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Report to

Blackburn with Darwen Borough Council
Burnley Borough Council
Calderdale Metropolitan Borough Council
Hyndburn Borough Council
Kirklees Metropolitan Borough Council
Pendle Borough Council
Rochdale Metropolitan Borough Council
Rossendale Borough Council

Landscape Guidance for Wind Turbines up to 60m high in the South and West Pennines

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1 INTRODUCTION

1.1 Background and aims

Local planning authorities are encouraged, in the National Planning Policy Framework (NPPF), to have a positive strategy to promote energy from renewable and low carbon sources, with policies that *"maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts"*[1].

This guidance has been prepared for eight local planning authorities in the South and West Pennines, in recognition of the need to accommodate well-sited and appropriately designed turbines in these landscapes. It presents generic advice, aimed at developers and local authority planning officers and members, on the landscape and visual issues associated with the smaller classes of wind turbine, including good practice guidance in relation to location, siting, layout, design and cumulative impacts.

The guidance is intended to complement the *Landscape Capacity Study for Wind Energy Developments in the South Pennines*[2], which covers many (but not all) of the same local authority areas. That document provided broad guidance on the landscape capacity of the South Pennines to accommodate wind energy developments of different sizes, focusing primarily on larger scale commercial turbines.

The principal aim of the present guidance is to facilitate a rigorous, structured approach to consideration of landscape and visual issues associated with single turbines and groups of turbines up to 60m in height to blade tip.

The guidance is intended to help developers understand (and respond effectively to) the specific landscape and visual issues associated with smaller classes of turbine. It will be used to inform and support development management decisions.

The guidance deals solely with the landscape and visual siting and design aspects of proposals for smaller scale wind turbines. There are many other issues to be taken into account when preparing such proposals, such as ecology, archaeology, built heritage, shadow flicker, ice throw, and operational requirements, but these are not considered here. Planning decisions must also take a wider range of factors into account.

1.2 The need for guidance

Smaller scale wind turbines are likely to be located in the farmed and settled landscapes of the moorland fringes, valleys and lowlands with dense networks of roads and rights of way, and in locations relatively close to industry, settlements and residential properties. These turbines therefore are often seen in different landscape contexts to larger scale, commercial turbines, which are commonly sited on sparsely settled moorland plateaux and hills. This means that smaller scale turbines tend to raise different siting and design issues. For

[1] Department of Communities and Local Government (2012) *National Planning Policy Framework*, para97. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

[2] Julie Martin Associates (2010) *Landscape Capacity Study for Wind Energy in the South Pennines*, report to Burnley, Bury, Calderdale, Kirklees, Rochdale and Rossendale Councils. http://www.rochdale.gov.uk/PDF/2010-04-14_LDF_Land_Cap_Study_Wind_Energy_Dev_South_Pennines_Jan_2010.pdf

example, smaller scale turbines are frequently viewed in close conjunction with existing built and natural features, and may be seen by greater numbers of people at close range.

There are growing numbers of planning applications for smaller scale wind turbines in the South and West Pennines, comprising single turbine developments, groups of two or three small turbines, and in some cases larger groups of small turbines. Many of these applications are now coming forward in areas already affected by existing turbines, both large and small. This is giving rise to increasingly complex patterns of wind energy development with associated landscape and visual impacts. Often these impacts run across local planning authority boundaries and may need to be dealt with jointly by adjacent authorities. It is recognised that a consistent approach to these issues would be beneficial.

1.3 Other related guidance

There is very little if any existing guidance in England specifically on the siting, design or cumulative impacts of smaller scale wind turbines. At national level, Natural England has produced guidance on where and how on-shore wind energy might be successfully accommodated within the natural environment[3] and this includes some broad advice on landscape and visual issues, mainly related to larger turbines.

At regional level, the *Landscape Capacity Study for Wind Energy Developments in the South Pennines* provides advice on landscape sensitivity to and capacity for wind energy as well as initial guidance on good siting, layout and design, although this too mainly relates to larger scale commercial wind energy developments. There is also older guidance on landscape sensitivity to wind energy development in Lancashire[4].

Existing landscape character assessments can also be an important source of information on the specific characteristics of the landscapes of the South and West Pennines. The *Landscape Capacity Study for Wind Energy Developments in the South Pennines* includes an overview of all the landscape character types within Burnley, Bury, Calderdale, Kirklees, Rochdale and Rossendale. Further detail of the landscape character of the South and West Pennines – including the key characteristics of the area's distinctive landscape character types – can be found in landscape character assessments and guidance for the South Pennines Heritage Area[5] and Lancashire[6].

Finally, Scottish Natural Heritage has produced a suite of guidance relating to onshore wind energy development, including guidance on siting and designing wind farms in the landscape, siting and design of smaller scale wind turbines, and assessing the cumulative impacts of onshore wind energy developments[7]. This has informed the present guidance and may be very useful as wider reading, as many of the same principles will apply to English landscapes.

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[3] Natural England (2010) *Making space for renewable energy: assessing on-shore wind energy development* (NE254) http://publications.naturalengland.org.uk/publication/38006?category=34022

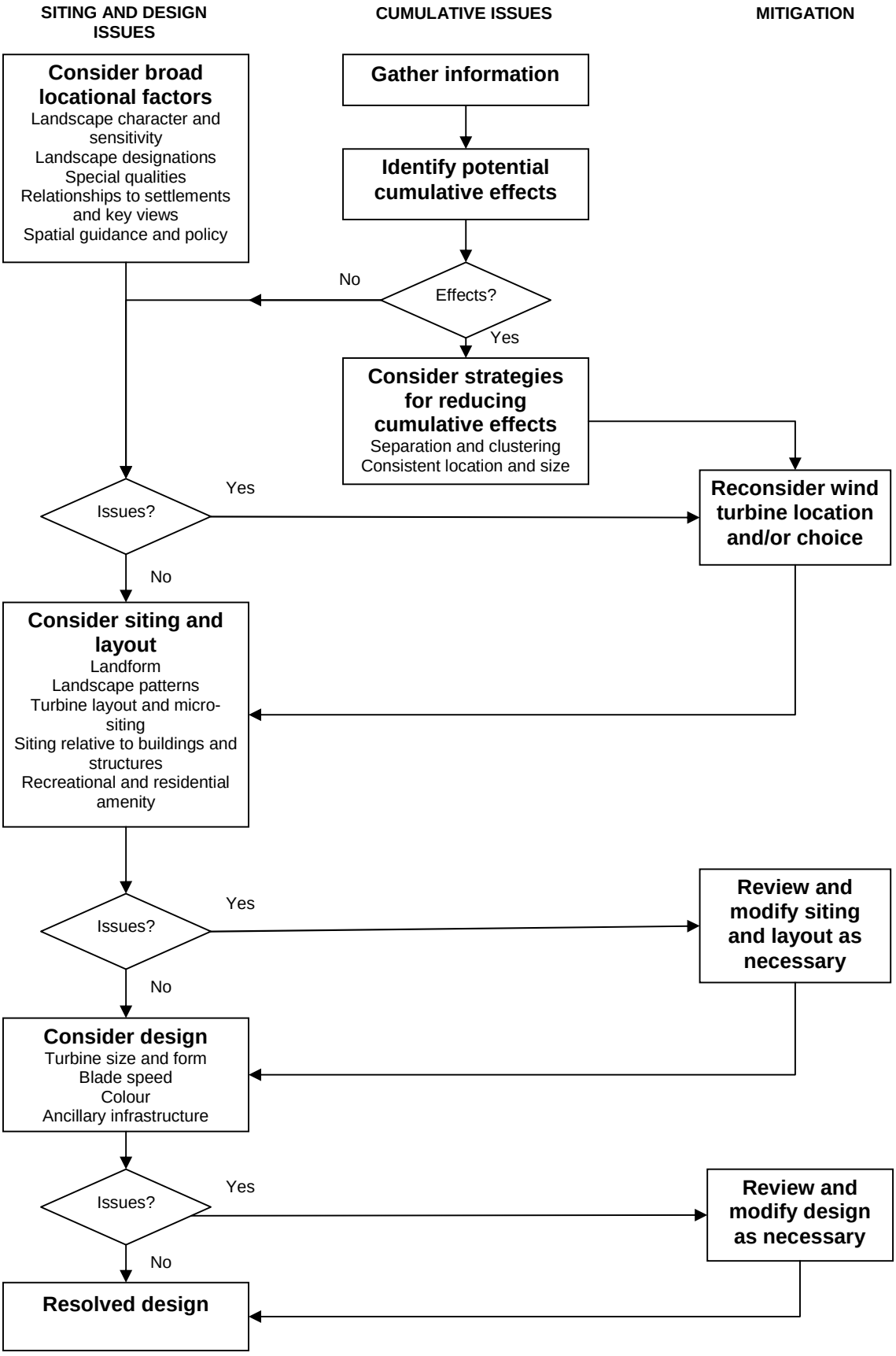
[4] Lovejoy (2005) *Landscape Sensitivity to Wind Energy Development in Lancashire*, report to Lancashire Country Council and others. http://www.lancashire.gov.uk/environment/landscape/landscapewind/index.asp

[5] Land Use Consultants (1999) *South Pennines Landscape Character Assessment* and *South Pennines Landscape Guidelines*, reports to Standing Conference of South Pennine Authorities (SCOSPA).

[6] Environmental Resources Management (2000) *A Landscape Strategy for Lancashire: Volume 1 Landscape Character Assessment and Volume 2 Landscape Strategy*, report to Lancashire County Council (covers Blackburn with Darwen, Hyndburn and Pendle, which were not part of the South Pennines study). http://www.lancashire.gov.uk/environment/landscape/lanscapesumcov.asp

[7] http://www.snh.gov.uk/planning-and-development/renewable-energy/onshore-wind/landscape-impacts-guidance/

Recommended process for applying the guidance



1.4 Using the guidance

Section 2 of the guidance provides basic background information on the characteristics and appearance of smaller scale wind turbines.

Section 3 discusses issues of siting and design, presenting good practice advice on how prevent and minimise landscape and visual impacts.

Section 4 examines the potential cumulative landscape and visual impacts of smaller scale wind turbines in different development contexts and gives advice on how issues of cumulative impact can be addressed.

The recommended process for applying the guidance is shown on the previous page.

It is very important that work on siting and design and on cumulative issues should be undertaken in parallel (as shown above), not sequentially, as cumulative issues are likely to have a strong influence on siting and design generally.

At the end of each subsection of the guidance, a text box details the key questions that need to be answered in relation to the potential landscape and visual impacts of smaller scale wind turbines. These questions are also listed in ***Annex 1*** as an overall checklist of factors to consider when developing or appraising proposals for smaller scale turbine development. ***Annex 2*** gives further details of key siting and design considerations for smaller scale wind turbines in different groups of landscape character types across the South and West Pennines. It summarises the guidance that is most relevant to those types.

1.5 Information requirements

Regardless of turbine size and whether or not a turbine proposal will require a formal environmental impact assessment (EIA) [8] it essential to have basic information about a scheme from the very outset, so that landscape and visual issues can be given proper consideration.

At a minimum, for the appraisal of landscape and visual issues, this information should include a location map on an Ordnance Survey base; and a scale drawing of the intended turbine. However a key tool, especially for turbines over 25m to blade tip, is a computer-generated map of the zone of theoretical visibility (ZTV) of the proposed turbine or turbines. This is important as it helps greatly with the identification of viewpoints and the extent of potential turbine visibility in the surrounding area.

As scheme development progresses, much more detailed information may be required to facilitate proper landscape, visual and cumulative assessment. Typically for turbines 25-60m in height (and sometimes also for smaller turbines) this may include not only ZTV mapping but also photomontages and/or wireframe images to show the appearance of the turbine(s) in the landscape from perhaps 4-6 key viewpoints (or occasionally more). The viewpoints should ideally be chosen in discussion with the local planning authority. Where significant cumulative impacts are anticipated, cumulative ZTV mapping and photomontages may also be needed to facilitate understanding of cumulative impacts.

[8] Where more than two turbines or turbines over 15m to hub (equivalent to around 25m to blade tip) are proposed a 'screening opinion' should be sought from the local planning authority to determine whether or not a formal EIA will be required.

Example of ZTV mapping

Source: Extract from a figure in a report by FPCR Environment and Design Ltd

Further advice on specific information requirements at various stages in the assessment process is given later in this report. General advice on good practice in landscape and visual impact assessment and on the preparation and use of ZTV mapping and photomontages can be found in published *Guidelines for Landscape and Visual Impact Assessment*[9].

2 WIND TURBINE CHARACTERISTICS

2.1 Size and scale

2.1.1 Domestic and micro-turbines (up to 12m to blade tip)

These turbines, generating up to around 6kW, are usually installed to supply electricity to domestic, agricultural or small scale industry, although excess energy may be sold to the national grid. Domestic roof- and wall-mounted turbines are most likely in urban areas where they may give rise to cumulative impacts on townscape. In rural areas freestanding domestic and micro-turbines are more common. The smaller ones (up to around 12m) relate well to the size of existing buildings in the landscape, including farm buildings, and are relatively easy to accommodate in a settled landscape if sited in association with a building cluster.

2.1.2 Very small turbines (12 to 25m to blade tip)[10]

Freestanding turbines of this height generate up to around 20kW and can be, at their highest, over twice the height of a two-storey house. This size of turbine is therefore likely to be more prominent and may appear above buildings. However a well-grown, mature forest tree may reach a similar height to these turbines, so in fertile upland fringe or lowland landscapes, turbines of this size may not be unduly prominent. Other structures of similar height include some communications masts and small pylons.

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[9] Landscape Institute and Institute of Environmental Assessment and Management (2002) *Guidelines for Landscape and Visual Impact Assessment*, 2nd edition, Spon.

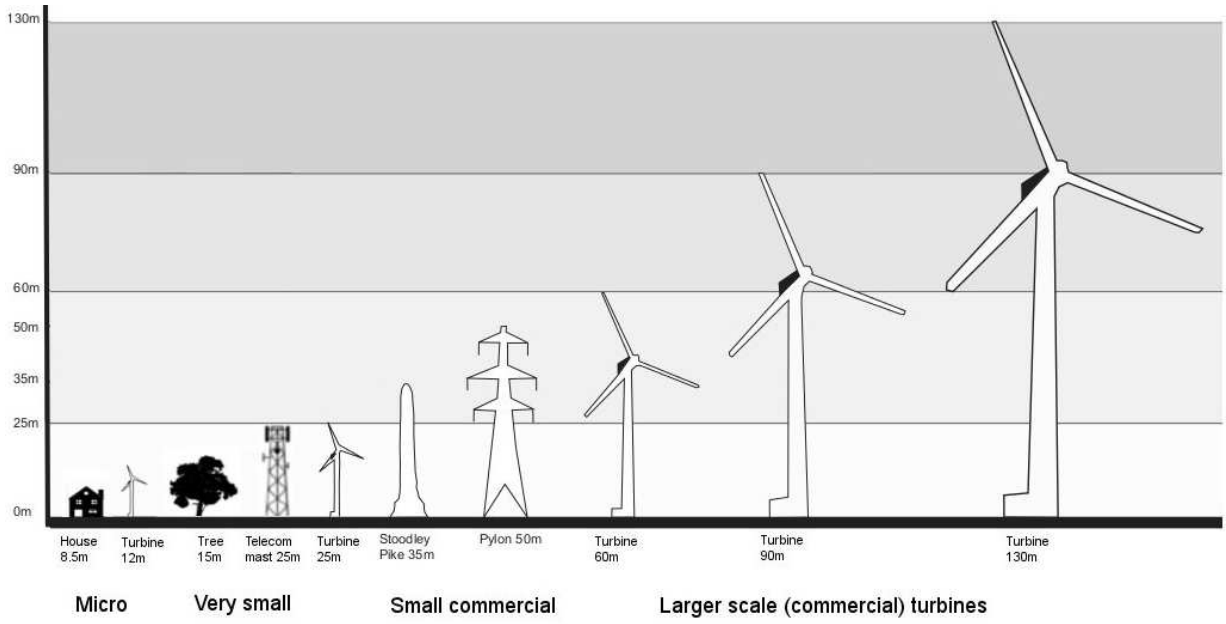
[10] These correspond to 'very small' turbines in the *Landscape Capacity Study for Wind Energy Developments in the South Pennines.*

2.1.3 Small commercial turbines (25 to 60m to blade tip)[11]

Turbines in this height range are capable of generating up to around 500kW and are likely to be taller than most buildings and trees. Although at the lower end of this range they may still be of similar height to some communications masts and pylons, at the top end of the height range the only structures of similar height are likely to be occasional very tall communications masts and industrial structures such as chimneys. These turbines tend to site best in simple, empty landscapes where there are few existing landscape features that might offer scale comparisons, or in industrial settings adjacent to existing large scale buildings.

The terms 'micro', 'very small' and 'small commercial' turbines, where used in this report, refer to turbines within these specific height ranges. Note that the landscape and visual guidance given sometimes differs for different size classes.

Scale diagram (also showing larger scale turbines for comparison)



2.2 Appearance

Choice of turbine is a key factor in the potential landscape and visual suitability of small turbines, especially where the new turbines will be seen in conjunction with other existing turbines. In contrast to larger scale commercial wind turbines, a considerable range of styles, design and colours of small wind turbine is commonly available, and further advice on turbine appearance is presented in section 3.3. In general rotation speeds for smaller scale turbines are higher than for larger turbines and this will influence their appearance, especially when seen together with slower moving turbines.

[11] These correspond to 'small' turbines in the *Landscape Capacity Study for Wind Energy Developments in the South Pennines.*

Fast rotation speeds, common with smaller turbines (left), can draw the eye compared to the slower speeds associated with larger turbines (right).

There are two main forms of small turbine currently available – those which rotate on a horizontal axis and those which rotate on a vertical axis. Horizontal axis turbines are much more common than vertical axis turbines.

2.2.1 Horizontal axis turbines

These are usually three bladed machines mounted on a tubular tower, although two bladed machines are becoming more common and lattice towers are sometimes used. Three-bladed machines, mounted on a solid tapering tower and pale grey in colour, have the same form as large commercial machines. Two-bladed machines tend to have longer, propeller-like blades whose rotational motion tends to appear less smooth than that of three-bladed models. Where the two types of turbine are seen together the contrast will be evident. Some smaller scale horizontal axis turbines also have a yaw or arm that moves to face the blades into the wind.

Typical three- and two-bladed turbines

2.2.2 Vertical axis turbines

Vertical axis wind turbines tend not to be as efficient as horizontal axis machines but they do offer benefits in low wind situations. They also tend to be easier to build, can be mounted close to the ground, and handle turbulence better, but may require guy wires for stability.

They are generally smaller than horizontal axis turbines and are more common in urban areas where there may be townscape issues to consider. Their forms are sometimes tailored to create a design statement for an individual site. Although the characteristics differ from horizontal axis turbines, siting and design considerations tend to be similar.

© northdevonfarmer © Ell Brown

Typical vertical axis turbines

3 SITING AND DESIGN ISSUES

Ideally when developing and appraising a smaller scale wind energy development, broad locational factors should be considered first, followed in turn by more detailed issues of siting, layout and design. This is because the careful choice of location tends to offer the greatest scope for preventing or alleviating landscape and visual impacts.

In addition, this iterative process allows key landscape and visual issues and potential constraints to be identified early in the project planning process, when other options can still be considered without unnecessary difficulty or expense. The relationship to any existing and consented wind turbines in the vicinity should also be a key consideration at an early stage but is covered separately in Section 4.

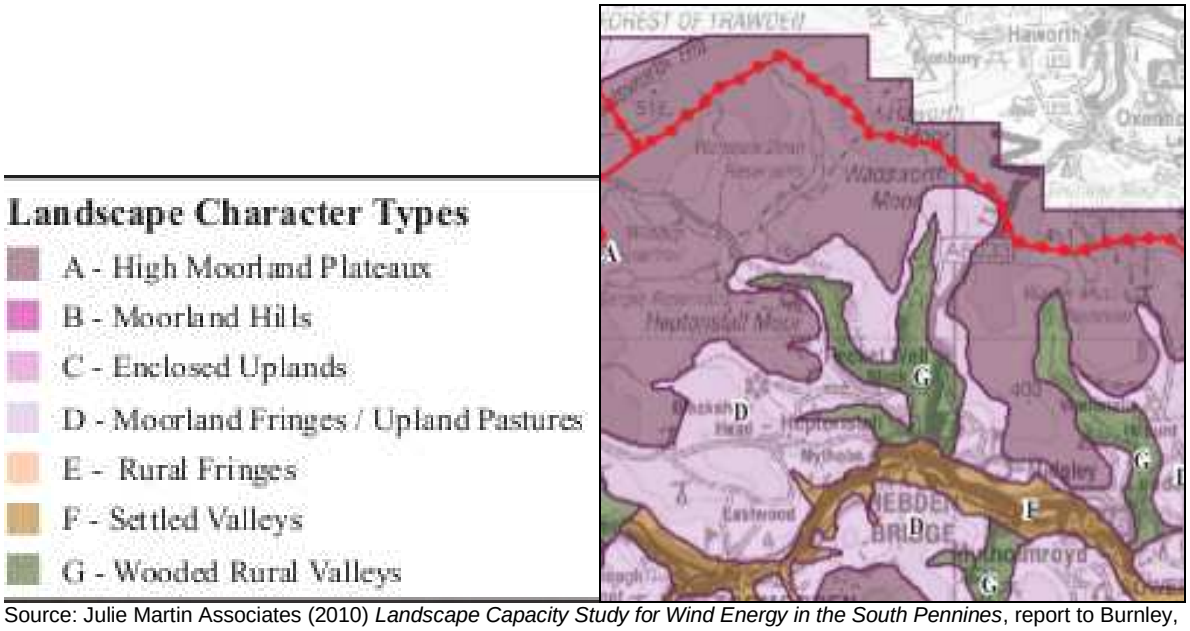
3.1 Broad locational factors

3.1.1 Landscape character and sensitivity

The relevant landscape character assessment(s) (LCAs) (see section 1.3) should be used initially as a basis for identifying the landscape character types and the key landscape characteristics in the area where the wind turbines are proposed to be located. For locations covered by the *Landscape Capacity Study for Wind Energy Developments in the South Pennines*, the landscape sensitivity assessments for each landscape character type (pp55-80 of the report) may also provide helpful background; while in Lancashire the study of *Landscape Sensitivity to Wind Energy Development in Lancashire* should be consulted. Further analysis of the specific characteristics of the immediate locality, using 1; 25,000 Ordnance Survey maps and aerial photographs, will help ensure that the site and its context are considered at a scale appropriate to the development proposal.

The effects on landscape character are likely to be related to factors such as the scale of the landscape, landform and landcover, and more detailed guidance on these important relationships is presented in section 3.2. For instance, is the landscape small scale, intimate and settled or large scale, open and expansive? The height of the turbine(s) proposed should seek to complement landscape character – hence in the former case micro or very small turbines may be appropriate, while in the latter case small commercial turbines may be considered. A basic understanding of landscape character is therefore a very helpful tool in identifying an appropriate location for smaller scale wind turbines. Annex 2 gives further details of key location, siting and design considerations for smaller scale wind turbines in different groups of landscape character types across the South and West Pennines.

Example of landscape character assessment mapping



Source: Julie Martin Associates (2010) *Landscape Capacity Study for Wind Energy in the South Pennines*, report to Burnley, Bury, Calderdale, Kirklees, Rochdale and Rossendale Councils

Consider:

- Have you referred to the landscape character assessment?
- What type(s) of landscape are affected?
- What are their key characteristics and sensitivities?

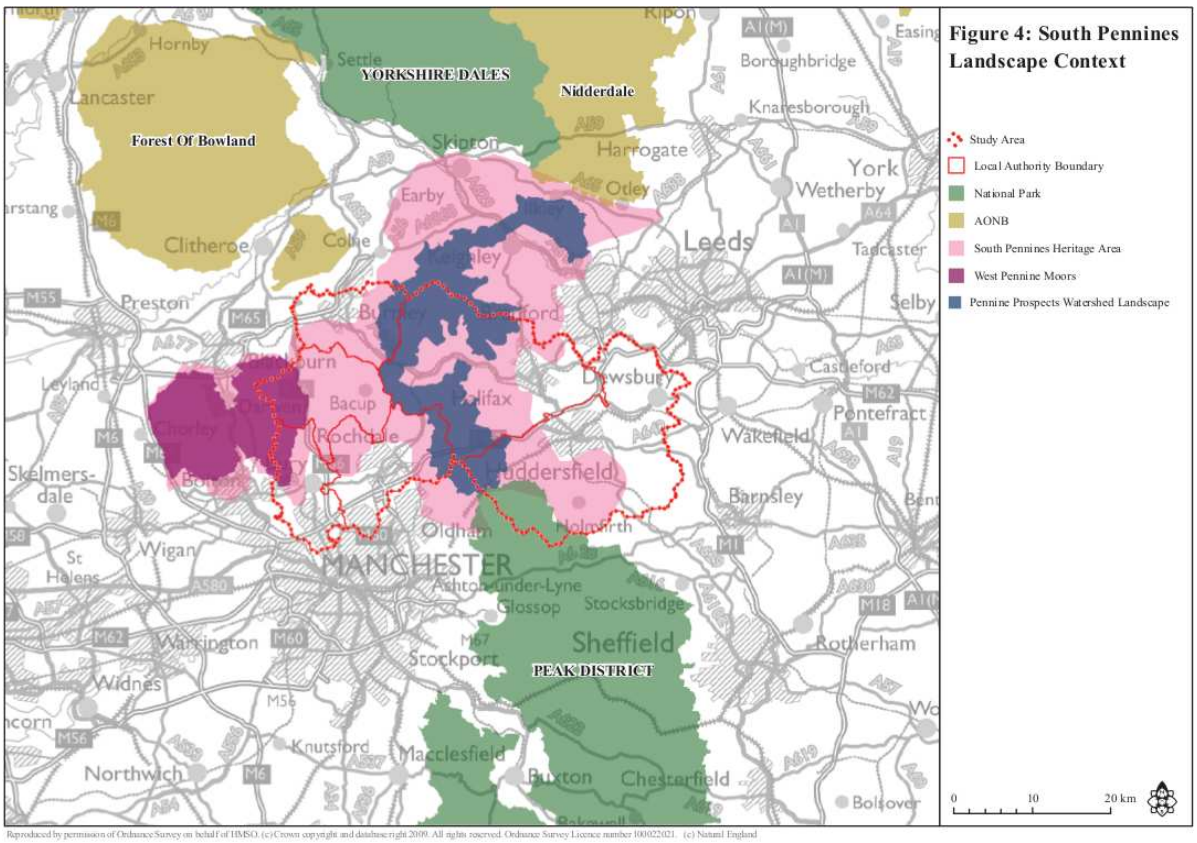
3.1.2 Landscape designations

Landscapes designated for their national, regional or local scenic, designed or recreational quality may be sensitive to smaller scale wind energy development – especially *small commercial* turbines. Even where turbines are not sited within designated landscapes, they may significantly alter their landscape settings and/or key views to and from those landscapes. The NPPF (paras 113-114) highlights the need to give great weight to conserving landscape and scenic beauty in National Parks and Areas of Outstanding Natural Beauty (AONBs) and also encourages local planning authorities to give protection, commensurate with their status, to landscape areas designated as being of local importance.

The South and West Pennines are important scenically and recreationally for the countryside experience that they offer to the large nearby urban populations. These interests have been recognised in the non-statutory designation of the South Pennines Heritage Area and the West Pennine Moors. The South Pennines Heritage Area forms an upland link between the Peak District and Yorkshire Dales National Parks. The Forest of Bowland AONB also lies

close to the north[12]. There are also many other designations such as historic parks and gardens and country parks that may indicate special landscape sensitivity.

Principal landscape designations in the South Pennines



Source: Julie Martin Associates (2010) *Landscape Capacity Study for Wind Energy in the South Pennines*, report to Burnley, Bury, Calderdale, Kirklees, Rochdale and Rossendale Councils

Effects on these areas will depend on the nature of the wind energy proposal and the reasons why the area has been designated. It is helpful to establish at an early stage whether or not the proposal might affect a designated landscape, and if so, in what way its landscape character and qualities would be affected. ZTV mapping and information on the location of designated landscapes within the ZTV will be relevant.

Consider:

- Is the proposal in or close to an AONB or National Park?
- Is the proposal in or close to the South Pennines Heritage Area or the West Pennine Moors?
- Are there any other nearby designations (such as country parks or historic parks and gardens) that might be affected?

3.1.3 Special qualities

Certain parts of the landscape may be valued for their 'special qualities'. Such special qualities may include scenic landmarks or landscape features – such as the beacons and gritstone tors that characterise parts of the upland edges in the South and West Pennines. Turbine development that appears in key views of such features may detract from landscape perceptions and enjoyment of these features.

[12] Partly within Pendle Borough.

Similarly, smaller scale turbine development close to areas valued for their relative wildness or tranquillity has the potential to undermine those qualities. For example, areas such as Blackstone Edge and Darwen Moor are highly valued for the relative wildness that they provide close to urban centres. In other areas there may be valued natural or cultural heritage features, such clough woodlands and weaving mills, whose proximity may heighten landscape sensitivity.

The potential impact on such special qualities should be considered when locating wind farm development in the landscape. Information on special qualities can be found in the relevant LCA, often under the heading of 'key environmental features'.

Extract from Lancashire Landscape Strategy describing special qualities of the Moorland Fringe landscape character type

Moorland Fringe Landscape Character Type

Character Areas

4a Trawden Fringe
4b Rossendale Moorland Fringe
4c Blackburn Moorland Fringe
4d Bowland Gritstone Fringes
4e Bowland Limestone Fringes
4f Longridge Fell Fringes
4g South Pendle Fringe
4h Leck Fell Fringe
4i North Pendle Fringe
4j West Pennine Fringes

Key Environmental Features

- Dry stone walls of roughly hewn blocks with distinctive construction styles and wall copings create strong patterns within the landscape, reflect the underlying geology and are also of historical/cultural interest.
- Elevated and often long distance views over the surrounding landscape from lay-bys and viewpoints.
- Undulating landform with stunted hawthorns and gorsey roadsides give texture to the landscape and provide a transition between the ordered lowlands and wild uplands.
- Enclosed archaeological sites, dating from the Iron Age, which survive in these marginal locations as they have not been destroyed by the intensity of activity taking place lower down in the river valleys.
- Distinctive vernacular architecture of asymmetric stone dwellings housing living quarters and barns under one roof (laithe houses), stone terraced cottages and farmsteads reflect the underlying geology and provide an insight into the lifestyle of the former inhabitants.
- Victorian reservoirs demonstrate the importance of the landscape for water storage as well as providing important wildfowl and wader habitats.
- Small semi-natural clough woodlands are valuable ecological habitats and prominent landscape features.
- Isolated farmhouses, cottages and short lines of buildings are often prominent on the steep slopes.

Source: Environmental Resources Management (2000) *A Landscape Strategy for Lancashire: Volume 1 Landscape Character Assessment and Volume 2 Landscape Strategy*, report to Lancashire County Council

Consider:

- Are there important landmarks or landscape features nearby?
- Is the landscape unusually wild or tranquil?
- Are there important natural or cultural heritage resources nearby?

3.1.4 Relationship to settlements and key views

Smaller scale turbines are commonly associated with settlement, building groups and other built structures such as industrial and commercial buildings. It is very important, when siting a turbine close to settlement, to consider the visual relationship between the turbine and the settlement itself. For example, it may be useful to consider whether the relationship appears logical and cohesive from a variety of viewpoints; whether it would affect the appearance and landscape setting of the settlement (for example by providing a new focal point); and whether it might dominate approaches to the settlement.

In the South and West Pennines one of the most important visual relationships is between the settlements, principally in the valley locations, and the often sharp, pronounced skylines at the break of slope above. Wind turbines located on these skylines may have a disproportionate impact on views from settlements below. Visually the landscape may also be especially sensitive close to key recreational areas and routes. By systematically identifying key viewpoints (ideally using ZTV mapping), the likely overall visual impact of a turbine location can be appraised at an early stage in project planning and if necessary alternative locations can be considered.

The relationship between settlements in the valley floor and the pronounced skylines above is especially important in the South and West Pennines. Skylines are highly sensitive to change.

Consider:

- Does the proposal have a logical visual relationship with the settlement pattern?
- Would it affect the landscape setting of the settlement, or key recreational or residential views such as views to skylines?
- Would the turbine(s) dominate approaches to settlement?

3.1.5 Spatial guidance and policy

Finally, in broad locational terms, it is important to consider any relevant spatial guidance and policy that the local planning authority may have in relation to wind energy.

Local planning authorities are now encouraged by the NPPF (para 97) to outline, in their spatial plan, areas where all scales of wind turbine development, including smaller scale development, are likely to be acceptable. The process of plan preparation, which is ongoing in the South and West Pennines authorities, may include consideration of emerging patterns of wind energy development and their impacts.

In the course of plan preparation, the local planning authorities may produce further guidance indicating, in more detail, where and how smaller scale turbines can be accommodated in the landscape. It is most important that any such emerging spatial guidance and policy be considered when preparing proposals for smaller scale wind turbines, especially in relation to cumulative landscape and visual impacts.

Consider:

- Does the proposal accord with the spatial plan for wind energy development, where this exists?
- Does it meet relevant policies or criteria on landscape, visual and cumulative impact?

3.2 Siting and layout

3.2.1 Landform

Understanding topographic scale and form and how these factors influence the relative proportions of features in the landscape is important when siting wind turbines. Assessing the scale of the landform involves considering the perceived vertical height and horizontal expanse of the topography, as well as the degree of openness or containment offered by topographic relief.

In general, *micro* and *very small* turbines are likely to sit more comfortably on lower ground, for example on flatter terraced areas, the side slopes of low hills or ridges, or dips within undulating land where their scale will be in proportion with that of the landscape. *Small commercial* turbines, by contrast, may be accommodated more easily on low hills or expansive slopes – perhaps backed by higher hills – where they will be seen as a relatively small part of a simpler, larger scale landscape, ideally with no immediate scale comparators.

Micro and very small turbines may sit best in the lower parts of the landscape (left), where they can be partly screened by vegetation and topography. By contrast, small commercial turbines (right) may to be more suited to a higher, more expansive landscape.

In all cases, judgements need to be tempered by consideration of the complexity of the surrounding landform. For example, where there are visible ridges, knolls, drumlins or rock outcrops close by, even a small turbine may adversely affect landscape perceptions, by diminishing the perceived height or intruding on the distinctive form of these features. Smaller turbines should not be sited on the top of such distinctive landforms, which may be key contributors to local landscape character. Often small siting adjustments, even by a few hundred metres, can effectively mitigate such adverse impacts.

The landscape setting of these jagged gritstone tors, to the right of the photograph, is sensitive to the introduction of turbines, which could intrude on their distinctive form

Where possible, local landform should be used to help limit the visibility of the turbine(s) from key viewpoints. Clearly *micro* and *very small* turbines will be more easily screened than *small commercial* turbines.

Consider:

- What is the scale of the landform in the surrounding area?
- Is the landform simple or complex?
- Does the proposal respond well to landform scale and form?
- Would local landform features help to limit visibility of the proposal, or tend to accentuate it?

3.2.2 Landscape patterns

Existing landscape patterns – including settlement and field patterns – also give important clues as to where turbines may fit best within the landscape and should be carefully analysed during the siting process. *Micro* and *very small* turbines tend to be most easily accommodated alongside existing settlement and other infrastructure. *Small commercial* turbines, as noted earlier, may be more appropriate in simple, open landscapes where there are few existing settlement or field patterns that could be interrupted, or in industrial settings.

Within a given landscape character type it is helpful if turbines can be located consistently in relation to existing landscape patterns. For example *micro* and *very small* wind turbines in moorland fringe and upland pasture landscapes, which occur in many parts of the South and West Pennines, ideally should follow and reinforce the settlement pattern (which is one of scattered farmhouses and villages within a network of fields and lanes on the valley

terraces) and be located at a similar elevation within the landscape. This will reduce the overall impact on landscape character.

Micro or very small turbines, associated with clusters of farm buildings in this moorland fringe landscape, could reflect and even reinforce the characteristic settlement pattern.

Small commercial turbines tend to be more suited to simple expansive landscapes (such as the slopes just above the farms in the photo to the left) or to industrial settings in the valley bottom such as that on the right.

Consider:

- What are the predominant landscape patterns in the surrounding area?
- Does the scheme complement or conflict with existing landscape patterns?

3.2.3 Turbine layout and micro-siting

In all cases the turbine layout should be considered from several viewpoints, including the most sensitive and/or frequently viewed viewpoints. For *micro* and *very small* turbines there may be the opportunity to take advantage of mature trees and woodland in the landscape to afford screening. Where more than one turbine is proposed, the turbines can be arranged in different layouts, or arrays, that may offer scope to create a simple, even sculptural, visual image.

For instance, turbines could be arranged in a straight line where a geometric field pattern or straight road edge exists, or in a more informal scattered group or sweeping line adjacent to an indented woodland edge. In a landscape that is already visually complex or cluttered, for example by pylons, it may be better to use a clustered layout rather than a dispersed layout (or even a single larger turbine) to help reduce potential visual conflicts. Overlapping or 'stacking' of turbine blades and towers and marked differences in elevation between turbines should be avoided. Turbine layouts should also respect the underlying landform, to avoid the need for unnecessary levelling and ground disturbance.

Micro-siting distances are sometimes used to allow developers to change the precise location of turbines to avoid unforeseen constraints such as archaeology. Although developers do need some flexibility, this should be kept to a minimum where landscape and visual impacts are sensitive to small changes in turbine siting. Even a few metres of movement can make a big difference to the perceived layout of smaller turbine sites, affecting the visual relationships between turbines, or between turbines and buildings or trees. This can radically change the landscape composition, the degree of screening afforded, and/or the visual impact of the turbines.

Consider:

- Does existing woodland offer screening?
- Could modest changes in siting reduce turbine visibility?
- If there is more than one turbine, are the turbines grouped well when seen from key viewpoints in the surrounding area?
- Could changes due to micro-siting at a later stage adversely affect the perceived layout or screening?

3.2.4 Siting relative to buildings and structures

Smaller scale turbines are commonly associated with settlements, building groups and other built structures such as modern industrial and commercial buildings and plant. It is important that there should be a good relationship, visually, with any such existing buildings and structures, although this relationship will vary according to the context – an isolated farmstead setting being very different to a business park for example. Special attention to built heritage issues is recommended where wind turbine development would potentially affect the fabric or settings of historic monuments, conservation areas and listed buildings[13].

Careful consideration should be given to the location of the turbine or turbines relative to nearby buildings or structures. The turbine should not have an overbearing presence or dominate existing buildings unless it is deliberately intended to form a new focal point or landmark, for instance in an industrial setting. A simple, clear, visual relationship will usually be most effective.

[13] See advice from English Heritage on wind energy and the historic environment http://www.english-heritage.org.uk/publications/wind-energy-and-the-historic-environment/

Particular care should be taken to avoid creating visual clutter relative to existing structures, especially pylons, which are common in some parts of the South and West Pennine landscape. This adverse visual impact is most likely to occur where the proposed turbines are taller than the pylons and directly overlap the transmission line in key short-range views.

The steeple in the photo on the left is a key landmark and scale comparator for any turbines close by and great care should be taken not to affect its setting. In the photo to the right the key concern is to avoid aggravating existing visual 'clutter' caused by pylons.

Consider:

- Do the turbine(s) respect the presence of any nearby buildings or structures?
- Is the visual relationship a simple or a complex one?
- Would the proposal create or add to any existing visual clutter (eg where pylons are present in the same view)?

3.2.5 Residential and recreational amenity

There are no nationally agreed or statutory separation distances required between wind turbines and dwellings or public rights of way; and individual residents have no right in law to a view. Precedent suggests that a minimum separation distance of at least 10 times rotor diameter is advisable to mitigate impacts on residential amenity. For bridleways, the British Horse Society has suggested a minimum separation of 200m (and a preferred separation of 3-4 times turbine height) from routes that may be used by horses. For other public rights of way a separation of at least the fall-over distance of the turbine is generally recommended.

In terms of landscape and visual impacts, however, effects that may occur over a wider area of up to 500m or even more may also be relevant to decision-making on wind turbines up to 60m in height. For example, where a proposed wind turbine would markedly affect the view from a substantial number of dwellings (or indeed a whole settlement) its visual impacts may be considered significant. Similarly, where an important or well-used right of way would be markedly affected, the visual impacts may be considered significant.

When assessing the impacts of smaller scale turbine(s) on residential and recreational amenity, it is helpful to bear in mind not only the viewing distance but also the number of residential or recreational receptors affected; the importance and sensitivity of the views or rights of way; and the nature of the change in view (for example the extent to which the turbines would intrude on existing views). Views to key landmarks or other distinctive and valued landscape features may be especially sensitive to change or interruption.

Many of the settlements in the South and West Pennines have clear views to surrounding hillsides, so residential amenity is often an important issue. The area has a dense network of recreational routes, such as the Pennine Bridleway (right), which are highly sensitive visually.

Consider:

- How many residential properties would have views of the turbine(s) and from what distance?
- Are there key recreational receptors (eg National Trails or long distance paths) that might have views of the turbines, and from what distance?
- Would views to key landmarks or other distinctive and valued landscape features be affected?

3.3 Design

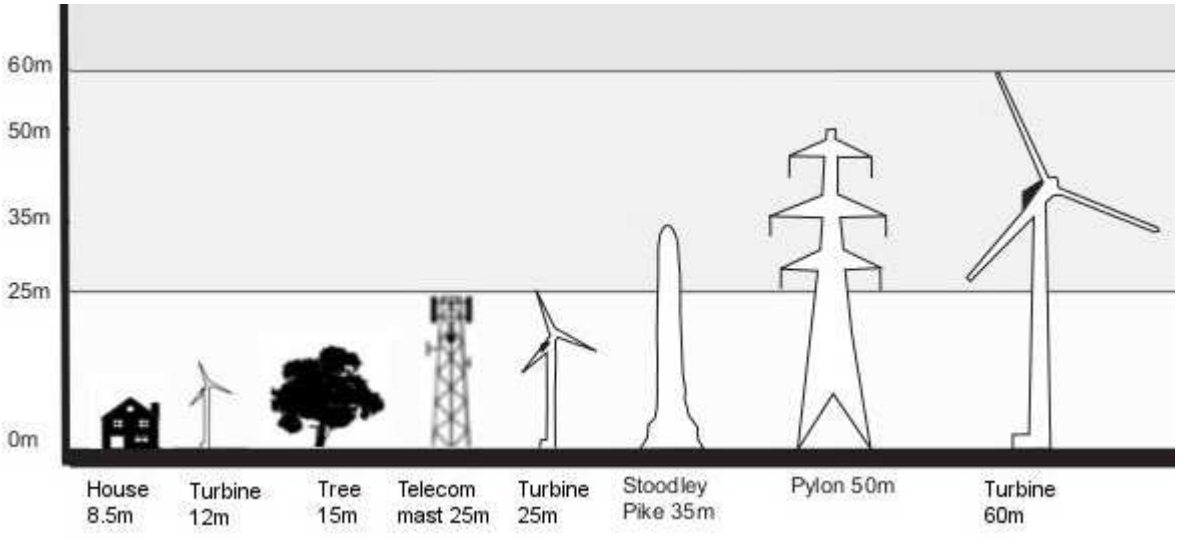
3.3.1 Turbine size and form

Careful choice of turbine during the design process will help to ensure optimal landscape fit and avoid complex mixes of turbine types in any location. Applicants are encouraged to consider and discuss a number of different turbine options, taking account of existing turbine development in the locality (see Section 4).

Clearly, the size of turbines will be key to their relationship with their surroundings. Typical heights of elements in the landscape that may be located near to smaller scale wind turbines are shown below. Identifying the specific heights of landform features, vegetation and built features on the proposed site, and comparing these to the heights of different turbine options, will also help to inform decisions on size. It is particularly important that *micro* and *very small* turbines in settled areas should relate well to the scale of adjacent landscape features; it may be slightly less important for *small commercial* turbines in locations where there are fewer obvious scale comparators.

Typical heights of common landscape elements, for comparison with turbines of different heights

Landscape element	**Typical height**
Single storey house	5m
Two storey house	8.5-10m
Farmyard grain silo	10m
Telegraph pole	10.5m
Mature tree	15m
Pylon	35-50m



In terms of turbine form, there will also be decisions to be made. Again, choices should be influenced by the existing landscape context. A three bladed machine with smooth, balanced, relatively slow motion is likely to be preferable close to dwellings, while in a less sensitive, busy urban setting turbine speed may be less critical and a faster moving two-bladed turbine may be appropriate. A tubular tower (below left) provides a simple clean image; whereas a lattice tower (right) tends to be more industrial in character and may be better suited to an industrial location. Vertical axis turbines, most common in urban locations, ideally should be tailored to their specific townscape setting.

Consider:

- What is the height of the proposed wind turbine(s) to blade tip?
- Is this appropriate to the heights of existing features within the landscape context?
- Do the proposed turbine(s) have the most appropriate form, appearance and blade movement for the proposed site?

3.3.2 Turbine colour

While larger scale commercial turbines are generally light grey in colour to reduce their contrast with the sky, there may be greater scope to consider the use of other colours for smaller scale turbines to reduce their prominence. The best approach is to try to match the colour to the main (or most important) backdrop. *Micro* and *very small* turbines are often

sited on lower ground and seen against a backdrop of land from many viewpoints. In these situations there may be scope to relate the turbines to the colour and tones of the landscape behind. *Small commercial* turbines, like larger turbines, may be seen mainly against the sky, and in such circumstances a paler colour may be appropriate. In all cases the reflectivity of the turbine components should be minimised. A variety of seasons and weather should be taken into account when choosing turbine colour.

Care needs to be taken with differing tower and blade colouring. For example, darker turbine heads can appear to 'float' in situations where a light turbine base is seen against the sky. Conversely lighter turbine heads can disappear in bright conditions, leaving the darker tower highlighted.

The turbine in the centre of the photo on the left, seen mainly against a dark forested hillside, is very effectively camouflaged by its dark colour; while the pale grey turbine on the right, seen mainly against the sky, blends well with this background in most light conditions.

Consider:

- Are the proposed turbine(s) mainly seen against the sky or backclothed by landform or trees?
- How would they look in different seasons and weather conditions?
- Does the proposed colour choice reduce the prominence of the turbines?

3.3.3 Ancillary infrastructure

Careful attention to the siting and design of any ancillary development will help to minimise landscape and visual impacts. Advantage should be taken of local topographic variation or screening features in the landscape where possible, and the visibility of any new features should be minimised. Ancillary structures such as access tracks and, more occasionally, control buildings, should be designed to be appropriate to the scale and character of the landscape setting.

Existing tracks should be used for access wherever possible. New tracks, if required, should follow existing field boundaries or woodland edges if possible rather than cutting across open fields or landform. Any cut and fill on sloping sites, to accommodate access tracks or turbine bases, should be minimised. Where landscape features such as hedges, walls or bridges need to be removed or altered to permit transport of long loads (such as turbine blades) to site, they should be reinstated; and any new fencing or walling, where needed (eg for safety or agricultural reasons) should be appropriate in scale and form to the local landscape and use characteristic local materials.

Turbines with integral transformers should be used where possible, especially on open sites. Grid connecting cables, particularly in rural locations, should be buried to reduce landscape clutter unless there is a clear justification for overhead lines.

The access track and hardstanding for this small turbine on steep slopes (left) have scarred the landscape. Site access for large turbine components risks damage to traditional landscape elements (right) including walls and trees.

Consider:

- Have existing access tracks been used wherever possible?
- Do proposed tracks complement the existing pattern of roads and tracks or are they intrusive?
- Do the proposed tracks avoid steep slopes and minimise the need for cut and fill?
- Are any new ancillary structures such as buildings, walls and fences appropriate in scale and form to the local landscape, and do they use characteristic local materials?
- Is it proposed to bury connection cables and if not, what would their impacts be?

4 CUMULATIVE ISSUES

A key concern in the South and West Pennines at the present time relates to the growing cumulative effects associated with the many smaller scale turbines that have been consented in recent years and the significant volume of applications that is coming forward.

When preparing a proposal for a smaller scale wind turbine development, it is important to consider potential cumulative effects from the outset. Early discussions with the local planning authority about cumulative issues and emerging wind energy development patterns in the surrounding area will be beneficial.

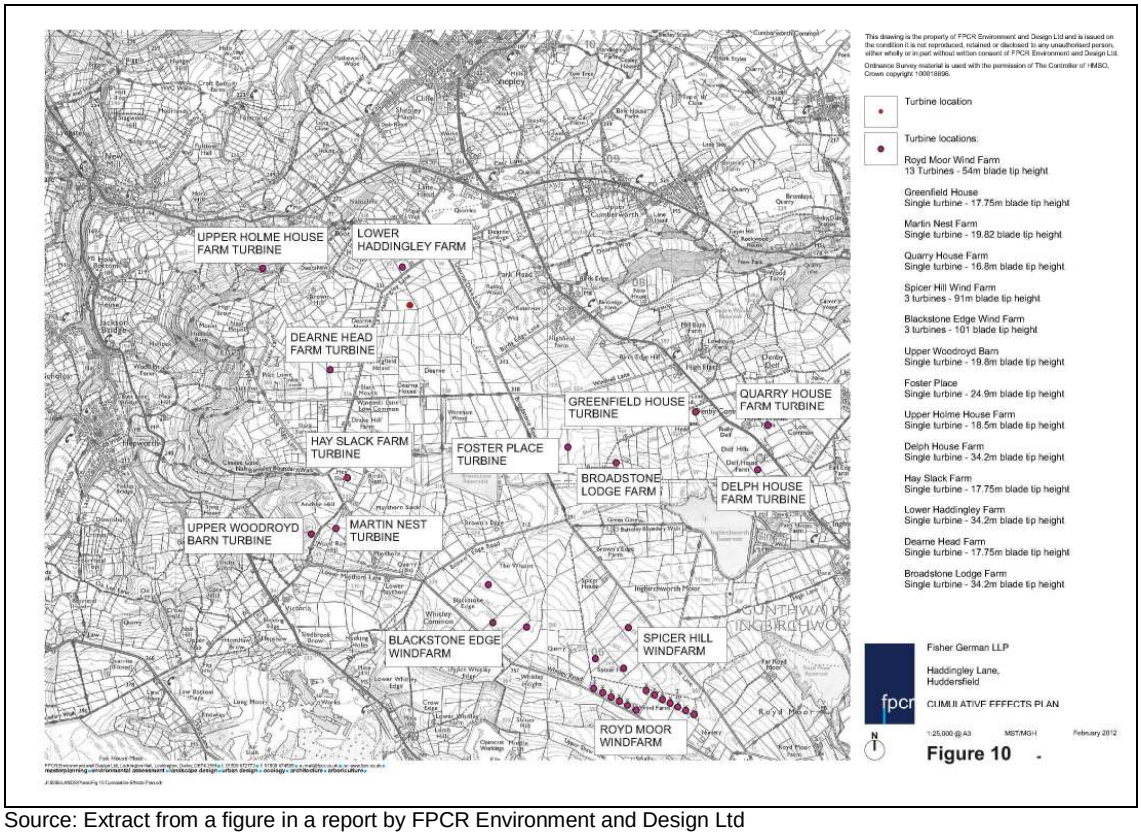
4.1 Cumulative effects

4.1.1 Gathering information

In order to consider potential cumulative effects it is necessary, first of all, to establish the 'baseline' situation in relation to wind energy development in the surrounding area. Information should be collected about all existing, consented and application stage wind energy developments (as well as those refused but subject to appeal) in the surrounding area.

Most local planning authorities now have a map and database that contains this information and should be able to provide assistance. Details of the turbines' respective heights and forms, and where possible ZTV mapping, should also be compiled. Key issues are likely to relate to any other smaller scale turbines (under 60m) within around 5km and any larger scale turbines (over 60m) within around 10km. Greatest weight is usually given to existing and consented sites, as there is relative certainty as to their impacts.

Example of 'baseline' map showing location and heights of existing turbines around an application site



Source: Extract from a figure in a report by FPCR Environment and Design Ltd

Using this information, the existing pattern, character and landscape and visual influence of wind energy developments (of all sizes) in the surrounding area can then be reviewed at a strategic level. Tools such as Google Earth Street View can be very helpful at this stage, as the location of each development can be marked on the aerial photographs and then viewed from public roads in the surrounding area.

Work should also be undertaken, in discussion with local planning officers, to explore whether any land in the surrounding area has been identified as potentially suitable for further wind energy development (especially larger scale development). This may be indicated in the relevant development plan(s) and/or the *Landscape Capacity Study for Wind Energy Developments in the South Pennines*[14], which includes specific advice (pp83-106) on the wind energy landscape capacity of different parts of the South Pennines.

Note that in areas close to local planning authority boundaries, it will be necessary to compile information from more than one authority in order to take account of potential cross-boundary issues.

[14] Julie Martin Associates (2010) *Landscape Capacity Study for Wind Energy in the South Pennines*, report to Burnley, Bury, Calderdale, Kirklees, Rochdale and Rossendale Councils. http://www.rochdale.gov.uk/PDF/2010-04-14_LDF_Land_Cap_Study_Wind_Energy_Dev_South_Pennines_Jan_2010.pdf

This turbine has some cumulative landscape and visual effects with the wind farm on the horizon, even though it lies around 10km away.

Smaller turbines in the immediate setting of this wind farm give rise to visual conflict.

Consider:
- What existing and consented wind energy developments lie in the surrounding area?
- What are their respective heights (to blade tip), forms and visibility?
- Has the area been identified as potentially suitable for further wind energy development?
- Have existing and potential cross-boundary developments been considered?

4.1.2 Types of potential cumulative effect

Cumulative effects – which are defined as the additional changes caused by a proposed development in conjunction with other similar developments – occur when further wind energy development is proposed in the vicinity of existing or consented wind turbines. This affects landscape character and ultimately can lead to the landscape assuming a different character overall, where wind turbines come to dominate a particular landscape. Specific types of cumulative effect that may occur include:

- ***fragmentation of landscape patterns*** where turbines are poorly or inconsistently sited relative to existing landscape features;

- ***creation of visual clutter*** where wind turbines on different sites are seen in combination, especially where close together;

- ***visual conflict***, where the differing rotation speeds, heights and/or appearances of turbines that are seen together detract from landscape perceptions;

- ***skyline impacts***, where multiple turbines change or occupy a significant proportion of a distinctive skyline; and

- ***visual impacts on recreational interests*** such as long distance paths or cycle routes where there are combined or sequential views of turbines over long sections of route.

These possible issues should be carefully considered using the information gathered about other existing and potential wind energy developments in the surrounding area. A field visit to view any operational turbines and the sites of consented turbines is also essential if the landscape and visual relationships between the different turbines are to be properly understood.

Consider:
- Do existing and consented turbines have a significant influence on landscape character and/or key views?
- What types of cumulative impact (from the above list) might result from this additional development?

4.2 Specific issues in different settings

In the South and West Pennines, the transitional landscapes on the fringes of the moorland plateaux and hills are often most vulnerable to cumulative effects because here there tends to be wide intervisibiity between high and low ground. In the following situations particular attention should be paid to siting and design of smaller scale turbines, remembering that both combined and sequential cumulative effects are relevant.

4.2.1 In combination with larger scale turbines

Perhaps the most serious landscape and visual issues may occur where smaller scale turbines (of any size class) are seen together with medium or large commercial turbines over 60m in height to blade tip. This is increasingly common – especially on the high moorland plateaux and hills of the South and West Pennines, which already have commercial wind energy development, typically with turbines 100-125m high to blade tip, in a number of locations.

Where smaller scale turbines are introduced into the views of larger scale turbines, they can create a confusing and poorly coordinated visual image, in terms of height, form and/or turbine group size. This is because of the way in which objects in the landscape influence perceptions of relative position and size (ie perspective) – affecting our recognition of whether a feature is small or large, far away or near. Such effects are often particularly noticeable where the proposal sits within the same landscape character type as the larger turbines; and where turbine form or colour are markedly different. In addition, the faster blade rotation speeds of the smaller turbines may be very obvious (and potentially distracting) when larger and smaller turbines are viewed simultaneously.

Similar issues may also arise where smaller scale turbines are already present or proposed in an area where larger scale wind energy development is possible or likely in future. In this case the presence of the smaller turbines may constrain further wind energy development because of the adverse cumulative landscape and visual impacts that would occur. This may be a relevant consideration when determining planning applications for any smaller scale wind energy developments in the surrounding area.

The moorland plateaux landscape character type at Scout Moor is now characterised by large commercial turbines. The introduction of small commercial turbines on the same skyline would be visually confusing and distracting.

Consider:

- Would the proposal sit within the same landscape character type as the larger turbines (existing or potential)?
- If so, would they frequently be seen in the same view, and would this generate visual conflict or confusion?
- Would key skylines or recreational routes be affected by cumulative impacts?
- Would the existing and proposed turbines be similar in form and colour?
- Would there be obvious differences in blade movement speeds?

4.2.2 In combination with other smaller scale turbines

Where there are other smaller scale turbines in the surrounding area, the landscape and visual impacts of additional smaller scale turbine development are usually less serious but nonetheless may be important cumulatively and relevant to planning decisions. Some parts of the South and West Pennines now have very strong concentrations of smaller scale wind turbines, which are becoming a key landscape characteristic.

The turbines clustered around this South Pennines village are similar in height and location, but their cumulative impacts are heightened by the use of several different turbine designs.

With very careful siting and design, as described in Section 3, this is not necessarily a significant landscape issue. However it may become an issue in some circumstances. Problems are especially likely to occur where there are noticeable inconsistencies in the location of turbines within the landscape, for example where there are marked differences in the elevation of turbine sites; where turbines are insufficiently separated from one another, giving rise to visual clutter; and where contrasts in height, form, colour or blade movement

are evident. In general, within a given area, all the small wind turbines should be of a similar height class (*micro*, *very small* or *small commercial*). Different height classes are unlikely to mix well visually.

Such problems can frequently be overcome by better planning, for example by ensuring that all developments associate in the same way with landscape features such as farmsteads; by careful siting to minimise intervisibility with other small turbines from important viewpoints; and by use of turbines of similar size and design.

Consider:

- Would the proposed turbines be similarly located within the landscape to those already existing in the area?
- Would the proposal create landscape clutter when seen with existing turbines?
- Would the turbines be similar in size, form, colour and speed of blade movement?

4.3 Addressing cumulative effects

There are a number of useful strategies that can be applied to help identify, prevent and/or minimise serious cumulative landscape and visual effects associated with the development of smaller scale wind turbines.

4.3.1 Separation and clustering

The first is to consider whether the proposal visually would link two (or more) previously separate or distinct wind energy areas. If the new turbine(s) would link these areas, they may extend a wind energy influence over a much wider area.

For example, where *small commercial* turbine(s) occurs in a lowland landscape between two larger upland sites that have already been developed for commercial wind energy, it may connect these sites visually and wind turbine influence on landscape character as a whole may become much more significant and dominant as a result.

Conversely, the impact of a wind turbine proposal on landscape character may be reduced if the proposal is sited so as to form part of a 'cluster' or local grouping of smaller scale wind turbines of similar size and form. Note that, for clustering to be effective, the turbines need to be close enough together to read as coherent group, not a series of disparate developments.

A locational strategy based on separation and clustering can help to ensure that areas of less developed or undeveloped landscape can be retained. Breaks or gaps between wind energy developments should be maintained where landscape and visual separation is desirable, with new development being focused in specific geographic areas already affected by wind energy schemes. This is particularly important for *small commercial* wind turbines, whose visual influence may be extensive and may erode the relatively wild character of the South and West Pennine Moors, which is one of the special landscape qualities of the area as a whole

Guidance on designing wind energy development in landscapes with multiple wind farms has been prepared by Scottish Natural Heritage and may provide a useful source of further advice and information. Although the guidance focuses on larger scale commercial development, many of the same principles apply to *small commercial* turbines also.[15]

[15] http://www.snh.org.uk/pdfs/strategy/renewables/Guidance_Siting_Designing_windfarms.pdf Chapter 5.

A coherent cluster of small commercial turbines such as this could potentially be extended by development on adjacent land without giving rise to significant cumulative impacts

Consider:

- Would the proposal link two previously separate or distinct wind energy areas?
- Alternatively, would the proposal form part of an existing coherent 'cluster' of wind farms or wind turbines?
- Is it important in landscape and visual terms to maintain an area of separation?

4.3.2 Consistency in location and size

As noted previously, consistency in location and size offers key opportunities for reducing the cumulative landscape and visual impacts of smaller scale wind turbines. Different classes of wind turbine development (*micro, very small, small commercial*) may be specially suited to specific landscape character types, and their location within these landscape character types will help to ensure that the turbines complement landform and landscape patterns, especially if they are consistently located in relation to topography and settlement features such as farmsteads, forestry and headwalls below the open moorland edge.

In the South and West Pennines, *small commercial turbines* tend to be most suited to the lower moorland slopes (just above the enclosed upland and moorland fringe landscapes) and to some lowland, urban and industrial landscapes. They are less suited to the open tops of the moorland plateaux and hills where larger scale wind energy development tends to be concentrated. *Very small* turbines tend to be most suited to the enclosed uplands and fringes, set back from but still associated with settlement. *Micro* turbines can be successfully accommodated in many valley and lowland landscapes, especially when associated with existing building clusters. However, both *very small* and *micro* turbines can be difficult to

accommodate in open plateau or upland landscapes where, despite their small size, they may have a disproportionate effect on views to the skyline.

Special care should be taken not to introduce smaller scale turbines into the landscape settings of medium or large commercial turbines (over 60m). In general such turbines should not be sited on the same hill top or ridge line as medium or large commercial turbines, or within the same landscape character type, as this is very likely to have adverse impacts on landscape perspective, skylines and recreational receptors.

Consider:

- Would the new pattern of wind energy development show clear and consistent associations with particular landscape character types and features?
- Is the size of turbine suited to the landscape character type?
- Would the landscape settings of larger commercial turbines be affected?

4.3.3 Thresholds of cumulative impact

Ultimately, in some cases, despite the best of siting, layout and design, it may become clear that any further wind turbine development would 'tip the balance' to cause significant, and potentially unacceptable, adverse impact on the landscape and visual environment in the surrounding area. Understandably this is a very difficult judgement to reach and professional landscape advice may be needed to help explore and, where appropriate, substantiate such a judgement.

It is useful, where there are serious issues of cumulative impact, to draw together factual evidence on the scale and significance of the cumulative impacts overall. To make this possible, cumulative ZTV mapping and photomontages will be required from the developer. This information should be reviewed and evidence compiled on factors such as:

- The influence of the proposed turbine(s) on perceptions of key landscape features or special qualities such as relative wildness – would the scheme make wind turbine influence much more noticeable or widespread?
- The number of turbines cumulatively visible in the surrounding area – has this reached an especially high level?
- The overall extent of wind turbine visibility – would the proposed development add significantly to the spatial extent of turbine influence in this landscape (ie would it extend the ZTV considerably)?
- The importance of the affected views – are these views highly valued, for example as key views to an iconic landscape feature such as a monument or distinctive skyline; and would they be significantly interrupted?
- The numbers of people/distance affected – would the proposal affect a whole settlement or a considerable length of a long distance walking route?

Consider:

- Could this proposal, in conjunction with existing and consented turbines, 'tip the balance' to significantly alter the landscape and visual environment?
- If so, what evidence is available to support this view?

ANNEX 1: Development checklist for small turbines

FACTOR	QUESTIONS	COMMENTS	SIGNIFICANT ISSUE? (Y/N)
LOCATION			
Landscape character See 3.1.3	Have you referred to the landscape character assessment? What type(s) of landscape are affected? What are their key characteristics and sensitivities?		
Landscape designations See 3.1.2	Is the proposal within or close to an AONB or National Park? Is the proposal within or close to the South Pennines Heritage Area or West Pennine Moors? Are there any other nearby designations (such as country parks or historic parks and gardens) that might be affected?		
Special qualities See 3.1.3	Are there important landmarks or landscape features nearby? Is the landscape unusually wild or tranquil? Are there important natural or cultural heritage resources nearby?		
Relationship to settlements and key views See 3.1.4	Does the proposal have a logical visual relationship with the settlement pattern? Would it affect the landscape setting of the settlement, or key recreational or residential views such as views to skylines? Would the turbine(s) dominate approaches to settlement?		
Spatial guidance and policy See 3.1.5	Does the proposal accord with the spatial plan for wind energy development, where this exists? Does it meet relevant policies or criteria on landscape, visual and cumulative impact?		

SITING AND LAYOUT			
Landform See 3.2.1	What is the scale of the landform in the surrounding area? Is the landform simple or complex? Does the proposal respond well to landform scale and form? Would local landform features help to limit visibility of the proposal, or tend to accentuate it?		
Landscape patterns See 3.2.2	What are the predominant landscape patterns in the surrounding area? Does the scheme complement or conflict with existing landscape patterns?		
Turbine layout and micro-siting See 3.2.3	Does existing woodland offer screening? Could modest changes in siting reduce turbine visibility? If there is more than one turbine, are the turbines grouped well when seen from key viewpoints in the surrounding area? Could changes due to micro-siting at a later stage adversely affect the perceived layout or screening?		
Siting relative to buildings and structures See 3.2.4	Do the turbine(s) respect the presence of any nearby buildings or structures? Is the visual relationship a simple or a complex one? Would the proposal create or add to any existing visual clutter (eg where pylons are present in the same view)?		
Residential and recreational amenity See 3.2.5	How many residential properties would have views of the turbine(s) and from what distance? Are there key recreational receptors (eg National Trails or long distance paths) that might have views of the turbines, and from what distance? Would views to key landmarks or other distinctive and valued landscape features be affected?		

DESIGN			
Turbine size and form See 3.3.1	What is the height of the proposed wind turbine(s) to blade tip? Is this appropriate to the heights of existing features within the landscape context? Do the proposed turbine(s) have the most appropriate form, appearance and blade movement for the proposed site?		
Turbine colour See 3.3.2	Are the proposed turbine(s) mainly seen against the sky or backclothed by landform or trees? How would they look in different seasons and weather conditions? Does the proposed colour choice reduce the prominence of the turbines?		
Ancillary infrastructure See 3.3.3	Have existing access tracks been used wherever possible? Do proposed tracks complement the existing pattern of roads and tracks or are they intrusive? Do the proposed tracks avoid steep slopes and minimise the need for cut and fill? Are any new ancillary structures such as buildings, walls and fences appropriate in scale and form to the local landscape, and do they use characteristic local materials? Is it proposed to bury connection cables and if not, what would their impacts be?		
CUMULATIVE CONSIDERATIONS			
Gathering information See 4.1.1	What existing and consented wind energy developments lie in the surrounding area? What are their respective heights, forms and visibility? Has the area been identified as potentially suitable for further wind energy development?		

	Have existing and potential cross-boundary developments been considered?		
Types of potential cumulative effect See 4.1.2	Do the existing and consented turbines have a significant influence on landscape character and/or key views? What types of cumulative impact might result from this development?		
In combination with larger scale turbines See 4.2.1	Would the proposal sit within the same landscape character type as the larger turbines (existing or potential)? If so, would they frequently be seen in the same view, and would this generate visual conflict or confusion? Would key skylines or recreational routes be affected by cumulative impacts? Would the existing and proposed turbines be similar in form and colour? Would there be obvious differences in blade movement speeds?		
In combination with other smaller scale turbines See 4.2.2	Would the proposed turbines be similarly located within the landscape to those already existing in the area? Would the proposal create landscape clutter when seen with existing turbines? Would they be similar in size, form, colour and speed of blade movement?		
Separation and clustering See 4.3.1	Would the proposal link two previously separate or distinct wind energy areas? Alternatively, would the proposal form part of an existing 'cluster' of wind farms or wind turbines? Is it important in landscape and visual terms to maintain an area of separation?		
Consistency in location and size See 4.3.2	Would the new pattern of wind energy development show clear and consistent associations with particular landscape character types and features?		

	Is the size of turbine suited to the landscape character type? Would the landscape settings of larger commercial turbines be affected?		
Thresholds See 4.3.3	Could this proposal, in conjunction with existing and consented turbines, 'tip the balance' to significantly alter the landscape and visual environment? If so, what evidence is there to support this view?		
SIGNIFICANT ISSUES OVERALL			
Location			
Siting and layout			
Design			
Cumulative			
Total (out of a possible 20)			

ANNEX 2: Siting in different landscape character types

(see South Pennines and Lancashire Landscape Character Assessments for types maps)

Moorland plateaux and hills

Relevant landscape character types:
South Pennines types A and B
Lancashire types 1 and 2

Large scale, sweeping, open, sparsely settled landscapes

Key considerations are effects on:

- Skylines
- Wild character
- Distinctive rock outcrops and historic monuments
- Upland recreational routes

Potential conflicts with:

- Existing/potential larger turbines
- Other structures such as pylons

Choose sites that are:

- Well away from larger turbines
- Backclothed by higher ground

Avoid:

- Extending wind turbine impact into new areas
- Industrial designs eg lattice towers

Most suited to: small commercial (but only infrequently and on the edges)

Enclosed uplands and fringes

Relevant landscape character types:
South Pennines types C, D, E, K and N
Lancashire types 3, 4, 6, 7, 14

Medium scale, often horizontal and terraced, strongly patterned, settled and farmed, few trees

Key considerations are effects on:

- Scenic quality
- Approaches/settings to villages
- Historic farmsteads
- Tranquillity
- Views to and from valleys

Potential conflicts with:

- Other turbines of differing appearance and/or height

Choose sites that are:

- Well away from larger turbines
- Visually associated with settlements or farms
- Evenly spread

Avoid:

- Disrupting field patterns
- Conflict with horizontal form

Most suited to: all turbine classes, but mainly micro and very small turbines

Valley landscapes  Relevant landscape character types: South Pennines types F, G, I Lancashire types 8, 9	**Steep sided, incised, small scale, enclosed and often wooded landscapes (some with reservoirs)** Key considerations are effects on: • Historic farms and remnant industrial features • Immediate skylines and views from settlements and reservoirs below • Physical fabric of hillside Potential conflicts with: • Any larger turbines that may be visible above • Buildings and other structures that provide obvious scale comparators Choose sites that are: • Screened by woodland • In dips and hollows in landform • Backclothed by higher ground Avoid • Breaking the skyline • Access tracks that scar the hillside Most suited to: micro turbines
Lowland farmland  Relevant landscape character types: South Pennines type L Lancashire types 5,13	**Large scale, mainly horizontal or rolling form, dispersed farmsteads, some visual enclosure** Key considerations are effects on: • Landscape quality • Visual amenity/ openness • Views from route corridors Potential conflicts with: • Nearby farm buildings • Structures such as pylons and transmission masts Choose sites that are: • Well away from larger turbines • Away from main settlements • Visually associated and in scale with farms or industry Avoid: • Overwhelming landform features such as drumlins • Interrupting key views to hills, settlements or other features of interest Potentially suited to: micro, very small or small commercial turbines (depending on specific context)

Urban and industrial

Relevant landscape character types:
South Pennines types M, O, U
Lancashire types: urban

Areas dominated by built development (housing, factories, hospitals, business parks, transport corridors, quarries etc)
Key considerations:

- Scale/ design of existing buildings
- Scope to create new visual focus or design statement
- Residential amenity

Potential conflicts with:

- Existing landmark structures such as historic textile mills
- Existing detractors such as pylons and communications masts

Choose sites that:

- Show a functional relationship with nearby buildings
- Respect their relative heights and proportions

Avoid:

- Exacerbating any existing visual clutter

Potentially suited to: micro, very small or small commercial turbines (depending on specific context)