines flowing along the main grain of the ridge and clearly contrasting with its horizontal emphasis. However picturesque and balanced compositions of heath, rocky outcrops, woods and sweeping farmland around distinctive summits are highly sensitive.

Due to the elevation and openness of the ridge any development is likely to be widely visible. A simple predictable relationship with the ridge top and logical appearance in an exposed position would assist in portrayal of a positive image whilst development sited in peripheral hilly parts, on ridge sides or in the context of existing pylons and masts is likely to appear more confusing.

A significant constraint is potential for intrusion on the setting of Penrith and rim of the Eden Gorge as well as over dominance of villages within it. Although there is some potential for positive association with an intensive land management and integration with rectilinear patterns turbine development may also be perceived as spoiling a largely uncluttered ridge, conflicting with a sense of calmness and exacerbating a trend towards blandness and deterioration in natural character.

Particular sensitivities in relation to the setting of national designations include:

- *contribution of the ridge to inspiring views over the Vale of Eden towards the Lakeland fells from the from the western scarp of the North Pennines AONB most notably from the A686 pass, Hartside Cross viewpoint, the Maiden Way and the C2C Cycle Route (NCR 7) and further south from the Pennine Way around High Cup*
- *views from the Penrith 'gateway' to the Lake District NP and M6, A592, A66 approaches*

LANDSCAPE TYPE 11: UPLAND FRINGES

Landscape Sub-Types	11a Foothills 11b Low Fells
Key Characteristics	Sensitivity
Landscape Character:	
Scale and Enclosure Varies with altitude from medium scale enclosed rolling or hilly farmland to larger scale plateau farmland, open fell bottoms or moorland and outlying low fells (11b). Land cover also varies from improved pasture fields to open moorland. Field size reflects local relief, small in hilly parts but large on flatter plateaus. Variety of scale indicators in lower parts including walls, hedges, conifer plantations, deciduous trees and small woods, rocky outcrops and minor valleys but higher areas tend to be featureless.	Moderate (3) Small group would not intimidate low fells and plateau farmland. Exceptionally a large group might relate to broad sweep of fell side or moorland. Lower more pronounced hilly terrain highly sensitive due to intimate scale and potential for over dominance in restricted zones of visibility. In close range turbines may appear incongruous and out of scale against detailed features of relief and land cover. Most likely to appear rational on windswept hill/fell tops of southern and western upland fringes.
Complexity and Order Transitional but generally balanced and calm. Simple open moorland of rough pasture with colourful patches of heather and extensive conifer plantations in parts gives way to lower farmland dominated by improved pasture. Farmland can be simple with a pattern of large square fields and small plantations with poor hedges, fences and walls or diverse in hillier parts with smaller fields and a variety of features such as streams and wooded minor valleys, wooded steep slopes, tarns and marshy hollows, rocky outcrops, boundary trees and tree clumps round farms. Low fells (11b) have NE/SW grain.	Moderate (3) Opportunities for organic configurations related to form of individual low fells and larger hills or sweep of lower fell sides. Simple moorland canvas offers potential for dramatic contrast. On lower flatter farmland plateau rectilinear group might mirror regular filed pattern and plantation blocks. More diverse hilly terrain highly sensitive due to potential confusion of variable heights and limited scope for visual linkage.
Manmade Influence Trend towards reduced variety due to agricultural intensification and afforestation in 20 th century. Symptoms include neglect or removal of walls, hedges, deciduous woodland and loss moorland to improved pasture or conifer plantations. Largely unspoilt but harmony sometimes locally weakened by large modern quarries, pylons, conifer blocks, masts, M6 or farm sheds.	Moderate/High (4) Potential for positive association with working character of intensively farmed or afforested areas and large scale engineered aspects such as quarries or roads. However may be perceived as exacerbating deterioration of rough untamed qualities and compromising unspoilt character.
Skyline Complex skyline of interwoven hills with intermediate horizons interrupted by trees and woods gives way to emptier smooth fells or moorland. Frequently backed by higher uplands. Few points of vertical focus except occasional pylons, masts, and existing turbines. Pronounced hills can create immediate and dominant skylines relative to valleys and frame vistas.	Moderate/High (4) Potential for confusing and unpredictable relationship with complex skyline of lower foothills. In higher parts limited scope for isolated turbine grouping to form a predictable and clear visual contrast with barer fell and moorland skylines but may appear illogical in context of higher upland skylines. Potential for localised over dominance and visual confusion with pylons, masts and existing turbines.
Connections and Adjacent Landscapes Generally part of a wider hierarchical and uplifting scene with adjacent uplands (13) including N. Pennines escarpment, Lakeland Fells and Howgills. Often contrasting textures and colours serve as a foil. Also contribute to setting of main valleys (8b), towns such as Kendal, Ulverston and Cleator Moor and Hadrian's Wall. Furness foothills important to open and scenic estuarine views. Intervisibility with surrounding fell tops some of which nationally valued.	Moderate/High (4) Whilst large scale backdrops of uplands likely to assist absorption in terms of scale turbines have potential to clutter and detract from jar against foreground of wider restful and well composed scenery. Also potential for intrusion on sensitive valley rims, setting of important towns and Frontiers of the Roman Empire: Hadrian's Wall as well as prospects from adjacent fells. discordant
Remoteness and Tranquillity Rapid transition from remote open uplands to more settled farmland generally perceived as peaceful rural backwaters. Only major disturbance is the M6 motorway which carves through the low fells (11b) and to lesser extent other through routes such as A595, A6, A685, A684 and A69.	Moderate/High (4) Noise and movement of turbines maybe appropriate adjacent to through routes but elsewhere likely to compromise sense of remoteness in higher parts and peaceful backwater character of settled parts.
Visual:	
Visual Interruption Varies from prominent sweeps of open fell side/moorland to lower rolling foothills where visibility is significantly interrupted by the relief, individual and clumps of trees, plantations, hedges and buildings. Low fells (11b) open but broken configuration into individual summits tends to shorten views.	Moderate (3) Turbine development assisted by rolling topography and frequent interruptions resulting in glimpsed or intermittent views. However likely to stand out on fell sides and moorland.
Settlement and Key Views Absent or only isolated farmsteads across higher parts but frequent scattered farmsteads, hamlets and small villages served by minor roads evenly spread across lower foothills. Concentration of villages evident along foot of North Pennine scarp and elsewhere along main through routes. Views of southern part of N Pennines from Pennine Bridleway, C2C Cycle Route (also Copeland), Eden Valley Cycle Route and W2W Cycle Route (also S Lakeland). Fox's Pulpit view (11b).	Moderate (3) Higher parts offer scope to site development well away from settlements whilst dispersed settlement in lower foothills presents greater limitations on siting and size of development.
Overall Sensitivity	Moderate

LANDSCAPE TYPE 11: UPLAND FRINGES

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting Northern fringe of 11a N Pennines (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
North Pennines AONB Eastern fringes of 11a North Pennines strip	National: Conservation and enhancement of natural beauty derived from the special qualities of: a unique landscape unit with a distinctive geology and unusually large extent of high, exposed semi-natural moorland which has outstanding wilderness qualities; scenic contrasts and unfolding sequence of simple moorland, sheltered dales and dramatic scarp as well as spectacular individual features; moorland landscapes valued for their long views and western scarp affords panoramic views; special interests of historic mining landscape, unique flora and fauna, unusual range of geological and geomorphological features and wealth of archaeological and historical remains which contribute to landscape character.
Landscape of County Importance All areas beyond AONB	County: Protection of distinctive character attributable to natural/built features, absence of detractors, views, and sometimes landform or land cover creating a strong positive response.
Registered Historic Parks and Gardens E part of Holker Hall	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Concentrations along River Gelt in N Pennines, Ellerside and Millom Park in Furness and Great Wood in West Cumbria	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
11a Foothills 11b Low Fells	8.5%: common 0.5%: rare
Conservation Interests and Associations	Description
Historic Environment Widespread archaeological remains Conservation Areas: Cumrew and Dufton in N Pennines Cartmel and Newland in Furness	Settlement pattern dispersed in foothills (11a) and few isolated farmsteads in low fells (11b). Field system product of late enclosure. Some farms originated as late as 16 th century. Ring garths and intakes identifiable. Widespread upstanding remains include prehistoric stone circles and cairns, medieval shielings and droveways, remnants of late medieval deer parks and prolific industrial remains eg quarrying and lead mining. Some areas especially rich eg Warcop Common.
Ecology Many small pockets of interest Limited in N. Pennines and S Lakeland to SSSIs and sometimes SACs or SPAs over main rivers and becks or moorland extensions. Also Limestone Pavements Orders east of Kirkby Stephen. Designations absent in Furness except for RIGGS near Millom. In W Cumbria small RIGGS, SSSI/SAC on R Ehen and few small sites.	Low fells (11b) and N/ E areas (11a) support areas of upland heath and acid grassland. Rush pasture frequent on poorly drained ground throughout and species rich hedgerows in lower parts. Many small valleys often support upland oak woods and habitat for otters and dippers. Occasional outcrops of limestone support limestone grassland and upland ash woodland. Purple moor grass, gorse scrub and small stands of wet woodland in damp hollows also found in low fells (11b).

LANDSCAPE TYPE 11: UPLAND FRINGES

Capacity Statement

Overall the Upland Fringes landscape is judged to have **low/moderate** capacity to accommodate turbine development. This reflects moderate sensitivity overall, moderate/high to high landscape value recognised by LoCI and AONB designation* and moderately strong historical and ecological interest. Rapid transitions in character occur with changes in altitude which affect acceptability.

Within the North Pennines gently rolling or terraced upland fringe landscapes along the northern edge and the south west end around Stainmore Gap have a particular sensitivity because of their contribution to the contrasting sequence of landscapes valued under the AONB designation. In between foothills on the edge of the Vale of Eden run up to join the dramatic western scarp and together these form one of the most distinctive parts of the AONB. Here dramatic and varied landforms, panoramic views and a string of historic scarp foot sandstone villages are qualities likely to be compromised by any scale of wind energy development.

Key constraints within this type include the potential for wind turbines to compromise the unspoilt character and sense of remoteness or peace found in these rural backwaters; general absence of comparable man-made structures; visual context against higher uplands in which turbines may appear illogical if placed below the main skyline and clutter the foreground of wider and uplifting landscape compositions.

Higher parts offer some aspects favourable to turbine development. The larger scale outlying low fells, moorlands, fell bottoms and high plateau farmland suggest scope for small group development and possibly a large group on broader topographic sweeps. This could create a focal point in clear visual contrast to a simple moorland canvas of rough pasture and heathland or relate to the regular large scale pattern of fields and plantations and associate with large scale engineered aspects such as main roads and large quarries.

The restricted views and intimacy of the lower foothills are likely to be intimidated by turbine development. A dispersed pattern of small settlements would make it difficult to avoid over dominance and a complex skyline of interwoven hills and diverse farmland exhibiting a variety of natural and historic features suggests potential for visual confusion.

Particular sensitivities in relation to the setting of national and international designations include:

- *sequential views towards the AONB from Hadrian's Wall Trail and Cycle Route (part of NCR 72) and from viewpoints at the forts, milecastles and camps between Lanercost and Birdoswald*
- *sequential views towards Frontiers of the Roman Empire: Hadrian's Wall from the Tindale Fells in the AONB (NCR 72), Pennine Way as it descends into the Irthing Valley and A69*
- *panoramic views from the upland edges of the AONB over the Vale of Eden towards the Lakeland fells most notably from the Pennine Bridleway around Croglin Fell and Knock Gill, the A686 pass, Hartside Cross viewpoint, the Maiden Way and the C2C Cycle Route (NCR 7), the Pennine Way around High Cup and from the Stainmore Gap A66, Coast to Coast footpath and W2W Cycle Route 'gateway'*
- *views from below where the scarp forms an imposing wall above the Vale of Eden most notably from the A66, A686, Settle Carlisle Railway, Pennine Bridleway and C2C and EV Cycle Routes (NCR 7/ 68)*
- *views from the Shap Fells and Potter Fell on the south-eastern fringe of the Lake District NP and sequential views in from the W2W Cycle Route (NCR 68), Dales Way and A6*
- *contribution to tranquil and picturesque compositions with fells in the Lake District NP around the Duddon and Leven estuaries and views from the trunk road skirting edge of Park and 'gateways' off it, National Cycle Route 72, Furness Fells and Black Combe*
- *in West Cumbria views from the C2C Cycle Route (NCR 71) and views out from the Ennerdale and Loweswater Fells and 'gateways' off the A5086 to the Lake District NP*
- *views from the western Howgill Fells in the Yorkshire Dales NP over the low fells and back towards them from the A684 and M6*

* For those areas that fall within the North Pennines Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 12: HIGHER LIMESTONE

Landscape Sub-Types	12a Limestone Farmland 12b Rolling Fringe	12c Limestone Foothills 12d Moorland & Commons
Key Characteristics	Sensitivity	
Landscape Character:		
<p>Scale and Enclosure Mostly large scale rolling or undulating hills and fells with occasional steep slopes and scars. Generally open and bare with wide views sometimes exposed (12d) or more enclosed in valleys. Medium/small scale fields in settled farmland (12a) and foothills (12c south). Otherwise broad scale land cover fabric of open commons (12d), large allotments of rough pasture and remnant heath or conifer plantations sometimes extensive (12b, 12c north). Scale indicators scarce increasing in settled farmland (12a) include: walls, hedges, occasional tree clumps, relict broadleaved woods, and rock outcrops.</p>	<p>Low/Moderate (2) Scale and wide horizons generally suggest scope for a small to large scale group development. Lower improved farmland and valleys highly sensitive due to intimate scale, potential for over dominance in restricted zone of visibility and context of more frequent natural and built scale indicators.</p>	
<p>Complexity and Order Generally balanced. Core areas include simple moorland forms covered by rough grassland/heather mosaics with extensive limestone pavements/scars and isolated trees (12d) and rolling farmland with improved pasture divided by stone walls into a strong pattern of small fields around ancient villages softened by trees (12a). Transitional fringe areas of mixed pasture are sometimes fairly simple divided into large rectangular fields with isolated plantations and occasional tree clumps with signs of neglect (12b) or more distinctive estate land with extensive plantations, parkland and some ancient woodland (12c).</p>	<p>Moderate/High (4) Turbines likely to disrupt scenic harmony of core limestone areas of rolling farmland with distinctive historic patterns and simple craggy moorland with mosaics of natural grassland and heather. Simpler fringe areas less sensitive with potential for ordered turbine groupings to mirror large regular fields or plantation blocks.</p>	
<p>Manmade Influence Strong sense of history in core areas (12a,d) with evidence of settlement as early as Neolithic. Rich legacy of visible archaeological remains including medieval field patterns. Trend towards reduced variety due to agricultural intensification and afforestation in 20th century. Symptoms include neglect or removal of walls, woods, boundary trees loss of species rich grassland/heather moorland and large farm sheds. Localised presence of large quarries, masts, pylons and roads with concentration by M6.</p>	<p>Moderate/High (4) Turbines likely to appear incongruous in context of historic field patterns and visible remains. Limited potential for positive association with afforestation and large scale engineered aspects such as quarries or roads. However may be perceived as exacerbating deterioration of rough untamed qualities and compromising unspoilt character.</p>	
<p>Skyline Simple flowing horizons sometimes stepped in profile with (12a,d) or more rounded (12b,c). Generally bare and smooth occasionally textured by trees. Can form landmark skylines eg Hilltop/Sandale escarpment (12b) or eye catching scars (12d). Skyline complicated by trees scrub and interweaving ridges in lower areas. Pylons and masts conspicuous in parts.</p>	<p>Moderate (3) Some scope for isolated turbine grouping to form a predictable and clear visual contrast with barer fell and moorland skylines but visual clutter is an issue. Distinctive landmark skylines likely to be compromised. Potential for unpredictable relationship with complex skyline of lower farmland and visual confusion with pylons and masts.</p>	
<p>Connections and Adjacent Landscapes Strongly connected by inter-visibility with nearby fells (13) some of which nationally valued including Lakeland Fells, North Pennines and Howgills. In Allerdale (12b north) defines the edge of the Solway Basin. Can contribute to setting of important valleys, settlements and viewpoints eg upper Lune valley and Kirkby Stephen, Caldbeck valley and Faulds Brow.</p>	<p>Moderate/High (4) Whilst large scale backdrops of uplands may sometimes assist in absorption of turbines they may clutter and jar against distinctive sometimes dramatic views of adjacent fells. Also potential for intrusion on sensitive valley rims, settlement settings and prospects from adjacent fells.</p>	
<p>Remoteness and Tranquillity Only major disturbance is the M6 motorway and to lesser extent other through routes such as A66, A685, A595 and A5086. Population tends to be concentrated in historic villages with surrounding agricultural areas generally perceived as quiet and calm. Higher unsettled parts remote and tranquil.</p>	<p>Moderate/High (4) Noise and movement of turbines maybe appropriate adjacent to through routes but elsewhere likely to compromise sense of remoteness found in higher parts and quietness elsewhere.</p>	
Visual:		
<p>Visual Interruption Generally open ranging from bare grazing land and limestone pavements to settled farmland with trees concentrated around villages and farms or in valleys. Low incidence of interruption although localised containment by relief and plantations.</p>	<p>Moderate/High (4) Turbine development likely to stand out and be widely visible.</p>	
<p>Settlement and Key Views Largely absent across 12d and other higher parts. On lower farmland population concentrated in historic villages or isolated farmsteads. Villages often linear located in minor valleys or more nucleated next to springs on edge of moors, with strong limestone built character, greens and farm buildings within them. Views from national recreation routes: Pennine Bridleway; Coast to Coast footpath; W2W and C2C Cycle Routes.</p>	<p>Moderate/High (4) Higher parts offer some scope to site development well away from settlements but can be constrained tourism facilities. Lower settled farmland presents greater limitations on siting and size of development constrained by small scale nature of historic villages with potential for over dominance.</p>	
Overall Sensitivity	Moderate/High	

LANDSCAPE TYPE 12: HIGHER LIMESTONE

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Landscape of County Importance 12a, c, d and parts of 12b.	County: Protection of distinctive character attributable to landform (except 12b,c Eden) natural/built features (except 12b Allerdale), absence of detractors, views, and sometimes cultural features (a, d) or land cover (b, c, d) creating a strong positive response.
Registered Historic Parks and Gardens N tip of Lowther Castle and Image Garden Reagill (12b)	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland A few notably Crosby Gill and Scandal Beck (12a), gill woods on edge of Solway Basin (12b), Hoff Lunn Eden (12a/b) and around Greystoke Park (12c)	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
12a Limestone Farmland 12b Rolling Fringe 12c Limestone Foothills 12d Moorland & Commons	2.7%: ordinary 2.3%: unusual 1.3%: unusual 2.0%: unusual
Conservation Interests and Associations	Description
Historic Environment Rich concentration of visible remains particularly in 12a and 12d. Conservation Areas: Settle/Carlisle railway (12a/d) and several villages across 12a	In Eden nucleated villages often with greens and traditional farm buildings within them surrounded by mix of late and early enclosures with fossilised strips (12a, b Eden c) sometimes linked to commons by droveways or outgangs. In 12d little settlement, commons unenclosed and what enclosure exists is late. Features include earthworks eg prehistoric boundary walls, stone circles and cairns (12a,d), Viking remains (12b Allerdale), Roman roads (12d,c), early medieval settlement remains and evidence of medieval deer parks (12a, c), ridge and furrow and lynchets (12a,b), abandoned quarries and limekilns (12a,b,d), and isolated barns(12a).
Ecology Rich interest especially in 12d and 12a. Limited interest in 12b. Core areas of 12d covered by SACs/SSSIs/ large Limestone Pavement Orders and a NNR. Some of these spill over into fringes of 12a which also has patchy designation of SSSIs along rivers and grassland plus RIGGS near Nateby. Designations virtually absent across 12b except a few SSSIs along main rivers, a few RIGGS. Also very limited across 12c except small Limestone Pavement Orders near Greystoke, RIGGS and SSSI	Internationally important limestone pavements, upland heathland and acid grassland predominate in 12d. Limestone grassland present where limestone outcrops (12a,c,d, 12b occasional) species rich springs and flushes(12a,c,d). Parts notable for species rich hay meadows and broad roadside verges (12a,c). Stands of upland ash woodland often along gills and river valleys (12a, 12b occasional, 12c) many small rivers and becks support otter and crayfish. Some interest in disused quarries eg great crested newts (12b). Wood pasture and veteran trees in Greystoke Park (12c).
Geology and Geomorphology Important exposures of carboniferous limestone. LPOs and RIGGS as described above	Till and fluvio-glacial deposits exposed along Scandal Beck provide key evidence in Quaternary stratigraphy. Glacial erratic boulders of pink Shap Granite east of Shap (12d).

LANDSCAPE TYPE 12: HIGHER LIMESTONE

Capacity Statement

Overall the Higher Limestone landscape is judged to have **low/moderate** capacity to accommodate turbine development. This reflects moderate/high sensitivity overall, moderate/high landscape value recognised by LoCI designation in most areas and strong geological, ecological and historical interests. Acceptability is affected by localised geographical variations in the degree to which limestone characteristics are exhibited and wealth of historic features.

A key limiting factor is the open character of this type whereby any development is likely to be widely visible with only localised containment by relief or trees. This is liable to exacerbate potential problems of over dominance and intrusion relative to historic villages, and prospects from tourist routes and viewpoints both within this type and from the nearby fells of national landscape importance. Whilst there is some localised intrusion from modern developments, especially around the M6 corridor, this landscape type is largely unspoilt. Therefore protection of uncluttered and distinctive landmark skylines and a sense of remoteness or quietness are also major issues. Most parts are also rich in visible historic remains which are vulnerable in terms of both their scale and character.

Core areas that exhibit distinctive limestone features such as limestone pavements, scars and historic field patterns and others with parkland and ancient woodland are vulnerable because of their scenic richness and harmony. However there are some blander fringes, with fewer limestone features, that would not be intimidated by a small or possibly large sized group development especially if visually linked to large scale field patterns or forestry blocks. There is also some potential for positive association with large scale engineered components such as quarries and roads.

Particular sensitivities in relation to the setting of national designations include:

- *contribution of the rolling fringe around Ullock to coastal panoramas from the Loweswater Fells and C2C Cycle Route in the Lake District NP*
- *contribution of the rolling fringe on the edge of the Solway Basin to coastal panoramas from the northern fells of the Lake District NP including outliers such as Binsey, Green How and Faulds Brow, the Uldale and Caldbeck Fells and the Skiddaw massif, framed views out of valley 'gateways' off the A595 and sequential views from the Allerdale Ramble, Cumbria Way and Regional Cycle Route 10*
- *contribution of the lightly settled limestone foothills, which extend into the LDNP, to the quieter north-eastern fells*
- *panoramic views across the limestone foothills around Greystoke towards the Vale of Eden from the Carrock/ Bowscale fells and Blencathra massif in the Lake District NP and views back to the imposing steep eastern faces of these fells most notably from the C2C Cycle Route*
- *views from the Pooley Bridge 'gateway' to the Lake District NP and M6, A592, A66 approaches*
- *close affinity between limestone commons and farmland around Shap and the Haweswater Lake District NP 'gateway' landscape, with geological, historic and cultural connections*
- *key views out from the popular High Street range and back towards the Park from the M6, A6, Coast to Coast footpath and W2W Cycle Route (NCR 68)*
- *contribution to Vale of Eden panoramas from the Stainmore Gap North Pennines AONB 'gateway' most notably from the A66 and W2W Cycle Route (NCR 71) and towards the AONB from the same cycle route (NCR 68), the Settle Carlisle Railway, Pennine Bridleway and A685*

LANDSCAPE TYPE 13: FELLS AND SCARPS

Landscape Sub-Types	13a Scarps 13b Moorland, High Plateau 13c Fells
Key Characteristics	Sensitivity
Landscape Character:	
Scale and Enclosure Exposed large scale upland. N Pennines comprise expansive undulating moorland plateau (13b) with wide horizons but distinct high fells and summits in central section and dramatic western scarp (13a) with conical shaped outliers. Fells of SE Cumbria (13c) comprise either Lakeland extensions with steep sided rounded forms and deeply incised valleys or Pennine extensions with more angular craggy outlines. Largely rough grazing devoid of trees. Occasional features eg rock outcrops, screes, waterfalls and walls, farms woods on lower slopes.	Low/Moderate (2) Expansive scale and wide horizons of Pennine moorland would not be intimidated by a wind farm development whilst a large group might relate to the scale of individual fells. Incised valleys vulnerable to over dominance due to more intimate scale and restricted zone of visibility. Occasionally turbines may appear incongruous and out of scale against natural and built features particularly on lower slopes. Most likely to appear rational on windswept fell tops.
Complexity and Order Essentially a simple empty landscape. Contours of land generally smooth, in places rugged especially around the scars, sills and crags of the scarps (13a), moorland summits (13b) and limestone fells (13c Pennines) or remarkably sleek and gently domed as in the Howgills with fascinating shadow patterns (13c). Unenclosed rough pasture predominates in mosaics of colour and seasonal contrast with rushes, bracken and remnant heather or more uniform expanses of blanket bog on Pennines plateau (13b). Gully features frequent on steep slopes sometimes cloaked by remnant ancient woodland.	Moderate (3) Opportunities for organic configurations related to individual form of fells or ridges within plateau areas. Simple moorland canvas offers opportunities for turbines to create a dramatic contrast illuminating emptiness of this landscape. However potential to conflict with irregular vegetation mosaics and existing features such as rock outcrops, gills and broadleaved woodland. Elsewhere turbines may be perceived as compromising simplicity of virtual 'upland deserts' or sleek and majestic landforms.
Manmade Influence Semi- natural moorland and associated birdlife creates a strong sense of 'wildness'. Evidence of woodland clearance settlement and enclosure since prehistoric times and also visible remains of lead mining in N. Pennines (13b). Open moorland has been vulnerable to some overgrazing pressures and localised afforestation eg Whinfell. In most part unspoilt by modern development. Training and firing ranges above Warcop but most of permanent structures below scarp. Very few roads and large modern structures limited to odd communication or radar installations and pylons next to A6 at Shap (13c).	High (5) Little or no opportunity to relate to other modern manmade structures or regular patterns of management. Turbines likely to stand out as alien structures and be perceived as incongruous within an essentially wild unspoilt landscape.
Skyline Strong bare horizons. Can be simple and wide on moorland plateau or ridges or more complex where fells/summits interlock. Limestone of Pennines (13a,b,c) produces distinctive angular stepped profiles, scarps, scars, and flat tops where capped by Millstone grit. Lakeland extensions (13c Lakes) more rounded but with glacial features eg craggy cirques and screes. Very few masts or other vertical structures.	Moderate/High (4) Scope for turbine development to form a predictable and clear visual contrast in relation to flatter moorland parts or simple ridges. However likely to compromise distinctive landmark profiles of markedly domed or angular fells and craggy parts. Also likely to be less predictable relationship with skyline where summits and fells interlock. Maintenance of uncluttered skylines is an issue.
Connections and Adjacent Landscapes Contribute to setting of valleys (8) and settlements eg upper Lune and Kirkby Stephen, Tynedale and Alston, Kent and Kendal, middle Lune and Kirkby Lonsdale. Pennine scarp and W summits form impressive backdrop to Vale of Eden. Prominent from major route ways eg M6, W coast mainline, A6 and A66. Inter-visibility between 13c and fell tops of national parks and high limestone around Orton (12)	Moderate (3) N Pennines plateau offers scope to site development away from sensitive edges. Elsewhere potential for intrusion on sensitive valley rims, settings to important towns, prospects from adjacent fells of national importance and major route ways.
Remoteness and Tranquillity Limited access and absence of settlement conveys a strong feeling of remoteness and tranquillity. Scale and wide horizons of landscape makes viewer feel small and evokes a dramatic sense of space and freedom. Localised noise and movement from M6 motorway and A6 (13c) and A66 at Stainmore (13b).	High (5) Presence, noise and movement of turbines likely to compromise sense of freedom, tranquillity and remoteness
Visual:	
Visual Interruption Exposed with very few if any non-topographical containment features. In parts some topographic containment by ridges and individual summits but flatness of moorland plateau areas and raised profile of scarp increases exposure.	High (5) Turbine development likely to stand out and be widely visible.
Settlement and Key Views Scarp and high moorland/fells uninhabited with very limited road access. A few houses and farmsteads in some valleys. Occasional quiet country roads through some dales and across moors between them. Occasional farms/quarry or installation tracks. Some popular walking areas eg Howgills and national trails: Pennine Way/Bridleway; C2C/W2W Cycle Routes.	Low/Moderate (2) High moorland plateau areas offer scope to site development well away from settlements. However potential to be overbearing and intrusive in relation to popular walking routes and tourist trails.
Overall Sensitivity	Moderate/High

LANDSCAPE TYPE 13: FELS AND SCARPS

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
<p>North Pennines AONB All of Moorland, High Plateau (13b) and Scarps (13a) except southern tip at Mallerstang.</p>	<p>National: Conservation and enhancement of natural beauty derived from the special qualities of: a unique landscape unit with a distinctive geology and unusually large extent of high, exposed semi-natural moorland which has outstanding wilderness qualities; scenic contrasts and unfolding sequence of simple moorland, sheltered dales and dramatic scarp as well as spectacular individual features; moorland landscapes valued for their long views and western scarp affords panoramic views; special interests of historic mining landscape, unique flora and fauna, unusual range of geological and geomorphological features and wealth of archaeological and historical remains which contribute to landscape character.</p>
<p>Landscape of County Importance All of 13c and 13a/b beyond AONB at Mallerstang</p>	<p>County: Protection of distinctive character attributable to landform, land cover (Barbon and Middleton Fells), natural/built features eg steep slopes, crags, scree, wooded gills, tree clumps round farms, absence of detractors, views creating a strong positive response and remote peaceful character.</p>
<p>Ancient Woodland Very few. Group at S end 13a around Helbeck, none in 13b except R Gelt and isolated gill or valley woods in 13c especially Middleton/Barbon Fells on E fringes of Lune Valley.</p>	<p>National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes</p>
Rarity	Area of County
<p>13a Scarps 13b Moorland, High Plateau 13c Fells</p>	<p>1.4%: unusual 9.2%: common 4.1%: ordinary</p>
Conservation Interests and Associations	Description
<p>Cultural Scenic qualities have been inspirational</p>	<p>Central figure in N Pennines is 20th century poet WH Auden who was inspired by lead mining landscapes. JMW Turner followed the route and produced scenes along the modern-day Pennine Way through to High Cup Nick and Dufton. AW Wainwright recorded the majestic beauty of the Howgills whilst Thomas Pennant writing in 1769 condemned the fells around Shap as bleak and destitute of picturesque beauty.</p>
<p>Historic Environment Interest in woodland clearance, settlement and enclosure since prehistoric times and lead mining remains in N Pennines</p> <p>Conservation Areas: Settle/Carlisle Railway on E edge of Mallerstang Valley (13c)</p>	<p>Little or no modern settlement apart from isolated farmsteads, often on ancient sites (13c) and some abandoned post-medieval farmer/miner small holdings (13a,b). Woodland once covered all but highest parts. Clearance for agriculture began in prehistoric times and relict prehistoric field systems and settlements occur (13a,b) and in Howgills probably caused severe gully erosion. Field systems now generally absent, lower slopes of 13a/ c sometimes enclosed by often large, though not always regular, fields bounded by walls. Historic enclosure features include droveways, pennings and biolds (13c) small fields (13a north). Evidence of coal and lead mining 14th-19th century (13b) eg ruined buildings, bell pits and smelt mill chimneys. Sheiling remains common in Howgills (13c). Occasional 19th century grouse pits (13b).</p>
<p>Ecology Extensive tracts of moorland and heath supporting upland bird communities and often under international wildlife designations</p> <p>Majority of N Pennines (13a/b) covered by extensive SPA/SAC/SSSI designations and also large central NNR (Milburn Forest). Partial coverage in other areas (13c). Northern part of Birkbeck/Shap Fells covered by SAC/SSSI and central part of Howgills covered by a large SSSI, elsewhere designations absent. Small patches of SSSI/SAC designation across Barbon Fells and Wild Boar Fell.</p>	<p>High Pennine moorlands (13b) Shap Fells, Birkbeck Fells and Middleton Fells (13c) have extensive areas of blanket bog and upland heathland. Supports important breeding populations of upland birds eg golden plover. Also areas of limestone grassland where this rock outcrops (13a,b,c Pennines), acid grassland particularly Howgills, localised species rich springs and flushes with rarities eg gentians (13a,b) Rush pasture locally frequent on moorland edge (13a,b) supporting black grouse. Montane heath present on several summits and mine spoil supports unique lead tolerant flora (13b) Upland oak woodland present along some gills (13c). Fauna includes merlin, peregrine, kestrels, foxes, hares and red deer.</p>
<p>Geology and Geomorphology Significant interest in pockets especially along Pennine scarp and around limestone outcrops. International importance of AONB for geology and classic example of base metal ore field recognised by European Geopark status.</p> <p>LPOs at southern end N Pennines and Wild Boar Fell. Occasional RIGGS along N Pennines scarp slope (13a) Howgills, Barbon Fells and Wild Boar Fell.</p>	<p>Exposures of limestone and volcanic rock and dramatic landform features eg U-shaped valley of High Cup Nick along scarp edge 13a, ore field; glacial and periglacial features;caves and other karst features of Carboniferous limestone and various natural and engineered rock exposures (13c)</p>

LANDSCAPE TYPE 13: FELLS AND SCARPS

Capacity Statement

Overall the Fells and Scarps landscape is judged to have **low** capacity to accommodate turbine development. This reflects a moderate/high sensitivity and moderate/high to high landscape value recognised by LoCI and the North Pennines AONB designation* with strong ecological and geological interests and cultural associations.

Whilst the large scale, breadth of horizons and absence of settlement especially within plateau areas suggest scope to accommodate wind farm or large group development in contrast to simple moorland canvases there are some overriding constraints.

The key characteristics of this landscape are a strong sense of wildness, freedom, remoteness and an unspoilt nature. These are attributable to the predominance of semi-natural moorland vegetation and associated birdlife, expanse and general absence of roads, manmade structures and field enclosure. They also possess a variety of dramatic scenic qualities including steep slopes, crags and scarps; bleak and empty 'upland deserts'; awesome domed profiles such as the Howgills and distinctive angular profiles as in the Pennine fells. These essential qualities are likely to be compromised by any scale of turbine development with little or no scope for visual linkage or association with manmade patterns or forms. These problems are likely to be exacerbated by the extreme openness of this landscape where turbines would be exposed to view from sensitive receptors such as settlements and route ways in adjacent valleys, popular fell tops and national trails such as the Pennine Way.

Particular sensitivities in relation to the setting of international and national designations include:

- *sequential views towards the northern tip of the North Pennines AONB from Hadrian's Wall Trail and Cycle Route (part of NCR 72) and from viewpoints at the forts, milecastles and camps between Lanercost and Birdoswald and sequential views back towards Frontiers of the Roman Empire: Hadrian's Wall from the Tindale Fells within the AONB*
- *contribution of the fells to an unbroken expanse of predominantly empty natural upland landscape extending from within the Lake District NP eastwards across the Howgill Fells into the YDNP enjoyed for its sense of openness, tranquillity, freedom, wildness, solitude and panoramic views*
- *key views across the fells to and from both national parks and the southern end of the North Pennines most notably from the unrestricted access areas in the LDNP, the popular High Street range, Coast to Coast footpath, M6 'gateway', A6, Dales Way, W2W Cycle Route, Pennine Bridleway, Wainright walks, Orton Fells, Howgill Fells, Wild Boar Fell, Middleton Fells and Barbondale*

* For those areas that fall within the North Pennines Area of Outstanding Natural Beauty Policy R45 in the Cumbria and Lake District Joint Structure Plan 2001 – 2016 applies

LANDSCAPE TYPE 14: URBAN AREAS AND FRINGES

Landscape Sub-Types	Urban Areas	2d Coastal Urban Fringe 5d Urban Fringe
Key Characteristics	Sensitivity	
Landscape Character:		
<p>Scale and Enclosure Underlying landscape variable but generally medium to large scale. Urban fringes vary from flatter coastal areas with big skies and wide horizons (2d) or cliffs (Whitehaven) to rolling farmland with some sheltered valleys (5d). Large scale elements include disused airfields, heavy industrial buildings and docks, power stations, gas terminals, prisons, reclaimed spoil heaps (2d) and light industrial/retail estates. Human scale indicators include pylons, houses and woods, hedges, trees declining towards coast.</p>	<p>Moderate (3) Scale and openness suggest scope to accommodate development up to large group size. Coastal locations and broad ridges offer greatest scope whilst sheltered valleys and undulating terrain likely to be more sensitive due to more intimate scale potential for over dominance in narrow zones of visibility. Presence of large industrial elements may assist absorption. Likely to appear out of scale in context of houses and fabric of remnant farmland. Positive design rationale on exposed coasts.</p>	
<p>Complexity and Order Typically mixed and complicated land cover pattern with varying degrees of urban influence. Neglected farmland with run down boundaries, rough grassland and scrub, scars of former industry eg spoil heaps and disused railway lines and derelict buildings particularly in W Cumbria, encroaching housing and sporadic industrial/commercial development or institutional buildings and holiday parks (2d). Semi-natural accents eg parks and wooded valleys. Some organising linear elements eg hard coastal edges, major roads/railways.</p>	<p>Moderate/High (4) Introduction of turbines likely to compound visual confusion of disordered urban fringes. Some scope for an ordered grouping to relate to key linear elements or grain of existing large scale industrial layouts. Likely to appear incongruous against form and pattern of irregular semi-natural accents such as parkland.</p>	
<p>Manmade Influence Varies from built up areas to rural areas with strong urban influences. Coastal areas most dynamic with a visible industrial heritage stimulated by coal and iron mining dating back to 18th century eg Georgian and Victorian ports, small mining villages, spoil and slag heaps, disused railways and derelict land. Tourism heritage especially in Silloth and Furness. All subject to urban expansion pressures, new road and leisure developments. Farmland often rundown due to fragmentation of holdings and public access pressures.</p>	<p>Low/Moderate (2) Scope for positive association with industrial landscapes and historic utilisation of natural resources and power generation. In urban fringes potential conflicts with scale and character of traditional rural and industrial heritage features. May be perceived as urban expansion.</p>	
<p>Skyline Variable depending on topographic setting from broad plains with strong coastal horizons to valleys enclosed by hills. Frequent vertical structures including pylons, industrial sheds and silos, communication masts, chimneys, and existing wind turbines. Urban landmarks include church or town hall towers, castles and reclaimed spoil heaps.</p>	<p>Moderate (3) Flatter coastal horizons offer scope for predictable contrast. Valley settings more vulnerable due to presence of intensifying features eg valley rims, framed vistas and prospects. Scope to correspond to other vertical structures but also potential for clutter and conflicts of form and function. Historic landmark buildings and landforms vulnerable.</p>	
<p>Connections and Adjacent Landscapes Coastal locations have strong backdrop of open sea whilst inland often weak connections with subdued hinterland (2, 5). Nearby Heritage Coast, ridges (4, 5a, 9d - Whitehaven/ Workington) or high ground (3a, 10, 11a - Ulverston/ Kendal/ Penrith) Lakeland Fells, estuaries, dunes and beaches (1a, 2a - Millom/ Barrow/Solway) create significant backdrops/prospects.</p>	<p>Moderate (3) Along coast simple large scale context of seascape likely to assist absorption. Contribution to picturesque compositions and open views in relation to estuaries, enclosing high ground and natural coastal edges may be sensitive. Some potential for intrusion on prospects from landscapes of international and national importance.</p>	
<p>Remoteness and Tranquillity Mostly busy with noise and movement from roads, railways, and industrial, commercial or leisure activities. However also includes quieter residential areas, small villages and rural backwaters, derelict or reclaimed areas and parks often rich in wildlife and valued as green refuges for quiet recreation.</p>	<p>Low/Moderate (2) Noise and movement of turbines could relate to busier parts but likely to reduce sense of quietness in some locations.</p>	
Visual:		
<p>Visual Interruption Fairly enclosed urbanised landscapes with containment offered by extensive built development assisted by ridges and woods across urban fringe (5d). Reducing on exposed coastal plains (2d) with less interruption by relief and vegetation.</p>	<p>Low/Moderate (2) Buildings and other screening features likely to assist absorption and create glimpsed and intermittent views. Turbines likely to be more widely visible in coastal plain locations.</p>	
<p>Settlement and Key Views Edges of towns mostly suburban post 1930s characterised by spacious pattern of streets, low houses, gardens, communal amenity grassland and institutional buildings sometimes interspersed with commercial/light industrial development. Heavier industrial areas usually separate and often on coastal edge next to docks or reclaimed areas. Historic stone or brick built cores sometimes organic and winding of Medieval origin or planned grid patterns with squares formal parks and squares from Industrial Age. Holiday parks, Cumbria Coastal Way and Hadrian's Wall Trail present along coast (2d). Dense pattern of former mining villages in W Cumbria (5d), elsewhere more dispersed.</p>	<p>Moderate/High (4) Limited scope to site development away from residential edges, small villages within urban fringes or key amenity/tourism receptors. Likely to appear incongruous in terms of character, pattern and scale with potential for over dominance. Also potential for intrusion on important settings to historic cores or gateways and important open spaces eg promenades, parks, cemeteries, 'green' spaces. Some opportunities on urban edges and fringes where related to large scale industrial land, airfields, docks or major route ways.</p>	
Overall Sensitivity	Moderate	

LANDSCAPE TYPE 14: URBAN AREAS AND FRINGES

Value	
Landscape Designations and Planning Policies	Scale it Matters and Why
Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site and Setting N Carlisle Urban Area, 2d and 5d (site and setting) Silloth Urban Area and 2d (setting)	International: Protection of core archaeological features of the Roman wall and coastal defences as well as their landscape setting
Registered Historic Parks and Gardens Workington Hall (Curwen Park) Grade II and Carlisle Cemetery	National: Protection of special historic interest of parks and gardens and their settings
Ancient Woodland Few isolated woods in Cockermouth, Whitehaven, Barrow and nr Distington (5d)	National/Regional: Conservation of ancient semi-natural woodlands as irreplaceable nature conservation assets with associated interests including characteristic landscapes
Rarity	Area of County
Urban Areas 2d Coastal Urban Fringe 5d Urban Fringe	Not measured 1.3%: unusual 0.7%: rare
Conservation Interests and Associations	Description
Historic Environment Variable interest but common themes of ports, industrialisation and mining. Conservation Areas: Most limited to historic town centres and/or harbours: Silloth; Maryport; Workington; Whitehaven; Cleator Moor; Egremont; Dalton-in-Furness. Some extending beyond centre to edges of town: Penrith -Beacon Edge; Cockermouth-extensive and branching along Cocker and Derwent Valleys; Ulverton -Stonecross; Kendal -Fellside. Couple with dispersed pockets beyond centre and on urban edges: Carlisle -Stanwix/Rickerby to N, Botcherby to E and Caldew Valley to S; Barrow -Furness Abbey to NE, docks to S and Vickerstown Walney to W	Evidence of prehistoric habitation on Walney and outskirts of Carlisle. In Furness monks first exploited iron ore industrially in 12 th /13 th centuries. Barrow developed later as Victorian model town planned on grid utilising local iron ore and natural harbour for ship building. Now terminus for offshore gas. Much evidence of 18 th and 19 th century coal and iron mining in W. Cumbria. Stimulated early industrial development and ports including Maryport and Whitehaven a Georgian planned town second west coast port (after Bristol). High grade ore led to early growth of iron and steel making in Workington. Disused 19 th century railways also legacy helped growth mining and tourism (Silloth, Roa Island Barrow, Walney), agricultural industries. 2 nd WW military airfield remains feature around Silloth. Fields regular and indicative of late enclosure 5d
Ecology and Geology Pockets of interest SSSIs and sometimes SACs along main rivers through Carlisle, Cockermouth, Cleator Moor and Kendal and in Barrow Walney Channel SPA/SAC/SSSI. SSSI dunes at Silloth and RIGGS on cliffs at Whitehaven. Variety of designations eg SPAs, SACs, SSSIs and RIGGS covering sandstone cliffs south of Whitehaven, old quarries/mine workings/docks/dismantled railways at Maryport, Workington, Egremont, Millom, Ulverston, and Barrow.	2d supports wealth of wildlife often associated with former industrial sites and adjoining areas eg iron slag colonised by herb-rich grassland, Hodbarrow lagoon Millom breeding and wintering birds, damp ground and pools for great crested newts and natterjack toads, mudflats and saltmarsh for waders and wildfowl. In 5d mainly species poor hedgerows and occasional small areas of woodland.

LANDSCAPE TYPE 14: URBAN AREAS AND FRINGES

Capacity Statement

Overall the Urban Areas and Fringes landscape is judged to have **moderate** capacity to accommodate turbine development up to small group size and possibly large groups in coastal contexts. This reflects a moderate sensitivity overall, however some notable variations in character affect acceptability. These relate to proximity of the coast and residential development, presence of comparable large scale structures, and complexity of the topographic setting.

Greatest potential occurs in the context of large scale industrial land, disused airfields, docks or major route ways. Existing group developments have already been satisfactorily absorbed in locations on the outer Cumbrian coast which benefit from the large scale context of coastal plain and backdrop of the open sea; relationship with other large structures; simple and predictable contrasts with flat horizons and the natural order imposed by the coastline. In addition their logical position on windswept coasts and association in these locations with a history industrialisation and power generation based on local resources tends to promote a positive image. However these areas are at or near capacity and pressure for new development or extensions is likely to generate issues of visual clutter and confusion with existing turbines or other vertical structures such as pylons. Less exposed sites further inland are now attracting interest and whilst they might share the advantages of an industrial context, the higher sensitivity of adjacent rural landscapes and/or more intimate valley settings will not be as favourable as coastal locations.

Elsewhere residential amenity is a major constraint with the edges of towns dominated by suburban housing development and the urban fringes dotted with small villages issues of visual intrusion and over dominance are likely to arise. The settings to historic town centres or gateways and open spaces such as promenades, parks, cemeteries and 'green wedges' are vulnerable. There is also potential for intrusion on key landmarks within urban skylines such as historic castles and nearby prospects from nationally valued landscapes. Problems of visual intrusion are likely to be exacerbated where towns are set within valleys or hilly terrain with potential for effects such as blade flash over valley rims, dominance of limited vistas between hills, overbearance from turbines set on adjacent hilltops, and 'gateway' prospects from valley rims.

Another key factor limiting capacity is the potential for turbines to compound problems of visual confusion. The urban fringes are typified by patterns of neglected farmland fragmented by sporadic development and cluttered by pylons etc. and hence they offer little scope for convincing visual linkage with turbine groupings. Incompatibility between proposed turbines and the form and function neighbouring vertical structures such as industrial sheds and chimneys may also be a constraint unless coherent and balanced compositions can be achieved.

Particular sensitivities in relation to the setting of international and national designations include:

- *backdrop of Maryport, Silloth and Carlisle urban areas and fringes to open sequential views from recreation and tourist routes along the coastal edge of the Solway AONB and Frontiers of the Roman Empire: Hadrian's Wall most notably from Cumbria Coastal Way, the B5300, National Cycle Route 72, Hadrian's Wall Trail and from viewpoints at coastal forts associated with the Wall*
- *open prospects between Whitehaven and the St Bees Heritage Coast and integrity of the dramatic sandstone cliff scenery that extends beyond the boundary of this designation as viewed from the northern approaches via Cumbria Coastal Way*
- *contribution of the West Cumbrian urban areas and fringes to the Lake District NP in relation to coastal panoramas from the Ennerdale and Loweswater Fells and vistas from 'gateways' off the A5086 and A595 and the C2C Cycle Route (NCR 71)*
- *contribution of the Furness urban areas and fringes to picturesque estuarine compositions with fells in the Lake District NP and limestone hills of the Arnside and Silverdale AONB as viewed from the trunk road skirting edge of Park and 'gateways' off them, coastal railway, National Cycle Route 72, Black Combe, Furness Fells, Hampsfell, Arnside Knott and coastal edges*
- *location of the Cockermouth, Penrith and Kendal urban areas on or near the boundary of the Lake District NP, role as major 'gateways' into the Park and integrity of limestone and foothill landscapes that extend from within the boundary of the Park up to the edge of these towns*

Map 7 – Landscape Character Classification

Map 8 – Landscape Capacity

APPENDIX 2.1

Key Characteristics Sensitive to Wind Energy Development

Landscape Character Sensitivity:

Key characteristics that reflect the landscape character of elements including landform, land cover, settlement, field enclosure and manmade elements and aesthetic aspects experienced by the visual senses such as scale, pattern and movement or scenic dimensions such as skyline and focal points.*

Scale and Enclosure

Scale and enclosure explores factors such as landscape size and breadth of views. Understanding these factors help in gauging how a landscape will feel and whether there is a positive design rationale. Assessment of the size of the topography and land cover elements provides an understanding of how large structures such as turbines might appear in relation to their landscape context. Many landscape elements have sizes and characteristics which are familiar to us and the size of development may be gauged against these. In the close range the presence of human scale indicators such as buildings, hedges, trees, pylons etc can indicate the relative size of turbines. At middle and long ranges horizontal elements such as long ridges, bands of woodland or built up areas may be compared against the overall extent of development. Amongst other things the degree of visual dominance depends on the proportion of the view occupied by any proposed development, therefore the existing openness or breadth of typical views is relevant.

eg an intimate and enclosed valley landscape with hedgerows and trees is likely to be more sensitive to turbine development than a large scale open and featureless plateau where the sense of exposure to wind evokes a stronger rationale for this form of development.

eg an enclosed valley where views are channelled by topography and woodland is likely to be more sensitive than a coastal plain landscape with an overriding sense of openness because any given development would occupy a greater proportion of the field of view.

Complexity and Order

Understanding the complexity of a landscape – whether it has a simple predictable composition or complex composition comprised of overlapping elements that results in constant visual surprise and interest – can help to determine how turbine development will relate or contrast with its character. It is important to consider this complexity both in relation to topography and land cover and the way the two interact. In contrast to *visual complexity* where there is some order, hierarchy and rationale to the arrangement of elements, *visual confusion* refers to a landscape that is bewildering and unclear. This occurs where there is no obvious rationale for the combination of elements and often being haphazardly placed with no direct relationship to the landscape or to each other. Because of their regular standardised shapes and efficiency requirements turbines lend themselves to geometric layouts. In turn these can be more readily integrated into regular manmade patterns such as geometric systems of fields and plantations or against strong linear features such as coastline that impose order on the landscape. Balance and harmony in the overall landscape are also relevant.

e.g. the introduction of large modern turbines into a scenic landscape of craggy mountains with related mosaic of natural vegetation cover and historic features such as cairns and stonewalls is likely to be more unsettling than their introduction into an extensive moorland landscape where they could create a new focal point contrasting with the simple skyline and illuminating the vast scale and emptiness of this landscape.

* With the exception of Remoteness and Tranquillity which is generally considered to be a perceptual aspect but can be informed by and reflect the other more objective aspects

eg a coastal plain landscape with a simple geometric pattern of fields and isolated farmsteads might comfortably accommodate turbine development whilst their introduction into a busy and disordered urban fringe landscape is more likely to compound visual confusion.

eg wind turbines introduced into the context of a well balanced sinuous landscapes such as a valley with hanging woodlands and a meandering river or 'natural' eighteenth century parkland are likely to appear discordant and incongruous

Manmade Influence

It is important to consider the degree of manmade influence on a landscape in order to determine how turbine development will relate to both the character and function of existing elements. Modern turbines which display an overtly human influence and functional character are likely to relate well to contemporary landscapes featuring other modern manmade structures or buildings, especially where these are large in scale and have a vertical emphasis. They are also likely to associate positively with landscapes that have a working, utilitarian or industrial character. The tall mechanical forms of turbines may correspond to other manmade verticals such as masts, pylons, chimneys, silos, towers or cranes although issues of visual confusion may arise as discussed under the heading below. Turbine development may also relate to large scale engineered aspects such as quarries and reservoirs or working landscapes shaped by man such as intensively managed farmland or afforested areas. The latter also have overlaps with a consideration of pattern as discussed under the heading above.

e.g. turbines are likely to be less conspicuous and associate positively with the character of a heavy industrial landscape dominated by built structures with a vertical emphasis whilst they would be the focus of attention and appear incongruous within the more semi-natural and irregular forms of a limestone farmland landscape dominated by historic buildings.

Skyline

Understanding the skyline of a landscape – whether it is defined by the presence of vertical structures or is a simple empty horizon – can help to determine how turbine development would relate or contrast with its character. As discussed under the heading above turbines may correspond to the character and vertical form of other manmade structures appearing on the skyline, such as masts, pylons and chimneys, however if inadequately separated visual confusion may arise due visual overlaps between the contrasting detailed form and arrangement of these verticals and their functions. Distinctive skylines or landmarks likely to be compromised by turbine development also need to be considered. The nature of the skyline can determine the predictability and intensity of effects in a variety of ways such as a background of low contrast reducing intensity, the eye being drawn to a prominent skyline such as a valley rim, a rolling landscape where the appearance of turbines is unpredictable or tiered landscapes where turbines might integrate with the broad banding of intermediate horizons.

e.g. in a reposeful moorland landscape where there are few vertical elements, turbine development may be appropriate as it could form a point of focus in the landscape and clear visual contrast to the horizontal emphasis of the skyline

eg a fell or moorland landscape characterised by bare horizons where manmade verticals are absent are likely to be more vulnerable due to their pristine character

e.g. in an urban fringe landscape that has many vertical elements of varied sizes and form such as existing turbines, pylons, industrial buildings, chimneys and cranes turbine development could increase the sense of clutter and visual confusion

eg in a landscape dominated by existing power lines the introduction of turbines is likely to create visual confusion due to contrasts between the lattice construction of pylons and the solidity of turbines as well as the horizontal linearity of power lines and vertical point feature of turbines

e.g. in a rural landscape with dramatic local landmarks such as vertical faces of limestone scars, or sandstone cliffs or symbolic features such as lighthouses, church spires or towers turbine developments could compete with and dilute the perceived value of these elements.

Connections with Adjacent Landscapes

The influence of turbines usually extends well beyond the boundaries of the landscape type within which they are located particularly where there are sharp contrasts in elevation or open views. It is therefore essential to consider views into and from adjacent landscapes to understand the impact of a development upon areas of different character. A neighbouring landscape may form a strong backdrop and its characteristics may influence the sensitivity of the receiving landscape. The contribution of a receiving landscape to a broader scenic composition featuring a sequence or variety of landscape types and the setting of important receptors also needs consideration.

eg the introduction of turbines in a landscape forming the rim of a neighbouring higher sensitivity valley landscape may adversely affect its character and setting of towns or historic features within it

eg the introduction of turbines on a coastal plain landscape which contributes to a distinctive estuarine composition of tidal flats, marsh, mosses, coastal plain and background of fells may detract from this wider context

eg the introduction of turbines in an upland fringe landscapes may detract from important prospects from within a neighbouring high fells landscape

e.g. the introduction of turbines on a coastal strip or farmland lying below a large escarpment need to be-viewed in the context of the large scale character of the adjacent seascape or landscape which is likely to assist absorption

Remoteness and Tranquillity

The opportunity to experience a sense of peace, isolation and remoteness is valued by a growing number of people for relaxation and recreation. The number of places where this can be achieved is increasingly limited. Turbines introduce a strong human element into the landscape together with movement and noise and this can have an impact on these experiences. Interpretation of the degree of physical and/or perceived remoteness and tranquillity will assist in determining how changes, as a result of wind energy development, will be experienced.

e.g. in a fells landscape turbine development may increase the sense of human influence, movement and noise thereby detracting from the remote and tranquil character of that landscape.

eg in an urban fringe industrial landscape turbines may relate to existing movement and noise and strong sense of human influence

Visual Sensitivity:

Key characteristics that reflect general visibility, influenced by landform, extent of tree, woodland and building cover, the numbers of people of different types likely to perceive any change and potential for mitigation of visual impacts through siting, scale etc.

Visual Interruption

This refers to the extent to which visibility of the potential wind energy development may be contained by the scale (vertical) and density of topographic, natural and manmade features. As the landscape becomes more interrupted by these features there is a growing possibility that visibility will be limited. The term originates from the previous supplementary planning guidance

which defined five categories of visual interruption. An understanding of this characteristic can also assist in assessing landscape sensitivity to cumulative effect (the most open landscapes being the most sensitive).

e.g. a largely rolling farmland landscape significantly interrupted by blocks of woodland, hedges, walls and buildings offers greater opportunity to visually absorb turbine development than moorland plateaus or estuaries comprising extensive flat or gently undulating topography with few if any non-topographic features where turbines are likely to stand out

Settlement and Key Views

Settlement structures and patterns often have a distinctive relationship with the landscape for example linear villages on ridge tops commanding extensive views or nucleated villages nestled between hills with restricted views. Understanding settlement patterns, density and scale can help predict how turbine development will relate to the settled landscape and how they will appear in views from settlements. Visual receptors that are likely to be most sensitive to wind energy development need to be considered. These will include residents, communities and tourists or visitors whose attention or interest is focused on the landscape. Key views to consider include not only those from settlements but also those from strategic transport and recreation routes, tourist destinations, open access land (Countryside and Rights of Way Act 2000) and established viewpoints as well as potential changes to important landscape settings or 'gateways'.

e.g. in and around towns turbine development may be located in close range without appearing too dominant, especially in the context of similar industrial developments and provided they do not intrude on residential areas, valued landscape settings or views enjoyed by the community.

e.g. in a lightly populated landscape containing small-scale dispersed settlements, turbine development may be appropriate provided it has a complementary scale and/or is sufficiently distanced from these settlements so as not to be over dominant or intrusive.

e.g. in a landscape with a dense population but occurring in a dispersed pattern of villages more settlement edges will be exposed and therefore more residential receptors are likely to be affected than if the population is concentrated in large towns

e.g. a landscape featuring linear villages located on areas of higher ground commanding extensive views is likely to be more vulnerable than one featuring nucleated settlements nestling in valleys

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APPENDIX 2.2
Threshold Criteria for Landscape Importance and Rarity

Importance	Typical Scale	Typical Designations
<i>High</i>	International National	World Heritage Site, National Park, AONB
<i>Moderate/High</i>	Regional Sub-Regional Local	Landscape of County Importance Area of Local Landscape Importance
<i>Moderate</i>	Sub-Regional Local	Undesignated, value perhaps expressed through non-official publications or demonstrable use
<i>Moderate/Low</i>	Local	Undesignated, some redeeming features
<i>Low</i>	Local	Undesignated

The above follows a modification/extension of a scale in the DETR's *Guidance on the Methodology for Multi-Modal Studies* presented in Appendix 6 of the GLVIA.

Rarity	Area (%)*
<i>Unique</i>	<0.3
<i>Rare</i>	0.4 – 1.0
<i>Unusual</i>	1.1 – 2.6
<i>Ordinary</i>	2.7 – 7.2
<i>Common</i>	>7.3

* Area occupied by Landscape Type/Sub-type as % of all Types based on Cumbria Landscape Classification 1995 p.7.

APPENDIX 2.3
Baseline GIS Information

Data	Dataset	Source
Base Map	OS 1:50,000 raster	Ordnance Survey
<u>Settlement and Views:</u>		
Settlement Pattern	Addresspoint	Ordnance Survey
National Cycle Routes	National Cycle Routes: Coast to Coast (C2C) Eden Valley Walney to Wear	Sustrans
National Trails	Hadrian's Wall Trail Pennine Bridleway Pennine Way	
Rights of Way	Rights of Way – Cumbria Outside LDNP	Cumbria County Council
Strategic Transport Routes	Roads – Motorways – Cumbria; A Roads – Cumbria; Railways - England	Ordnance Survey
<u>Strategic Landscape Designations</u>		
World Heritage Sites	World Heritage Sites – Visual Impact Zones (Hadrian's Wall)	English Heritage
WHS Setting	World Heritage Sites – Visual Impact Zones (Hadrian's Wall)	English Heritage
AONBs	AONBs - Cumbria	Cumbria County Council
Heritage Coast	Heritage Coast - Cumbria	Cumbria County Council
Landscapes of County Importance	Landscapes of County Importance (LOCI)	Cumbria County Council
Registered Historic Parks and Gardens	HER – Registered Historic Parks and Gardens	English Heritage
Conservation Areas	HER – Conservation Areas	Cumbria County Council
Ancient Woodlands	NC – Ancient Woodlands	English Nature
<u>Associated Values</u>		
SPAs	NC – Special Protection Areas	English Nature
SACs	NC – Special Area of Conservation	English Nature
SSSIs	NC – Special Sites of Scientific Interest	English Nature
RIGGS	Geological and Geomorphological Sites	Cumbria RIGS Group
Limestone Pavement Orders	NC – Limestone Pavement Orders	Cumbria County Council
National Nature Reserves	NC - National Nature Reserves	English Nature

PART 2

SECTION 3

GUIDANCE ON LANDSCAPE AND VISUAL IMPACT ASSESSMENT

3 Guidance on Landscape and Visual Impact Assessment

Introduction

Aim and Basis

- 3.1 This guidance seeks to define the requirements for the landscape and visual impact assessment (LVIA) of proposals for wind energy development within Cumbria in order to ensure that such assessments are:
- **Comprehensive:** cover all the significant issues whilst being focused and succinct.
 - **Credible:** provide high quality information representing current best practice.
 - **Effective:** are part of an iterative process of development planning and design through which best environmental fit may be achieved.
 - **Consistent:** provide levels of information that are comparable between different developments.
 - **Legible:** communicate information easily and provide a true impression.
- 3.2 This guidance has been developed using the second edition of the Guidelines for Visual and Landscape Impact Assessment (GLVIA)²⁸ and tailored to suit the complex effects arising from second and third generation wind turbines observed within Cumbria and recorded in recent studies^{29 30}.
- 3.3 It is recognised that it is the primary responsibility of the landscape professionals carrying out the LVIA to develop a methodology appropriate to the nature, location and scale of the development proposal and the potential sensitivity of the site. This methodology should be appended to the LVIA and preferably agreed with the regulatory authority prior to the assessment. As a general principle the methodology should clearly describe the assessment process and most importantly spell out the criteria used for professional judgements in predicting effects and determining significance.

²⁸ 'Guidelines for Landscape and Visual Impact Assessment' Second Edition, The Landscape Institute and Institute of Environmental Management and Assessment 2002

²⁹ 'University of Newcastle: Visual Assessment of Windfarms: Best Practice' Scottish Natural Heritage 2002

³⁰ 'Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes' Scottish Natural Heritage February 2001

Definition of Landscape and Visual Effects

- 3.4 In PPS22 the Government recognises that “Of all the renewable technologies, wind turbines are likely to have the greatest visual and landscape effects”³¹. These are independent but related issues and the GLVIA makes the following distinction “landscape effects are changes in the landscape, its character and quality, whilst visual effects relate to the appearance of these changes and the resulting effect on visual amenity”.

Cumulative Effects

- 3.5 Cumulative effect is a complex issue which will be increasingly relevant to the assessment of wind energy schemes as more and larger developments are proposed. For any given proposal developers should determine whether cumulative landscape and visual impact assessment (CLVIA) is necessary by reference to the requirements set out in paragraphs 1.34-1.40 above. The guidance on CLVIA has been adapted from guidance issued by Scottish Natural Heritage³² and ODPM³⁴ to suit the landscape and experience of cumulative effects in Cumbria.

When is an Assessment Needed?

- 3.6 The statutory framework for Environmental Impact Assessment (EIA) provides the basis for the methodology*. However the GLVIA recognises that the ‘EIA process may benefit other projects, for which EIA is not formally required, in helping to achieve environmentally sensitive and sustainable development’. The Companion Guide to PPS 22³⁴ advises that the issue of landscape and visual impact should be considered in relation to smaller renewable energy applications that do not require full EIA highlighting it as a specific issue with regard to wind, because of the large scale of turbines, and one that local planning authority may require information on. Consequently the following guidance applies to LVIAAs reported in either a formal environmental statement

³¹ ‘Planning Policy Statement 22: Renewable Energy’ ODPM 2004

³² ‘Guidance: Cumulative Effect of Windfarms’ Scottish Natural Heritage 2005

*DETR Circular 02/99 Environmental Impact Assessment advises that an EIA is more likely to be required for commercial developments of 5 or more turbines, or more than 5 MW of new generating capacity. This advice is still current, however, given the increased generating capacities of turbines this indicative threshold in practice translates to developments of 3 or more turbines.

³⁴ ‘Planning for Renewable Energy: A Companion Guide to PPS 22’ ODPM 2004

(ES) or any informal information accompanying a planning application. It is recognised that the level of detail in the LVIA will need to be tailored to suit the size of development and consultation and agreement on this is expected with the planning authority and relevant statutory consultees.

Treatment of Turbine Size

- 3.7 The guidance is written on the basis of experience of on-shore turbine structures in Cumbria to date (ie maximum overall height to blade tip around 120m). As and when new models are introduced which are larger than this, due allowance will have to be made in applying the guidance.

Document Structure

- 3.8 The structure of this guidance is framed around the relevant chapters of an Environmental Statement (ES) including the initial chapters of site selection and project description common to other environmental topics. Questions are highlighted in the margins to alert readers to issues frequently raised by wind energy development in Cumbria. These serve as a checklist for the scope of issues to be covered in the LVIA alongside additional site specific issues emerging from scoping and consultation exercises for each individual proposal.

Iterative Process of Project Design and LVIA

- 3.9 It is stressed that developers are expected to involve a suitably experienced landscape architect from the beginning of the EIA process. Landscape and visual aspects should be set alongside economic and technical requirements as well as other environmental considerations at all stages of project development. Site selection and the initial design should be informed and respond to an ongoing LVIA. If proposals are to meet the high standards of siting and design set out in the planning policy framework it is essential that landscape and visual considerations are primary in the siting and overall concept for the layout. Wind energy developments will be visible and both individual turbines and groupings of turbines should be carefully designed as three-dimensional objects or groups of objects (compositions) within the landscape³⁵. This assessment guidance should be read in conjunction with the guidance on siting and design contained in paragraphs 1.45 – 1.90. This iterative approach is illustrated in Figure .

³⁵ 'Wind Farms in Scotland' Marc van Grieken et al, Landscape Design Journal Oct 2003

Figure 3.1 The Iterative Design Approach

Project Design Stage	Landscape Design Stage		Link to LVIA
Feasibility and Site Selection (including comparative site appraisals)	Strategic overview of location	Confirm location in the broad landscape context is acceptable in and identify appropriate development size thresholds.	Initial evaluation through desk study of broad landscape context by reference to the main landscape type descriptions and their capacity indicated in Part 2.
	Siting and initial sizing	Test suitability of specific site against landscape sensitivity and value criteria (Part 2 Tables 1 & 2) and determine appropriate form of development e.g. large cluster related to geometric field pattern and turbine size related to the scale of existing landscape elements eg hills, existing turbines. Refine in response to scoping exercise and preliminary survey and analysis.	Scoping study identifying main issues through desk study of local landscape setting by reference to the landscape sub-type descriptions, preliminary site survey to confirm this and preliminary ZVI key receptor analysis. Identify any significant infrastructure issues e.g. access or grid connection.
Conceptual Design (including assessment of alternative design options)	Composition/ Outline Layout	Initial design as a 3D object in terms of height, number and arrangement of turbines, orientation to find the optimum relationship with the local landscape character and visual composition with the main elements of the landscape setting appreciated from key views. Explore alternatives through a series of visualisations.	Study the baseline conditions and identify critical constraints through analysis of key sensitivity characteristics of the local landscape setting e.g. broad scale and enclosure, complexity, order and broad patterning; key receptors and modifying factors in the landscape setting relevant to these e.g. screening, contrast, framing.
Detailed Layout Design	Micro-siting	Design to protect and minimise damage to features and maximise opportunities for screening and landscape integration. Respond to micro-siting proposals led by engineering and other environmental consideration e.g. ecology, archaeology and noise to ensure that the 3D composition in the wider landscape setting is not subverted.	Study the baseline conditions of the site, access routes and immediate landscape setting; identify detailed patterns and key landscape features combined with analysis of the nature of the site's visibility from key close range receptors.
Component Design	Detailed design of turbines, infrastructure and ancillary developments	Devise strategies and parameters for turbine design (e.g. colour and reflectivity), ancillary structures, access tracks, buildings, reinstatement, and landscape mitigation measures to reduce or off-set adverse effects, such as replacement of hedgerows, removal or downgrading of access tracks.	Analysis of compositional qualities relative to key receptors e.g. dominant background and character of local elements and features and extent of potential damage to those on site.
Secondary Mitigation	Detailed design of off-site mitigation measures and land management proposals	Design measures to reduce visual effects (e.g. off-site planting to screen specific receptors). Devise long term measures to directly compensate for adverse effects (e.g. loss of hedgerow) off-set by hedgerow restoration and general landscape enhancement to off-set unrelated damage (e.g. restoration of heather moorland).	Identification of residual adverse effects to landscape and visual amenity. Analysis of value and condition of characteristic elements and features with reference to management guidelines e.g. Cumbria Landscape Strategy.

SITE SELECTION

Alternatives Considered and Selection Rationale

- 3.10 Describe the alternative sites considered and their landscape constraints/opportunities. Indicate why the final choice was chosen and why it was considered suitable in terms of potential landscape and visual effects.
- 3.11 It is a requirement of the EIA regulations to provide an outline description of the main alternatives considered and an indication of the main reasons for the final development choice. This should reduce misinformed criticism and demonstrate how environmental factors have been taken into account. Increasingly, consideration of alternatives even for projects outside EIA requirements is seen as good development practice. It helps to demonstrate that proposals meet the high standards of siting and design set out in Planning Policy Statement 22, and regional and local planning policies.

THE PROPOSED DEVELOPMENT

Alternative Compositions Considered

- 3.12 Describe the alternative conceptual design options considered. Recent experience has shown that with regard to landscape and visual impacts the most crucial considerations are turbine heights, numbers of turbines, layout configurations and orientation of groupings. The assessment should describe and illustrate these alternative 3D compositions and explain why the preferred solution represents the optimum fit e.g. demonstrate that the height of turbines is appropriate to the scale of the receiving landscape and the orientation presents the best aspects of the development relative to key visual receptors (draft Zones of Visual Influence (ZVI) and wireframes would provide appropriate illustration).

Design Philosophy and Primary Mitigation Measures

- 3.13 Describe the design principles, landscape criteria and rationale adopted. The primary means of mitigating the impact of wind turbines will be through careful consideration of siting, 3D composition, detailed layout and component design that achieves the optimum landscape fit, and avoidance of visual dominance and intrusion as part of an environmentally integrated and iterative design process. Primary mitigation measures that avoid or reduce adverse landscape and visual effects are therefore best described as design iterations within this section of the ES or Supporting Information.

Description

- 3.14 Describe activities and elements of the project relevant to landscape and visual effects at each stage of its life cycle. The descriptions should include details on:
- Form - shape, bulk, and orientation.
 - Materials - colour, reflectivity and texture.
 - Location and physical dimensions of major construction plant, delivery vehicles, buildings, structures and site areas under different uses.
 - Movements of turbine blades, construction plant, materials and work force.
 - Construction and reinstatement methods.
 - Duration of the life cycle stage.
- 3.15 Some of this may be achieved by cross referencing to other sections and figures within the ES. However a consistent and coherent picture is essential as it is the foundation for all predictions of effects. Relevant items requiring description include:

Construction Phase

Will there be any off-site damage to landscape fabric due to easement or widening requirements to accommodate large turbine components?

Is the detailed site layout integrated with the landscape pattern, have losses been minimised, damage to sensitive features and habitats avoided and screening potential maximised?

Have all elements that are not essential to the operation of the development been removed and can others such as internal tracks and the site access be downgraded at the end of the construction phase to reduce landscape impacts?

- External access and haulage routes for construction and delivery vehicles and any modifications to them.
- Site access from the public highway meeting including turning circle and visibility splay requirements.
- Removal and protection of existing features.
- Internal site access tracks (noting any that are temporary or that may be reduced in width on completion of construction phase, any cut and fill or drainage requirements).
- Site cable runs.
- Borrow pits, disposal areas and storage areas.
- Temporary lay down areas and crane hard standings.
- Contractors compound for temporary accommodation, parking and storage of materials and plant.
- Turbine foundations.
- Temporary anemometer.
- Removal or reduction and reinstatement of temporary elements eg site compound, track verges and crane hard standings.

Can site conditions and vegetation be reinstated; are there any opportunities for improving landscape character, what are the relevant timescales?

Has site clutter been minimised e.g. incorporation of transformer in base of turbine tower; under grounding cables?

Operational Phase

- Number and type of turbines.
- Transformers and meteorological masts.
- Substation compound and switch gear/metering building.
- Grid connection.
- Signage and fencing.
- Landscape mitigation measures.
- Operational wind speeds and turbine blade rotation speed.
- Servicing and emergency operations.
- Land management operations and objectives.

Decommissioning Phase

- Removal of the turbines, ancillary structures e.g. the sub-station, infrastructure e.g. site access, internal tracks, external road easements or widening, overhead power lines.
- Reinstatement e.g. covering foundations and re-seeding.
- Future land management and any elements to be retained.

3.16 As stated above, some of this may also be achieved by cross referencing to other sections and figures within the ES.

BASELINE CONDITIONS

Area of Study

3.17 The ZVI of turbines extends over a considerable area and the nature and magnitude of effects varies with the range from the proposal. Since an ES is required by regulation to assess potential significance, as a minimum the study area should cover a range within which significant impacts could potentially occur. This will entail a consideration of the perceived size and intensity of visual effect at different ranges (see references^{29 30 36} and Appendix 2.4) and sensitivity of the receptors. Given the scale of current third generation turbines (95-120m to blade tip) 18km is considered to be a minimum radius for the ZVI and study area for a stand alone scheme. This reflects the limit of potential visual significance. The presence of receptors of exceptionally high sensitivity such as a National Park or Area of Outstanding Natural Beauty landscapes or a significant viewpoint

³⁶ PAN45(revised 2002): Renewable Energy Technologies, Scottish Executive

like a popular mountain peak, would be expected to extend the range, with 30km considered to be a maximum radius. Determination of the study area extent should be fully justified in relation to these aspects.

Cumulative Study Area

- 3.18 Where CLVIA is required the cumulative ZVI and study area should have a minimum radius of 30km from the centre point of the new proposal. However, the Planning Authority may request an extension of the study area to address specific cumulative issues. This should normally be decided at the scoping stage of the project with decisions informed by a base plan of all existing consented proposed and relevant prospective schemes within a 60km radius (see paragraphs 1.34-1.40).

Viewpoints and Routes

- 3.19 Identify and justify the selection of representative viewpoints routes used for assessment of landscape and visual effects. Tables indicating each viewpoint location, range, receptor type and reason(s) for selection are useful in this respect. Early draft ZVIs can help the Planning Authority and consultees to advise on the selection of fixed viewpoints and routes for sequential visual assessment. These should be agreed at the scoping stage or during the baseline studies for the EIA and chosen to represent:

- The range of landscape character and visual receptor types at different points on the compass and distances relative to the development.
- Key views (or sequences of views) where the most significant effects are anticipated e.g. highly valued landscapes/ townscapes/ 'gateways' or settings, established public viewpoints, settlements, tourist destinations, regularly used strategic transport and recreation routes (see Section 2, Appendix 2.1).
- Locations where cumulative effects will occur with other wind turbines either in combination or succession from fixed positions or in sequence on a journey (within areas of ZVI overlap).

- 3.20 The number of viewpoints required will depend on the size of the proposal and site sensitivity but is likely to be around 15 – 25. These should increase exponentially with proximity to the proposed development so that the majority are within the mid to close ranges. Wireframe visualisations should be used to illustrate the potential changes in view at all the viewpoints and supplemented by photomontages at a selection of viewpoints agreed with the planning authority. It is recommended that priority should be

Have settlements, important footpaths or roads etc been carefully investigated to locate viewpoints representing the best vantage point of the proposal?

Have all the relevant landscape and visual receptors been identified at each viewpoint?

given to close and mid range views (i.e. within 2.4km and 6km) and to receptors of highest sensitivity. The total number of photomontages required will again depend on the size of the proposal and site sensitivity, but 5 are regarded as an absolute minimum.

- 3.21 Precise locating of viewpoints should follow thorough field investigation to ensure the 'worst case situation' is assessed for the relevant receptor.

Format of Landscape Descriptions

- 3.22 Experience has shown it appropriate to consider the baseline landscape and subsequent assessments within the ranges expressed below which in turn relate to variations in the appearance or perception of wind turbines described in Appendix 2.4. This approach also has the advantage of linking into the iterative design process described in Figure 3.1 and addressing the effects created by interrelationships between landscape types and sub-types within a landscape setting. Connection with adjacent landscapes is recognised as a key sensitivity characteristic for wind proposals (see Section 2, 2.1). Any national designations such as AONBs and Registered Historic Parks and Gardens should be picked out as separate landscape receptors within this framework and described by reference to any detailed citations or landscape assessments specific to the designation.

- **Broad Landscape Context** (within approximately 18-30km): Describe by reference to the existing regional classification of landscape character areas³⁷ and the county level classification of main landscape types^{38 39}.
- **Local Landscape Setting** (within approximately 6-12km): Describe by reference to character descriptions for landscape sub-types in the county level classification^{38 39} and confirm key characteristics, described in the capacity assessments in Section 2, by rigorous field survey and analysis from the representative viewpoints.
- **Immediate Landscape Setting** (within approximately 2.4 km): Describe the key characteristics within close range by field survey and analysis from the representative viewpoints.

³⁷ 'Countryside Character Initiative: North West' Countryside Agency (www.countryside.gov.uk/ccj)

³⁸ 'Cumbria Landscape Classification' Cumbria County Council, 1995

³⁹ 'Cumbria and Lake District Joint Structure Plan 2001-2016: Technical Paper 5: Landscape Character' Cumbria County Council

- **The Site** Describe the detailed topography, land use, vegetation, features of landscape ecological, cultural or archaeological interest, access points, and rights of way through detailed site survey and analysis.

Description of Landscape Resource

3.23 Within this framework use a structured approach to describe the landscape resource in terms of the following receptors:

- **Physical Fabric:** Elements (main parts), e.g. ridges, valleys, woodland, pastureland, fabric of walls and hedges, settlements and features (eye-catching details), e.g. crags, streams, hedgerow trees, masts, chimneys, farm buildings, views. This may pertain to landform, land cover, culture and land use.
- **Characteristics:** Characteristic patterns, combinations and interactions of the above elements and features which make a particular contribution to the sense of place. Include aesthetic factors (scenic qualities), such as scale of landform, grain of hills and ordered pattern of geometric fields, confusion of elements; and the way it is perceived (impression conveyed), e.g. tranquil, picturesque, remote, wild, industrial, managed, historic. Pay particular attention to those characteristics sensitive to wind energy development (see: Table 2.1).
- **Overall Character:** Combination of physical fabric and characteristics making up a distinct and consistent character in a particular type of landscape.

3.24 The physical fabric of a landscape is generally quantifiable, easily and objectively described. With regard to landscape characteristics aesthetic factors can still be "recorded in a rational, rigorous and standardised, if not wholly objective, way"⁴⁰. They are distinct from the perceptual aspects of landscape character, which are much more subjective and where responses to them will be more personal and coloured by the experience and the preferences of the individual⁴¹. Aesthetic and perceptual aspects are both important dimensions of character which will lie at the heart of any acceptability judgements. The original Cumbria Landscape Classification³⁸ should

⁴⁰ 'Landscape Character Assessment Guidance for England and Scotland' Countryside Agency and Scottish Natural Heritage, 2002

⁴¹ 'Landscape Character Assessment: Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity' Countryside Agency and Scottish Natural Heritage 2003/4

be referred to as it crucially describes these in a section entitled 'Subjective Impression' in each landscape sub-type description.

Landscape Sensitivity

3.25 The GLVIA explains that that determination of the sensitivity of the landscape resource is based upon an evaluation of each key element or characteristic of the landscape likely to be affected. The degree to which a particular landscape can accommodate change will vary according to intrinsic characteristics. Those exhibiting particular sensitivity to wind development have been defined as key characteristics in Table 2.1. They determine tolerance to change which is tested out on application of a specific proposal and reflected in the impact magnitude scores. They should not be double counted as part of sensitivity for the purposes of weighting the significance of effects. In this respect sensitivity should be restricted to the evaluation of the landscape resource.

3.26 Classify and justify the relative sensitivity of elements, features, characteristics and overall character using a textual scale. A scale of at least 5 levels such as that used by the DETR (GLVIA Appendix 6) is preferred given the diversity of landscapes occurring in Cumbria. Judgements should reflect such factors as:

- **Landscape Dynamics and Condition:** Indicate the extent to which the landscape is changing and the likely direction and rate of change together with the likely future character of the landscape without the proposal. This will provide a yardstick for the impact of the proposed development. Take account of the Cumbria Landscape Strategy⁴² which provides land management guidelines for individual elements and features. Refer to the overall state of the area e.g. degraded and condition of individual elements e.g. buildings hedgerows.
- **Landscape Value:** Describe the value and importance of the landscape components. Identify at what geographical scale it is important, who it is important to and why.
- Refer to the key indicators of value defined in Table 2.2, and confirm the evaluations in the capacity assessments. In addition acknowledge local designations and perceptions of value through consultation with the local authority, local amenity groups and residents or visitors at the scoping stage. Within Cumbria values are likely to include

Is there scope for the development to contribute to the restoration or enhancement of the landscape?

⁴² 'Cumbria Landscape Strategy' Cumbria County Council, 1998

the contribution a landscape makes to tourism or image in relation to economic development.

Description of Visual Context and Importance

Does the site contribute to any valued settings e.g. to a settlement or valued landscape? Is it already the focus of attention e.g. landmark ridge or hill?

- 3.27 Within the Zone of Visual Influence (ZVI) review and confirm the visual enclosure and interruption characteristics described in the capacity assessments. Describe the site's local contribution to visual amenity and the compositional qualities as observed in key views as described above in paragraph 3.19. Significant visual effects are most likely to occur in the close (2.4km) and middle (6-12km) distance ranges so the description should concentrate and be structured according to these. Identify the main shadow areas in the ZVI and describe any significant landform, built of vegetative screening elements. Also describe other significant influences on views towards the site eg channelled views along valleys or a coastline or distinctive skylines that draw the eye.

Visual Receptor Sensitivity

- 3.28 Classify and justify the relative sensitivity of different types of receptor including communities; occupiers of residential properties and caravans; users of outdoor recreational facilities; and people travelling through or past the affected landscape using a textual scale with at least 5 levels.
- 3.29 Distinguish between users of outdoor recreational facilities whose attention is focused on the landscape, for example walkers (high sensitivity) and those whose attention is focused on an activity e.g. wind surfers (low sensitivity). Consider the landscape setting of settlements valued and enjoyed by the community. Distinguish between the different levels of familiarity and expectations between residents and visitors or tourists. As with landscape value specific visual receptors are likely to have relevance to assessment of effects on tourism or economic development.

ASSESSMENT OF EFFECTS

General

- 3.30 This section should:-
- Systematically describe the likely effects of the proposal.
 - Indicate the primary and secondary mitigation measures.
 - Estimate the magnitude of the effects.

- Provide an assessment of the nature (adverse/beneficial) and significance of these effects supported by clear evidence and reasoned argument.

3.31 Focus on the potentially significant effects which have preferably been agreed with the consultees at the scoping stage. Consider changes likely to be brought about by the proposal at various stages of the project life-cycle: construction, operation and, where appropriate, decommissioning and after-use. Describe the degree of permanence and duration of effects that is whether they are permanent or temporary (short, medium or long term).

3.32 Distinguish between direct and indirect effects. A direct (or primary) effect would be attributable to a proposal itself, for example a physical effect on landscape elements such as removal of a hedgerow to create an access; or visual appearance effect on landscape characteristics such as creating a strong vertical accent in a landscape of subdued relief. An indirect (or secondary) effect is not a direct result of the development but may be delayed in time or produced away from the site such as subsequent car park and signage in response visitor interest; off-site extraction of stone; traffic generation and grid connections.

Format and Description of Landscape Effects

3.33 In the first instance describe the predicted landscape change arising at each representative viewpoint. Extrapolate the findings to describe the more general landscape changes in respect of the physical fabric, characteristics and the consequential effect on the overall landscape character. In recognition of the variation in turbine and landscape appearance with distance the description of landscape effects should again be structured according to the four ranges established at the baseline stage with national designations picked out separately paying attention to the qualities and characteristics for which they were designated (see paragraph 3.22 above).

Will the proposal have a confusing and variable relationship with character because it will be seen against a variety of landscape types?

Will the proposal appear as a single cohesive feature through unity of turbine type and appropriate spacing between turbines?

- **Physical Fabric:** Wherever possible quantify effects such as physical damage or loss, improvements or gains to landscape elements and features, i.e. area of heather or length of stone walling/hedgerow lost; extent of replacement planting.
- **Characteristics:** By reference to the criteria set out in Table 2.1, systematically consider how the visual appearance of wind turbines, their blade movement and noise will affect the key characteristics sensitive to the proposal. This will

What image does the landscape convey e.g. managed; wild; degraded; urbanised; industrial; rural; exposed. What kind of image will the proposed development possess in relation to this?

cover both aesthetic aspects such as scale or pattern and perceptual aspects such as tranquillity and wildness. Whilst the latter are more subjective varying perceptions should be acknowledged since they often lay at the heart of debates on acceptability. Describe how the proposal will be typically seen, for instance will it be intermittently or widely visible? Within the immediate landscape setting include a description of how the visual appearance of the detailed layout, site infrastructure and ancillary structures will affect local characteristics.

- **Overall Character:** Overall will the development appear to weaken, maintain or reinforce the character of the landscape? What kind of image will the proposal possess in relation to the landscape? Will it be perceived as being positive/neutral/negative? How well it is designed and sited in relation to the landscape setting of the site will have an important bearing on this.

Format and Description of Visual Effects

- 3.34 Describe the general extent and pattern of visibility by reference to the ZVIs. Highlight any significant topographic features that limit visibility or create areas of shadow. Qualify the topographic model by reference to any significant screening or interruption by tree cover or buildings.
- 3.35 In the first instance describe the predicted change in the view from each representative viewpoint. Extrapolate the findings to provide a general summary of the likely visual effects on receptors within this ZVI and key views (see 3.19 above). This summary should convey an overall picture of the extent of effects on visual amenity. The summary should be structured in some way for instance by range, receptor type, or compass direction.
- 3.36 The level of detail should relate to the range and potential significance of effects for instance in the close range (within 2.4 km) quantify and describe effects on individual properties as well as groupings in settlements and towns; in the mid range (2.4 - 6 km) reduce the level of detail to a summary of the general pattern of likely effects on individual properties and settlements. Pick out any notable effects on higher sensitivity receptors in the middle to long range (beyond 6km).
- 3.37 Describe the change in the view by comparing the existing view with that which would result if the development went ahead by reference to:
- **Compositional Qualities:** Describe how the proposal is likely to read in terms of extent of

Will the proposal appear separated from nearby landscape features, creating a simple focal point and avoiding visual confusion with other elements?

Will the development appear visually stable in relation to the landform it is placed on?

visibility, prominence (see typical descriptors in Appendix 2.4) and response to the compositional quality of the view. Consider how the development will appear in relation to key elements and features in the landscape setting and respond to existing visual forces. How it will look as a basic visual element in the landscape for example in relation to the skyline, the coastline, hill shapes, other vertical structures and landmarks. Consider whether a harmonious composition has been achieved through iterative siting and design measures as described in paragraphs 1.85. Describe the composition not only between the wind turbine and the landscape elements but to each other. Identify and explain how certain modifying factors in the landscape (as described in the baseline conditions section above) may tend to reduce or intensify the magnitude of the impact. Note any intrusive or disturbing effects such as blade overlap, proportional visibility or over dominance.

- **Journey Scenarios:** In relation to walkers or travellers it will be relevant to describe the sequential view with reference to constancy, degree of screening or interruption and resultant effects e.g. transient, surprise or glimpsed views.

Format and Description of Cumulative Effects

- 3.38 Describe cumulative effects in terms of the change to both landscape character and visual amenity brought about by the combined effects of the proposal and other existing or proposed developments. Identify the extent to which the proposal would create additional cumulative effects that are additional to the effects to be expected from the development individually⁴³. Use the cumulative sensitivity criteria set out in Table 1.2 as a checklist for systematically identifying both cumulative landscape and visual effects. It is important that the landscape and visual assessments should take account not only of the number of individual turbines, but also of the number of separate developments.

Landscape

Will the proposal portray a clear simple image by appearing well and consistently related to the landscape characteristics, visually separated and create a predictable rhythm through similarities in composition and placement in the landscape?

Will there be a confusing and bewildering combination of wind developments because of visual overlaps, variable design and relationship to landscape?

- 3.39 In the first instance describe the predicted change in the view from each representative viewpoint. Analyse the cumulative ZVI and describe the geographical area(s) where the combined effects between the proposal and other wind developments would be shared. Identify the wind developments contributing to those effects and the landscape sub-types that make up those areas. By extrapolating the findings from the representative viewpoints describe the cumulative landscape effects on each area by

⁴³ SNH Guidance: Cumulative Effects of Windfarms 2005

reference to:

- **Physical Fabric:** Two or more developments may cumulatively affect landscape elements or features; wherever possible quantify combined effects such as physical damage or loss, improvements or gains.
- **Characteristics:** Consider how the developments relate to each other i.e. do they appear to form a singular collective feature in the landscape or as separate, disunited individuals. Consider their relationship to the receiving landscape characteristics, for example complementing an existing repetitive pattern or conflicting with a sense of remoteness and solitude. Some characteristics may lend themselves to cumulative development whilst others may constrain it.

Visual

Will the viewer(s) feel uncomfortably surrounded by wind developments or will two developments create unresolved duality whereby the eye jumps from one to the other?

Does the configuration of the view in terms of skyline, relative elevation or framing make wind developments appear disproportionately dominant or overbearing?

Do the developments impinge or detract from existing focal points or distort the sense of scale or distance?

Will views be glimpsed with disconcerting sudden/partial visibility of turbines above the horizon or prolonged with predictable relationships between turbines and skyline?

Taking account of on the speed of the observer and /or the distance between viewpoints will turbines appear frequently or occasionally?

3.40 In the first instance describe the predicted change in the view from each representative viewpoint. Extrapolate the results to summarise the cumulative effects on visual amenity Describe combined visual effects of developments by reference to:

- **Compositional Qualities:** Consider how they will appear in relation to each other. Consider how they will balance with other elements or respond to existing visual forces in the composition and how effects maybe modified by the view configuration.
- **Journey Scenarios:** Consider sequential visibility by walkers, riders and cyclists as well as motor or rail travellers. Describe the manner, duration and frequency with which wind turbines may be seen while travelling through a landscape and how this may affect the perception of the landscape as a whole. Speed of travel needs to be taken into account. The cumulative impression created by seeing two wind farms in an hour's driving is of a quite different (lesser) order from seeing two in an hour's walk.

3.41 Where proposals are extensions or adjacent to existing wind energy development, changes in scale need to be taken into account involving a consideration of the ability of the receiving landscape to accommodate the larger composite feature (see paragraph 1.40). Where a proposal is suggested within about 6km of another, in addition to the general issue of cumulative effect, there are important issues of compatibility in terms of turbine size, density, design, layout and overall cohesion that should be considered (see paragraph 1.88 – 1.89).

Magnitude of Effects

3.42 Magnitude is a combination of the scale, extent and duration of an effect.⁴⁴ Categorise the magnitude of effects using a textual scale, for example negligible, low, medium, high, and very high for both adverse and beneficial effects. A scale of at least 5 levels is preferred as research has found it to be more representative of the diversity of size (magnitude) found in visual impact assessment²⁹. The typical criteria for each level should be defined in the methodology and are expected to make reference to the following:

Landscape Effects:

- Extent of physical change to key elements or features.
- Extent of the area subject to change and prominence of turbines.
- Degree of variance or compatibility between turbines and each key characteristic of the baseline landscape.
- Degree of change to overall character and image brought about by incremental and combined effects on key characteristics.

Visual Effects:

- Extent of visibility and the number and proportion of turbines that would be visible.
- Proportion of the view occupied by the proposal which relates to the distance of the viewpoint from it and breadth of the existing view.
- Apparent size and prominence taking account of modifying factors in the view likely to reduce or intensify this e.g. degree of contrast, framing, scale cues, backgrounding²⁹ and disturbing effects e.g. proportional visibility.
- Degree of contrast or integration with the character of existing elements e.g. scale, texture, form and design resolution with the visual dynamics of the composition e.g. stability, cohesion, separation.
- Angle of view, frequency and duration of sequential views and relative elevation

3.43 Following the principle of the 'worst case situation'⁴⁵

⁴⁴ Guidelines for Landscape and Visual Impact Assessment, 2nd Edition, The Landscape Institute and Institute of Environmental Management & Assessment 2002

⁴⁵ 'Guidelines for Landscape and Visual Impact Assessment' Second Edition, The Landscape Institute and Institute of Environmental Management and Assessment 2002

evaluation in winter is preferred when leaf cover and therefore vegetative screening and/or filtering are minimal. In any event seasonal variations should be noted.

Cumulative Effects:

3.44 Define separate sets of criteria to categorise the magnitude of landscape and visual cumulative change brought about by the proposed development.. These are expected to make reference to the following:

- Relative impact of each individual wind development according to the above.
- Extent of combined influence (reflected by overlaps in ZVIs and visual interruption).
- Degree of variance or compatibility of multiple wind developments with key characteristics of the baseline landscape.
- Frequency and duration of sequential views.
- Proportion of view occupied by multiple developments.
- Apparent prominence reflecting number, scale and proximity (density) of wind developments or turbines and taking account of modifying factors in the configuration of the view.

As a second stage consider the consequences of that change on the overall degree of cumulative effects brought about by all developments taken together (see 1.25-1.27).

Nature of Effects

3.45 Determination of the nature of a proposal's effects (ie adverse/beneficial) is not a clear cut matter because of the varying responses of individuals to wind development, and the varying ways a landscape is perceived. The expectation of the viewer and their familiarity with wind development will have a bearing on this. In terms of landscape aesthetics assessment should be more straight forward. Proposals that complement key characteristics* and create stable harmonious compositions with key landscape elements are more likely to be positively received. Variations in landscape perceptions and likely responses to the proposed wind energy developments should be highlighted in any assessment since they will often lie at the heart of considerations of acceptability. It is therefore preferable to separate out the nature of effects from

*Normally through a comfortable fit e.g. with scale of landscape elements but sometimes through simple contrast e.g. isolated vertical on horizontal plain whereby the magnitude of change is high but not necessarily adverse.

considerations of magnitude.

Significance

- 3.46 Categorisation of the significance of effects using a textual scale is preferred for example 9 levels from low to major. The two principle criteria determining significance are magnitude of effect and sensitivity of the receptor. It is for each assessment to determine which effects are significant or not in terms of the Town and Country Planning (EIA) Regulations 1999, in other words to determine a significance threshold. This should be based on a well reasoned judgement supported by thorough justification for its selection and explicit explanation as to how the conclusions about each effect assessed have been derived. From experience in Cumbria where a scale of levels is used those at the higher end of the scale are generally deemed to be equivalent to significant effects in terms of the regulations.
- 3.47 In line with the best practice advocated by Newcastle University²⁹ the use of matrices setting out the main correlations between these two variables is preferred. These make the link between magnitude and sensitivity explicit and are considered to be a helpful tool in mapping and explaining the basis for the judgements made. In reality the theoretical position indicated by these matrices may need adjustment according to particular circumstances. These are a matter for professional judgement and they should be supported by a thorough justification where appropriate.
- 3.48 The level of significance should be qualified according to the nature of the effect, duration, i.e. short, medium, long term or permanent, and the geographical scale it is significant at, for example, local, regional, national or international. The number of people affected is also likely to be relevant with regard to significance of visual effects.
- 3.49 Given the complexity and size of wind energy projects it will generally be appropriate to provide separate assessments of the effects on each component of the landscape i.e. elements, characteristics, and resulting effect on overall character at each of the different range bands established at the baseline stage.
- 3.50 A record of the landscape analysis and the visual analysis at each viewpoint and visual extrapolations should be provided through tables or schedules appended to the LVIA. These should systematically set out: location, distance to nearest turbine, angle and elevation, landscape component type or visual receptor type and number, sensitivity, description of the change to the landscape or view, magnitude,

nature and duration of change, and likely significance. This approach will increase the transparency of the assessment process.

Secondary Mitigation

- 3.51 Secondary mitigation measures should be designed to specifically address the remaining (residual) negative (adverse) effects of the final development proposals. These would include 'add-on' measures such as off-site screen planting relative to a specific visual receptor to remedy the negative effects of an otherwise fixed design scheme. These should be seen as distinct from landscape integration measures developed as part of the iterative design process and identified as design iterations within the project description.
- 3.52 Compensatory measures or related environmental improvements may offset unavoidable residual effects, for example the loss of hedgerow to site access offset by restoration of remaining hedgerows. In general compensation should be regarded as a last resort and treated with caution. Some mature habitats may be irreplaceable or take centuries to replicate.
- 3.53 Experience has shown that wind energy developments present opportunities for enhancing the landscape. Although often linked to mitigation, enhancement is a separate issue that explores opportunities to contribute positively to the landscape of the development site and its wider setting. Examples of enhancement opportunities include species rich grassland, heather moorland and Cumbrian bank and hedgerow restoration. Such measures contribute to sustainable development. Reference should be made to the Cumbria Landscape Strategy (Cumbria County Council 1998) which identifies enhancement opportunities for each landscape type.

PRESENTATION MATERIAL

In addition to standard text, the following illustrations will assist understanding of the assessment. The requirements respond to problems encountered with the legibility, ease of use and realism of maps and visualisations. To ensure readability of maps and visualisations it is important that they should not be restricted to the standard A3 format commonly used for Environmental Statements, where larger than A3 they should be included in loose leaf format in plastic pockets within the LVIA or in 'fold out' format. Supplementary illustrations in digital format maybe helpful, the format of these should be agreed with the local authority bearing in mind that file sizes are likely to be large. It is also important that any digital images are of high resolution so that visual clarity is not compromised and the colour and tonal quality on photomontages is maintained.

Information Type	Required Format
Proposed Development	
Site Layout	Site Layout Plan Showing position of turbines, services, tracks, all ancillary elements and temporary lay down areas or compounds with site levels in context of physical landscape fabric (including: contours; type and condition of land cover, boundaries and trees; existing access points; existing utilities; public rights of way; and important environmental features) and landscape mitigation measures. Scale 1:2.5,000 – 1:5,000
Turbines and other Elements	Scaled Elevations Showing technical detail of turbines and ancillary buildings with key dimensions.
	Typical photographs of turbines proposed.
Baseline Conditions:	
Landscape Character and Policy Context	Showing site location, landscape types and sub-types, designations and policies superimposed on the blade tip ZVI and OS 50,000 Landranger colour map base within study area. Indicate range bands i.e. 2.4, 6, 12 and 18km related to broad similarities in appearance (see Appendix 2.4). Reproduction scale: 1:100,000
Local Landscape Setting	Showing landscape analysis relevant to proposed Composition of the development with radius of 2.4 - 6km (including main landscape characteristics and elements and features, contours and topographic grain, field patterns, focal points, other visual forces and elements modifying or screening visual effects) Scale 1:10,000
Assessment of Effects:	
Extent of Visibility	ZVI for hub height and blade tip on OS 50,000 Landranger colour map base with radius of 18 – 30 km indicating the numbers of turbines eg 1-2, 3-4, 5-6 which may be visible by use of shading (GLVIA p150). Indicate representative viewpoint locations and range bands i.e. 2.4, 6, 12 and 18km related to broad similarities in appearance (see Appendix 2.4). Reproduction scale: 1:100,000 Enlarged ZVI to blade tip on OS 50,000 Landranger colour map base within 6-12km and indicate representative viewpoint locations. Reproduction scale: 1:50,000

	Colour and density of ZVI should not obscure OS base information.
Visualisations	<p>Visualisations⁴⁶ based on photographs taken with single lens reflex (SLR) or digital single lens reflex (DSLR) cameras with a 50mm lens in a 35mm film format or its digital equivalent, reproduced at a size for viewing at normal reading distance ie approx. 46cm, commonly A3 landscape format giving an image height of approx. 20 cm(absolute minimum image height of 13cm for exceptional circumstances eg cumulative panoramas)and at a viewing angle close to the original field of view of the scene ie 45 - 130 degrees. On each state location (NGR), elevation, distance to nearest visible turbine, dimensions of all turbines, camera format, lens focal length, horizontal angle of view and appropriate viewing distance.</p> <p>Computer generated wireframe views for all viewpoints (15 – 25 no. with majority within close and mid ranges i.e. 2.4 and 6km). Colour photomontages at all or a selection of viewpoints where significant effects likely as agreed with regulatory authority (5 no. min).</p>
Cumulative Visibility	<p>Cumulative base plan (for scoping stage or ES) for all built, consented, undetermined applications and relevant schemes in the public domain within a radius of 60km at scoping stage (maybe less for ES depending on agreed study area) Indicate the footprint of each development and 30km radius around each in a different coloured solid line.</p> <p>Reproduction scale: 1:150 – 250,000 (depending on no. of wind energy developments and complexity)</p> <p>Cumulative ZVI to blade tip for all built, consented and undetermined applications within a min radius of 30km of the proposal on OS 1:50,000 Landranger black and white map base. <u>Use composite ZVIs for each scheme noting that all or part of the development of may be seen (GLVIA p150).</u></p> <p>Indicate viewpoint locations representing cumulative effects and routes relevant to sequential effects. Indicate 2.4, 6, 12 and 18km range bands for the proposal. Use partially transparent colour shading to distinguish each development eg red, blue, yellow and areas from where one or more development is likely to be seen (with corresponding overlaps of orange green, purple etc). Where four or more schemes are involved ZVIs become difficult to interpret, use separate additional cumulative ZVIs.</p> <p>Reproduction scale: 1:100,000</p>
Cumulative Visualisations	<p>Photomontages and or wireframe views for all viewpoints representing cumulative effects. Within 15km illustrate individual turbines beyond this show as an array. Clearly annotate to interpret the different developments or proposals. Format and information requirements as above plus status of existing developments i.e. installed, consented or decision pending, and distance to nearest visible turbine for each development and dimensions of turbines in each.</p>

⁴⁶ SNH Visual Representation of Windfarms Good Practice Guidance, 2006

Guidance on the effects of distance on perception of Wind Energy Developments

From the analysis of guidance and research information (set out below), and experience in Cumbria, the following table presents guidance on the relationship between distance and likely appearance or perception of third generation wind energy developments featuring turbines of approximately 95 – 120m high to blade tip. This guidance assumes an open landscape and should not be used mechanistically as a large number of modifying factors can affect likely appearance. These include different weather conditions, season, time of day, direction of view, the number of turbines and breadth of development relative to the viewer, relationship of wind energy developments to other elements in the view and their compositional qualities, familiarity and expectations of the viewer.

Distance	Likely Appearance	Range
Up to 2.4 kms	Dominant focus, movement of turbines clear and may collectively convey a distinct rhythm	close
2.4 - 6 kms	Prominent, key element of the landscape, turbine details still evident	middle
6 - 12 kms	Conspicuous, noticeable element in wider landscape, only prominent in clear visibility, movement of blades perceptible to casual observer	
12 – 18 kms	Apparent, visible element of a wide landscape, turbines begin to be perceived as a group forming a windfarm rather than individual elements, blade movement only perceptible in clear conditions	long
18 – 30 kms	Inconspicuous, minor element of a wide landscape composition, only seen in very clear visibility, movement of blades generally unclear	

Background Research

PAN 45 (revised 2002): Renewable Energy Technologies, Scottish Executive

The following table is presented in paragraph 78 as a general guide to the effect which distance has on the perception of the development in an open landscape. It is not clear what turbine heights these distances relate to. It was also recognised that perception would also be dependent on whether the turbines can be viewed adjacent to other features, different weather conditions, the character of the development and the landscape and nature of the visibility.

Fig 8: General Perception of a Wind Farm in an Open Landscape

	Perception
Up to 2 kms	Likely to be a prominent feature
2-5 kms	Relatively prominent
5-15 kms	Only prominent in clear visibility – seen as part of the wider landscape
15-30kms	Only seen in very clear visibility – a minor element in the landscape

*Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes
Scottish Natural Heritage February 2001*

Broad similarities of visibility extent are described in Section 2.3.3. Again it is recognised that the extent to which a wind farm will be visible will depend on its size and positioning in relation to particular landscape characteristics, especially landform, other vertical features and the clarity of the light and prevailing weather conditions. However, assuming an open landscape their descriptions can be summarised as set out in the table below. The distance bands correspond to those used in PAN 45 and appear to be based on experience of turbines up to a blade tip height of 90m.

	Likely Appearance
Up to 2 km	Dominant focus, movement of turbines clear and may collectively convey a distinct rhythm.
2-5 km	Key element of the landscape.
5-15 km	Part of the wider landscape, only prominent in clear visibility, movement of blades may still be discernible.
15-30km	Minor element of a wide landscape composition, only seen in very clear visibility, movement of blades generally unclear.

*University of Newcastle: Visual Assessment of Windfarms: Best Practice
Scottish Natural Heritage 2002*

Conclusions based on analysis of eight windfarms operating in Scotland are drawn in Section 5 with a caveat that they are only likely to be applicable to other areas in UK of similar character. The sizes of the windfarms ranged from 9 to 46 turbines and were therefore generally larger than those experienced in Cumbria to date. The turbine heights to blade tip were between 53.5 and 85.5m, typical of second generation machines. It is noted that higher turbines are visible over larger distance and they judge that an increase in height to something approaching 100m to blade tip for third generation wind turbines will result in the distance ranges increasing by around 20% in many cases. They note that at distances much greater than 30km the limit of visibility to the human eye is being approached. The following table summarises their conclusions:

Conclusions based on 2nd generation turbines	Predictions for 3rd generation turbines (ie 20% increase)	General Visibility
5 - 8 km	6 – 9.6 km	Turbine detail noticeable.
10 - 15 km	12 – 18km	Perceptible to a casual observer, begin to be perceived as a group forming a windfarm rather than individual turbines, blade movement perceptible in clear conditions.
15-25 km	18 – 30km	Perceptible in clear conditions by sensitive observers and residents.

The 20% increase is reflected in their recommendation for a ZVI distance of 30km for turbines of 100m to blade tip.

They state that distance should not be used mechanistically to predict magnitude at a particular viewpoint because it can be modified by a large number of factors, some related to human perception and some related to physical elements and the design of the environment. Consequently a detailed table of six visual size classes rather than distances is provided which has some useful descriptors.

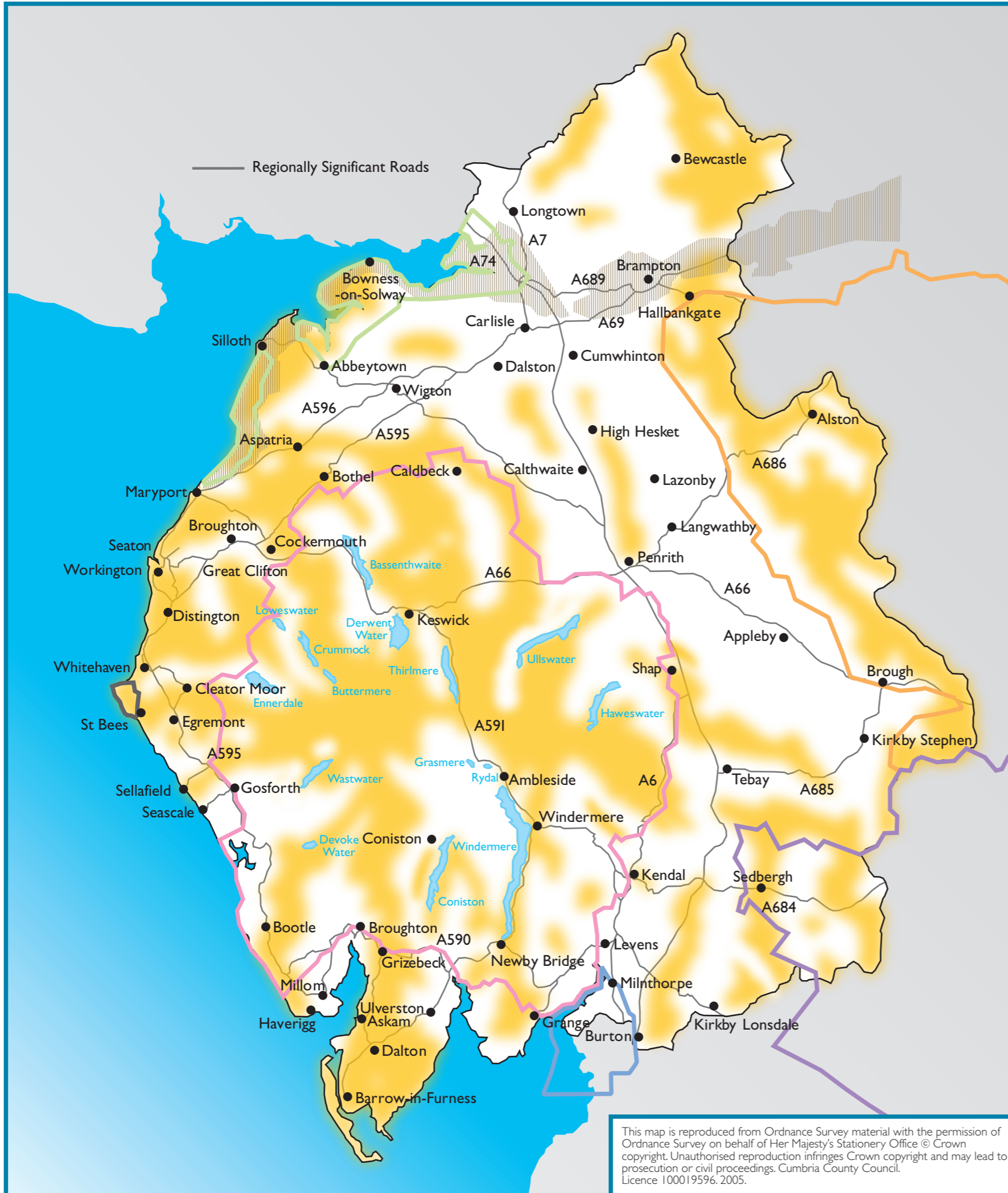
Wind speeds > 6.5m/second

Map I

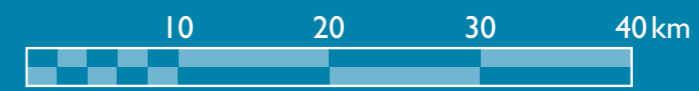
Please note that in some areas it may be technically feasible to operate wind turbines at speeds of less than 6.5m/second. This map is indicative only.

Key

- Lake District National Park
- Yorkshire Dales National Park
- Solway Coast AONB
- North Pennines AONB
- Arnside and Silverdale AONB
- Frontiers of the Roman Empire:
Hadrian's Wall - visual envelope
- St Bees Heritage Coastline
- Cumbria County Council Boundary
- Wind Speed >6.5m/second



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Wind Energy Development Sites

Map 2

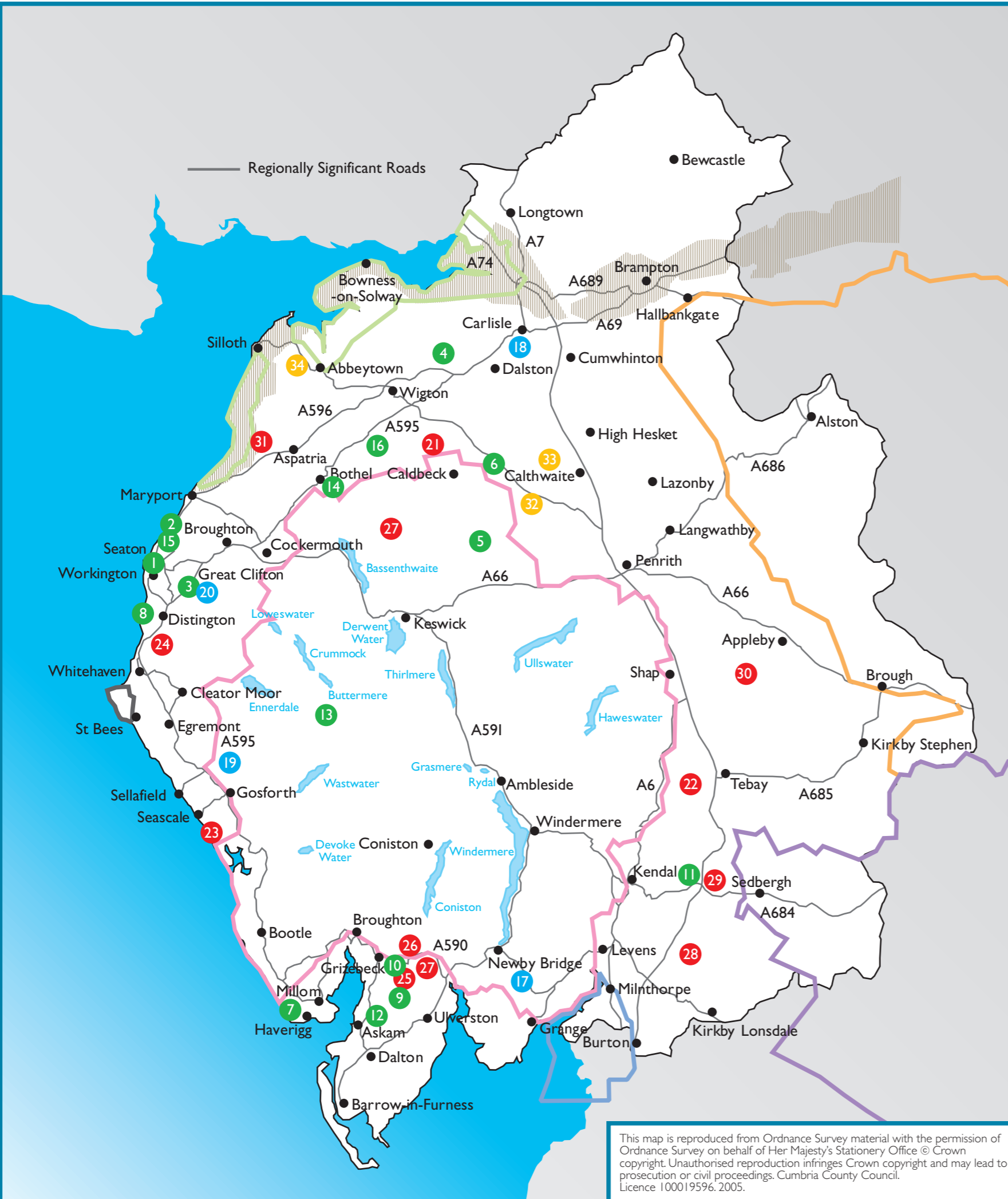
This map should be read in conjunction with the Landscape Capacity Assessment Findings in Part 2. When considering the potential acceptability of a scheme all other planning issues set out in the SPD must be considered. This map is indicative only.

Key

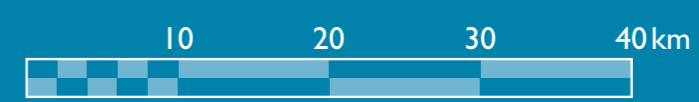
- Lake District National Park
- Yorkshire Dales National Park
- Solway Coast AONB
- North Pennines AONB
- Arnside and Silverdale AONB
- Frontiers of the Roman Empire: Hadrian's Wall - visual envelope
- St Bees Heritage Coastline
- Cumbria County Council Boundary
- Operational
- Approved
- Appeal
- Refused
- Application

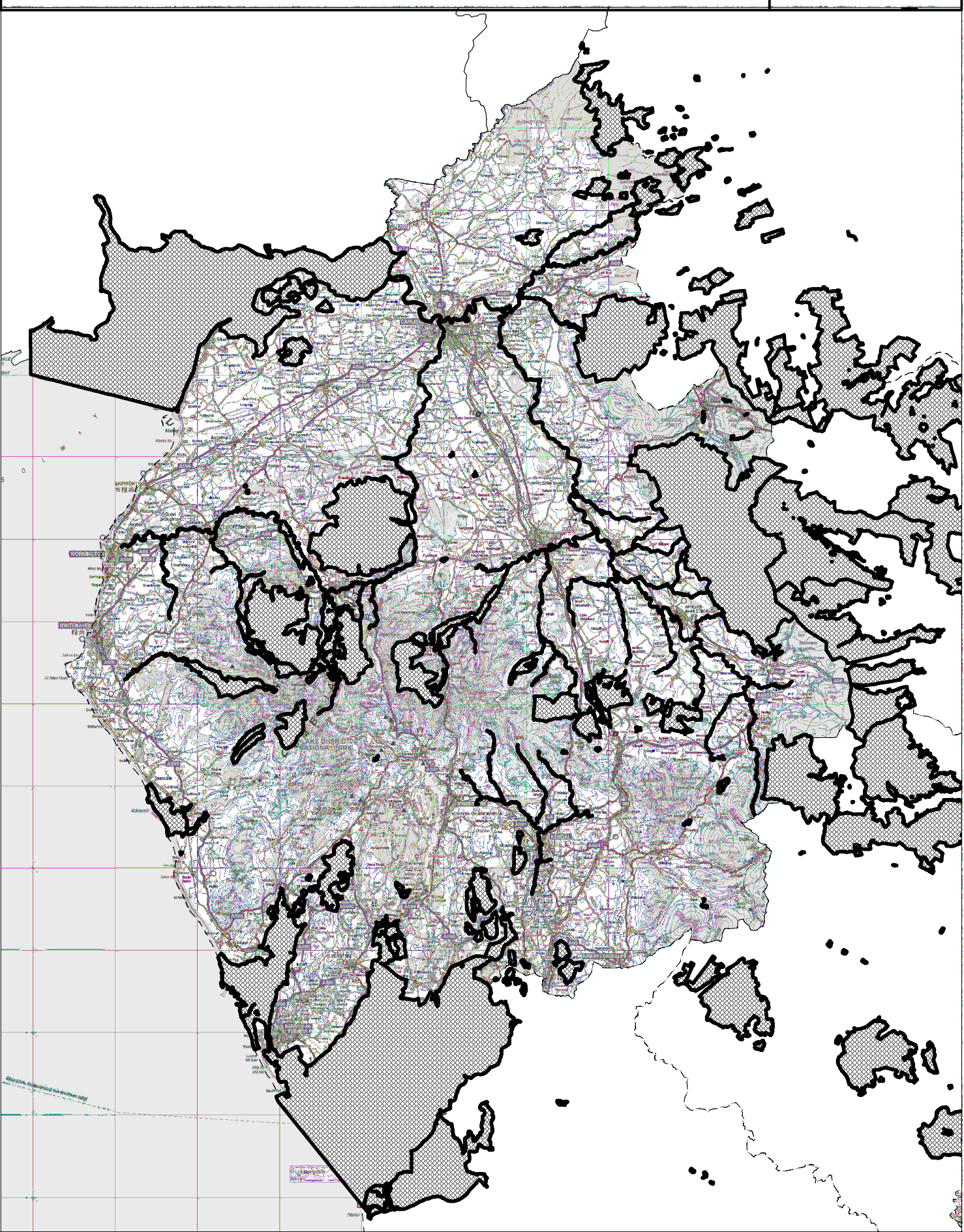
- | | |
|---------------------------------------|---------------------------------------|
| Wind Energy Development - Operational | Wind Energy Development - Refused |
| 1 Oldside | 21 Hilltop |
| 2 Siddick | 22 Whinash Wind Farm |
| 3 Winscales | 23 Drigg |
| 4 Great Orton | 24 Fairfield Farm (2) |
| 5 Swineside* | 25 Gunson Height |
| 6 Newlands Mill | 26 Lowick Beacon |
| 7 Haverigg | 27 Lowick Common |
| 8 Lowca | 28 Barkin House |
| 9 Harlock Hill | 29 Firbank Fell |
| 10 Kirkby Moor | 30 Hoff Moor |
| 11 Lambrigg Fell | 31 Brownrigg Hall |
| 12 Far Old Park | |
| 13 Black Sail Hut* | Wind Energy Development - Application |
| 14 Wharrels Hill | 32 Lamony |
| 15 Vordian | 33 Grise |
| 16 High Pow | 34 Hellrigg |
| Wind Energy Development - Approved | |
| 17 Barnscar Fold* | |
| 18 Pirelli | |
| 19 Laverock Howe* | |
| 20 Winscales Moor | |

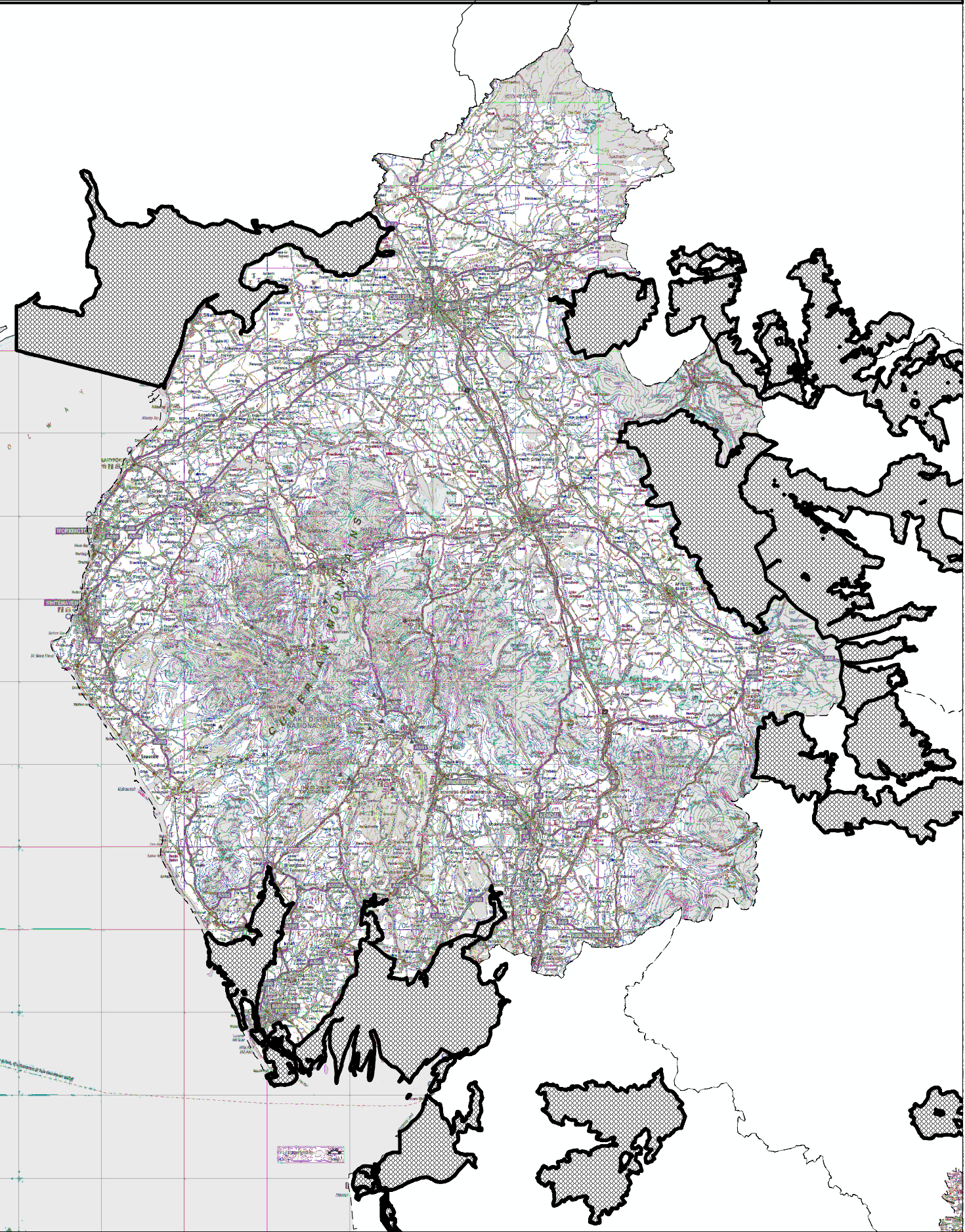
* schemes within the Lake District national Park are small scale providing power to individual buildings only

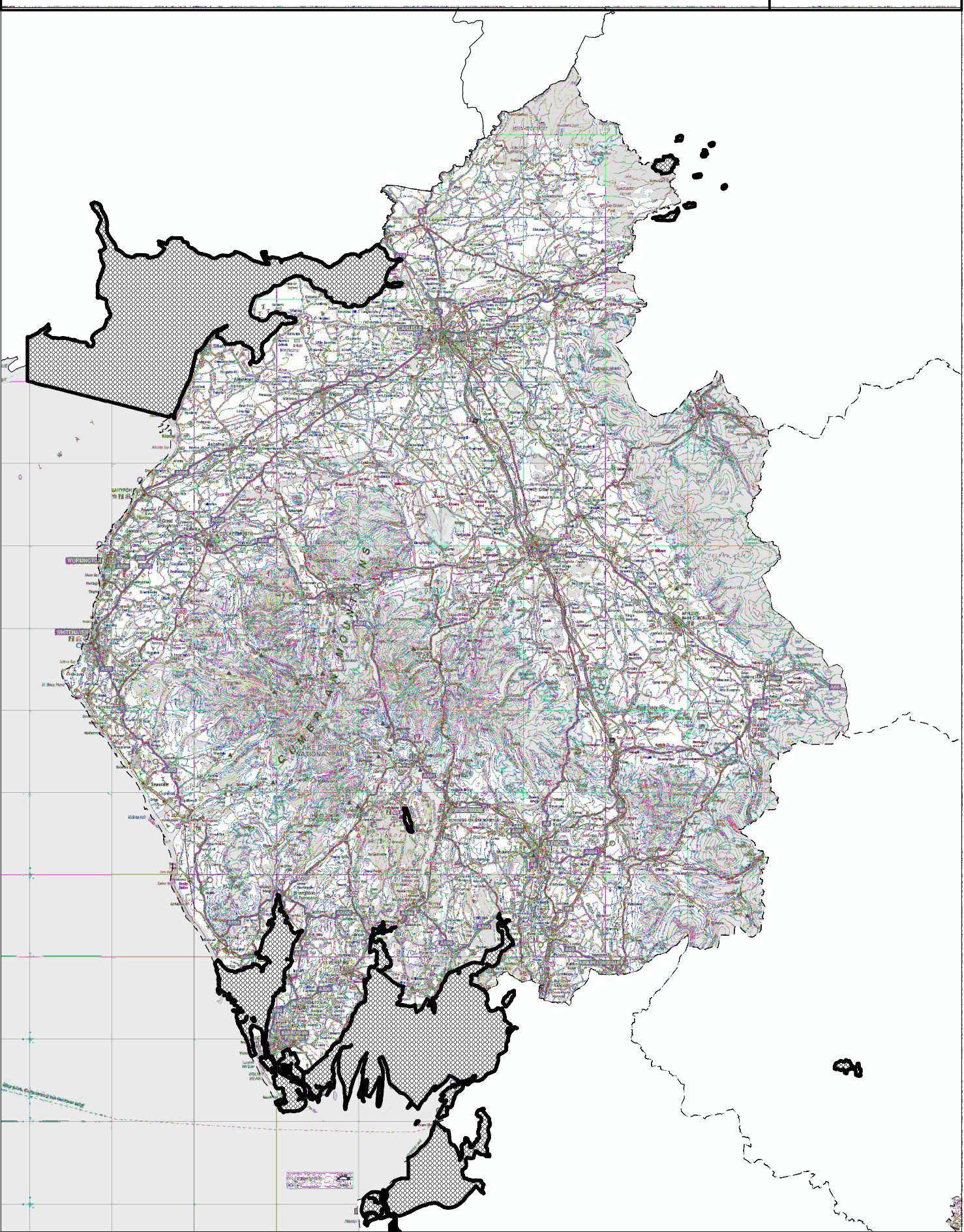


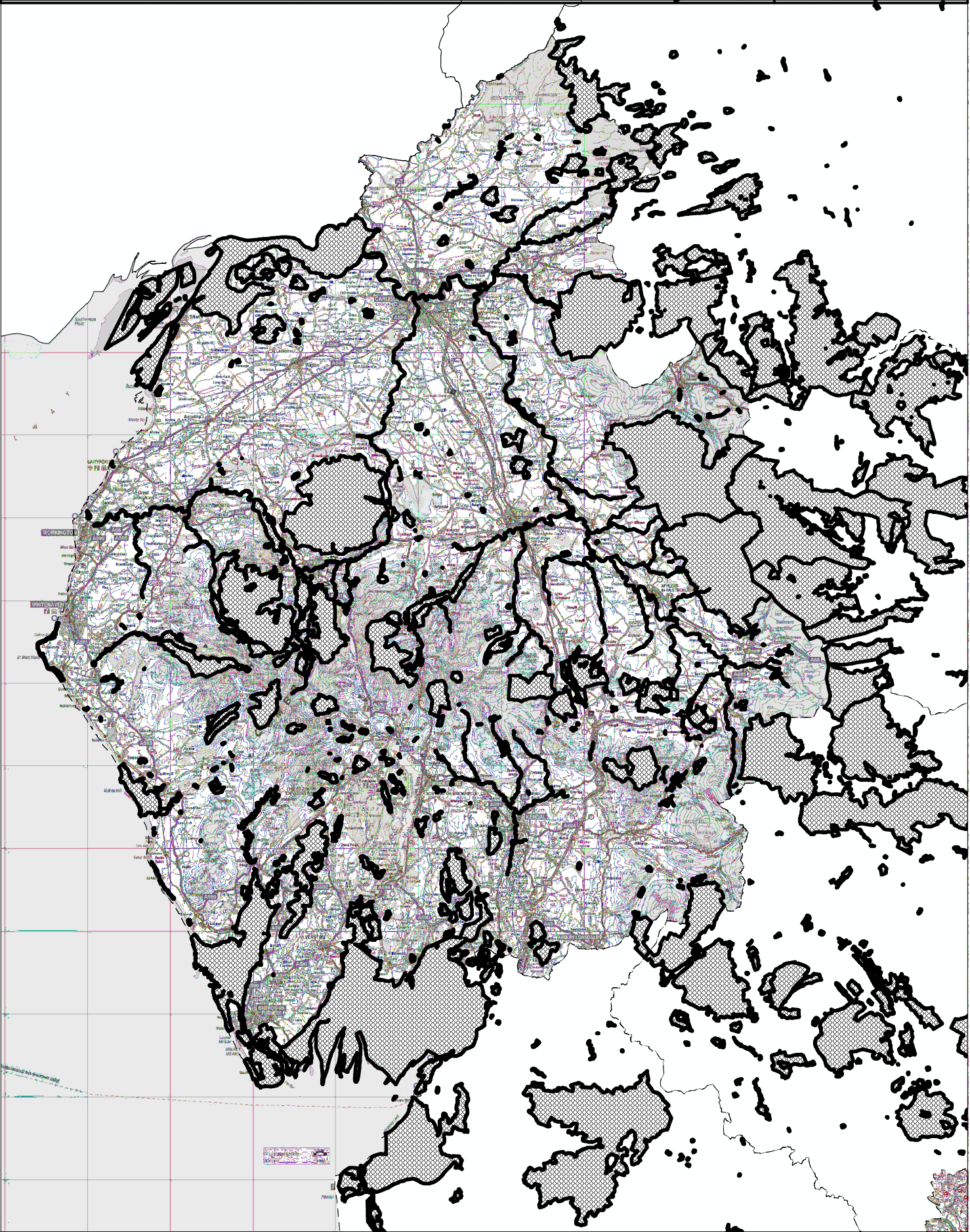
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Landscape Character
Classification (1995)

Map 7

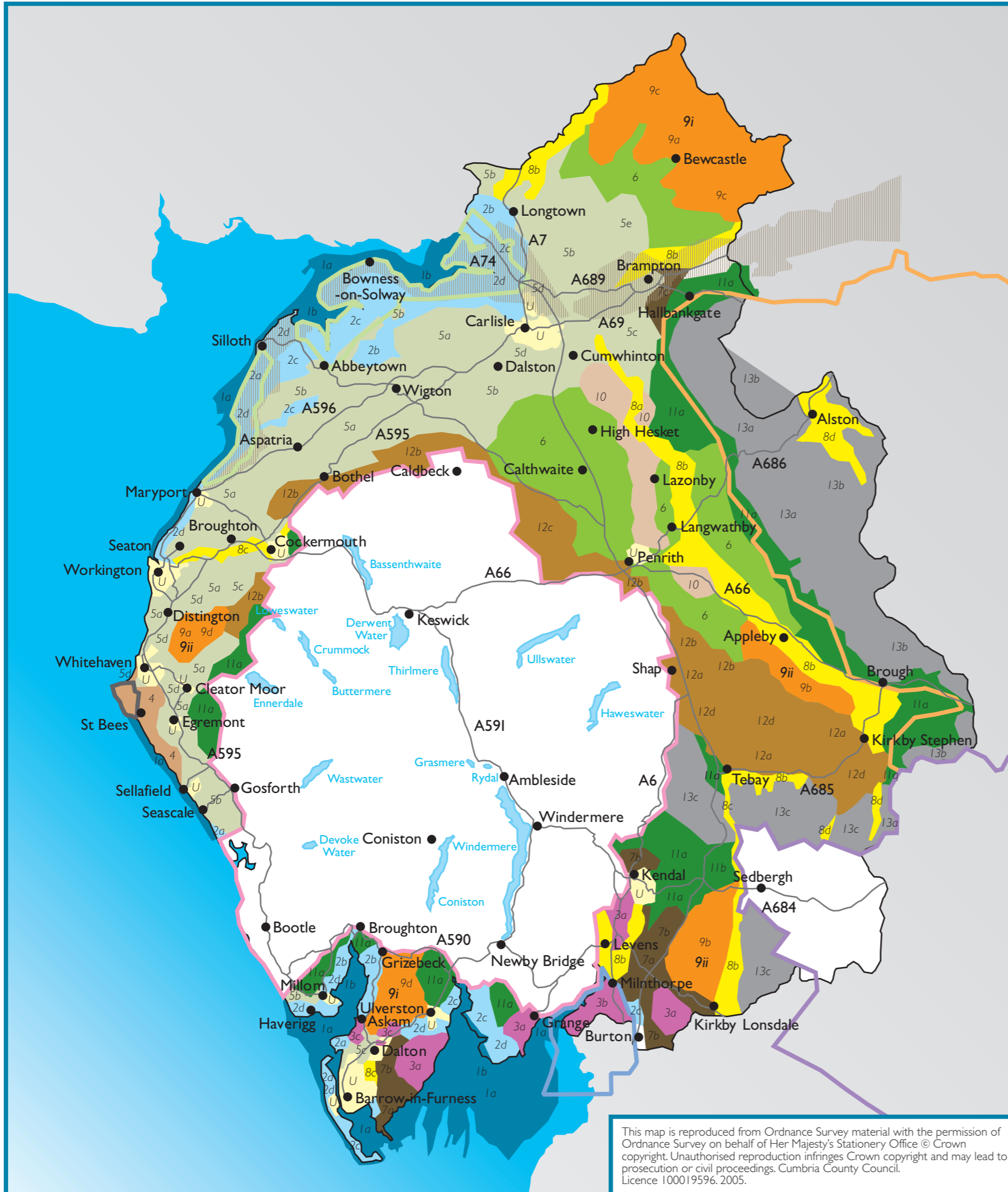
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Key

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Cumbria Landscape Classification

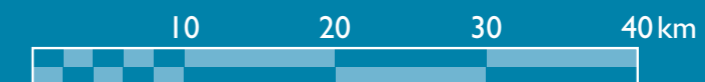
- Type 1 - Estuary and Marsh
- Type 2 - Coastal Margins
- Type 3 - Coastal Limestone
- Type 4 - Coastal Sandstone
- Type 5 - Lowland
- Type 6 - Intermediate Land
- Type 7 - Drumlins
- Type 8 - Main Valleys
- Type 9 - Intermediate Moorland Plateau
- Type 10 - Sandstone Ridge
- Type 11 - Upland Fringes
- Type 12 - Higher Limestone
- Type 13 - Fells and Scarp
- Type 14(U) - Urban Area



Landscape Character Type and Sub Types

- | | | |
|--------------------------------|---|--------------------------------------|
| 1 Estuary and Marsh | 8 Main Valleys | 12 Higher Limestone |
| 1a Intertidal Flats | 8a Gorges | 12a Limestone Farmland |
| 1b Coastal Marsh | 8b Broad Valleys | 12b Rolling Fringe |
| 2 Coastal Margins | 8c Valley Corridors | 12c Limestone Foothills |
| 2a Dunes and Beaches | 8d Dales | 12d Moorland and Commons |
| 2b Coastal Mosses | 9 Intermediate Moorland and Plateau | 13 Fells and Scarps |
| 2c Coastal Plain | 9i Intermediate Moorland | 13a Scarps |
| 3 Coastal Limestone | 9a Open Moorlands (Bewcastle Fells) | 13b Moorland, High Plateau |
| 3a Open Farmland and Pavements | 9c Forests (Kershope and Spadeadam) | 13c Fells |
| 3b Wooded Hills and Pavements | 9d Ridges (Furness) | 14(U) Urban Areas and Fringes |
| 3c Disturbed Areas | 9ii Moorland Hill and Low Plateaus | 2d Coastal Urban Fringe |
| 4 Coastal Sandstone | 9a Open Moorlands (West Cumbria) | 5d Urban Fringe |
| 5 Lowland | 9b Rolling Farmland and Heath (Eden and South Lakeland) | |
| 5a Ridge and Valley | 9d Ridges (West Cumbria) | |
| 5b Low Farmland | 10 Sandstone Ridge | |
| 5c Rolling Lowland | 11 Upland Fringes | |
| 5d Drained Mosses | 11a Foothills | |
| 6 Intermediate Land | 11b Low Fells | |
| 7 Drumlins | | |
| 7a Low Drumlins | | |
| 7b Drumlin Field | | |
| 7c Sandy Knolls and Ridges | | |

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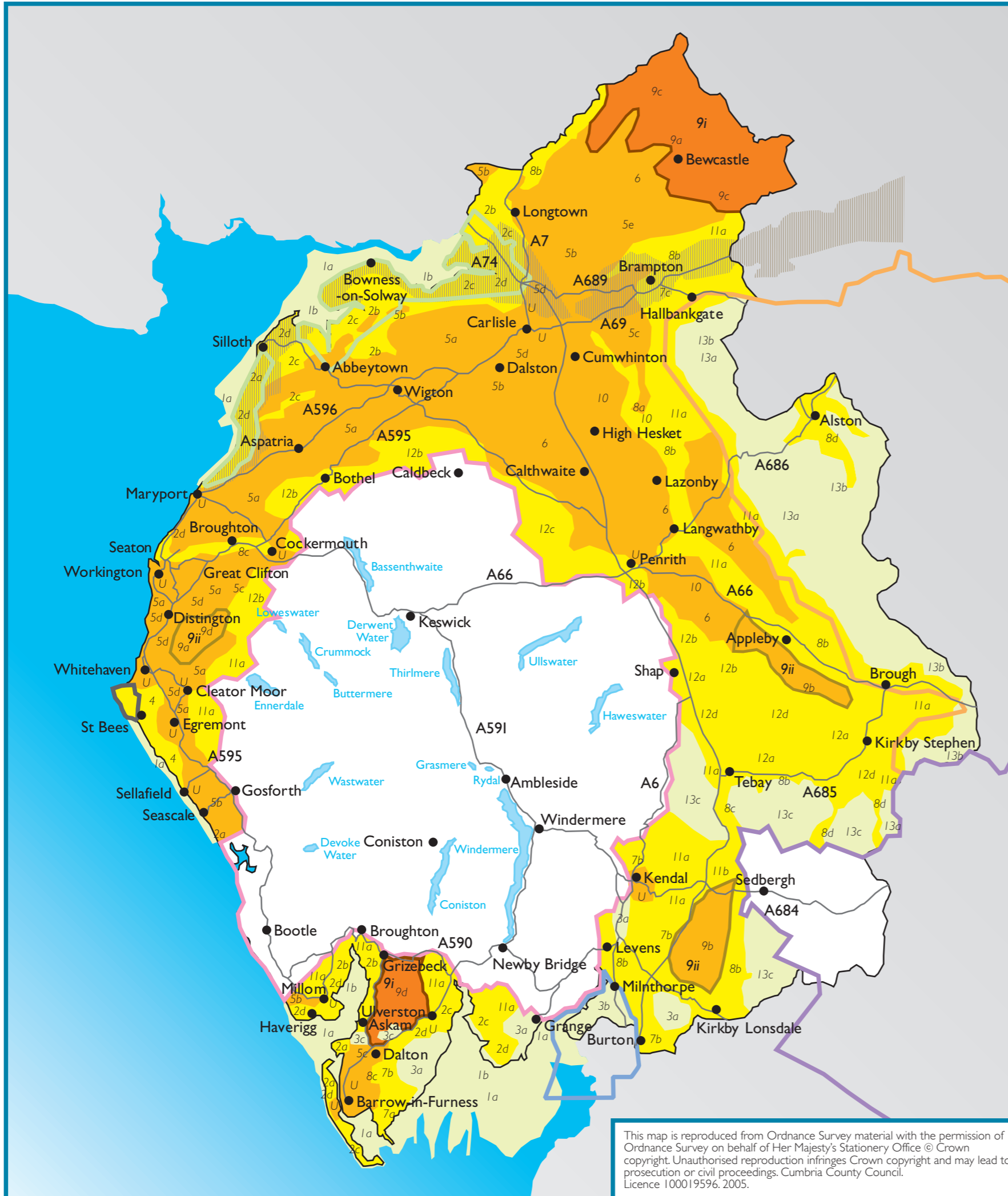
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Landscape Classification Subtype

- Moderate/High Landscape Capacity
- Moderate Landscape Capacity
- Low/Moderate Landscape Capacity
- Low Landscape Capacity



Landscape Character Type	Landscape Capacity	Appropriate scale of development
1 Estuary and Marsh	Low	All scales generally inappropriate
2 Coastal Margins	Low/moderate	Up to a small group, exceptionally a large group in most extensive parts and where unconstrained by settlement
3 Coastal Limestone	Low	All scales generally inappropriate
4 Coastal Sandstone	Low/moderate	Up to a small group beyond St Bees Head
5 Lowland	Moderate	Up to a small group, exceptionally a large group
6 Intermediate Land	Moderate	Up to a small group, exceptionally a large group
7 Drumlins	Low/moderate	Single turbines or a small group
8 Main Valleys	Low/moderate	Up to a small group, exceptionally a large group, in broader valleys
9i Intermediate Moorland	Moderate/high	Up to a large group, exceptionally up to a medium wind farm on high moorland
9ii Moorland Hill and Low Plateaus	Moderate	Up to a small group
10 Sandstone Ridge	Moderate	Up to a small group, exceptionally a large group
11 Upland Fringes	Low/moderate	Up to a small group, exceptionally a large group, on broader topographic sweeps
12 Higher Limestone	Low/moderate	Up to a small group, exceptionally a large group, in blander parts
13 Fells and Scarps	Low	All scales generally inappropriate
14 Urban Areas and Fringes	Moderate	Up to a small group, exceptionally a large group, in coastal contexts

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