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Strategic Landscape Capacity Assessment for Wind Energy in Angus



Final Report

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EXECUTIVE SUMMARY

OBJECTIVES AND METHOD

This study has considered the capacity of the Angus landscape to accommodate onshore wind energy development. The landscape capacity assessment is based on an assessment of landscape sensitivity and value of the different landscape character types and areas in Angus together with the evolving wind energy development scenario in Angus and a surrounding 30km buffer area. This has involved a staged process:

- Firstly assessing the underlying capacity of the Angus landscape to accommodate wind turbine development;
- Secondly, assessing the degree of cumulative change resulting from operating and consented wind turbines in the study area and in Angus;
- Thirdly, assessing the extent to which cumulative consented development has reached the limit of the landscape's capacity to acceptably accommodate wind energy developments.
- Finally, assessing residual capacity and the level of further development that could acceptably be accommodated within areas of Angus.

The study is based on the premise that, given current renewable energy targets, it is accepted there will be a degree of landscape change and effects on visual amenity resulting from wind energy development that will require careful management. In applying the assessment process, the study has addressed a number of concepts and issues that affect the perceived significance and acceptability of cumulative changes caused by multiple wind energy developments in the landscape.

STRUCTURE OF THE REPORT

The main report is divided into 6 chapters describing the assessment process, findings and conclusions. There are a number of appendices containing detailed information relevant to the assessment.

Chapter 1 Introduction describes the background to the project

Chapter 2 Method describes the basis of the assessment of cumulative effects and landscape capacity. It describes the key criteria used in assessing landscape sensitivity and value and in determining the degree of cumulative impacts on the landscape. The method is a staged, transparent process, balanced between objective assessment and informed professional judgement. Chapter 2 navigates the reader through the rest of the assessment process, outlining the purpose of each chapter and the relevant tables and figures

Chapter 3 Landscape Baseline describes the physiography, landscape character and landscape designations of the study area. It focuses on Angus, with a 30km buffer zone that includes significant parts of Perth & Kinross; Aberdeenshire and the Cairngorms National Park.

Chapter 4 Visual Baseline describes the visual sensitivity assessment. This involves a computer generated intervisibility assessment across the study area, focussing on visibility of the Angus landscape to settlements, transport routes and key viewpoints.

Chapter 5 Wind Turbines in the Study Area describes the distribution of consented and proposed wind energy developments, from single turbines to windfarms, across Angus and the wider study area.

Chapter 6 Assessment is a detailed capacity and cumulative impact assessment. It assesses the underlying capacity of the landscape for wind energy development; the extent to which current development has utilised the underlying capacity and the remaining or residual capacity for wind energy development. The assessment process for each of the landscape character types in Angus is detailed in **Table 6.1**. Chapter 6 also gives detailed guidance on the appropriate size and siting of wind turbines and windfarms in the landscape character areas. The analysis of capacity and cumulative development across Angus is shown spatially on maps in **Figures 6.1 to 6.3**.

The study concludes with a summary map, **Figure 6.4**, indicating areas with underlying capacity for wind energy development and overlapping areas in which cumulative impact limits development (i.e. where consented development limits the potential for future development due to occupying the underlying capacity). The summary figure is also shown as **Figure A** following this executive summary.

SUMMARY OF FINDINGS

The Angus Landscape

The landscape of Angus is characterised by a transition from coastal landscapes in the southeast progressing northwest to agricultural lowland and lowland hills, thence to highland landscapes in the northwest that grade into the Cairngorms National Park. The bulk of the population lives in small towns and villages in the lowland and coastal areas, through which the main transport routes pass.

The transition between highland and lowland is particularly dramatically presented in Angus, in the form of the Highland Boundary Fault separating the broad valley of Strathmore from the Grampian Mountains. This is a key factor in affecting the capacity of the Angus landscape to accommodate wind turbines.

Assessment of Underlying Capacity

The assessment has determined that there are no areas of Angus with an underlying capacity for extensive windfarms with large scale turbines. In contrast with much of Scotland there is no capacity for wind turbines in the highest upland areas, due to the high visual sensitivity and landscape value of these areas within Angus. Larger scale lowland farming, forestry and hill areas have the greatest underlying capacity for wind turbine development. Some smaller scale lowland areas, highland foothills and the coast have more limited capacity.

Some areas such as the Sidlaw Hills and parts of the Low Moorland Hills, Strathmore and the Dipslope Farmland have capacity for small groups of larger turbines up to 80m

height. However, most areas have more limited capacity, for occasional groupings of turbines up to 50m height. There are limits on cumulative development in all areas if significantly adverse levels of landscape change are to be avoided

Consented Wind Energy Developments at May 2013

Operational and consented wind turbines in Angus comprise a total of 116 turbines over 15m high. The vast majority are turbines less than 50m tall, grouped singly or in small clusters in lowland and highland foothill areas. One windfarm of eight 81m turbines is located at Ark Hill in the Sidlaw Hills. The main concentrations of wind turbines are in the southwest and northeast of the lowland areas. There are very few turbines in the mountains and glens of northern Angus or in the coastal areas.

In the 30km area surrounding Angus; including Perth & Kinross, Aberdeenshire, Dundee City and Fife, there are over 400 consented turbines and several significantly sized windfarms, including one close to Angus at Drumderg in Perthshire. There are no turbines over 15m in the Cairngorms National Park to the north. There are no consented offshore windfarms.

Past Planning Decisions

A number of applications for windfarms in Angus have been refused or dismissed at appeal. All the applications have been for large turbines, between 84m and 132m in height and two to eleven turbines located in highland, lowland and coastal landscapes. The reasons for refusal vary, but all the decisions include landscape and visual impacts relating to the large size of turbines as a factor.

Wind Energy Proposals at May 2013

Current applications for a total of 51 wind turbines include two windfarms in the eastern Sidlaw Hills and one s36 application for 17 135m turbines at Nathro in the Highland Summits and Plateaux. In the 30km area beyond Angus there are applications for 112 turbines. This includes a windfarm proposal in Perthshire directly adjacent to highland Angus and several wind turbines in Aberdeenshire, northeast of Strathmore. There are three offshore proposals south and east of Angus at scoping stage: Inchcape at closest 15km; Neart na Goaithe at 30km and Firth of Forth & Tay Alpha and Bravo arrays at 27km and 38km.

CAPACITY FOR FURTHER WIND ENERGY DEVELOPMENT

This assessment has demonstrated that the landscape of Angus has the underlying capacity to accommodate wind energy development of an appropriate type and extent. Appropriate development relates to the varied characteristics of the landscape; the visual sensitivities of the population spread across lowland Angus and the higher value or sensitive context of some areas of landscape. The particular characteristics of Angus means there is no scope for the larger scale of windfarm development seen elsewhere in Scotland.

The main underlying capacity for development lies within some of the larger scale more extensive lowland areas which can accommodate larger turbine sizes, but not the

largest sizes and not in large groupings. Other areas have a more limited underlying capacity, which would not be appropriate for larger turbine sizes, and some areas have very limited or no capacity for wind energy development.

At current levels of development there is residual capacity in Angus for further appropriate wind energy development in most areas that have underlying capacity. Future development in each landscape type or area should follow the guidance given in Chapter 6. The aim of the guidance is to ensure that the acceptable capacity for development in terms of turbine sizes, group sizes and spacing between turbines and groups is not exceeded, and that other issues guiding or limiting development are taken into account.

The main opportunities and limitations on capacity are discussed below and the areas concerned illustrated in schematic form in **Figure A** at the end of this summary.

Areas with Highest Underlying Capacity

Figure A identifies in dark green four areas which have the highest underlying capacity in Angus for wind energy development:

- 1) Careston Broad Valley Lowland to the north west of Brechin.
- 2) Muir of Pert Broad Valley Lowland to the east of Brechin.
- 3) Montreathmont Forest and farmland to the south of Brechin.
- 4) The Sidlaw Hills with contiguous areas of Dipslope Farmland to the south and east and Low Moorland Hills south of Forfar.

These areas have the capacity to accommodate larger sizes of turbine and/or greater numbers and concentrations **relative to other areas** of landscape in Angus. This is based on a combination of one or more factors including suitable landscape character, lower visual sensitivity or lower value. Not all of these factors are present in every area identified and the analysis and guidance in Chapter 6 should be followed.

Wind turbines are already located in some of these areas, utilising some of the underlying capacity and therefore reducing residual capacity. The limitations resulting from this are discussed below.

Areas with Limited Underlying Capacity

Most of the remaining lowland and coastal areas of Angus have some underlying capacity for wind energy development but are generally not suited to larger turbines, large groupings or extensive concentrations of wind turbine development. The areas are shown in light green in figure A. Capacity varies from the ability to accommodate only very occasional small/medium wind turbines in some of the Upper Highland Glens to more frequent medium turbines across much of the Highland Foothills, Broad Valley Lowlands and Dipslope Farmland. Some areas of the Dipslope Farmland may be able to accommodate occasional single medium/large turbines subject to detailed assessment of local characteristics.

Currently there are limited numbers of existing, consented and proposed smaller scale developments (mainly single small/medium and medium size turbines). Guidance in Chapter 6 is intended to steer future development in these areas to an acceptable level.

Areas with No Underlying Capacity

Significant areas of Angus have no underlying capacity for wind turbine development. These are left uncoloured in Figure A:

- 1) All of the Highland Summits and Plateaux LCAs, due to their importance to the Angus landscape, connectivity with the Cairngorms National Park, high visual prominence, high relative wildness and recreational value;
- 2) Some upper parts of Highland Glens and Highland Foothills which extend into the Lochanagar and Mount Keen draft Core Area of Wild Land and are contiguous with the Highland Summits and Plateaux.
- 3) Some prominent summits, viewpoints and hillforts in the Sidlaw Hills, Highland Foothills and Low Moorland Hills.

It is recommended that these landscape types and areas remain undeveloped with turbines to protect their character, avoid widespread visibility, protect key viewpoints and features and particularly to protect the key feature of the Highland Boundary Fault and its backdrop of the Grampian Mountains.

When assessing the acceptability of larger turbine proposals in neighbouring landscape character areas, proximity to the sensitive areas described above should be taken into account.

Areas Where Cumulative Impact Limits Further Development

As described above, a number of landscape types and areas in Angus have an underlying capacity to accommodate wind energy development. However, existing and consented development in or nearby some of these areas means that further significant development may exceed the acceptable cumulative capacity of the landscape. The five areas where current cumulative impact limits capacity for further development are shown as hatched areas in Figure A.

- 1) Alyth Foothills / Glen Clova
- 2) Menmuir / Hill of Ogil
- 3) Brechin and Muir of Pert
- 4) Letham to Firth Muir of Boysack
- 5) Central Sidlaws and Tealing

They are defined by several factors including: The developed areas and the extent of their impacts on the surrounding landscape; underlying landscape capacity within the surrounding landscape and the extent of area within which development should be limited to avoid extending cumulative landscape and visual impacts.

The boundaries shown in Figure A are indicative. They are described in more detail for each area in Chapter 6 Table 6.2, together with the main objectives for limiting further development. In the case of specific development proposals there should be an assessment relating to these criteria.



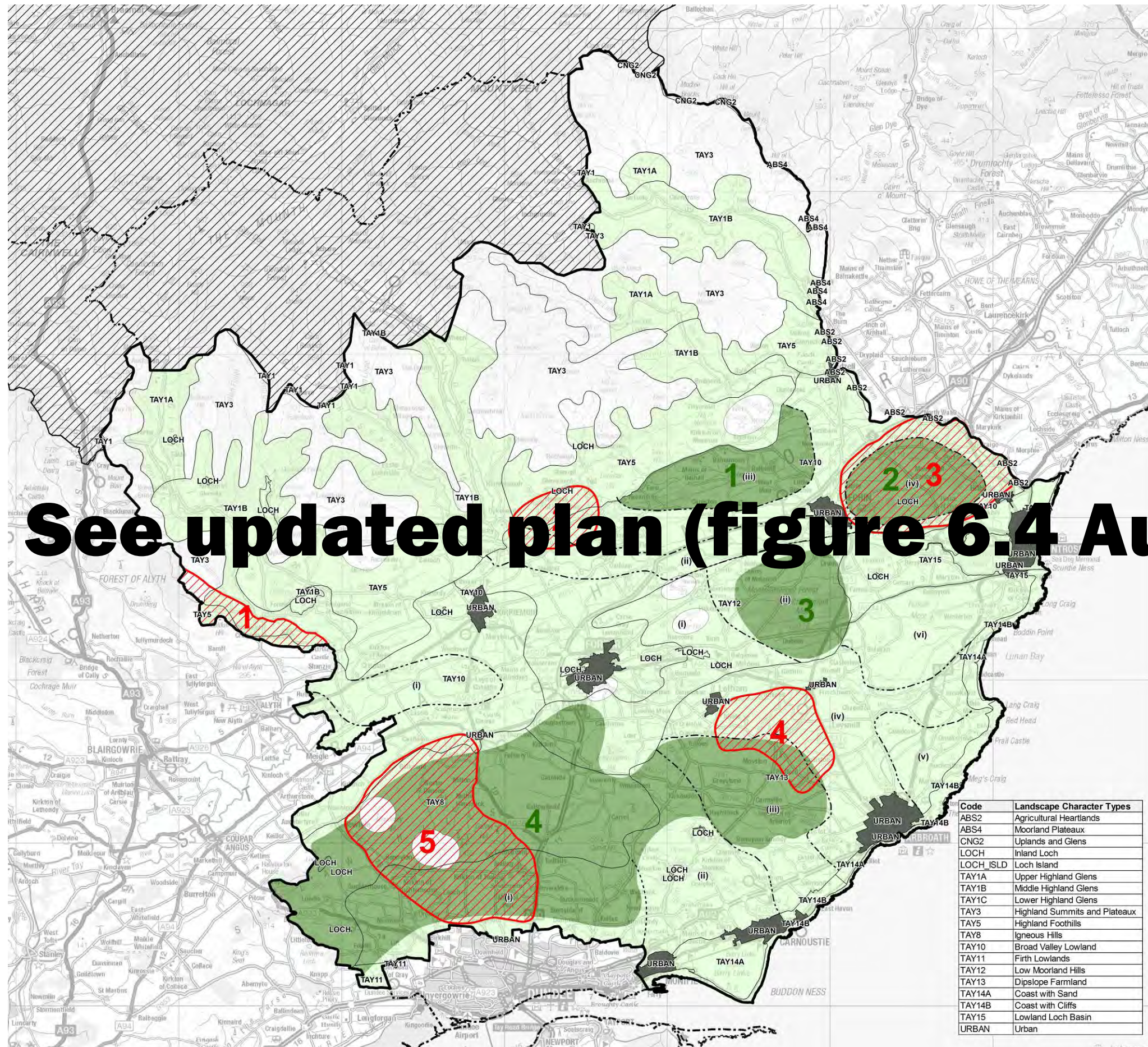
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Wind Energy Consultancy**

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Legend

- Study Area
- Scottish Local Authority Boundaries
- Cairngorms National Park
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- LCA Sub Areas (Ref. Table 6.1)
- Settlements
- Areas with Highest Underlying Capacity:
 1. Careston Farmland
 2. Muir of Pert
 3. Montreatmont Forest
 4. Sidlaw Hills and Dipslope Farmland
- Areas with Limited Underlying Capacity
- Areas with No Inherent Capacity
- Areas where Cumulative Impact Limits Development:
 1. Alyth Foothills, Glen Cl...
 2. ...
 3. ...
 4. ...
 5. Central Sidlaws and Tealing

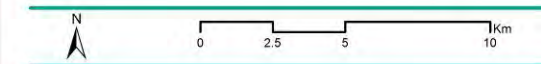
See updated plan (figure 6.4 August 2016)



Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure A

Wind Turbine Development Opportunities and Constraints



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1.0 INTRODUCTION

1.1 Background

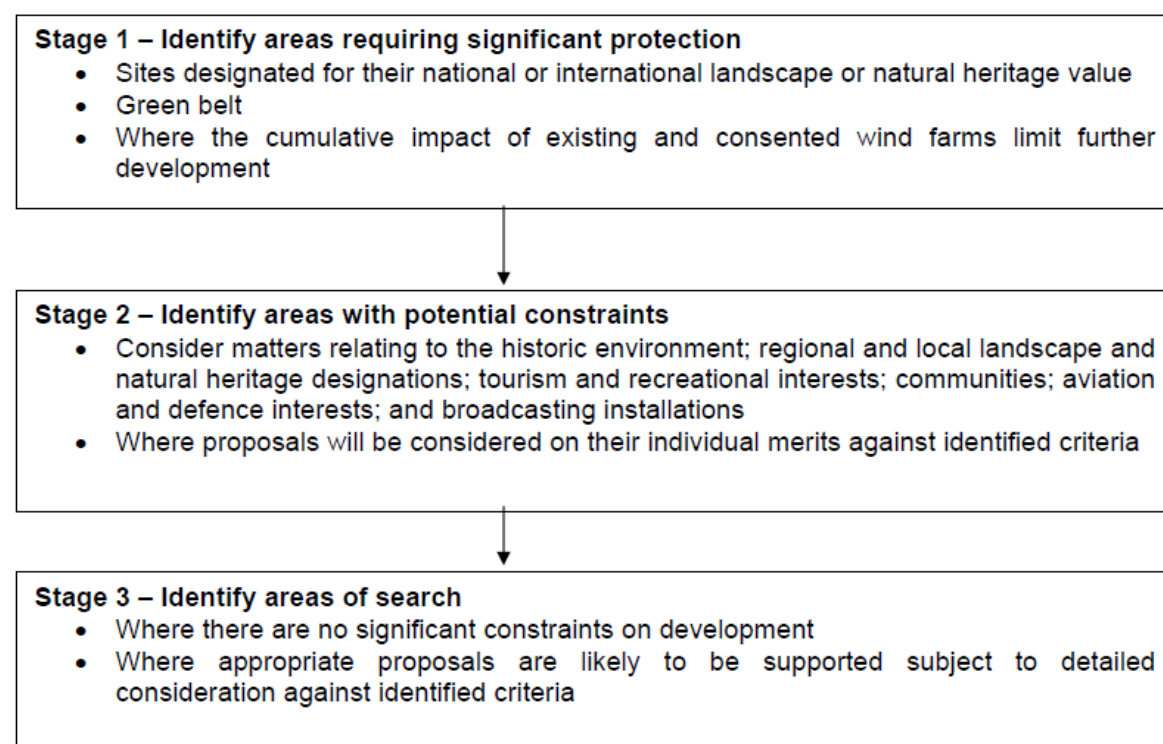
Scottish Planning Policy (*SPP 2010*) states that local authorities should make positive provision for the development of windfarms in locations where the technology can operate efficiently and environmental and cumulative impacts can be satisfactorily addressed. The Scottish Government has strongly stated its support for renewable energy developments and encouraged Planning Authorities to ensure appropriate planning guidance is in place.

Angus Council’s wind energy guidance is being reviewed as part of the Local Development Plan Process and the Scottish Government’s instruction to incorporate a locational framework. It will also reflect the recent increase in proposals for wind energy projects, particularly single or small groupings of turbines as a result of the introduction of the Feed in Tariff. Given this factor and existing levels of development in upland areas, Scottish Government web based guidance (*Onshore Wind Turbines, July 2013*) states:

‘Planning authorities are more frequently having to consider turbines within lower-lying more populated areas, where design elements and cumulative impacts need to be managed’.

Scottish Government policy in SPP and web based guidance clearly indicates that cumulative development within areas may lead to eventual limits on further development and that this should be considered as a significant constraint. Areas where cumulative development has reached a threshold of acceptability are a Stage 1 constraint in a Spatial Framework, requiring significant protection from further development:

Figure 1.1: Extract from Current Scottish Government Guidance on Preparing Spatial Frameworks



Angus’s existing guidance (*Renewable Energy Implementation Guide, 2012*) gives guidance for applicants for wind turbine development. It includes an indication of varying landscape capacity based on the findings of a study carried out by Ironside Farrar in 2008. (*Angus Windfarms Landscape Capacity and Cumulative Impacts Study*). That study determined the capacity for windfarm development across Angus, based on analysis of landscape character, quality and value and an assessment of significance of landscape change resulting from different potential scales of development.

The Ironside Farrar study found that Angus has little capacity for larger scales of wind energy development due the sensitive location of its uplands; spread of its population in lowland and coastal areas, modest scale and settled character of the landscape. Highland and coastal areas were not deemed suitable for windfarm development due to their landscape quality and visual sensitivity. A number of recent planning appeal dismissals for windfarms in or near these areas have underlined this finding.

1.2 Consultancy Appointment

Ironside Farrar, together with Envision 3D, has been appointed by SNH, Angus and Aberdeenshire Councils to undertake a strategic landscape capacity assessment with respect to wind energy development across the two neighbouring local authority areas. The key purpose of this study is to provide detailed guidance on the capacity of the landscape across both areas to accommodate wind turbine development and to inform the review of the Development Plans’ spatial frameworks and supplementary guidance.

The key study objectives are:

- To identify the sensitivity of the landscape to different types and scales of wind energy development;
- To identify viewpoints, routes and features, and the views from these, which are particularly sensitive to wind energy development;
- To advise on the capacity and potential for the landscape to accommodate different types or scales of wind energy development;
- Identify areas where cumulative impact is potentially at, or near, capacity, and provide an indication of when the capacity threshold would be reached for these areas;
- Identify areas, in landscape terms, unsuitable for wind energy developments;
- Provide clear siting and design guidance for landscape character areas that are identified as having some capacity for specific scales of development.

This study specifically assesses landscape sensitivity, value and capacity together with the impact of cumulative wind energy development in order to determine where significant protection from further development may be required. This study addresses these requirements through a staged assessment process detailed in sections 2.0 to 6.0.

1.3 National and Local Policy

National and local planning policies in Scotland are well disposed towards the development of onshore wind energy. However it is accepted that there are limitations imposed by environmental sensitivities and the capacity of areas to accept cumulative development. Therefore the acceptability of multiple windfarms and turbines and the cumulative landscape and visual impacts of development has to be considered in the light of national and development plan policy. **Appendix 1** reviews current national policy and guidance and Angus development plan policy and guidance.

Emerging Policy

Emerging Scottish Planning Policy (*SPP Consultation Draft 2013*) continues to strongly support onshore wind energy. It continues to support the undertaking of Spatial Frameworks and capacity studies. Key changes in emphasis are the recommendation for inclusion of all scales of wind energy development in spatial frameworks and the provision of a more detailed hierarchy and explanation of constraints to and opportunities for wind energy development.

1.4 Landscape Capacity and Cumulative Impacts

SPP and Scottish Government guidance identifies cumulative impacts and landscape capacity as being critical to the identification of broad areas of search. This study has thus been prepared to inform the Council on the issues of landscape capacity and cumulative impact. Accordingly it comprises three main themes:

- A strategic landscape capacity study, investigating the underlying capacity of landscapes within Angus to accommodate wind energy development;
- A cumulative assessment examining the level of cumulative development of operating, consented and proposed wind turbines and wind farms in Angus.
- Guidance on the levels and types of wind turbine development throughout Angus that would be acceptable in landscape terms, taking into account the first two considerations.

It is emphasised that this is a strategic level landscape and visual study, providing a context for consideration of capacity for, and the cumulative effects of, existing and potential future wind turbine developments in Angus. No site specific conclusions should be drawn from it in relation to current, proposed or future wind turbines and windfarms.

As a strategic landscape and visual study this does not address specific localised impacts such as effects on individual residential receptors or other sensitive receptors. All wind energy proposals should be considered on their own unique locational and design characteristics as well as their strategic context. All proposals should be subject to landscape, visual and cumulative impact assessment including (if required) a full environmental assessment.

2.0 CUMULATIVE IMPACT AND CAPACITY METHODOLOGY

2.1 Purpose of Methodology

The purpose of the following assessment is to determine the capacity of the Angus landscape to accommodate wind energy development and to determine the levels of cumulative development that would be acceptable across Angus. The assessment takes into account existing cumulative development within and around Angus and is based on the premise that current renewable energy policies will lead to a future level of landscape change within Angus that requires careful management.

The key objectives of the study are outlined in section 1.2 above. The methodology serves these objectives through a clear assessment of sensitivity and capacity of landscapes across Angus, together with an assessment of the cumulative effects of current consented wind energy development and the potential for accommodating further development in the future.

Nevertheless, it is recognised in published guidance that the assessment of landscape capacity and cumulative impacts is not a straightforward exercise. The background considerations and detailed methodology for this process are detailed in **Appendix 2** of this report. The following is a summary of the methodology, key considerations and guide to the presentation of findings and recommendations.

2.2 Study Stages

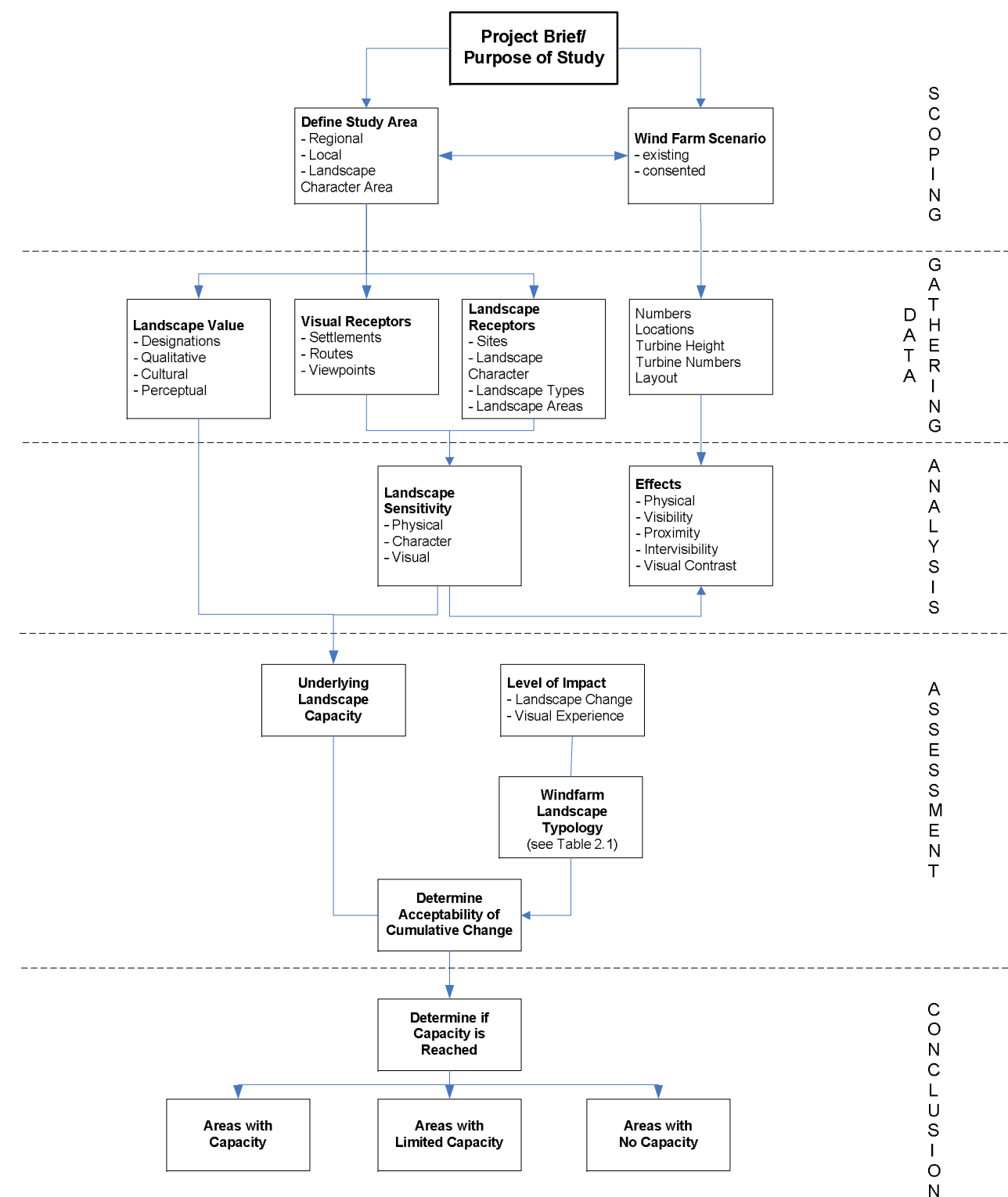
The assessment is a staged process comprising:

- 1) Define study area and characterise landscape and visual baseline and scope of wind energy types to be included in the strategic study.
- 2) Assess landscape sensitivity based on landscape character types (LCTs) and landscape character areas (LCAs) in Angus. This assessment considers landscape character sensitivity, visual sensitivity and landscape value.
- 3) Assess the capacity of the Angus landscape to acceptably accommodate wind energy development of different types and scales based on the assessment of sensitivity and value of the LCAs and LCTs. This is an assessment of the *underlying* landscape without taking the effects of existing wind turbines into account.
- 4) Record the current type and extent of consented wind energy development in Angus and the surrounding local authorities.
- 5) Determine the extent to which cumulative consented development has occupied the underlying capacity of the landscape to accommodate wind energy developments.
- 6) Further to the assessment of landscape capacity and cumulative development, identify areas in which:
 - there is no underlying landscape capacity for wind energy development;

- consented cumulative development limits landscape capacity for further wind energy development.
- there is remaining landscape capacity for wind energy development.

The assessment process is summarised as a flow chart in Figure 2.1 below.

Figure 2.1. Cumulative Impact and Landscape Capacity Methodology Flowchart



The assessment and spatial strategy is followed by guidance on appropriate types and levels of wind energy development for the areas in which there is remaining capacity.

2.3 Scope of Assessment

2.3.1 Area Covered

The study focuses primarily on the local authority area of Angus. However, an area 30km beyond the boundary is considered in terms of the potential extended visual influence of wind energy developments on neighbouring landscape areas.

2.3.2 Wind Energy Development Types

The study considers all sizes of turbines and developments operating, consented or proposed, as well as potential future scenarios where appropriate. This extends the assessment in the *Angus Windfarms Landscape Capacity and Cumulative Impacts Study* (Ironsides Farrar 2008) which concentrated on commercial scale developments and turbines.

Turbines less than 15m to blade tip are not considered to have the same qualities of scale, prominence and widespread visibility that lead to the wider cumulative impacts that characterise larger turbines with a blade tip higher than 15m. Capacity assessment and guidance for turbines less than 15m to blade tip is limited to localised generic siting and design considerations.

2.3.2 Use of Geographical Information Systems

The study has used the GIS application; Arcview 10.2. It is emphasised that this application is used only as a tool to manage, map and illustrate spatial data. The assessment process does not use GIS and is described in the following sections.

2.4 Landscape and Visual Baseline

The landscape baseline assessment includes a description and classification of landscape character and record of designations and features that contribute to landscape value. The landscape character assessment is based on landscape character types (LCTs) and landscape character areas (LCAs) in Angus identified and described in the *Tayside Landscape Character Assessment* (SNH, 1999) – see section 3.2 and Table 3.1 below. Further landscape character types in neighbouring areas, primarily Aberdeenshire, are also identified. These are detailed in the above publication and others in the national series. Some refinements, for the purposes of this study, are made based on site observations. These include modifications to boundaries between LCAs and identification of sub-types or sub-areas based on subtle variations in character within LCAs (see 3.2.3).

Landscape value is determined partly through landscape designations. There are no local designations in Angus and the national designations are outside the study area, although they are adjacent to it. Related designations that can contribute to landscape value and character are recorded. These include natural and cultural heritage designations,

recreational/ visitor facilities and core paths. Other factors affecting perceptions of value include wildness and remoteness which have recently been assessed across Scotland.

The visual baseline assessment involves a computer-based intervisibility assessment based on different turbine heights and receptor types. Whilst a simplistic approach, this helps to identify the areas that are most likely to be sensitive and areas in which wind turbines might be least visible. Professional judgement was further informed by wireline visualisations for different turbine sizes from a range of viewpoints.

2.5 Method for Determining Landscape Sensitivity and Capacity

The method for determining landscape sensitivity and capacity is detailed in **Appendix 2**. This involves consideration of the two main elements discussed in 2.4 above:

- 1) The sensitivity of the landscape fabric and character to turbine development, which includes landscape features, elements and characteristics and its visual sensitivity, including intervisibility and receptor types.
- 2) The value of the landscape as determined by stakeholders. This may include national or local recognition by landscape designation or cultural association, or value to a community of interest such as local residents or an interest group.

Appendix 2 describes a breakdown of the physical and perceptual characteristics that contribute to landscape character, visual sensitivity and value. Each criterion is described and evaluated in terms of its sensitivity to wind energy development. An overall assessment of **high, medium** or **low** is derived from a composite of all the criteria. There is no consistent relative weighting of criteria as, in the case of each landscape type or area, different criteria are likely to be critical in the sensitivity assessment.

Following the above assessment, an overall professional judgement on capacity for developments of different types is made on the basis of sensitivity and value. Landscape capacity is rated according to the degree to which wind turbines may be accommodated without significant and/or adverse effects on sensitivity and value. The descriptive criteria below for **high, medium** and **low** describe the main thresholds on a continuum between no capacity and high capacity.

Low Capacity: A landscape that is both sensitive to wind turbine development and has a high value, where only a slight level of change can be accommodated without significantly affecting any of the key defining criteria

Medium Capacity: A landscape that has some sensitivity to wind turbine development and has some aspects of value, where a moderate level of change can be accommodated which may significantly affect some of the defining criteria

High Capacity: A landscape that has low sensitivity to wind turbine development and has low value, and can accommodate change that significantly affects most of the key defining criteria

Broadly speaking there is an inverse relationship between landscape sensitivity/value and capacity. However, this is not a simple relationship that can be expressed in a matrix: a balance of judgement is made in each case as landscape value may be a more important factor than sensitivity in some cases; and vice versa in others.

Turbine height and the size and layout of types of turbine development may relate better to some LCTs than others and the geographical extent of LCAs within some otherwise suitable LCTs may limit capacity for development.

2.6 Defining Landscape Change and Cumulative Capacity

An understanding of cumulative impacts and change in the landscape is key to determining acceptable levels of development and whether or not areas have reached cumulative capacity. This is discussed below and in further detail in **Appendix 2**.

2.6.1 Cumulative Change

Appendix 2, section 2.7 discusses in detail the issues involved in determining cumulative change thresholds and the acceptability of these changes. It refers to Scottish Government web based Guidance (2013) and SNH siting and design guidance (2009) for onshore wind energy developments. Key factors that affect the perception of cumulative change include:

- the distance between individual windfarms and/or turbines;
- the distance over which they are visible;
- the overall character of the landscape and its sensitivity to windfarms;
- the siting and design of the windfarms themselves (particularly turbine height and windfarm size); and
- the way in which the landscape is experienced.

In determining an acceptable level of development, it is necessary to clearly define what differing levels of development actually entail. The methodology therefore sets out defined levels of change to the landscape and visual environment that might occur or be experienced depending on the size, number and location of turbines to be built within an area.

The descriptions in Table 2.1 set out a graded landscape typology that defines increasing levels of cumulative landscape and visual impact of turbines by describing their effect on landscape character and the experience of those living in or travelling through the landscape. These descriptions are used without prejudice as a tool to illustrate cumulative landscape change to all parties involved in planning wind energy development.

Further generic illustration of the concept is provided in Part 1 section 5 of the SNH guidance (see guidance paragraphs 5.5 and 5.6 and illustrative sketches, also shown below Table 2.1). The extent of current and potential future wind turbine landscape types in Angus is described in detail in chapter 6 and illustrated in Figures 6.2 and 6.3.

Table 2.1: Description of Levels of Cumulative Wind Turbine Development

Landscape Type	Landscape Character	Visual Experience
Landscape with no Wind Turbines	A landscape type or area in which no, or a minimal number/size of wind turbines is present, or visible from neighbouring areas.	There would be no, or negligible, effects on visual receptors.
Landscape with Occasional Wind Turbines	A landscape type or area in which windfarms or wind turbines are located and/or are close to and visible. Turbines are not of such a size, number, extent or contrast in character that they become one of the defining characteristics of the landscape's character.	Visual receptors would experience occasional close-quarters views of a windfarm or turbines and more frequent background views of windfarms or turbines. Some of the turbines would not be perceived as being located in the landscape character type or area. No overall perception of wind turbines being a defining feature of the landscape.
Landscape with Wind Turbines	A landscape type or area in which a windfarm, windfarms or wind turbines are located and/or visible to such an extent that they become <i>one</i> of the defining characteristics of the landscape character. However, they are clearly separated and not the single most dominant characteristic of the landscape.	Visual receptors would experience frequent views of windfarms or wind turbines as foreground, mid-ground or background features, affecting their perception of the landscape character. However there would be sufficient separation between windfarms and turbines and sufficient areas from which wind turbines are not visible such that they would not be seen as dominating the landscape over all other landscape features.
Wind Turbine Landscape	A landscape type or area in which windfarms or wind turbines are extensive, frequent and nearly always visible. They become the dominant, defining characteristic of the landscape. Nevertheless there is a clearly defined separation between discrete developments.	Visual receptors would experience views of windfarms and wind turbines as foreground, mid-ground and background features, to the extent that they are seen as the most dominant aspect of landscape character. Few areas would be free of views of wind turbines, although groupings would appear separated.
Windfarm	Landscape fully developed as a windfarm with no clear separation between groups of turbines. Few if any areas where turbines not visible.	Visual receptors would always be close to and nearly always in full view of wind turbines, with no clear separation between groups of turbines.

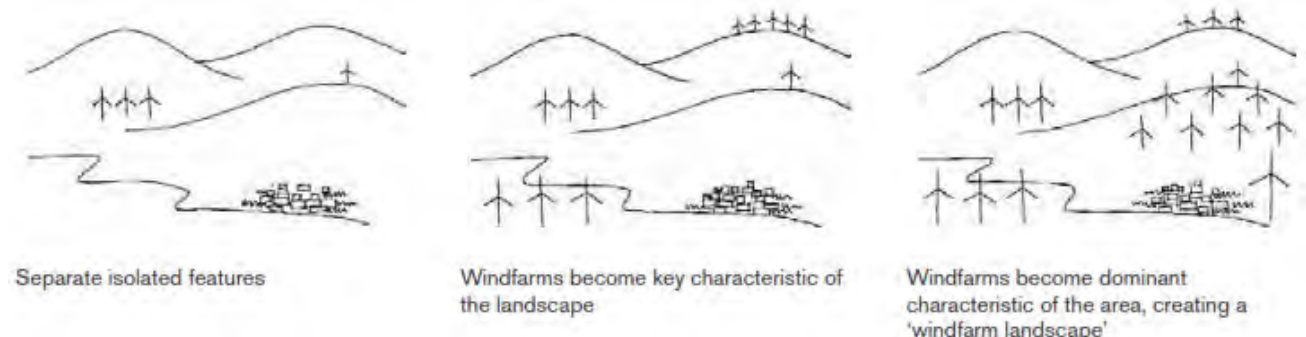


Figure 2.2: Illustrative Sketches of Wind Turbine Development (from SNH)

2.6.2 Determining Acceptable Levels of Change

The SNH siting and design guidance identifies three broad levels of cumulative change in the landscape that may be set by local authorities depending on landscape sensitivity and value and local policy objectives:

- **Landscape Protection:** Maintain existing landscape character.
- **Landscape Accommodation:** Accept a degree of change providing this does not fundamentally alter key landscape characteristics and visual resources.
- **Landscape Change:** Accept large amounts of change that may fundamentally alter key landscape characteristics and visual resources.

The descriptions in Table 2.1 provide a basis on which to understand and determine levels of change. However it is the collective decision of stakeholders including local authorities and their population that ultimately determines the levels of cumulative landscape change, that are acceptable across their area, and thereby the capacity.

2.7 Presentation of Assessment and Findings

The study assessment and findings are presented in the following chapters:

Chapter 3: Landscape Baseline

This chapter defines and describes the study area, including the geographical extent and landscape character of Angus and its surroundings. It also reviews other relevant information including landscape-related constraints, such as wildness, natural heritage and cultural heritage designations.

The assessment of landscape capacity and cumulative landscape change is based on the eleven Angus Landscape Character Types (LCTs) in the Tayside Landscape Character Assessment. These are divided into further Landscape Character Areas (LCAs) based on the published assessment. The figures incorporate slight modifications to the 1999 original resulting from observations by Angus Council, expansion of urban areas since 1999 and from our own on-site observations. Further subdivisions or Sub-Areas based on subtle variations are also identified. These changes are detailed in **Appendix 3**.

The information in chapter 3 informs the assessment of the sensitivity and value of each landscape character type and areas detailed in chapter 6.

Chapter 4: Visual Baseline

This chapter details the analysis carried out to establish the relative visibility and visual sensitivity of different parts of Angus. This involves a computer-based intervisibility assessment, carried by Envision 3D, based on different turbine heights and receptor types. The resulting maps are shown in **Appendix 4**.

The information in chapter 4 informs the assessment of landscape sensitivity as detailed in Chapter 6.

Chapter 5: Wind Turbines in the Study Area

This chapter describes the operating, consented and proposed wind turbine developments in the study area at May 2013. There is a detailed breakdown of numbers and sizes of turbines and windfarms in Angus and the surrounding study area. Locations of turbines are illustrated in Figures 5.1 and 5.2. There is also an analysis of turbine size ranges and distribution in relation to landscape character.

Appendix 5 reviews the factors involved in wind turbine location, size, design and distribution that affect landscape, visual and cumulative impacts.

Details of individual developments are given in **Appendix 6**

Chapter 6: Assessment of Landscape Capacity and Cumulative Change

This chapter analyses and assesses the information in the previous chapters to determine the landscape and visual impacts of, and capacity for, wind energy development across Angus. The assessment is summarised in **Table 6.1a-i** and **Figures 6.1 to 6.3**. The capacity assessment is informed by the detailed assessment of landscape sensitivity and value in **Appendix 7**. A desk and field based assessment was carried out, including the use in the field of 360° wirelines of existing, proposed and potential future wind energy developments. The assessment informs the subsequent spatial strategy and includes guidance on turbine size and distribution. Further details of how to use Table 6.1 together with the figures are given at the start of Chapter 6.

The assessment is carried out for each of the eleven LCTs in Angus. The capacity assessment and current cumulative change for each of the LCTs is then combined to come to an assessment of capacity and cumulative effects for the whole local authority area, and for the three main regional landscape areas of Angus, i.e.:

- 1) Highland;
- 2) Lowland and Hills;
- 3) Coast.

Further spatial and design guidance for locating wind turbines in areas with residual capacity for further development and areas with restricted capacity is given in Chapter 6.

2.8 Detailed Guidance

Chapter 6 also gives guidance on turbine sizes, cluster sizes and separation between groups of turbines for each landscape type and/or area that would limit cumulative development to the proposed acceptable level. This relates to turbines of small/medium and larger. As highlighted in 2.3.2, guidance on small turbines below 15m to blade tip applies at a local level and is generic.

Appendix 5 of this report contains detailed discussion of how turbine size, group size and group separation affects perceptions of wind energy and landscape character. Further

guidance is given in SNH's *Siting and Designing Windfarms* publication. Chapter 6 also briefly outlines the main considerations in developing the specific guidance.

2.9 Potential Opportunities and Constraints

The main spatial findings of the detailed assessment are summarised on a map in **Figure 6.4**. This shows the distribution of the following areas:

- Areas with significant underlying landscape capacity
- Areas with limited underlying landscape capacity
- Areas with no underlying landscape capacity
- Areas where capacity is limited by cumulative development (which would overlap with parts of some or all of the above areas)

Finally it is emphasised that this assessment is focused on landscape and visual issues. Areas which have been identified as suitable on this basis may be restricted by other unrelated factors such as protection of wildlife, proximity to dwellings, aviation restrictions or lack of grid connection. These issues are not the subject of this assessment and are covered by the Angus Implementation Guide.

3.0 LANDSCAPE BASELINE

The following section defines and describes the study area, including the geographical extent and landscape character of Angus and its surroundings. It also reviews other relevant information including landscape-related designations, natural and cultural heritage constraints. In the latter case it is the extent to which they may have a bearing on landscape character and value that is the primary consideration in this study.

3.1 Study Area

The study area for this assessment is shown in Figure 3.1. Angus lies on the east coast of Scotland, and is bounded by the Firth of Tay and City of Dundee to the south and the North Sea to the east. It has inland boundaries with Perth & Kinross to the west and Aberdeenshire to the north and east. Fife lies to the south of the Tay. The Cairngorms National Park includes part of the northern highland area of Angus, extending beyond into Perth & Kinross and Aberdeenshire. Angus has a total area of 2,181km² and a population of approximately 116,000.

The study focuses on the local authority area of Angus for the purposes of determining cumulative landscape and visual impact and landscape capacity. Nevertheless, there are a number of existing, consented and proposed windfarms and turbines in neighbouring local authority areas. Consideration has been given to these, due to the extensive visual influence exerted by most wind turbines. The study area therefore includes a 30km buffer around its boundary, including the North Sea.

3.2 Baseline Landscape Character Assessment

3.2.1 Landscape Context

The landscape of Angus comprises a transition from coastal landscapes by the Firth of Tay and North Sea in the southeast, progressing northwest to agricultural lowland and lowland hills, thence to highland landscapes of the Grampian Mountains in the north. Topography is shown in Figure 3.2. The bulk of the population lives in small towns and villages in the lowland area, through which the main transport routes pass. The landscape of Angus and of the more extensive Tayside area is described in detail in the TLCA (*Tayside Landscape Character Assessment, LUC, 1999*).

The *Angus Local Plan Review (Adopted 2009)* has adopted the TLCA as the base data informing its landscape character related policies. It identifies the landscape types in *Figure 3.2: Landscape Character Zones* as part of the justification for *Policy ER5: Conservation of Landscape Character*. In *Policy ER35 Wind Energy Development*, the zones are amalgamated into three main regional geographic areas shown in the *Local Plan Figure 3.4: Wind Energy Development: Geographical Areas*:

- Highland
- Lowland and Hills

- Coast

These areas are shown in Figure 3.3. The highland area of Angus extends northwards into the Grampian Mountains and the Cairngorms National Park.

The broad division of landscape character continues to the north and east in Aberdeenshire where the Highland Boundary Fault divides moorlands to the north from lowland farmlands and the coast to the south. To the west in Perth and Kinross the Lowland/Highland division continues, although the coastal landscape is relatively limited.

3.2.2 Landscape Character

Table 3.1 overleaf and Figure 3.4a define the landscape in more detail. There are a total of eleven landscape character types from the Tayside assessment: 4 Highland; 4 Lowland and Hills and 3 Coast. These are further subdivided into a number of individual character areas depending on whether there is more than one example of the landscape type geographically separated or distinct from the other(s). Figure 3.4b shows landscape character in the wider study area.

The coastal area, although important to the character of Angus, covers little of its surface area, being a predominantly narrow strip, with the exception of Montrose Basin. In contrast the lowland and highland areas cover most of Angus. The dividing line between the two is the Highland Boundary Fault between Lintrathen in the west and Edzell to the east. To the north of the Highland Boundary Fault lie the extensive rolling uplands and mountains/plateau of the Mounth Highlands dissected by the Angus Glens. This area of Angus lies partially within the Cairngorms National Park, which extends northwards beyond Angus.

To the south of the Boundary Fault lie the Tayside Lowlands. In Angus the division between highland and lowland landscape types is approximately 50:50 in area. Most of the characteristics of the landscape including topography, vegetation cover, land use and settlement patterns are subservient to this major division. There is a very striking contrast between the hills north of the boundary fault and the broad open valley of Strathmore to the south of it.

The following section briefly describes the context and character of the landscape in each of these areas. More detailed description and analysis is given in the TLCA.

Highland

Within the Highland area there are four landscape character types divided into a total of 18 landscape character areas. This reflects the dissected plateau nature of the Mounth with deep glens penetrating the mountains.

The Highland Boundary fault along the southern edge is reflected in the transitional *Highland Foothills* Character type, comprising four areas of smaller scale complex topography and mixed arable and hill farming separated by the mouths of the Angus Glens. This character type extends west into Perth & Kinross.

The Angus Glen character areas comprise *Glen Isla, Glens Prosen & Clova, West Water Valley* and *Glen Esk*. They run from southeast to northwest, dividing the *Highland Summits*

and Plateaux into a series of broad, rolling ridges. The *Mid Highland Glens* are shallower and more settled with some agriculture on the flat valley floor, whereas the *Upper Highland Glens* are narrower, deeper and less settled or cultivated.

Table 3.1. Landscape Character Areas in Angus (SNH Tayside Landscape Character Assessment, 1999*)

Geographic Areas	Landscape Character Types	Landscape Character Areas
Highland	1a. Upper Highland Glens	<i>Glen Isla</i> <i>Glen Prosen</i> <i>Glen Clova</i> <i>West Water Valley</i> <i>Glen Mark</i>
	1b. Mid Highland Glens	<i>Glen Isla</i> <i>Glen Prosen</i> <i>Glen Clova</i> <i>West Water Valley</i> <i>Glen Esk</i>
	3. Highland Summits & Plateaux	<i>Forest of Alyth</i> <i>Caenlochan Forest/ Glendoll Forest</i> <i>Muckle Cairn/ Hill of Glansie/ Hill of Wirren</i> <i>Hills of Saughs/ Mount Battock</i>
	5. Highland Foothills	<i>Alyth Foothills</i> <i>Kirriemuir Foothills</i> <i>Menmuir Foothills</i> <i>Edzell Foothills</i>
Lowland and Hills	8. Igneous Hills	<i>Sidlaws</i>
	10. Broad Valley Lowland	<i>Strathmore</i> <i>Lower South & North Esk Valleys</i>
	12. Low Moorland Hills	<i>Forfar Hills</i>
	13. Dipslope Farmland	<i>SE Angus Lowland</i>
Coast	14a.Coast with Sand	<i>Montrose</i> <i>Lunan bay</i> <i>Elliott</i> <i>Barry Links</i>
	14b.Coast with Cliffs	<i>Usan</i> <i>Auchmithie</i> <i>Carnoustie</i>
	15. Lowland Loch Basins	<i>Montrose Basin</i>

*The terminology used in the table headers differs from that used in the 1999 TLCA so as to be consistent with relevant publications and current terminology: the Geographic Areas are based on Angus Council Local Plan Review; the Landscape Types are called Landscape Character Types (LCTs) and individual landscape units are called Landscape Character Areas (LCAs).

The *Highland Summits and Plateaux* forms the most extensive Highland character type, separating the glens and merging into broader and higher mountain areas to the north of Angus. This character type continues west into Perth & Kinross and merges with other highland character types, including *Moorland Plateaux*, to the north and to the east in Aberdeenshire.

The northern parts of both the *Upper Highland Glens* and *Highland Summits and Plateaux* fall into the Cairngorms National Park although this designation does not extend into the lower hills northeast of Glen Esk.

Lowland and Hills

Within the lowland landscape area there are four landscape character types, further subdivided into five landscape character areas. The predominant lowland landscape types within Angus are the *Broad Valley Lowlands*, lying south of the Highland Boundary Fault, represented by Strathmore and the Lower South and North Esk Valleys and the large area of *Dipslope Farmland* between Dundee, Forfar and Montrose. Both of these areas are dominated by arable agriculture and are settled with towns, villages and networks of roads. Fields are medium to large in size with intermittent hedges and trees. There are areas of shelterbelts and small plantation woodlands. Three of the main settlements in Angus (Kirriemuir, Forfar and Brechin) and the main transport artery (the A90) lie in the *Broad Valley Lowlands*. The *Dipslope Farmland* is on higher undulating ground with smaller settlements on the periphery (eg. the villages of Letham and Friockheim) and more open aspects, although merging into the more densely populated coastal area in the south and east where Arbroath, the A92 and main railway are located.

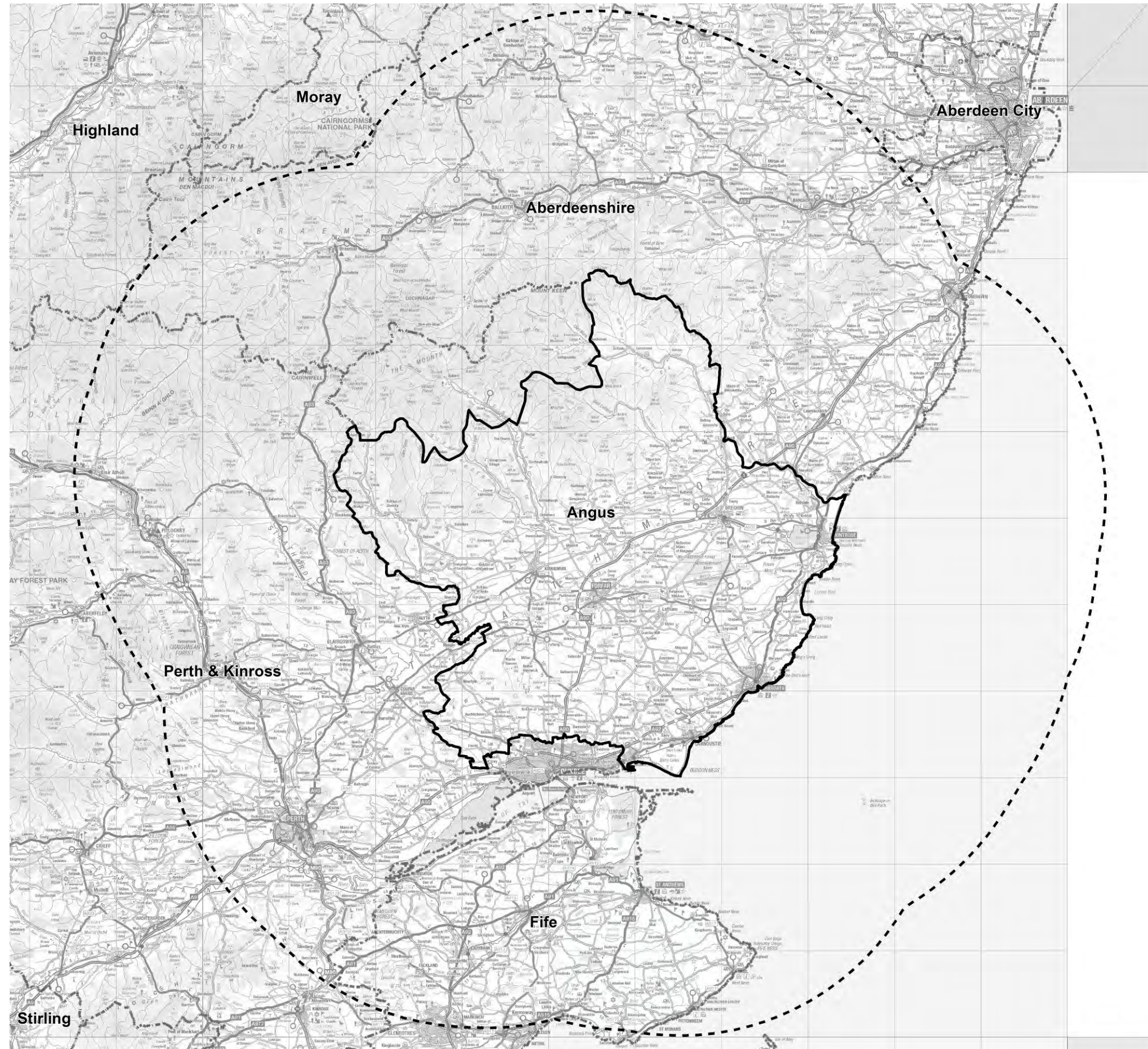
The two main lowland areas are separated by ranges of lowland hills: To the west the *Igneous Hills* of the Sidlaws divide the *Dipslope Farmland* and Dundee from Strathmore, this pattern extending west into Perth & Kinross. To the east the smaller scale *Low Moorland Hills* around Forfar separate the *Dipslope Farmland* from the Lower Esk Valleys.

Northeast into Aberdeenshire the lowland landscape area is represented by the *Agricultural Heartlands* type (from the *South & Central Aberdeenshire Landscape Assessment, SNH 1996*) which merges with the *Broad Valley Lowlands*. Strathmore, in Perth and Kinross and Angus, including the North and South Esk and the Howe of the Mearns in Aberdeenshire forms a broad continuous valley of 65km length between the River Tay in the southwest and Glenbervie in the northeast.

Coast

There are three Coastal Types: *Coast with Sand* is divided into four landscape character areas and *Coast with Cliffs* divided into three. These form a narrow strip along the Firth of Tay and North Sea, with rocky headlands alternating with dunes and sandy beaches. Only the Barry Links area of dunes between Monifieth and Carnoustie has a width of more than a kilometre.

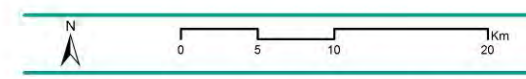
Four of the main towns of Angus: Monifieth, Carnoustie, Arbroath and Montrose punctuate these areas and there are main roads and the railway passing along or near the coast from Dundee to Arbroath, Montrose and eventually Aberdeen. There are small fishing villages and remains of castles on the rocky sections of coast. Otherwise there is little development



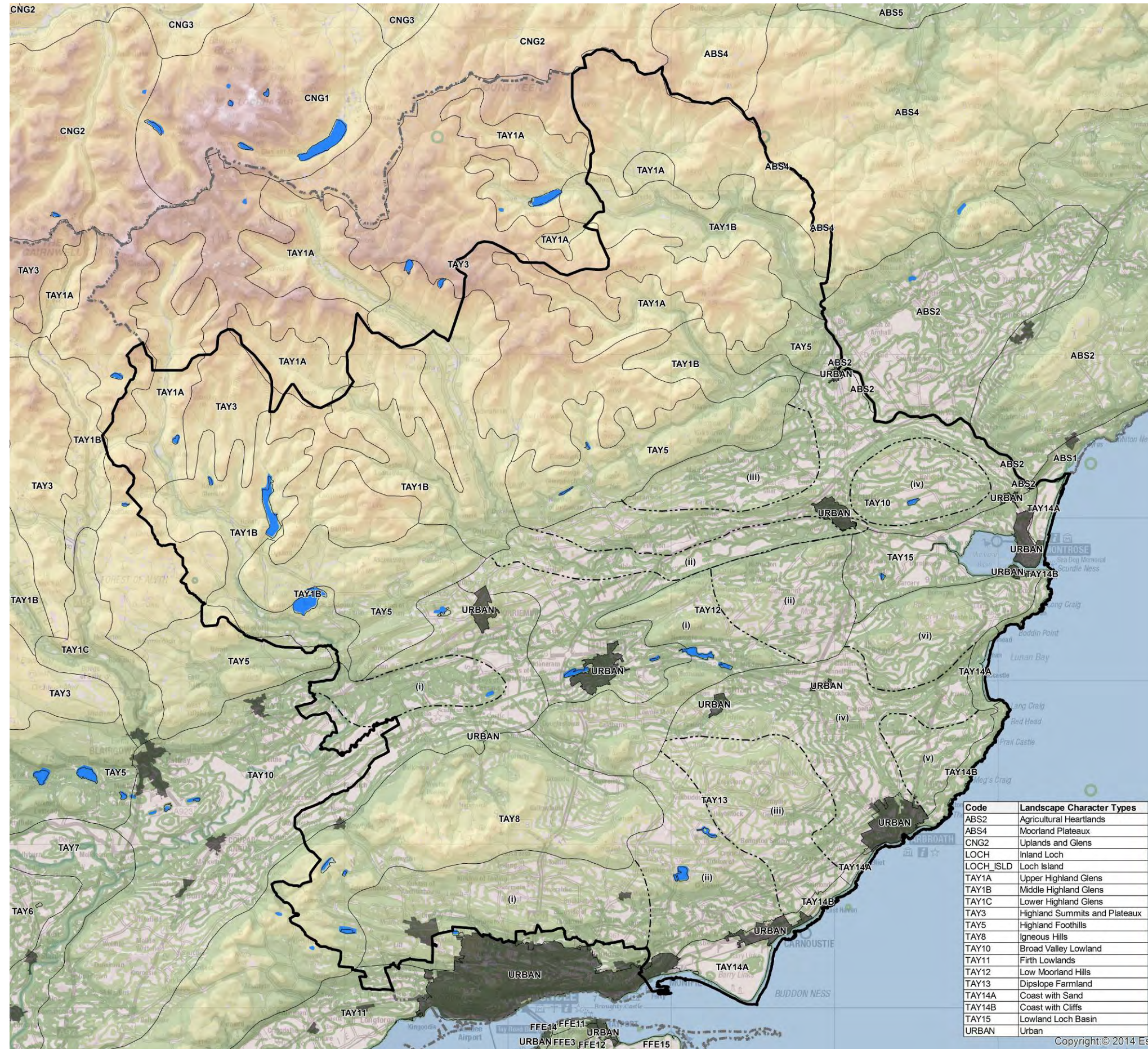
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- Legend**
- Study Area
 - Study Area 30km Buffer
 - Scottish Local Authority Boundaries

Figure 3.1
Study Area



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Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- LCA Sub Areas (Ref. Table 6.1)
- Lochs
- Settlements

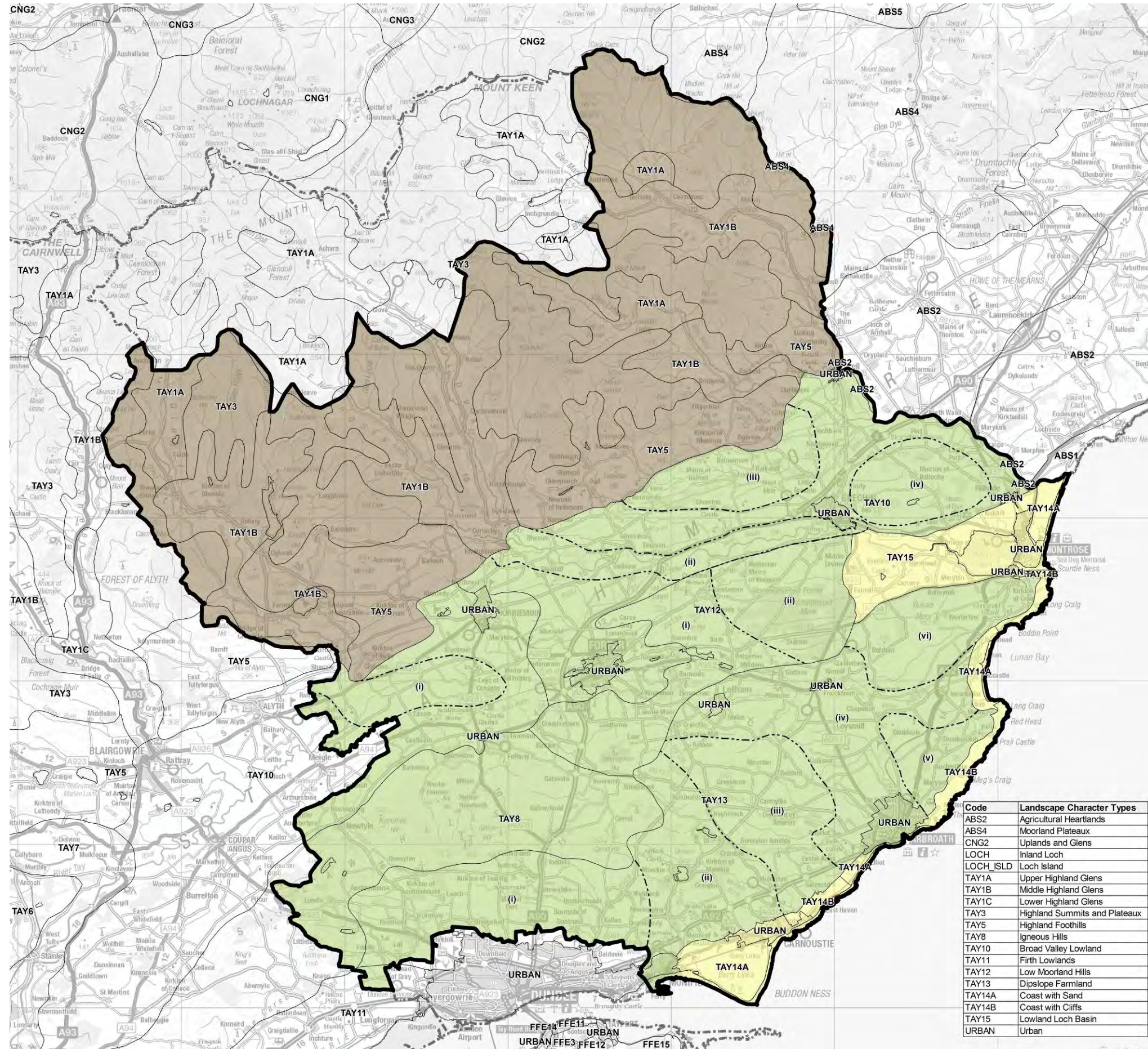
Elevation

- 1100 - 1200m AOD
- 1000 - 1100m AOD
- 900 - 1000m AOD
- 800 - 900m AOD
- 700 - 800m AOD
- 600 - 700m AOD
- 500 - 600m AOD
- 400 - 500m AOD
- 300 - 400m AOD
- 200 - 300m AOD
- 100 - 200m AOD
- 0 - 100m AOD

Figure 3.2
Topography



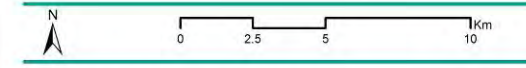
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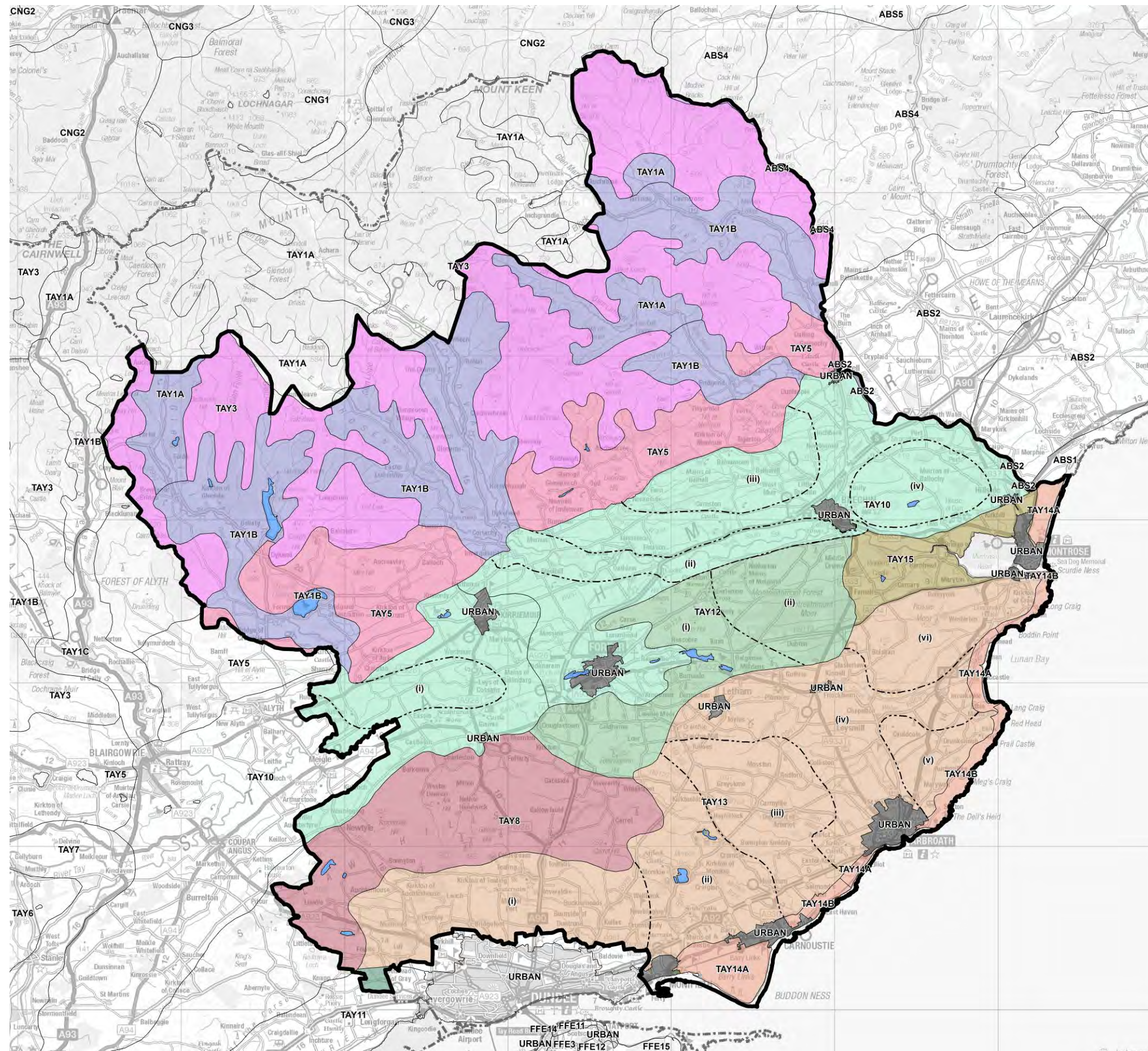
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Figure 3.3

Geographic Areas



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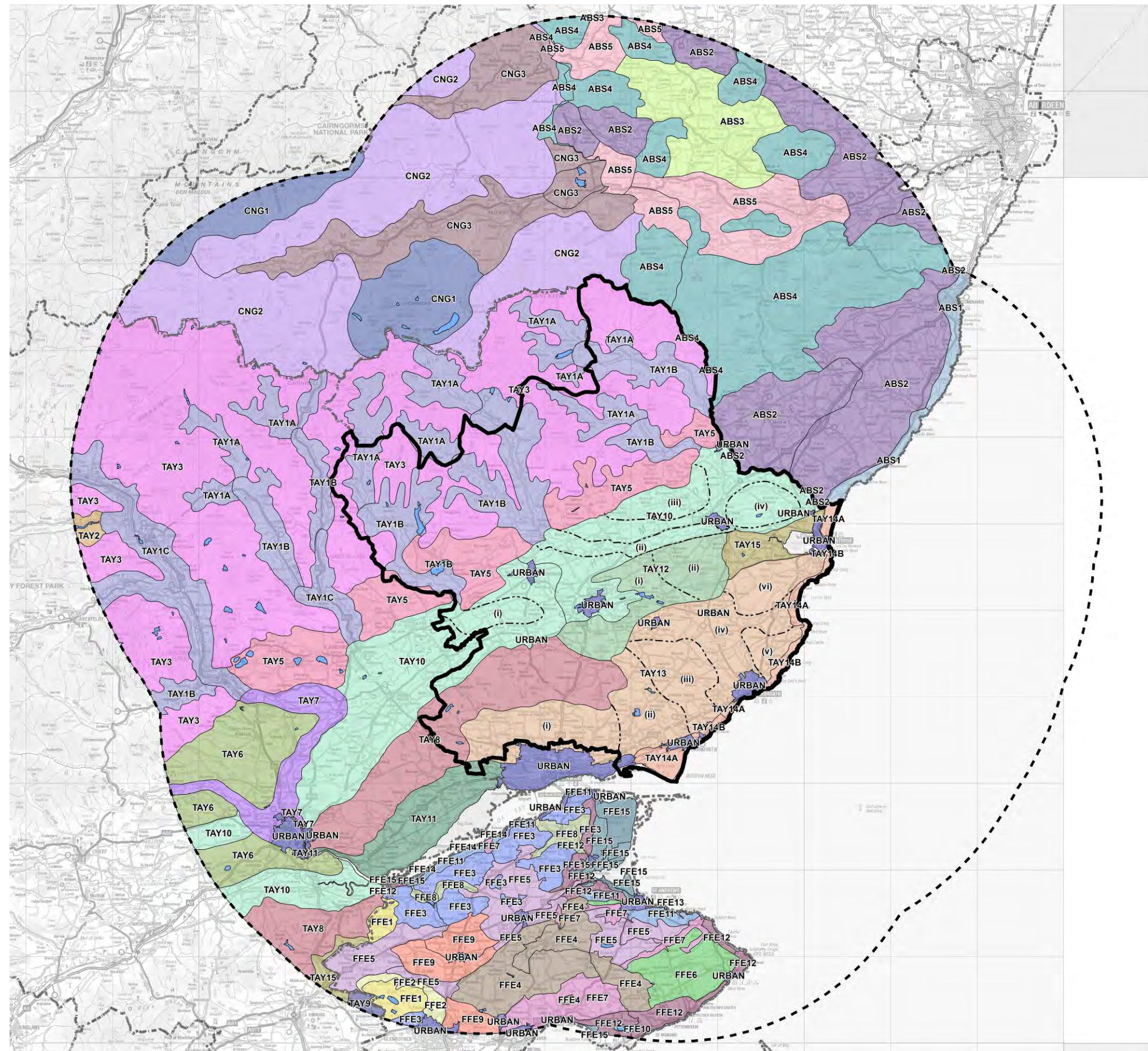
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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Landscape Character Type Key:**
- ABS2, Agricultural Heartlands
 - ABS4, Moorland Plateaux
 - CNG2, Uplands and Glens
 - LOCH, Inland Loch
 - LOCH_ISLD, Loch Island
 - TAY1A, Upper Highland Glens
 - TAY1B, Middle Highland Glens
 - TAY3, Highland Summits and Plateaux
 - TAY5, Highland Foothills
 - TAY8, Igneous Hills
 - TAY10, Broad Valley Lowland
 - TAY11, Firth Lowlands
 - TAY12, Low Moorland Hills
 - TAY13, Dipslope Farmland
 - TAY14A, Coast with Sand
 - TAY14B, Coast with Cliffs
 - TAY15, Lowland Loch Basin
 - URBAN, Urban

Figure 3.4a
Landscape Character Types and Areas in Angus



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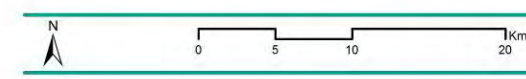
March 2014

7933 ANC 105

- Legend**
- Study Area
 - Study Area 30km Buffer
 - Scottish Local Authority Boundaries
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Landscape Character Type Key:**
- ABC1, Major River Valleys
 - ABC4, Open Farmland
 - ABC5, Wooded Farmland
 - ABS1, Coastal Strip
 - ABS2, Agricultural Heartlands
 - ABS3, Farmed Moorland Edge
 - ABS4, Moorland Plateaux
 - ABS5, Straths and Valleys
 - CNG1, Cairngorm Plateau
 - CNG2, Uplands and Glens
 - CNG3, Cairngorm Straths
 - FFE1, The Uplands
 - FFE2, Upland Slopes
 - FFE3, Upland Foothills
 - FFE4, Pronounced Volcanic Hills and Craigs
 - FFE5, Lowland Hills and Valleys
 - FFE6, Lowland Open Sloping Farmland
 - FFE7, Lowland Dens
 - FFE8, Lowland Glacial Meltwater Valleys
 - FFE9, Lowland River Basin
 - FFE10, Lowland Loch Basin
 - FFE11, Coastal Hills
 - FFE12, Coastal Terraces
 - FFE13, Coastal Cliffs
 - FFE14, Coastal Braes
 - FFE15, Coastal Flats
 - LOCH, Inland Loch
 - LOCH_SLD, Loch Island
 - MRN4, Uplands
 - TAY1A, Upper Highland Glens
 - TAY1B, Middle Highland Glens
 - TAY1C, Lower Highland Glens
 - TAY2, Highland Glens with Lochs
 - TAY3, Highland Summits and Plateaux
 - TAY5, Highland Foothills
 - TAY6, Lowland Hills
 - TAY7, Lowland River Corridors
 - TAY8, Igneous Hills
 - TAY9, Dolerite Hills
 - TAY10, Broad Valley Lowland
 - TAY11, Firth Lowlands
 - TAY12, Low Moorland Hills
 - TAY13, Dipslope Farmland
 - TAY14A, Coast with Sand
 - TAY14B, Coast with Cliffs
 - TAY15, Lowland Loch Basin
 - URBAN, Urban

Figure 3.4b

Landscape Character Types and Areas in Study Area



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with arable land often extending close to cliff edges. There is little in the way of trees, the areas being open and windswept. There are links golf courses located in dunes along the sandy sections of coast and Barry Links has a military firing range.

Between the Forfar Hills and Montrose the landscape lowers in elevation forming the *Lowland Loch Basin* of Montrose Basin, which is part flat agricultural land and parkland and part inland tidal lagoon separated from the North Sea by the spit of land on which lies Montrose.

3.2.3 Further Analysis of Landscape Character

Some of the landscape character areas in Angus cover extensive areas and show clear variations in character relating particularly to scale, topography and vegetation cover. In the following areas we have identified Sub-Areas with consistent characteristics which may have a bearing on sensitivity and capacity. Further information and a figure showing the changes are given in **Appendix 3**.

Broad Valley Lowland (TAY 10)

The *Broad Valley Lowland* LCT is extensive and divided into two LCAs: Strathmore in the west and Lower South and North Esk Valley to the east. Within these areas a number of smaller sub-areas have been identified which vary sufficiently from the main type to be noted as potentially more or less sensitive to wind energy development:

- i. An area of complex fluvioglacial landforms comprising rolling hillocks and ridges with a more irregular field pattern contrasting with the flatter checkerboard pattern of valley floor and field boundaries in Strathmore.
- ii. The corridor of the River South Esk between Glen Clova and Brechin is focused around the meandering river. It is slightly more enclosed by shallow landform and trees than the more open arable land of Strathmore and has features such as former mills and large estate houses and policies.
- iii. A significant area lying between the A90 and the Menmuir Hills is topographically separated by a curved ridge of land from the area draining into the South Esk. This area of undulating arable land drains to the North Esk and not to Montrose Basin
- iv. An area of higher ground lies between the A90 and Montrose Basin to the east of Brechin. This area is elevated with slopes falling on all sides. Although included in the *Broad Valley Lowland* it has many of the more exposed characteristics of the *Dipslope Farmland*.

The sub-areas in this case do not cover all the area of the main LCAs. Remaining areas are considered as more representative of the 'standard' type.

Low Moorland Hills (TAY 12)

Further analysis of the lowland *Low Moorland Hills* landscape type south and east of Forfar indicates that, although clearly higher than the Lower Esk Valleys and Montrose Basin, much of it is of lower elevation than the adjacent *Dipslope Farmland*. On analysis it comprises two distinct sub-areas: the lower, flatter and mainly afforested Montreathmont

Forest & Moor and surrounding farmland to the east of Turin Hill and north of Guthrie and the area of widely separated steep sided hills in rolling farmland to the west, surrounding the east and south sides of Forfar.

Dipslope Farmland (TAY 13)

The *Dipslope Farmland* covers a wide area and accommodates significant variation within this character type, varying from relatively small scale enclosed farmland in shallow valleys to large open arable fields or small areas of heather moorland on the highest ground. The LCA can be divided up into six geographical sub-areas based on elevation and exposure, tree cover and surrounding landscape context:

- i. Tealing Farmland: The sub-area lies in a bowl between the ridge enclosing Dundee in the south and the escarpment of the Sidlaw Hills to the north and west. Close proximity to the urban area means it is more populated with villages and roads and crossed by several electricity transmission lines converging on a major substation. The backdrop of the hills contains and shelters the area from the north and west
- ii. Monikie Farmland: The features distinguishing this sub-area from other parts of the Dipslope Farmland include a greater preponderance of woodland amongst areas of arable farmland. This is partly due to the presence of two country parks set around former reservoirs (Crombie and Monikie) and also the Panmure estate policies. It is well settled in the southern part. This gives the area a more enclosed, settled and smaller scale feeling, increasing the sensitivity to wind energy developments. An electricity transmission line crosses from west to east.
- iii. Redford Farmland: This sub-area is higher and/or more open and exposed than neighbouring sub-areas. The plateau-like landform of the highest northern part is gently rolling or undulating and has large arable fields in which boundaries have been removed or have become minimal, giving an open, simple character. Settlements are small and well separated. Farms and houses also appear well separated and farm buildings are often large. There are some areas of mature trees, most notably the very enclosed Guynd designed landscape. An electricity transmission line crosses the centre. Due to its openness, apparent larger scale and productive farmland character, the northern parts of this sub-area, separated from the coastal facing slopes by a low ridge or break in slope, would be less sensitive to wind energy developments.
- iv. Letham, Lunan Water and Arbroath Valleys: This sub-area surrounds watercourses that drain to the sea at Lunan Bay and Arbroath. It is generally lower and/or less open and exposed than neighbouring sub-areas and has more settlement, including the significant settlements of Arbroath, Letham and Friockheim as well as smaller hamlets, isolated houses and farms. A golf/housing resort is identified in the local plan at Letham Grange near Arbroath. The land is intensively farmed, including areas of polytunnels. There are significant areas of mature trees: within designed landscapes such as Guthrie and Pitmuies, along watercourses and around settlements. Roads follow the valley landforms. An electricity transmission line lies near Arbroath. Due to its more enclosed and settled character, the sub-area would be more sensitive to wind energy developments.

- v. Ethie Farmland: This sub-area is higher and/or more open and exposed than the surrounding valley sub-area, partly due to its coastal exposure. The landform is gently rolling or undulating and has large arable fields in which boundaries have been removed or have become minimal. There are no settlements, only isolated farms and houses. There are areas of mature trees inland but the higher ground close to the coast is open and exposed. A main road and railway crosses lower ground in the centre. Due to its openness and productive farmland character the sub-area would be less sensitive to wind energy developments, although it is limited in extent and due cognisance should be given to the coastal location which is more sensitive to wind energy development.
- vi. Rossie Moor: This sub-area is higher and more open and exposed than the valley sub-area to the south and Montrose Basin to the north. The landform is gently rolling or undulating and has large arable fields in which boundaries have been removed or have become minimal. There are no settlements, only isolated farms and houses. There are areas of mature trees inland but much of the land close to the coast is open and exposed. A main road crosses lower ground to the east. Due to its openness and productive farmland character the sub-area would be less sensitive to wind energy developments, although due cognisance should be given to the coastal location which is more sensitive to wind energy development.

Within all of these sub areas there are relatively minor variations in landform and landcover which lead to areas of localised sensitivity which should be taken into account in specific site assessments.

3.3 Landscape Designations

Landscape designations are an indication of landscape or scenic value recognised at national, regional or local levels. Landscape designations form part of the baseline for both the assessment of landscape capacity, and the preparation of a spatial framework. Landscape designations within the study area are noted below, and are shown in Figure 3.5, in relation to LCAs.

3.3.1 National Landscape Designations

The Cairngorms National Park includes the hills and upper glens in the north of Angus. This area is not included in the core Angus study area, but it is considered within the 30km buffer.

The Cairngorms National Park is a landscape-related national designation. It is located in the north of the area and extends beyond into Aberdeenshire and Perth & Kinross. The National Park area includes the northern parts of the *Highland Summits and Plateaux* and most *Upper Highland Glens* areas.

The only area of national landscape designation within Angus is the Deeside and Lochnagar National Scenic Area (NSA), the southern end of which lies in the northwestern part of Angus, including the highest mountains and Glen Doll at the head of Glen Clova.

Taking into account existing and emerging national policy, it is unlikely that commercial windfarm proposals would be considered acceptable within the NSA or the National Park. Whilst buffer areas are not encouraged by policy, the effects of windfarms near to the NSA or National Park could be a material consideration.

Other national designations are primarily related to sites of natural or cultural heritage value (e.g. SCAs, SPAs, SSSIs and Scheduled Ancient Monuments), which are not the subject of this study. Nevertheless some of these areas such as Montrose Basin and the numerous castles, churches, prehistoric monuments and hillforts in Angus are notable for their contribution to landscape character and are considered, where appropriate, in the assessment of landscape value and capacity. Furthermore, locations of cultural heritage importance often have a landscape setting well beyond their physical extent. These are discussed in 3.4 below.

3.3.2 Local Landscape Designations

There are no local landscape designations such as Special Landscape Areas or Areas of Great Landscape Value within Angus. The protection of landscape character outside the National Park is based on local plan policy which is informed by the TLCA. This is taken into account in the assessment of landscape capacity.

Aberdeenshire also has no local landscape designations. There are Areas of Great Landscape Value in Perth & Kinross, although none are contiguous with Angus.

3.3.3 Other Landscape Designations

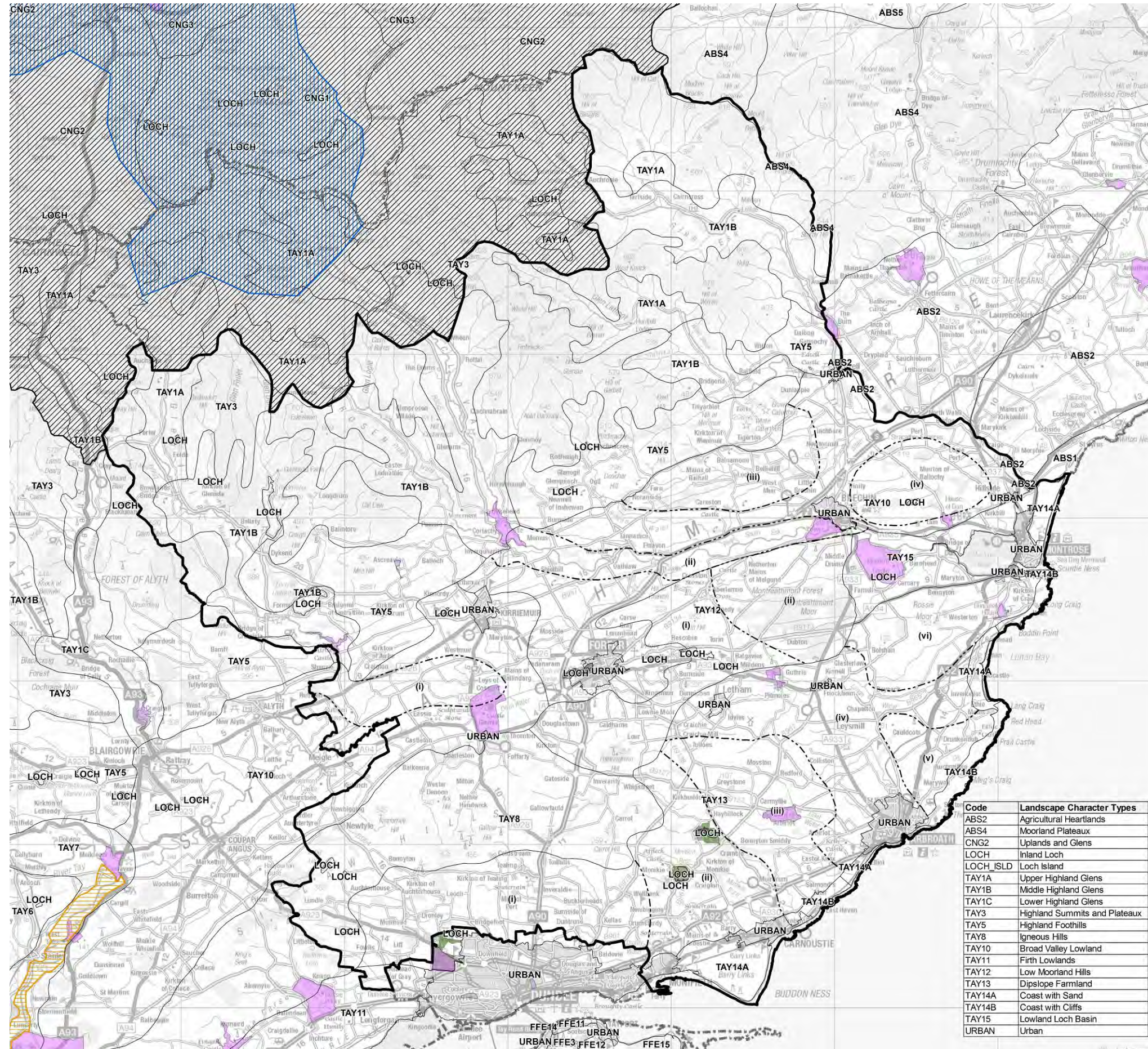
There are thirteen inventory Historic Gardens and Designed Landscapes (HGDLs) wholly or partially within Angus. The majority are located within lowland areas, but also include one in Montrose Basin and four others fully or partly within the edges of the highland area. Several further listed areas lie in the wider study area including Camperdown Park in Dundee City which is immediately adjacent.

Whilst this is not a statutory designation it is a landscape factor that contributes to the assessment of landscape character and value. These are taken into account in the assessment.

There are also three country parks in the area between Dundee, Carnoustie and Forfar at Monkie, Crombie and Forfar Loch and two country parks on the edge of Dundee City.

3.4 Other Designations

There are a number of designations that, whilst not solely landscape related, clearly indicate landscape value and inform the assessment process. These are shown in Figure 3.6 and discussed below. Illustrative examples are referred to in the assessment and guidance

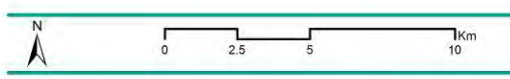


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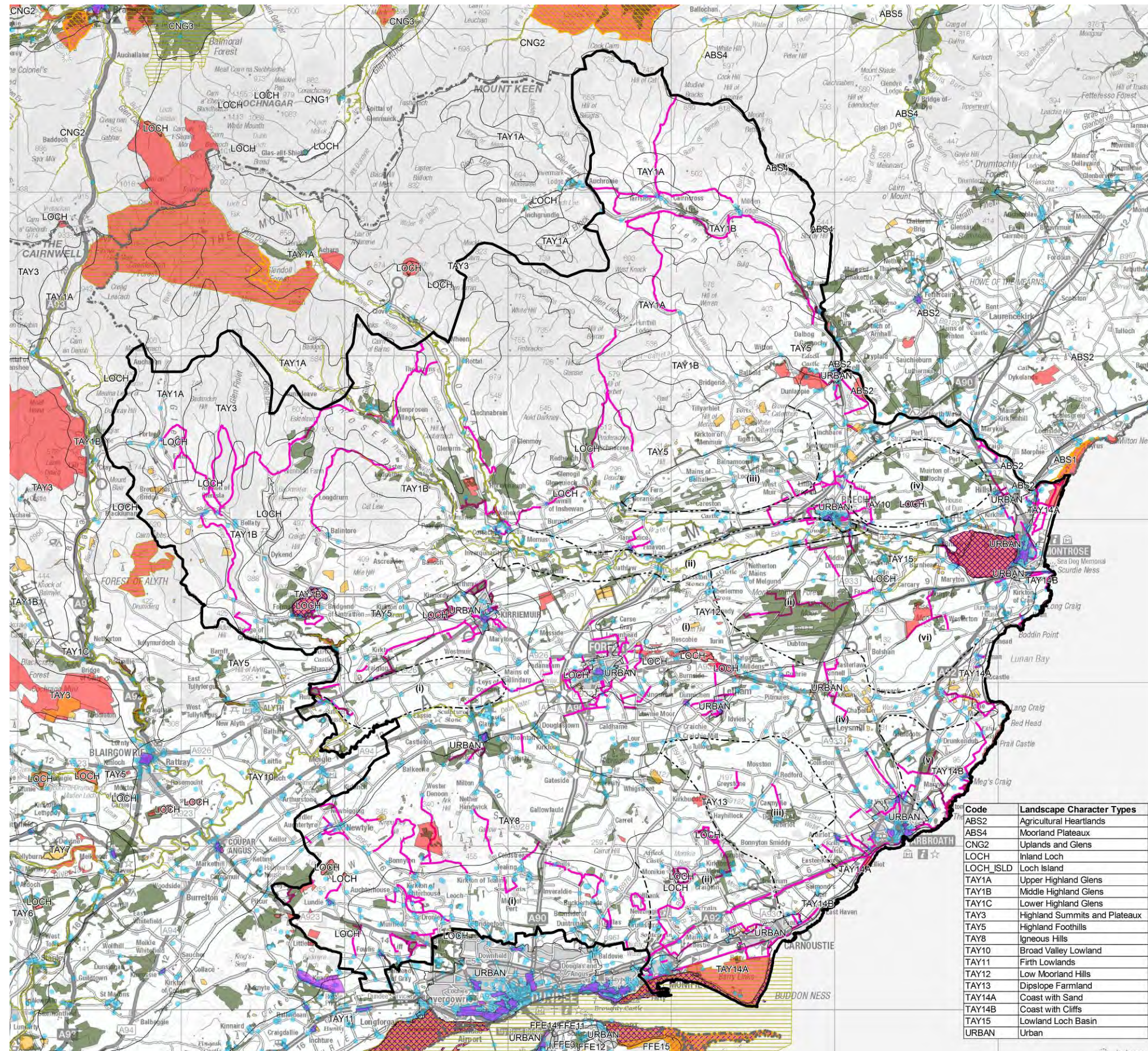
- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
 - Cairngorms National Park
 - National Scenic Area
 - Areas of Great Landscape Value
 - Gardens and Designed Landscapes
 - Country Parks

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 3.5
Landscape Designations & Landscape Character Areas



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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
 - Conservation Areas
 - Scheduled Ancient Monuments
 - Listed Buildings
 - National Nature Reserves
 - Special Areas of Conservation
 - Ramsar Sites
 - Ancient Woodland Inventory
 - Sites of Special Scientific Interest
 - Core Paths

Figure 3.6
Natural and Cultural Designations



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3.4.1 Historic and Cultural Designations

Scheduled Ancient Monuments (SAMs) are primarily a historic or archaeological designation. However they can be of landscape significance in their own right and contribute to the character and value of a landscape. Furthermore, effects on their setting should be a consideration for neighbouring development proposals.

Conservation Areas are primarily an urban designation. Nevertheless the appearance of a settlement can be a key feature contributing to the surrounding rural landscape and equally the setting of a Conservation Area can be affected by developments in the surrounding countryside. There are a total of nineteen conservation areas within Angus. The largest are within the main towns but there are a number within smaller settlements throughout Angus.

There are extensive numbers of SAMs throughout Angus. Most characteristic are the numerous hillforts concentrated in the Sidlaw and Forfar Hills and the Highland Foothills. There are extensive remains of settlements and field systems in the lowland areas and a number of ruined castles.

Listed Buildings feature throughout the urban and rural areas. The greatest concentrations are located in the older settlements, particularly, but also in the smaller historic settlements and throughout most of the lowland and upland fringe areas. Listed buildings contribute to landscape character and value and their setting is a consideration for neighbouring development proposals.

3.4.2 Nature Conservation Designations

Areas designated for their nature conservation interest and importance include SPAs SACs, Ramsar Sites, SSSIs and National Nature Reserves (NNRs). All are national or international designations and subject to the highest level of constraint in spatial frameworks. Whilst these constraints are primarily related to nature conservation interests (see 2.9 above), the designated area can contribute to the character and value of a landscape through its relatively undisturbed natural features and potential visitor interest.

In the Angus study area the most extensive areas are SSSI/Ramsar/SAC sites located along the coast: including Montrose Basin and Barry Links. A number of inland lochs are also SSSI's and/or Ramsar Sites. Several extensive SSSI's lie outside Angus, within the 30km buffer within the Cairngorms National Park and Aberdeenshire.

Ancient woodland inventory sites are distributed across Angus, most being located in the lowland areas and sheltered glens in the Highlands. The largest area is at Montreathmont Forest 10km to the east of Forfar.

3.5 Wildness Mapping

SNH's wild land policy (2002) recognises the importance both of wild land in Scotland's countryside and to perceptions of wildness to society. The policy also notes the potential for development to erode the extent of wild land and perceptions of wildness in other areas.

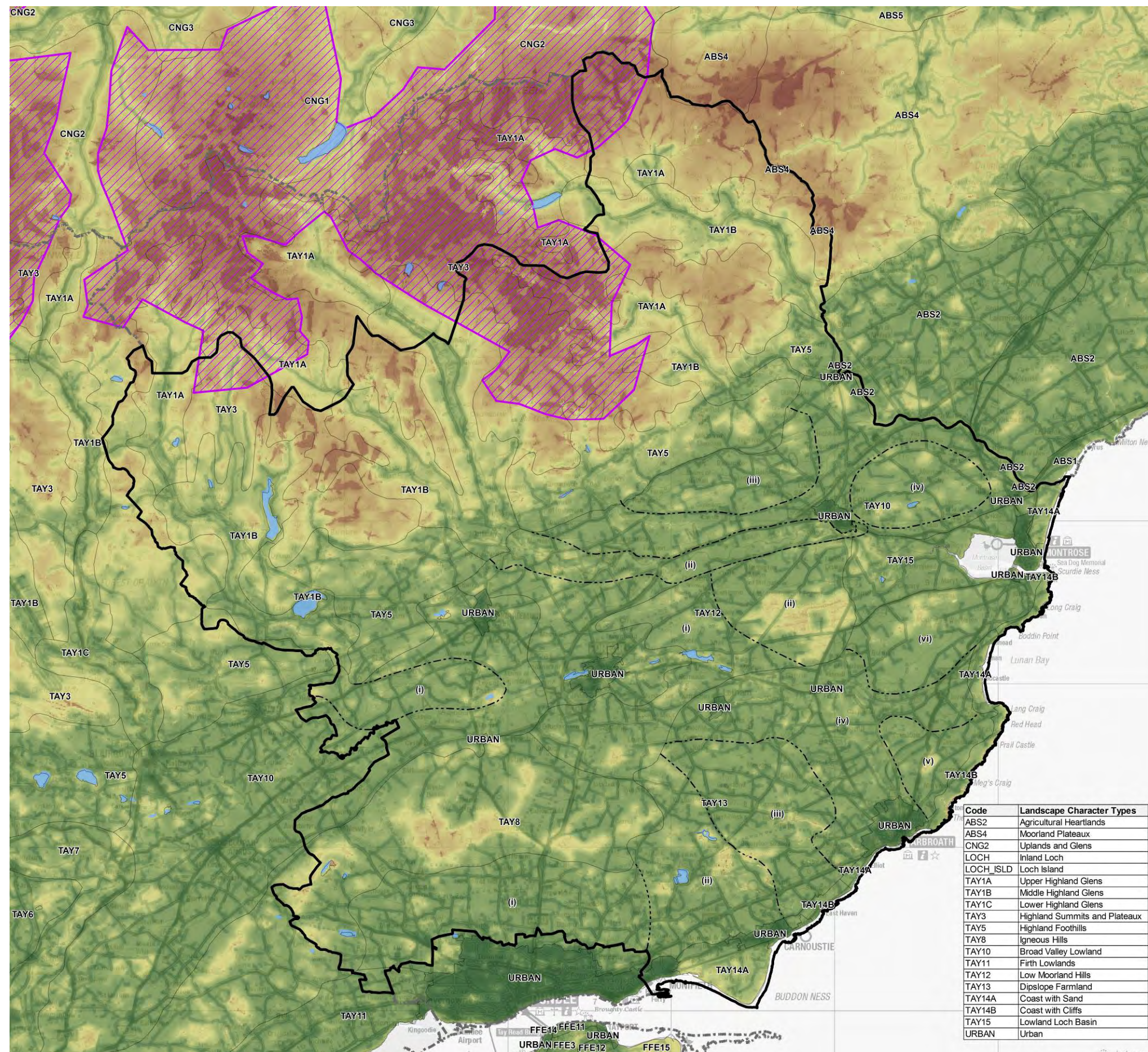
SNH has recently completed a mapping exercise in which the factors that contribute to wildness in a landscape have been combined and mapped to create a detailed picture of wildness on a relative scale (*Mapping Scotland's Wildness, Wildness Map January 2012*). Figure 3.7 of this report shows this in relation to the Angus landscape character areas. There is a sharp division in Angus between the Highlands and the Lowland and Coastal areas, with smaller areas of relative wildness appearing on the Sidlaw hills and Montreathmont Forest in the latter.

40 draft Core Areas of Wild Land have been identified across Scotland, based on the assessment of wildness. Area 16: Lochnagar and Mount Keen is partially located in Angus and fully within the Angus study area (*Core Areas of Wild Land in Scotland, April 2013*). This area is also shown on Figure 3.7: the greatest extent within Angus lies between Glen Clova, Glen Lethnot and Glen Esk, with smaller areas around Mount Keen to the north of Glen Esk and to the northeast of Glen Isla.

This information is used to identify areas with the highest wildness qualities in the study area and informs the assessment of landscape value of landscape character areas.

3.6 Other Relevant Matters

Other areas of interest which contribute to landscape value include walking and cycle routes such as the National Cycle Route, The Catevan Way and Angus Core Paths. Also included are viewpoints, parks and gardens, golf courses and access land. These areas are mapped on Figure 3.8 and taken into account in the assessment of value of landscape types and areas, as detailed in Appendix 7 and referred to in Chapter 6.



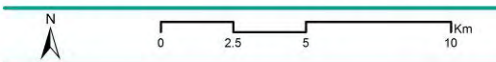
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Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- LCA Sub Areas (Ref. Table 6.1)
- Lochs
- Core Areas of Wild Land Character
- Level of Wildness**
- High
- Low

Figure 3.7

Scottish Wildness and Core Areas of Wild Land



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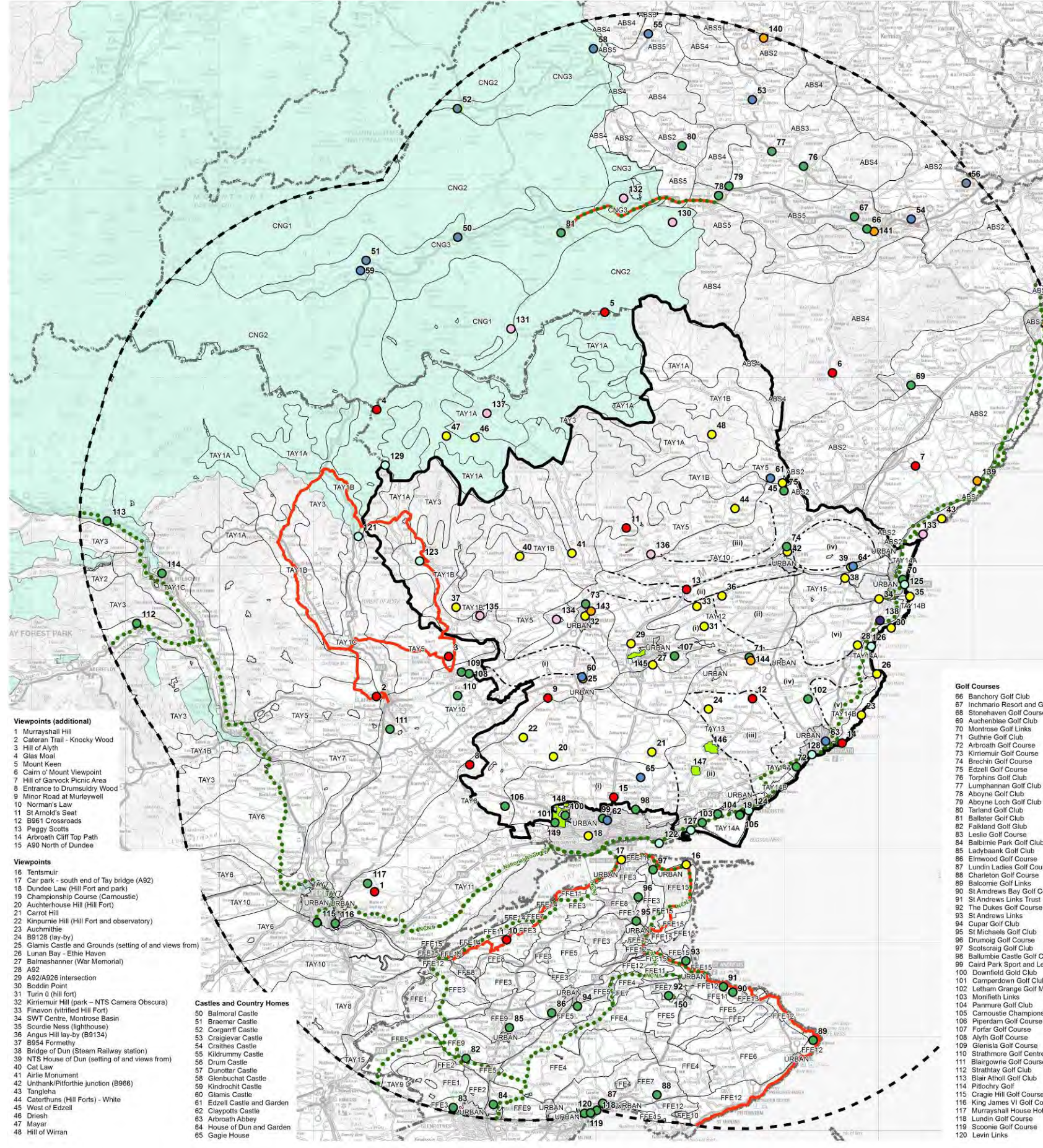


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Legend

- Study Area
 - Study Area 30km Buffer
 - Scottish Local Authority Boundaries
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
 - Cairngorms National Park
- Locations of Landscape / Recreational Interest**
- Castles and Country Homes
 - Golf Courses
 - Natural Features
 - Nature Centres and Reserves
 - Parks and Gardens
 - Visitor Attraction
 - Viewpoints
 - Additional Viewpoints
 - Cycle Routes
 - Long Distance Footpaths
 - Country Parks

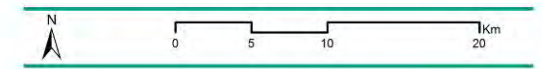
Code	Landscape Character Types
ABC1	Major River Valleys
ABC4	Open Farmland
ABC5	Wooded Farmland
ABS1	Coastal Strip
ABS2	Agricultural Heartlands
ABS3	Farmed Moorland Edge
ABS4	Moorland Plateaux
ABS5	Straths and Valleys
CNG1	Cairngorm Plateau
CNG2	Uplands and Glens
CNG3	Cairngorm Straths
FFE1	The Uplands
FFE2	Upland Slopes
FFE3	Upland Foothills
FFE4	Pronounced Volcanic Hills and Craigs
FFE5	Lowland Hills and Valleys
FFE6	Lowland Open Sloping Farmland
FFE7	Lowland Dens
FFE8	Lowland Glacial Meltwater Valleys
FFE9	Lowland River Basin
FFE10	Lowland Loch Basin
FFE11	Coastal Hills
FFE12	Coastal Terraces
FFE13	Coastal Cliffs
FFE14	Coastal Braes
FFE15	Coastal Flats
LOCH	Inland Loch
LOCH_ISLD	Loch Island
MRN4	Uplands
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY2	Highland Glens with Lochs
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY6	Lowland Hills
TAY7	Lowland River Corridors
TAY8	Igneous Hills
TAY9	Dolerite Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban



- Viewpoints (additional)**
- Murrayshall Hill
 - Cateran Trail - Knocky Wood
 - Hill of Alyth
 - Glen Moal
 - Mount Keen
 - Cairn o' Mount Viewpoint
 - Hill of Garvock Picnic Area
 - Entrance to Drumisduy Wood
 - Minor Road at Murleywell
 - Norman's Law
 - St Arnold's Seat
 - B961 Crossroads
 - Peggy Scotty
 - Arbroath Cliff Top Path
 - A90 North of Dundee
- Viewpoints**
- Tentsmuir
 - Car park - south end of Tay bridge (A92)
 - Dundee Law (Hill Fort and park)
 - Championship Course (Carnoustie)
 - Auchterhouse Hill (Hill Fort)
 - Carrot Hill
 - Kinrurnie Hill (Hill Fort and observatory)
 - Auchmithie
 - B9128 (by-by)
 - Glams Castle and Grounds (setting of and views from)
 - Lunan Bay - Ethie Haven
 - Balmashanner (War Memorial)
 - A92
 - A92/A926 intersection
 - Boddin Point
 - Turin 0 (hill fort)
 - Kinrurnie Hill (park - NTS Camera Obscura)
 - Finavon (vitrified Hill Fort)
 - SWT Centre, Montrose Basin
 - Scurdie Ness (lighthouse)
 - Angus Hill lay-by (B9134)
 - B954 Formethy
 - Bridge of Dun (Steam Railway station)
 - NTS House of Dun (setting of and views from)
 - Cal Law
 - Airlie Monument
 - Unthank/Pitortie junction (B966)
 - Tanghaia
 - Edzell Castle and Garden
 - Caterthuns (Hill Forts) - White
 - West of Edzell
 - Diesh
 - Mayar
 - Hill of Wirran
- Castles and Country Homes**
- Balmoral Castle
 - Braemar Castle
 - Corgarriff Castle
 - Craigievar Castle
 - Craithes Castle
 - Kidrummy Castle
 - Drum Castle
 - Duncatraz Castle
 - Glenbuchat Castle
 - Kindrocht Castle
 - Glams Castle
 - Edzell Castle and Garden
 - Claypotts Castle
 - Arbroath Abbey
 - House of Dun and Garden
 - Gagie House

- Golf Courses**
- Banchory Golf Club
 - Inchmarloch Resort and Golf Club
 - Stonehaven Golf Course
 - Auchenblae Golf Club
 - Montrose Golf Links
 - Guthrie Golf Club
 - Arbroath Golf Course
 - Kinrurnie Golf Course
 - Brechin Golf Course
 - Edzell Golf Course
 - Torphins Golf Club
 - Lumphannan Golf Club
 - Aboyne Loch Golf Club
 - Tarland Golf Club
 - Balalder Golf Club
 - Baltraine Park Golf Club
 - Ladybank Golf Club
 - Elmwood Golf Course
 - Lundin Ladies Golf Course
 - Charleton Golf Course
 - Balcombe Golf Links
 - St Andrews Bay Golf Course
 - St Andrews Links Trust
 - The Dukes Golf Course
 - St Andrews Links
 - Cupar Golf Club
 - St Michaels Golf Club
 - Drumlogie Golf Course
 - Scotsraig Golf Club
 - Balmuir Castle Golf Club
 - Card Park Sport and Leisure Grounds
 - Downfield Golf Club
 - Campdown Golf Club
 - Letlham Grange Golf Management
 - Monifeth Links
 - Pannure Golf Club
 - Carnoustie Championship Course
 - Piperdam Golf Course
 - Farfar Golf Course
 - Alyth Golf Course
 - Glensia Golf Course
 - Strathmore Golf Centre
 - Blargownie Golf Course
 - Strathray Golf Club
 - Blair Atholl Golf Club
 - Pitlochry Golf
 - Craigie Hill Golf Course
 - King James VI Golf Course
 - Murrayshall House Hotel and Golf Club
 - Lundin Golf Course
 - Scoonie Golf Course
 - Levin Links
- Natural Features**
- Mount Blair
 - Borghy Ferry Beach
 - Glen Isla
 - Carnoustie
 - Montrose Seafrost
 - Lunan Bay
 - Monifeth Beach
 - Arbroath Beach
 - Monamenach
- Nature Centres and Reserves**
- Glen Tanar
 - Loch Muick Reserve
 - Muir of Dinnet National Nature Reserve
 - St Cyrus National Nature Reserve
 - Loch of Kinrory National Nature Reserve - RSPB
 - Loch of Lintrathen
 - Mountains Animal Sanctuary
 - Corrie Fee National Nature Reserve
- Parks and Gardens**
- Dunnindal Gardens
- Visitor Attraction**
- Mill of Benholm
 - Grampian Transport Museum
 - Banchory Museum
 - Toitboth Museum
 - Kinrurnie Camera Obscura
 - Pitmaes Gardens
- Country Parks**
- Farfar Loch Country Park
 - Crombie Country Park
 - Monkie Country Park
 - Clatto Country Park
 - Campdown and Templeton Woods Country Park
 - Craigtown Country Park

Figure 3.8
Locations of Landscape Interest



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4.0 VISUAL BASELINE

The following section details the analysis that was carried out to establish the relative visibility and visual sensitivity of different parts of Angus.

4.1 Visual Receptors

In a study of landscape capacity and cumulative landscape impacts, it is important to consider visibility, and the effects of cumulative impact on visual receptors. This not only feeds into the assessment of landscape sensitivity and capacity (see Section 2.2), but also builds up a picture of how wind turbines might be perceived from visual receptors in and around Angus.

The types of potentially sensitive visual receptors within Angus are broadly categorised into three groups, represented by the following locations:

- Settlements, representing concentrations of residential receptors;
- Routes, representing travelling receptors, and including the dual carriageway Trunk Road, A roads, railway, and long-distance footpaths and cycleways;
- Viewpoints, representing visitors, selected from popular walking destinations, visitor attractions, and viewpoints identified on OS maps, including several viewpoints outside Angus but within the study area. These viewpoints were selected with the agreement of the officers of Angus Council.

The locations of the settlements, routes, and viewpoints are illustrated on Figure 4.1a and b. The assessment includes receptors in the visibility study buffer area of 15km beyond the Angus boundary (see 4.2 below).

Individual residential properties are not included in the visibility mapping although notice is taken of the frequency and distribution of dwellings in the analysis of each landscape character type.

Whilst there are working receptors in Angus, these have not been included, as it is common practice in Landscape and Visual Impact Assessment (LVIA) that people at work are considered to be low sensitivity visual receptors.

4.2 Visibility Analysis

An assessment of visibility was made from the settlements, routes and viewpoints illustrated in Figures 4.1a and b (Angus and wider study area). This was carried out by Envision 3D, using a computer based technique in which the intervisibility between receptors and landforms, or objects of specific heights on the landforms, is determined. The more intervisibility, the greater the visual sensitivity is likely to be. The method is described in more detail in **Appendix 2**.

The extent of the visibility assessment was limited to a 15km radius from the receptors. In our experience, this is the distance within which the great majority of significant impacts from wind farms or large turbines are likely to occur. Whilst it is recognised that impacts occur beyond this distance, up to 35km and beyond, as recognised by EIA best practice, this is not an EIA assessment and the results are considered to adequately distinguish between locations of potentially greater or lesser sensitivity.

Results of the visibility analysis are illustrated in Figures 4.2 a-f to 4.4 a-f (in **Appendix 4**). The colours show the differences in visual sensitivity across Angus. Red colours indicate areas that are most visible from the greatest numbers of receptors, grading through orange, yellow and green to blue areas that are seen by fewest receptors and uncoloured areas that would not be seen at all.

4.2.1 Settlements

Figures 4.2 a-f show that the areas most seen from settlements within 15km are located in the southern, lowland part of Angus; particularly near to where the largest population lies in Dundee.

Most notably visible are the edges of the *Dipslope Farmland* and coastal areas to the north and east overlooking the city and the south facing escarpment of the Sidlaws which is visible above the farmland. However there are pockets with low visibility for smaller objects (up to 50m) directly to the north of the city.

Other areas of *Dipslope Farmland* further east are visible from the settlements of Carnoustie, Arbroath, Brechin and Montrose. Rossie Moor between Brechin, Montrose and Arbroath is particularly visible by comparison with most other areas. The *Low Moorland Hills* to the north and east of Forfar, including Montreathmont Forest, also have a higher visibility, although lower ground between the hills is relatively concealed. Within Strathmore the most visible areas are the higher ground to the east of Brechin which separates the North and South Esk and the wider strath to the southwest of Kirriemuir.

Within the lowlands, the areas less visible from settlements include lower ground on the north of the Sidlaw Hills and the *Dipslope Farmland*, including the lower ground between Letham and Lunan Bay, and land draining to the North Esk to the north of the A90 at Brechin. In the latter area objects up to 50m or 80m are much less visible than in surrounding areas. On the coast Lunan Bay, sheltered by higher ground, is the least visible area.

The areas with least visibility of settlements lie to the north, in the Highland area. Here extensive areas would not be visible from settlements, reflecting the low population within these areas. The *Highland Foothills* are slightly more visible, with the most visible area being to the north of Kirriemuir. The narrow glens to the north of them are particularly sheltered from visibility.

4.2.2 Routes

The pattern of visibility from transport and other routes (Figures 4.3 a-f) shows similarities to the pattern for settlements, but is less skewed towards Dundee. Whilst areas close to Dundee are still the most visible for higher objects in particular, other areas showing

relatively higher visibility include: Strathmore and the Kirriemuir Hills around Kirriemuir which would be visible from several A roads including the A90; the higher Forfar Hills; the higher ground between North and South Esk; the higher areas of *Dipslope Farmland* including Rossie Moor and the *Highland Foothills*.

The less visible areas within the lowlands are similar to those for the settlements. Notably the pockets north of Dundee and the A90 near Brechin continue to show low visibility for objects below 50m or even 80m. Coastal areas show a similar pattern to settlements, with Lunan Bay the least visible.

Again the Highland area is the least visible due to the low density of routes within 15km, although the southern edges of all the hills are relatively more visible than is the case from settlements.

4.2.3 Viewpoints

The viewpoints tell a different story (Figures 4.4 a-f). This is because they relate less to centres of population and more to available views.

On the basis of the viewpoints selected, by far the most visually sensitive area is in Strathmore, around Kirriemuir. Areas north and east of Dundee have a low visibility from viewpoints.

Other areas of greater visibility from viewpoints include the *Low Moorland Hills* east of Forfar including Montreathmont Forest; the area of Strathmore around Brechin; all of the *Highland Foothills* and some of the southern ridges and summits of the *Highland Summits and Plateaux*. The heightened sensitivity of these areas reflects the significant number of hilltop viewpoints.

The areas least visible from viewpoints lie along the coast, in the valleys of the Sidlaw Hills and lower areas of the *Dipslope Farmlands* and in some of the Highland Glens. This is due to the concealing effects of topography.

4.2.4 Analysis of Visibility

The visibility analysis confirms some empirical observations of visual sensitivity across Angus, i.e. that it is the areas of higher topography and close to population areas that have the highest visual sensitivity. However it gives a more refined and nuanced assessment, determining which geographical areas are the most and least visually sensitive.

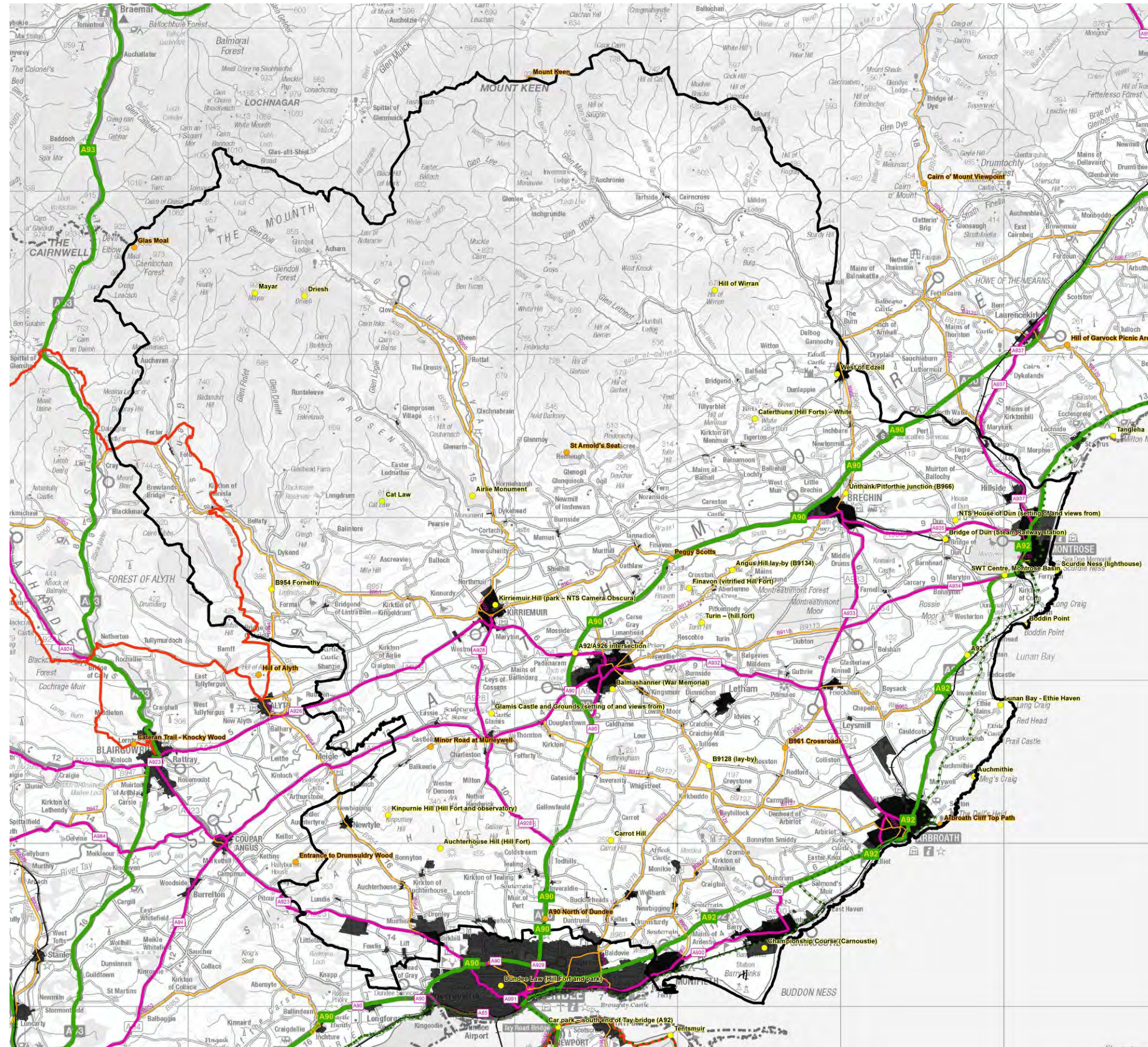
Areas of higher visibility may have a bearing on their capacity for wind turbine development although the relationship may not be simple: high visibility could mean high visual sensitivity but may also indicate exposed large scale locations suitable for turbines. Based on the computer assessment and on observation, the following areas are of higher sensitivity:

- The *Dipslope Farmland* and coastal areas north and east of Dundee due to proximity to a high population and transport routes;
- The main south facing escarpment of the Sidlaw Hills due to high elevation and proximity to a high population and transport routes;
- The Forfar Hills and Montreathmont Forest, the higher parts of which have higher visibility from viewpoints, transport routes and settlements;
- Higher areas of *Dipslope Farmland* which are visible from surrounding settlements and transport routes, particularly Rossie Moor and areas northeast of Dundee;
- Strathmore west of Forfar and particularly around Kirriemuir due to visibility from routes and from viewpoints;
- Strathmore east of Brechin where a higher area separates the North and South Esk and is visible from settlements, transport routes and viewpoints;
- The *Highland Foothills* and southern summits and ridges of the *Highland Summits and Plateaux*, due to visibility from viewpoints and, to a lesser extent, routes.

The least visible areas may have capacity to conceal turbines or site them away from most receptors. However their lack of visibility may indicate landscape character sensitivities such as smaller scale and greater levels of settlement, or alternatively remoteness:

- Lower *Dipslope Farmland* areas such as the Lunan Valley and areas north of Greystones which are sheltered by higher ground;
- Lunan Bay hidden between areas of higher *Dipslope Farmland*;
- Small valleys in the north and west of the Sidlaw Hills and between the Forfar Hills;
- Much of the *Highland Summits and Plateaux* and *Highland Glens* are not highlighted due to distance from population centres and transport routes. However they form a backdrop to much of lowland Angus and are in the foreground of views from the National Park;
- There are a number of small pockets which have lower visibility for smaller structures due to screening by surrounding low ridges. This includes areas of *Dipslope Farmland* north of Dundee and *Broad Valley Lowland* north of the A90 near Brechin.

The findings of the visibility assessment are incorporated in the analysis and assessment. Nevertheless, as discussed above, they require careful interpretation in relation to sensitivity of receptors, landscape character and the importance of some more distant views.

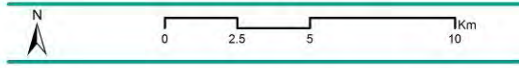


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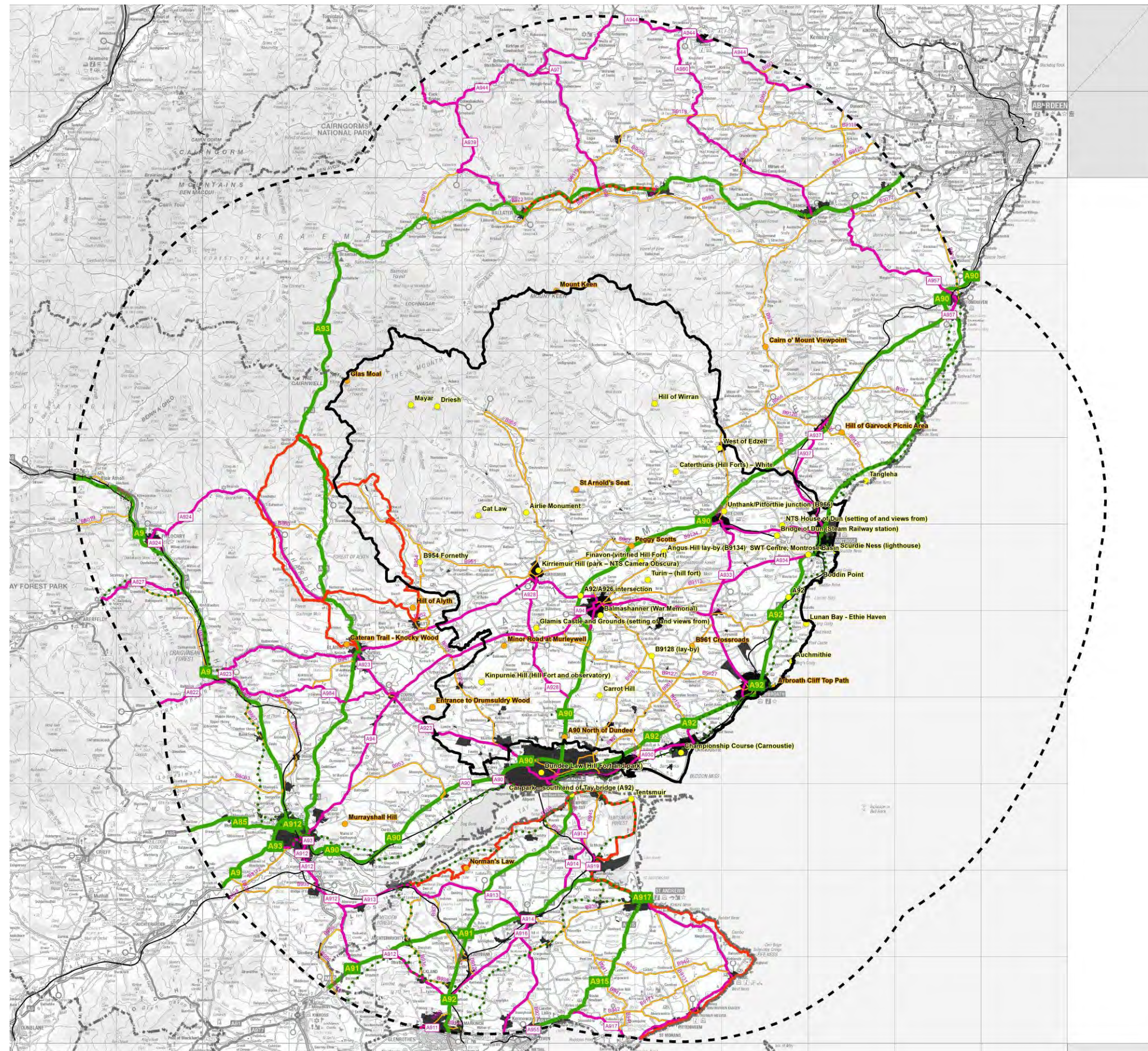
Legend

- Local Authority Boundary
- Scottish Local Authority Boundary
- Settlements
- Viewpoints
- Additional Viewpoints
- Cycle Routes
- Long Distance Footpaths
- Railway
- Road Classifications**
- Primary Road
- A Road
- B Road

Figure 4.1a
Transport Routes,
Settlements & Viewpoints
in Angus



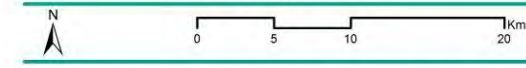
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- Legend**
- Local Authority Boundary
 - Study Area 30km Buffer
 - Scottish Local Authority Boundaries
 - Settlements
 - Viewpoints
 - Additional Viewpoints
 - Cycle Routes
 - Long Distance Footpaths
 - Railway
- Road Classifications**
- Primary Road
 - A Road
 - B Road

Figure 4.1b
Transport Routes,
Settlements & Viewpoints
in Study Area



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5.0 WIND TURBINES IN THE STUDY AREA

This section lists and describes the operating, consented and proposed wind turbine developments in the study area at May 2013. A brief explanation of turbine and windfarm size categories used in this study is given below.

5.1 Size of Wind Turbines and Windfarms

There are a number of overlapping and interacting factors which affect the potential landscape and visual effects of wind energy developments. The four main factors are:

- Size of turbine
- Turbine design (shape/ blades/ tower /colour)
- Numbers of turbines (within groups and/ or single turbines spread across an area)
- Distribution of turbine groupings (spacing between groups and/or single turbines)

The effects of these factors will in turn differ depending on the character of the landscape in which the turbines are located. The factors and their effects are discussed in detail in **Appendix 5** of this report. Tables 5.1 and 5.2 below provide a classification of wind turbine sizes and wind energy development sizes. These provide a basis on which turbine size and distribution is mapped and discussed in the following sections.

Table 5.1. Turbine Size Categories in This Study

Size Category	Blade Tip Height	Typical Use
Small	Turbines less than 15m in height	Typically used for domestic FiT schemes
Small-Medium	Turbines 15m to <30m in height	Typically used for domestic and farm FiT schemes
Medium	Turbines 30m to <50m in height	Typically used for farm and industrial FiT schemes
Medium/Large	Turbines 50m to <80m in height	Single turbine FiT schemes and smaller turbines used in commercial schemes
Large	Turbines 80m to <125m in height	Typical turbines used in commercial windfarms but also on some single turbine schemes
Very Large	Turbines 125m in height and greater.	Used in commercial onshore windfarms, as well as offshore (up to ca. 200m in the latter)

There is no current ‘accepted’ classification of commercial windfarm sizes in Scotland. Existing and proposed wind energy developments vary in turbine numbers and turbine sizes; from single small turbines to over 200 large turbines. Individual turbines vary in size from below 15m to more than 140m, with maximum outputs from a few kW to greater than 3MW.

To place Angus within context, it is worth considering the wider Scottish context. The table below refers to small, medium, large etc. size wind energy developments. For clarity the wind energy development size categories relate wherever possible to published guidance or planning application procedures. The 20MW size SPP currently refers is shown in the Table 5.2 below, although it should be noted that emerging Government policy is recommending the abandonment of this scale threshold.

Table 5.2. Wind Energy Development Size Categories

Size Category	Size Criteria	Planning Criteria/ Illustrative Examples
Small	A development of 3 or fewer turbines.	As defined by SNH guidance on assessment of small scale wind energy development (<i>SNH 2012</i>)
Small/Medium	A windfarm of more than 3 turbines up to 20MW output	Current SPP recommends windfarms above 20MW are to be covered by SPG. <i>E.g. Between 4 turbines over 50m and 10x2MW turbines or 6x3MW turbines</i>
SPP 2010 ‘Cutoff’ 20MW		
Medium	A windfarm between 20MW and 50MW output	Windfarms up to 50MW are dealt with as local planning authority applications. <i>E.g. Between 7x3MW and 16x3MW turbines</i>
Large	Windfarms greater than 50MW output	Windfarms over 50MW are section 36 Applications dealt with by Scottish Ministers. <i>E.g. A minimum size of 20x2.5MW or 17x3MW turbines</i>
Very Large	Windfarms greater than 100MW output	<i>E.g. A minimum size of 50 turbines over 125m tall</i>

5.2 Wind Turbine Distribution in the Study Area

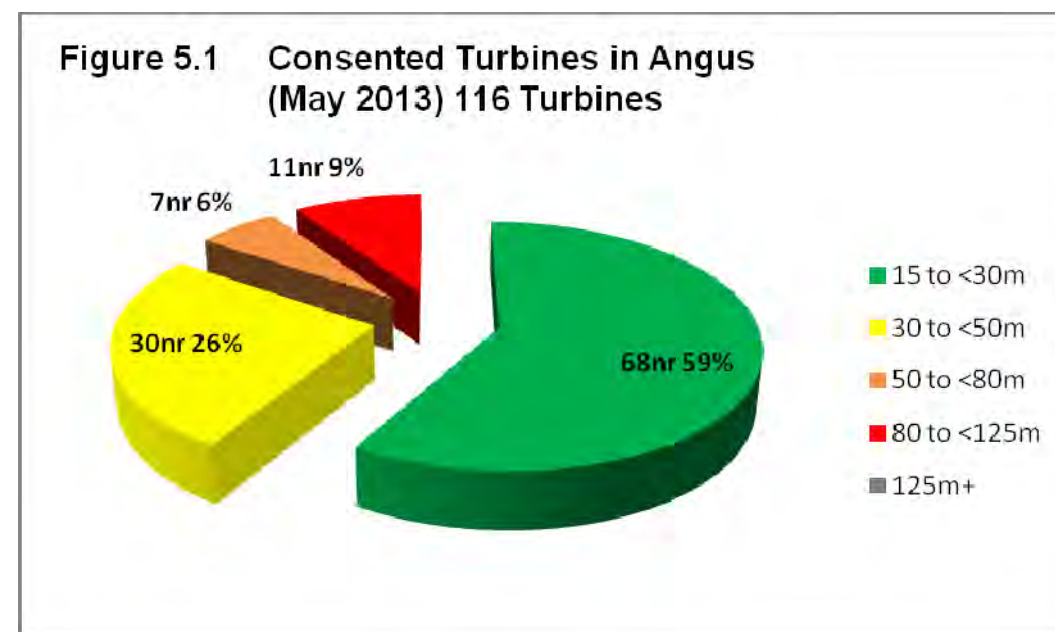
Consented and proposed wind energy developments within the study area are listed, together with details (where available) of location, number and height of turbines etc, in **Appendix 5**. The locations are shown in **Figures 5.1a** (Angus) and **5.1b** (whole study area).

At May 2013 there were within Angus a total of 116 turbines 15m and taller that are consented and 51 that are planned or S36 applications pending a decision. There are many further turbines consented and at planning stage in Perth & Kinross to the west, in Aberdeenshire to the east and in proposed offshore windfarms.

There are also a considerable number of turbines under 15m in height consented or pending approval. These are not included in the study.

5.2.1 Operating and Consented Wind Turbines within Angus

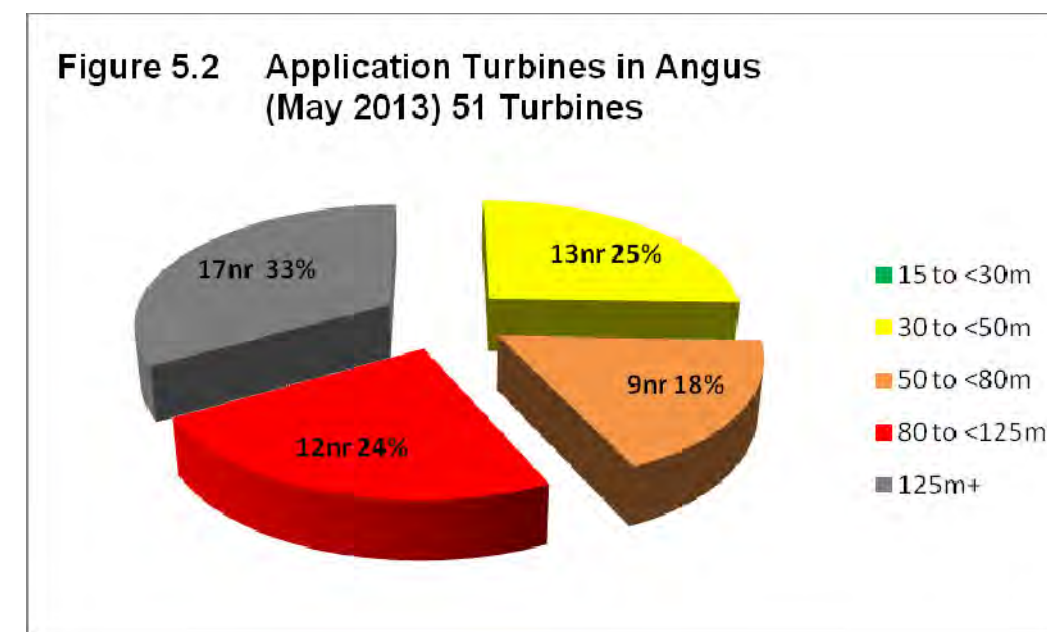
68 (59%) of the consented turbines are small/medium (15-<30m in height); another 30 are medium (30-<50m) and another 7 medium/large (50-<80m). Most of the turbines are single, with the remainder in groups of 3 or fewer. 8 of the 11 turbines over 80m are in Ark Hill windfarm in the Sidlaws. The other three are single turbine developments; with the tallest consented turbine at the former Tealing Airfield north of Dundee at 93.5m height.



The consented wind energy developments in Angus are all therefore at the smaller end of the size range. The only windfarm is Ark Hill with 8 x 81m turbines at 25MW. This is at the lower end of 'medium' in Table 5.2, and reflects the restrictions inherent in the Angus landscape.

5.2.2 Proposed Wind Turbines in Angus

The applications show a different distribution of sizes, with no turbines under 30m and the greatest proportion, 31 (59%), over 80m in height. These are mainly in windfarms.



Nathro, a S36 application with 17x135m turbines is the largest, located on the southern edge of the Highland area. At 61MW it would fall into the 'large' category in Table 5.2.

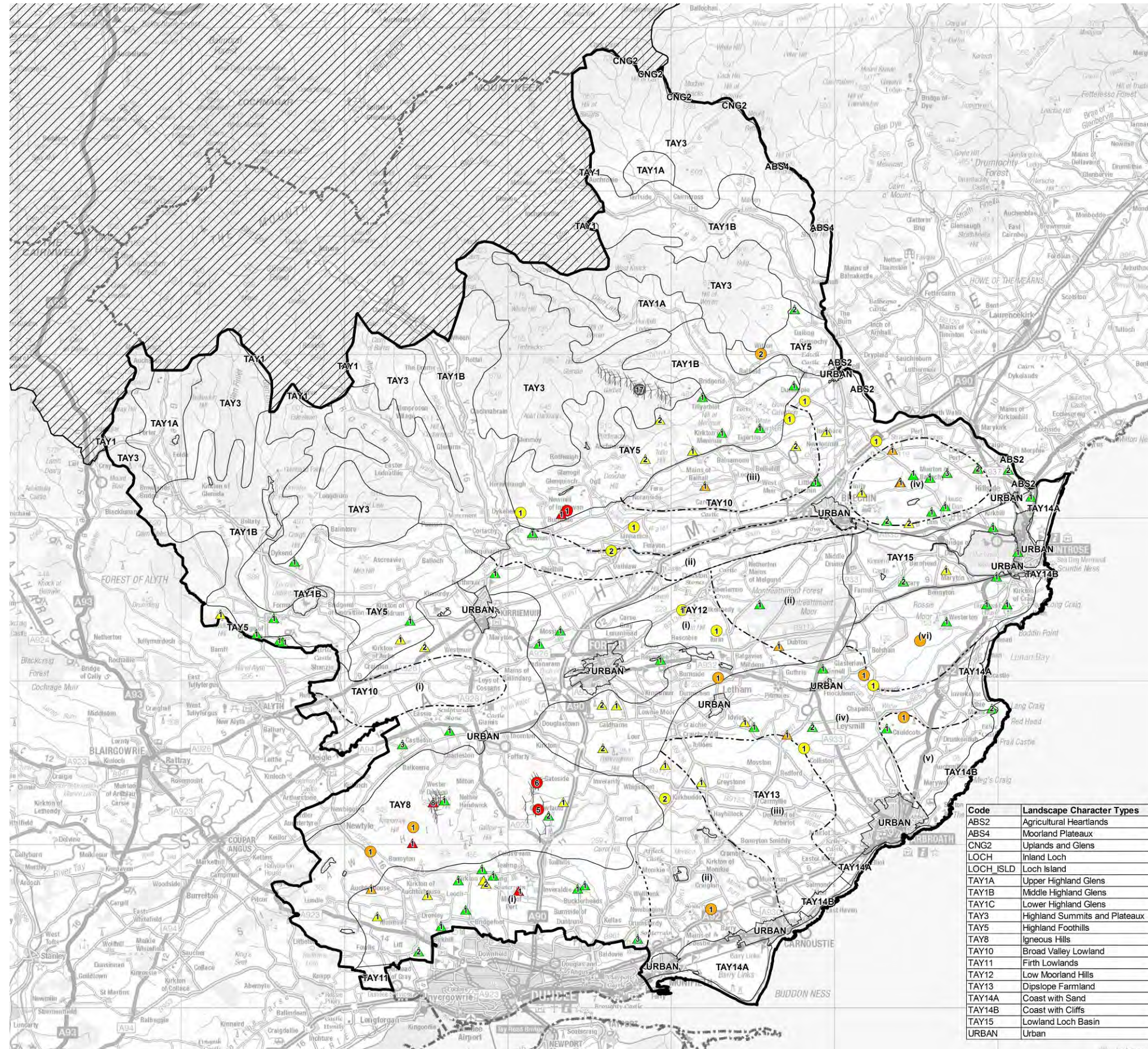
Two other small/medium windfarm proposals lie in the eastern Sidlaws: Frawney and Govals. The remaining proposals are predominantly single turbines.

5.2.3 Proposals That Have Been Refused

A number of windfarm proposals have been refused at planning application stage or dismissed at appeal over the past 5 years:

- Mountboy, Rossie Moor: 3x110m turbines (dismissed 2009)
- Montreathmont, Montreathmont Forest: 11x126.5m turbines (dismissed 2009)
- Dusty Drum, Carmyllie: 3x110 (refused 2009)
- East Skichen, Monikie: 3x91m (refused 2009)
- Hill of Finavon, near Forfar: 3x99.5m (dismissed 2012)
- Carrach on Mile Hill near Ascreavie: 9x84m (dismissed 2013)
- Corse Hill, near Carnoustie: 7x126m (dismissed 2013)
- GSK Turbines, Montrose: 2x132m (dismissed 2013)

The majority of these have been refused/ dismissed on the basis of adverse landscape and visual impacts based on the size (and sometimes number) of the turbines. This record is relevant to the subsequent detailed analysis and guidance in Chapter 6.



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Legend

- Study Area
- Scottish Local Authority Boundaries
- Cairngorms National Park
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- LCA Sub Areas (Ref. Table 6.1)

Consented Turbines:

(Height Category and No. of Turbines)

- Unknown Height
- 15 to <30m
- 30 to <50m
- 50 to <80m
- 80 to <125m
- 125m+

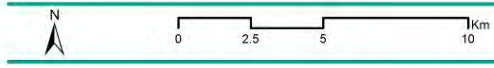
Application Turbines:

(Height Category and No. of Turbines)

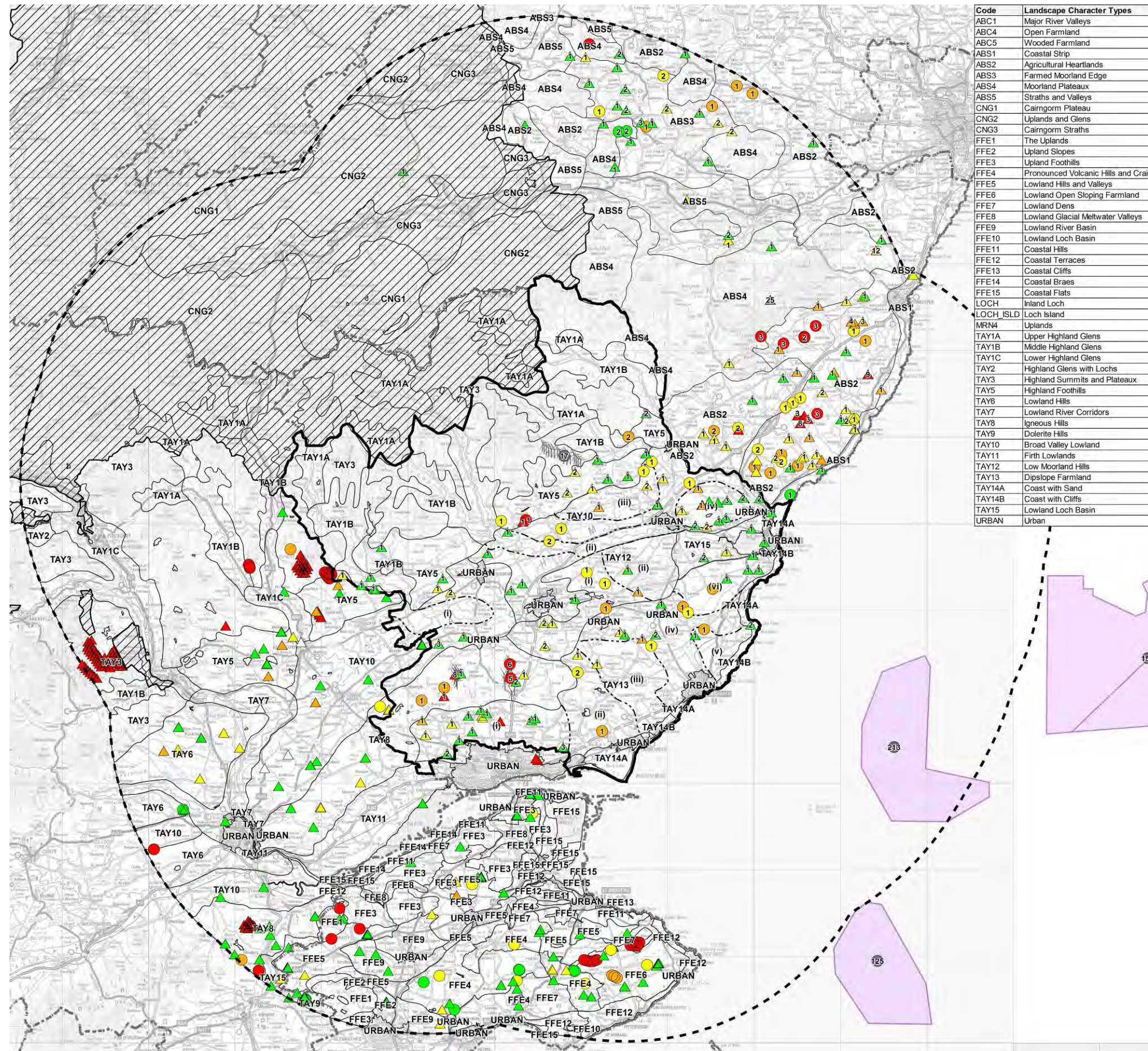
- Unknown Height
- 15 to <30m
- 30 to <50m
- 50 to <80m
- 80 to <125m
- 125m+
- Turbine Locations

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 5.3a
Existing, Consented & Proposed Wind Turbines in Angus



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Code	Landscape Character Types
ABC1	Major River Valleys
ABC4	Open Farmland
ABC5	Wooded Farmland
ABS1	Coastal Strip
ABS2	Agricultural Heartlands
ABS3	Farmed Moorland Edge
ABS4	Moorland Plateaux
ABS5	Straths and Valleys
CNG1	Cairngorm Plateau
CNG2	Uplands and Glens
CNG3	Cairngorm Straths
FFE1	The Uplands
FFE2	Upland Slopes
FFE3	Upland Foothills
FFE4	Pronounced Volcanic Hills and Craigs
FFE5	Lowland Hills and Valleys
FFE6	Lowland Open Sloping Farmland
FFE7	Lowland Dens
FFE8	Lowland Glacial Meltwater Valleys
FFE9	Lowland River Basin
FFE10	Lowland Loch Basin
FFE11	Coastal Hills
FFE12	Coastal Terraces
FFE13	Coastal Cliffs
FFE14	Coastal Braes
FFE15	Coastal Flats
LOCH	Inland Loch
LOCH_ISLD	Loch Island
MRN4	Uplands
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY2	Highland Glens with Lochs
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY6	Lowland Hills
TAY7	Lowland River Corridors
TAY8	Igneous Hills
TAY9	Dolerite Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban



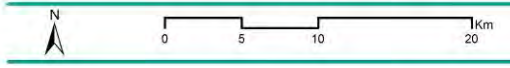
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- Legend**
- Study Area
 - Study Area 30km Buffer
 - Scottish Local Authority Boundaries
 - Cairngorms National Park
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)

- Consented Turbines:**
(Height Category and No. of Turbines)
- Unknown Height
 - 15 to <30m
 - 30 to <50m
 - 50 to <80m
 - 80 to <125m
 - 125m+

- Application Turbines:**
(Height Category and No. of Turbines)
- Unknown Height
 - 15 to <30m
 - 30 to <50m
 - 50 to <80m
 - 80 to <125m
 - 125m+
 - Turbine Locations
 - Extents of Offshore Windfarm

Figure 5.3b
Existing, Consented & Proposed Wind Turbines in 30km Study Area



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5.2.4 Consented Wind Turbines in 30km buffer outside Angus

Within the 30km buffer area outside Angus there are over 400 consented turbines, many of which are situated in windfarms. The majority of these are situated in Perth & Kinross and Aberdeenshire. There are no consented turbines in the Cairngorms National Park area.

The turbines most relevant to the Angus landscape are:

- the windfarms at Drumderg and Welton of Creuchies northwest of Alyth in Perthshire, which lie within the *Highland Summits and Plateaux* and *Highland Foothills* a few kilometres west of the Angus boundary, the former being extensively visible across Angus
- the windfarm at Tullo Farm on Hill of Garvock above Laurencekirk in Aberdeenshire, which lies within 10km east of Angus and is extensively visible in views along Strathmore and from eastern Angus (this windfarm is consented to be extended from 7 to 17 turbines);
- the two 120m turbines at the Michelin Factory in Dundee, within 2km of the southern Angus border
- the windfarm at Midhill in Aberdeenshire, which lies in the *Moorland and Plateaux* north of the Howe of Mearns, some 15km north east of Angus.
- a number of single turbines of medium to large size located in and around the Howe of Mearns, which is the northern end of the extensive lowland valley of Strathmore.

There are a number of wind turbines in Fife but most of these are single turbines that would be hidden behind the hills of northern Fife. Other larger concentrations of turbines within the 30km study area are at the edge of the 30km offset and mainly hidden by intervening landforms; although could be experienced sequentially on a journey through the wider study area.

There were no consented offshore windfarms in May 2013.

5.2.5 Proposed Wind Turbines in 30km buffer outside Angus

Within the 30km buffer area there were applications for a further 112 turbines on land. The most significant of these are as follows:

- 7 large turbines at Tullymurdoch wind farm in Perth & Kinross, straddling the boundary between *Highland Summits and Plateaux* and *Highland Foothills*, on the boundary with Angus
- a significant number of single turbine / small windfarm applications in the *Agricultural Heartlands* of Aberdeenshire within 20km of Angus.

There are three very large developments proposed offshore, all at scoping: This includes

- Inchcape, over 200 turbines, 15km offshore from Angus;
- Neart na Gaoithe with 125 x 197m turbines, located at 30km south on the edge of the study area;

- The 150 turbine Firth of Forth & Tay windfarm with Alpha and Bravo arrays at 27km and 38km to the east, lies largely outside the study area.

Further applications are smaller scale and/or further removed from the Angus boundary.

5.3 Landscape Character of Turbine Locations

The trend in Angus is for locating single and smaller groups of turbines in the lowlands. This does not reflect the trend for larger windfarms and clusters prevalent in upland areas of Scotland, nor the proliferation of turbines in the Aberdeenshire farmlands. It does however show a trend towards locating single and smaller groups of turbines in lowland areas and shows the more scattered distribution of smaller turbines typical of FiT projects (although recent submissions for individual turbines include increasingly large turbine sizes).

The consented developments in highland areas have single or low numbers of turbines of a smaller size. There are very few consents in the coastal areas and none in the highest of the highland areas, although there are highland windfarms in close proximity in neighbouring Perth & Kinross.

Within Angus, most of the consented turbines and planning applications for wind turbines are within lowland landscapes. The only windfarm, at Ark Hill, is located in lowland hills. There is one large development proposed in the Highland area. Table 5.3 below lists the turbine sizes relative to their locations. **Appendix 6** gives more details of individual developments

Figure 5.4: Consented Turbine Location and Heights in Relation to Landscape Character (May 2013) (Turbine Height: grey=very large; red=large; orange=medium/large; yellow=medium; green=medium/small)

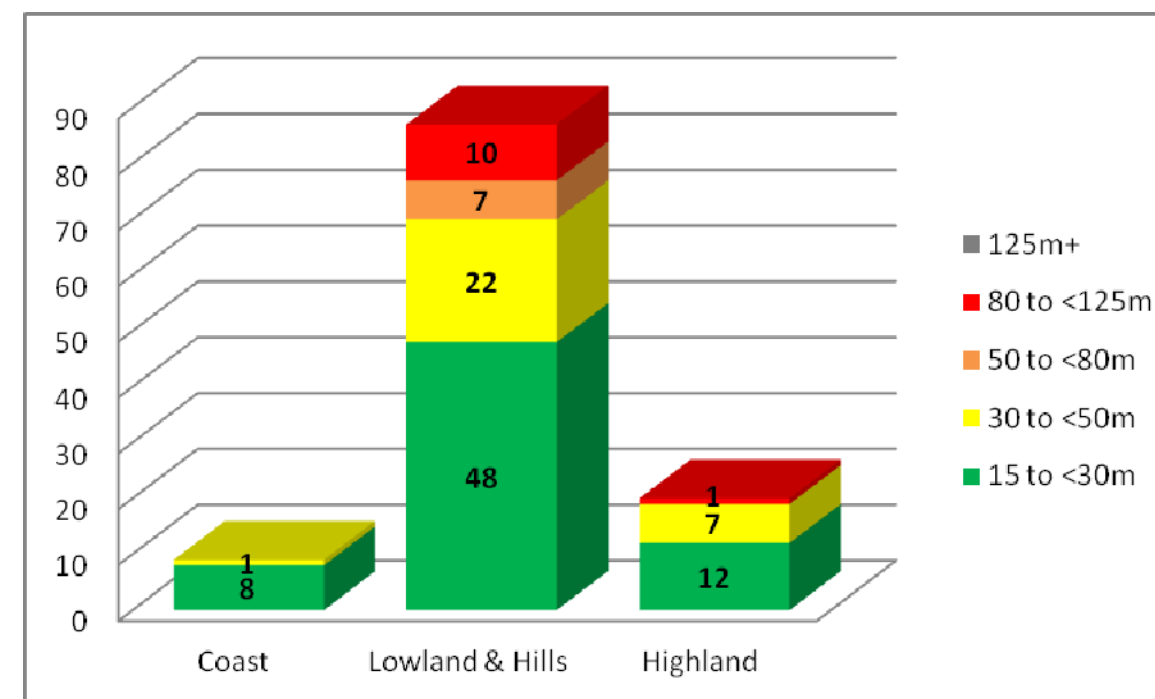
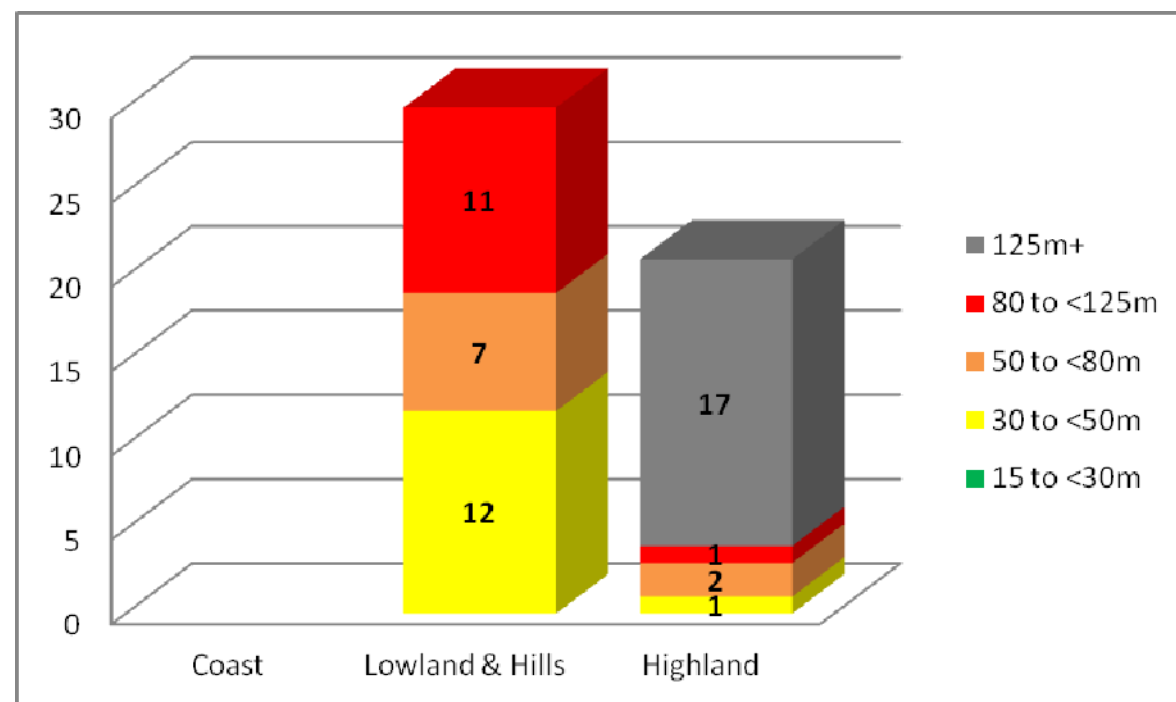


Figure 5.5: Application Turbine Location and Heights in Relation to Landscape Character (May 2013)



This tendency towards lowland landscapes can be explained by:

- the wide extent of lowland landscapes within Angus
- the potential sensitivity of the highland landscapes as a backdrop to Angus and proximity to the Cairngorms National Park
- Angus Council's existing locational guidance (*Renewable Energy Implementation Guide, 2012*) which supports appropriate locations for and scales of development across the local authority area

In landscape terms, upland areas offer a larger-scale landscape, which can accommodate larger turbines and it is rational to locate turbines in open, high and prominent areas to take advantage of higher wind speeds. Conversely, upland areas often represent "unspoiled" landscapes, with few overtly man-made features, and the construction of wind turbines and associated infrastructure (access tracks, electricity lines etc) could be seen as an unwelcome industrial addition. In Angus the largest scale upland types are seen as a prominently visible backdrop to the lowlands. This means that any significant wind energy development would have a very significant effect.

Coastal landscape areas are sensitive, being open, simple in character and visible inland and from the coastal settlements and areas outwith Angus. Over two thirds of Angus' population lives on the coast or immediate hinterland.

In lowland areas, the scale and pattern of the landscape is generally smaller, meaning that the largest windfarms and turbines can appear incongruous, particularly given the greater array of "reference features" such as trees and houses available with which to compare them. Together with the proximity of settlements and properties there are clear sensitivities

in such landscapes. Nevertheless, a location within the lowland area better reflects the relationship between energy production and the consumer, as well as generally being easier to service in terms of both access and connection to the electricity grid.

6.0 ASSESSMENT OF LANDSCAPE CAPACITY AND CUMULATIVE CHANGE

6.1 Assessment Purpose and Process

The purpose of the following assessment is to determine the capacity of the Angus landscape to accommodate wind turbine development and to determine what levels of cumulative development would be acceptable across Angus. The assessment involves four stages:

- 1) Firstly assessing the underlying capacity of the Angus landscape to accommodate wind turbine development;
- 2) Secondly, assessing the degree of cumulative change resulting from operating and consented wind turbines in the study area and in Angus;
- 3) Thirdly, assessing the extent to which cumulative consented development has reached the limit of the landscape's capacity to acceptably accommodate wind energy developments.
- 4) Finally, assessing residual capacity and the level of further development that could acceptably be accommodated within areas of Angus.

An assessment methodology is given in **Chapter 2.0** and further detailed in **Appendix 2**. The assessment is summarised in **Table 6.1(a-i)** and **Figures 6.1 to 6.4** following. Table 6.1 is divided into several columns which summarise the assessment and guidance. The assessment works from left to right across the table. A blank table with an explanation of each column/section is shown overleaf.

Maps in Figure 6.1a-f show the capacity for turbines of each size category in each LCT, LCA or LCA sub-type as determined by the assessment in Table 6.1. The assessment gives a broad category of high, medium or low (see method in Chapter 2).

Figures 6.2 and 6.3 are maps showing the extent of existing and proposed wind turbine landscape types in Angus. The types are explained in Table 2.1.

- The extents shown in Figure 6.2 are an illustrative approximation based on size and distribution of consented turbines and the modulating effects of topography and landscape character.
- The extents shown in Figure 6.3 illustrate the proposed acceptable extent of future wind turbine development through its effect on the landscape.

The assessment was informed by desk and field based survey. This included the field use of 360° wirelines of consented, proposed and potential future wind energy developments as seen from the representative viewpoints (see Figures 4.1a and b for location of these). These were used by both consultant and client in joint fieldwork, to arrive at a consensus view on landscape capacity for turbines numbers and sizes.

The areas shown are approximate, based on landscape character and topography, and account for key constraints and opportunities. In all cases the figures should be interpreted through the further detailed descriptions and guidance given in this report.

The assessment is carried out for each of the eleven LCTs in Angus and Table 6.1 is divided into sections reflecting this (Table 6.1(a-i)). Each table section is preceded by a brief summary of the landscape character and a map highlighting the distribution of the relevant LCT/ LCAs. The map also shows the distribution of consented and proposed wind turbines (as at May 2013) for ease of reference. Where there are significant variations in sensitivity, capacity or consented levels of development within the LCTs across Angus the relevant LCAs are given a separate assessment. Where the LCAs are divided into sub-areas with subtly different sensitivity and capacity these are also separately assessed. Each table section where significant capacity has been identified is followed by more detailed illustrated guidance on turbine siting.

This is followed by a summary of capacity and cumulative effects for the whole local authority area, and for the three main regional landscape areas of Angus, i.e.:

- 1) Highland;
- 2) Lowland & Hills; and
- 3) Coast.

Further spatial guidance regarding areas with restricted capacity and areas with capacity for further development are given at the end of this chapter and illustrated in **Figure 6.4**.

6.2 Guidance

Table 6.1 summarises guidance on turbine sizes, group sizes and separation between groups of turbines for each LCT/LCA that would limit development to the remaining landscape capacity. The details relate to turbines of each size category (small/medium, medium, medium/large, large and very large). It is stressed that the group size and spacing details for an area envisage the capacity for accommodating turbines of a *single size category* in the area, *not* for accommodating all categories together. There may be potential for accommodating different turbine sizes in the same area, but this would depend on the characteristics of the area, and accommodating one size of turbine will affect the ability to accommodate further turbines of any other size.

Where appropriate, further detailed and illustrated guidance for LCT, LCAs and sub-areas is given following the analysis in Table 6.1. The relative positioning and group spacing of turbines is discussed in the detailed guidance for each area.

As highlighted in section 2.3 of this report, guidance on small turbines, below 15m blade tip height, applies at a local level and is generic.

Appendix 5 of this report contains detailed discussion of how turbine size, design, group size and group separation affects perceptions of wind energy and landscape character. Further guidance is given in SNH's *Siting and Designing Windfarms* publication. The following briefly outlines the main considerations in developing the specific guidance for this assessment given with Table 6.1. The development of detailed guidance was also informed through the use of 360° wirelines in the field, as described in the preceding section.

6.2.1 Turbine Size

The guidance on turbine sizes generally relates most clearly to the horizontal and vertical scale of the landscape; complexity of landscape pattern and the presence or absence of smaller scale features and elements such as trees and houses. Small/medium and medium size turbines (under 50m blade tip height) are most able to be accommodated in smaller scale landscapes with more complex patterns and smaller scale reference features. Large and very large turbines (80m+ and 125m+ blade tip respectively) are most successfully accommodated in larger scale landscapes with simpler landforms and fewer small scale references. Smaller turbine sizes may also be accommodated in such landscape types although their proximity to larger size turbines would need to be carefully controlled.

The largest scale upland landscapes in Angus are relatively restricted in their capacity due to their visual sensitivity and landscape value. However some of the lowland types are of medium to large scale with a simple landform and pattern and may be able to accommodate larger turbines.

6.2.2 Turbine Group Size

Turbine group sizes relate to scale and complexity of the landscape, particularly to landform and pattern. In general larger scale more simple landscapes with gentle landforms and simpler patterns can accommodate larger groups of turbines, subject to having the physical capacity (i.e. available area).

6.2.3 Separation between Turbine Groups

Turbine size and group size can be generically related to landscape character when applied to a single turbine or windfarm, or across a number of windfarms. However, separation between groups of turbines is the single most important factor in controlling cumulative effects. This is because of the high prominence and extensive visibility of most turbines leading to effects on landscape character well beyond the turbine, as discussed in detail in Appendix 5.

The guidance in Table 6.1 therefore gives approximate separation distances that should be applied between turbine groupings (including single turbines) in order to achieve the desired turbine landscape typology. The main factors controlling the proposed separation distance are:

- 1) Proposed Turbine Landscape Type: each proposed type detailed in Table 2.1 requires a different separation distance to achieve the landscape and visual criteria described.
- 2) Turbine Size: larger turbines require a greater separation than smaller turbines to achieve the same landscape type.
- 3) Group Size: larger groups of turbines require a greater separation distance to achieve the same landscape type.
- 4) Landscape Character Type: this has an effect on all the above factors. In terms of visibility, more open landscapes with modest landforms are likely to require greater separation distances, whereas landscapes with significant topography and woodland

cover give the potential to reduce visibility. Factors such as scale and pattern can have a more subjective effect. The presence of other tall objects (such as electricity pylons) and of development also affects the perception of turbine development.

The distances given in Table 6.1 are a minimum, relating primarily to (1) and (2) above as in this case large groups are not proposed. Landscape character including topography is also important: where landforms are capable of visually separating turbine groups the distance between landforms is a consideration in setting distances.

In the case of small LCAs the separation distances for larger turbines might mean that, in theory, only one grouping would be comfortably accommodated within the area.

Separation distances also apply between a development in one landscape type and another in an adjacent type, or between turbines of different size categories. In such situations an average of the two recommended distances would be most appropriate.

In all cases the distances are an approximate range intended for guidance. Separation distances between specific proposals should therefore be considered in more detail on a case by case basis. In areas where turbine groupings can be accommodated, promote co-ordination between developments in order to accommodate more turbines within the landscape capacity. This includes encouraging turbines of a similar size and clustering as a group in preference to separation.

6.2.4 Other Factors which Influence Guidance

The capacity assessment for some generic LCTs does not cover the variation found between or even within individual LCAs of that type. This is usually because of one or two key landscape factors which partially override the characteristics including:

- All or part of the LCA is much more prominent and visible than the bulk of the area covered by the LCT;
- A particularly small area is covered by the unit compared with the main areas of the LCT;
- Some or all of the LCA lies in an area designated to protect a landscape or setting of a town;
- Close proximity to other more sensitive neighbouring LCAs which would be significantly affected by wind energy proposals otherwise suitable for the LCT;
- Close proximity to other LCTs, settlements or industry which reduces the sensitivity of a unit or part of a unit compared with the bulk of the area covered by the LCT.

A combination of any of these factors might limit the ability of a specific LCA, or part thereof, to accommodate a level of development otherwise acceptable to the LCT. The main areas are identified in Table 6.1 and Figures 6.1 to 6.4 but any specific development should be considered in more detail and assessed against local factors where appropriate.

Finally it is emphasised that this assessment is focused on landscape and visual issues. Areas which have been identified as suitable on this basis may be restricted

by other unrelated factors such as protection of wildlife, proximity to dwellings, aviation restrictions or lack of grid connection. These potential constraints are not the subject of this assessment and are covered by Angus Council's Local Plan Policies and *Implementation Guide for Renewable Energy (2012)* and the emerging Local Development Plan.

Explanation of Table 6.1

LANDSCAPE CHARACTER TYPE: (SNH Classification Code/Number) / NAME OF LANDSCAPE CHARACTER TYPE																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity					Turbine Size Key: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+													
UNDERLYING LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT				PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)									
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: <i>Name of Landscape Character Area/ Sub-Area</i>																		
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Brief description of consented wind energy developments (at time of report), including numbers size range, distribution, with key developments named.	Wind Turbine Landscape Type resulting from current consented levels of development (refer to Table 2.1 for description of type and map in Figure 6.2 for distribution of types across study area)	Proposed limits to future Wind Energy development expressed as a Wind Turbine Landscape Type (refer to Table 2.1 for description of type and Figure 6.3 for proposed distribution of types across the study area)	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Brief description of current applications (at time of report), highlighting the most significant proposals	Landscape Analysis: Brief description of key qualities and characteristics of the landscape character area/ sub-area and its capacity for different types of wind turbine development. Comments on Consented and Proposed Turbines: Brief comment on current developments and future proposals in relation to landscape capacity. Further detail is given in the guidance section following the table.
Assessment of landscape sensitivity and value of the landscape character area or sub-area (from detailed assessment in Appendix 5)				Assessment of landscape capacity for different turbine sizes derived from the sensitivity and value assessment and mapped in Figures 6.1a-e . This represents the 'underlying' capacity of the landscape and does not take into account the cumulative effects of existing/ consented wind energy development.							Max. Numbers in Group		1-3	1-3				
											Suggested range/ maximum number of turbines in groupings to ensure capacity is not exceeded							
									Min Group Separation Distances (km)		2-4	3-5						
									Suggested separation distance between turbine groupings to ensure capacity is not exceeded									

TAY 1: HIGHLAND GLENS

The Highland Glens lie in the Highland northern part of Angus and are deeply incised into the Highland Summits and Plateaux, providing access into the mountain massif and the Cairngorms National Park, in which the upper parts of the glens lie. The Angus Glens form part of the ever present backdrop to lowland Angus which rises north of the Highland Boundary Fault above Strathmore. They are a well known, signposted destination. The Glens are divided into two LCTs:

1A UPPER HIGHLAND GLENS

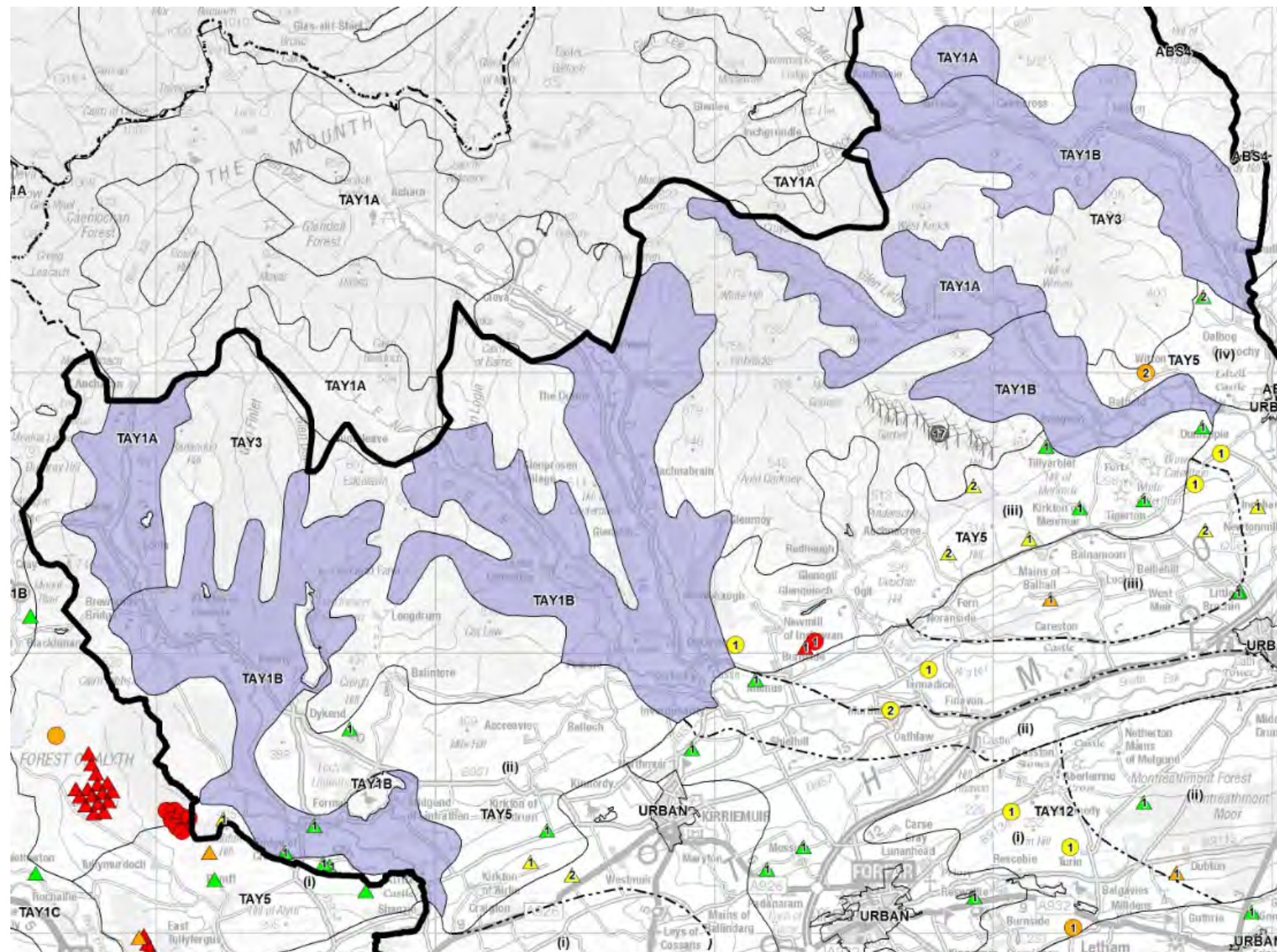
Deeply incised glens with qualities of remoteness and wildness emphasised by a lack of development and only minor roads or tracks. The Upper Highland Glen areas outside the National Park have similar

qualities to those within. However, being further removed from the highest mountains within the National Park they are generally of a lesser depth and wildness with more settled references on valley floors; such as enclosed fields, public roads and occasional houses or farms. (the exception being Glen Lethnot which lies within the Draft Lochnagar and Mount Keen Core Area of Wild Land).

1B MID HIGHLAND GLENS:

The Mid Highland Glens are further removed from the highest mountains and the National Park. They are generally of a lesser depth, with settled valley floors including enclosed fields, public roads, farms, houses and occasional villages.

There are five glens within the local authority area, each divided into the two types, although some of the upper glens are fully located in the National Park and therefore not included in this guidance.



1A Upper Highland Glen: Glen Tarf. Few signs of human settlement



1B Middle Highland Glen: Glen Esk. Areas with fields, roads and scattered settlement

Table 6.1(a): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Highland Glens

LANDSCAPE CHARACTER TYPE TAY 1: HIGHLAND GLENS																		
Key: ○ No Capacity ○ Low Capacity ● Medium Capacity ● High Capacity				Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+														
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT				PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)									
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
1a Upper Highland Glens Landscape Character Areas: Glen Isla; Glen Lethnot/ Westwater Valley; Upper Tarf Valley (Glen Esk)																		
Med/High	Med	Med/High	High	●	○	○	○	○	No current wind energy development.	<i>Upper Highland Glens with No Wind Turbines</i>	<i>Upper Highland Glens with No Wind Turbines/ Occasional Wind Turbines</i>	●	○	○	○	○	No current applications within UHG type. Proposed 17x135m turbine windfarm at Nathro above Glen Lethnot in neighbouring <i>Highland Summits and Plateaux</i>	Landscape Analysis: Deeply incised glens with qualities of wildness emphasised by a lack of development and only minor roads or tracks. The remote sparsely developed character is such that only single turbines up to 30m tall associated with buildings would be appropriate to this area, with no turbines in Glen Lethnot. Comments on Consented and Proposed Turbines: Current proposals for Nathro would have a significant visual influence on parts of Glen Lethnot
										Max. Numbers in Group	1							
										Min Group Separation Distances (km)	2-4							
1b Mid Highland Glens Landscape Character Areas: Glen Isla; Glen Prosen; Glen Clova; West Water Valley; Glen Esk																		
Med/High	Med/High	Med/High	Med/High	●	●	○	○	○	A few single small/medium turbines in and adjacent to lower areas of Glen Isla, West Water and Glen Esk. One 45m turbine in <i>Highland Foothills</i> at Kilry above Glen Isla.	<i>Mid Highland Glens with No Wind Turbines/ Occasional Wind Turbines</i>	<i>Mid Highland Glens with No Wind Turbines/ Occasional Wind Turbines</i>	●	●	○	○	○	One windfarm application at Tullymurdoch in Perthshire above Glen Isla (7x120m turbines). One medium turbine above Glen Clova; Proposed 17x135m turbine windfarm at Nathro above Glen Lethnot in neighbouring <i>Highland Summits and Plateaux</i> . Two medium/large turbines at Witton above West Water.	Landscape Analysis: The Mid Highland Glens are further removed from the highest mountains and the National Park. Suitable for wind turbine development of a smaller scale associated with settlements, farms or tourist facilities. Comments on Consented and Proposed Turbines: Proposals above Glen Isla would have a significant effect on a narrow section of the glen. Nathro windfarm would have a significant visual influence on Glen Lethnot/ West Water. Medium/large turbines at Witton are larger than recommended for the scale of landscape in which they lie and for the Highland Glens.
										Max. Numbers in Group	1-3	1						
										Min Group Separation Distances (km)	2-4	4-8						

GUIDANCE: TAY 1 HIGHLAND GLENS

1A UPPER HIGHLAND GLENS

Proposed Limits to Future Development: Upper Highland Glens with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium)

Group Sizes: 1 (small/medium)

Separation Distances: 2-4km (small/medium)

1B MID HIGHLAND GLENS

Proposed Limits to Future Development: Mid Highland Glens with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-3 (small/medium); 1 (medium)

Separation Distances: 2-4km (small/medium); 4-8km (medium)

Detailed Guidance for Highland Glens

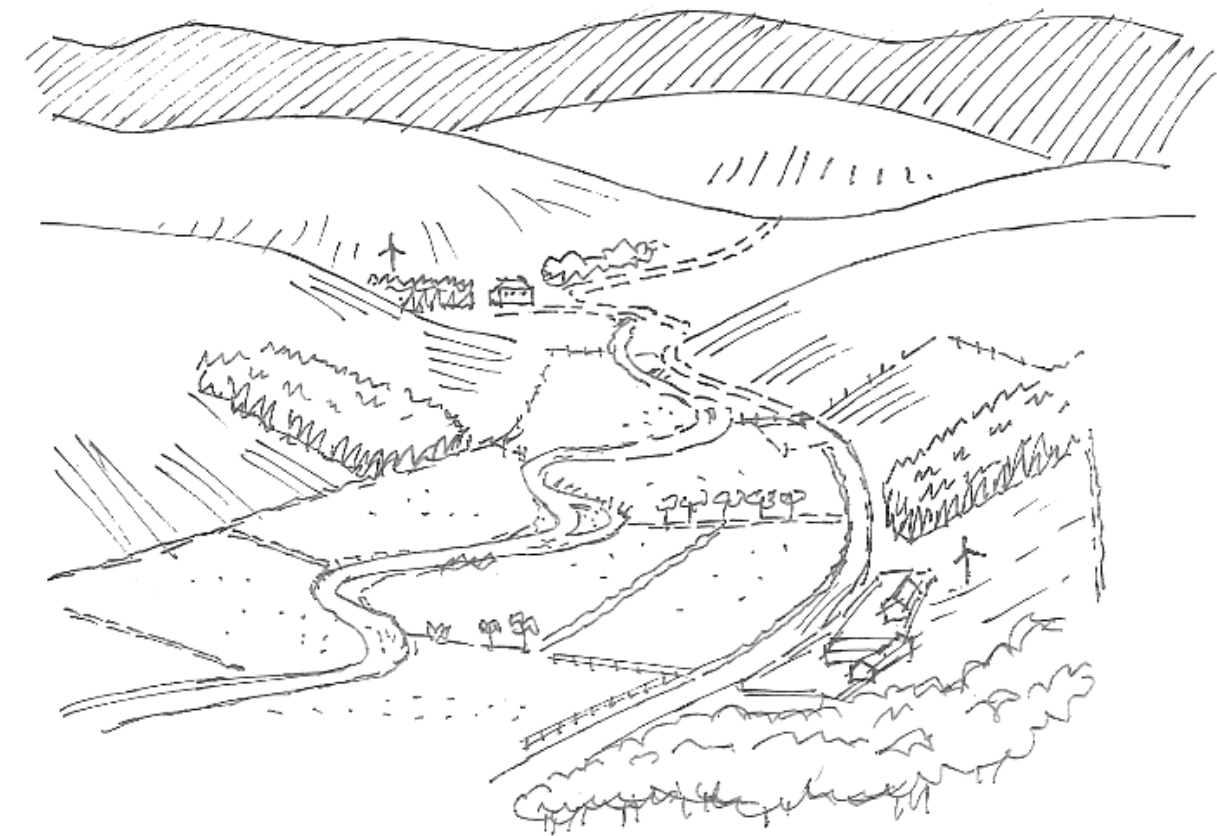
The Highland Glens have little capacity to accommodate wind turbines without adverse effects on their key characteristics of relative remoteness, wildness and low levels of built development.

Limit turbine development to single smaller size turbines located in the floor of the glen or the lower sideslopes, where enclosure or shelterbelt/ forestry planting already indicates human manipulation of the landscape. In the Upper Glens the remote largely undeveloped character is such that only single small/medium turbines up to 30m tall associated with buildings would be appropriate. All of Glen Lethnot above the public road end at Waterhead is located within the Lochanagar and Mount Keen Draft Core Area of Wild Land as it has no metalled road or dwellings. This area is not suitable for wind turbine development.

In the *Middle Highland Glens* it may be possible to accommodate medium size turbines up to 50m in association with larger clusters of development, although care should be taken not to dominate listed buildings, small cottages and houses or smaller scale scenic areas such as rivers, lochs, designed landscapes or prominent landforms.

Separate turbine groups sufficiently to ensure that there is minimal intervisibility between turbines, and/or ensure that turbines are sufficiently small to read as scattered, isolated features. Turbines in areas close to the electricity transmission line which crosses the lower part of most of the *Middle Highland Glens* should be carefully positioned so as to avoid visual clutter.

Currently there are no turbines located in the *Upper Highland Glens*. In the *Middle Highland Glens* there are very few, predominantly small/medium, turbines mainly in adjacent areas that have relatively little influence on the landscape. There is a concentration of small/medium and medium turbines near the bottom of Glen Isla, mainly in the adjacent *Highland Foothills*. Further turbine development in this area should be limited to avoid extending an area of *Landscape with Wind Turbines* fully into the glen.



Mid and Upper Highland Glens can only accommodate smaller turbines in the more settled lower sideslopes or valley floor where they are associated with scattered built development and other signs of human intervention

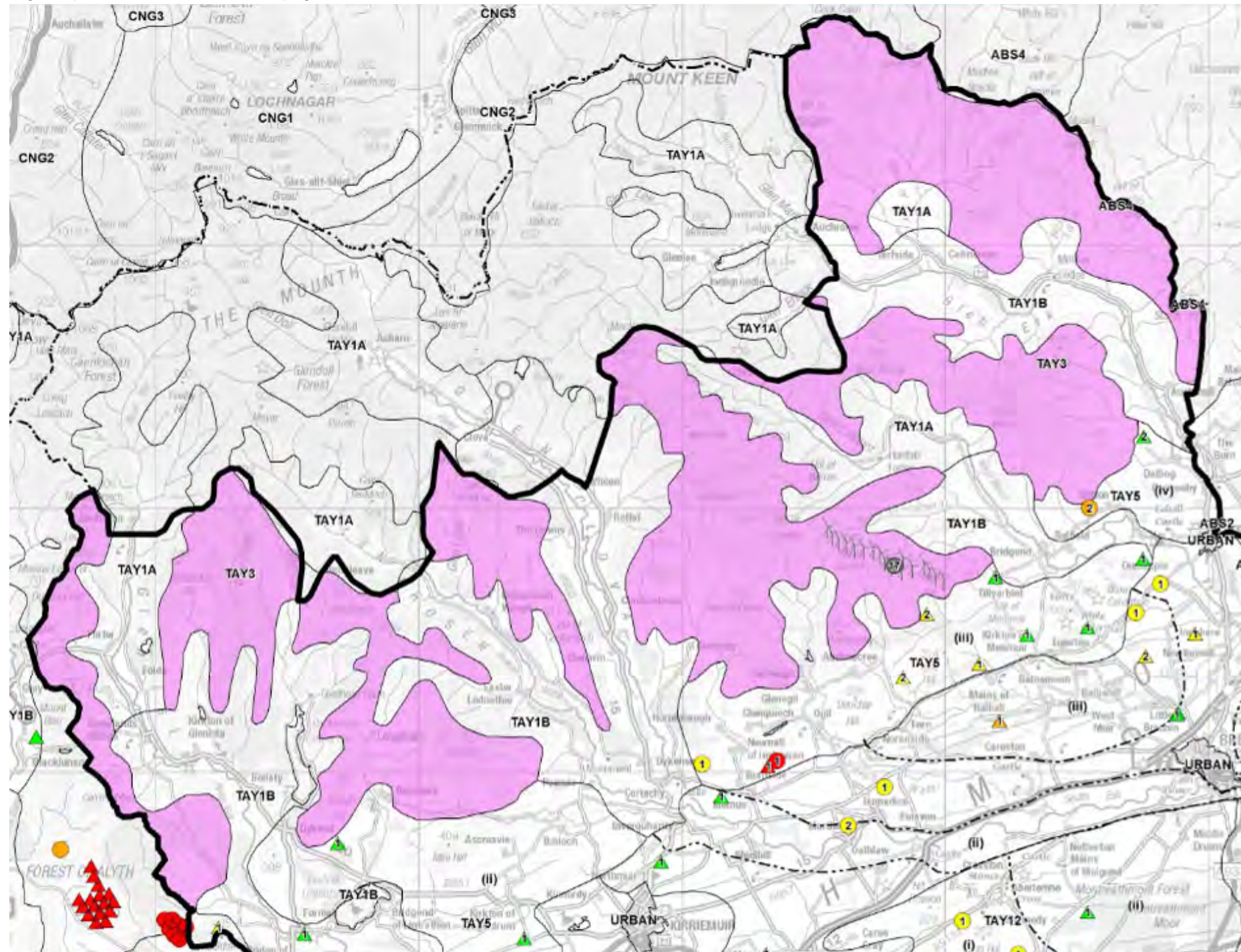
TAY 3: HIGHLAND SUMMITS AND PLATEAUX

This type covers a substantial area in the north and west of Angus. Much of the highest part surrounds the *Upper Highland Glens* lying within the Cairngorms National Park. The remaining areas, lying within the Angus study area form substantial ridges separating the glens from one another.

The hills are large in scale and predominantly of a rolling shape, generally with simple patterns of vegetation cover such as heather, grass or forestry. The broad ridges separating the Glens culminate in higher plateau areas with steep glaciated sides within the National Park. The hills also have a wild,

remote and windswept character. A substantial area within the study area, extending into the National Park is identified as a Draft Core Area of Wild Land (16. Lochnagar/ Mount Keen).

The *Highland Summits and Plateaux* form the foreground for views south from the National Park, the setting for the Angus Glens and an ever present backdrop to the north for much of the rest of Angus, emphasising the separation of lowland and highland landscapes north and south of the Highland Boundary Fault.



Highland Summits and Plateaux above Glen Clova form a backdrop to Kirriemuir Camera Obscura and the wider lowland area.



Site of the proposed Nathro Windfarm viewed from the south

Table 6.1(b): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Highland Summits and Plateaux

LANDSCAPE CHARACTER TYPE TAY 3: HIGHLAND SUMMITS AND PLATEAUX																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Areas: Forest of Alyth; Caenlochan/ Glen Doll Forests; Muckle Cairn/ Hill of Glansie/ Hill of Wirren; Hill of Saughs/ Mount Battock																		
Med	High	Med/High	Med/High	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	No turbines currently located within Angus HSAp. In Forest of Alyth within Perthshire, Drumderg (16x107m) lies within 2-3km and Welton of Creuchies, (4x98m) lies 5km west of Angus. A scattering of single/paired small/medium and medium turbines in neighbouring glens and foothills. One 45m turbine at Kilry above Glen Isla.	Highland Summits and Plateaux with No Wind Turbines/ Highland Summits and Plateaux with Wind Turbines (Forest of Alyth)	Highland Summits and Plateaux with No Wind Turbines/ Highland Summits and Plateaux with Wind Turbines (Forest of Alyth)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	One windfarm application at Tullymurdoch above Glen Isla (7x120m turbines); Proposed 17x135m turbines at Nathro windfarm above Glen Lethnot in neighbouring <i>Highland Summits and Plateaux</i> . Two medium/large (74m) turbines at Witton above the West Water.	<p>Landscape Analysis: The <i>Highland Summits and Plateaux</i> form the foreground for views south from the National Park, the setting for the Angus Glens and an ever present backdrop, beyond the Highland Boundary Fault, to much of the rest of Angus.</p> <p>Whilst large in scale and often of the rolling shape considered suitable for windfarm development, the hills also have a wild and remote character. A substantial area within the Study Area, extending into the National Park is identified as a Draft Core Area of Wild Land. The large scale may also be deceptive as the largest size turbines could reduce the perceived scale and grandeur of the hills.</p> <p>Due to these reasons this LCT is not considered to be suitable for wind turbines.</p> <p>Comments on Consented and Proposed Turbines: Consented wind turbines have little effect on this type within Angus. The windfarm at Drumderg affects the southern ridge of the Forest of Alyth area, creating a <i>HSAp with Wind Turbines</i>, slightly reinforced by the consented turbine at Kilry.</p> <p>The proposed turbines at Nathro would create a substantial area of <i>HSAp with Wind Turbines</i> extending well into the draft Core Area of Wild Land. It would dominate the nearby Menmuir Hills and would be a highly visible horizon feature across lowland Angus. Together with the two medium/large turbines at Witton this would affect the West Water valley.</p>

TAY5: HIGHLAND FOOTHILLS

The Highland Foothills LCT lies on the Highland Boundary Fault. It is therefore a transitional landscape between the Broad Valley Lowland of Strathmore and the Highland Summits and Plateaux. It has an intermediate scale, complex landform and often small scale detail due to the complex pattern of steep hills, small settled valleys and pockets of more fertile sheltered ground. Within Angus it comprises four separate areas.

(i) ALYTH FOOTHILLS

Most of this LCA lies within Perth & Kinross. The northeastern slopes overlooking Glen Isla lie within Angus, containing the lower part of the glen and forming the southwestern skyline.

(ii) KIRRIEMUIR FOOTHILLS

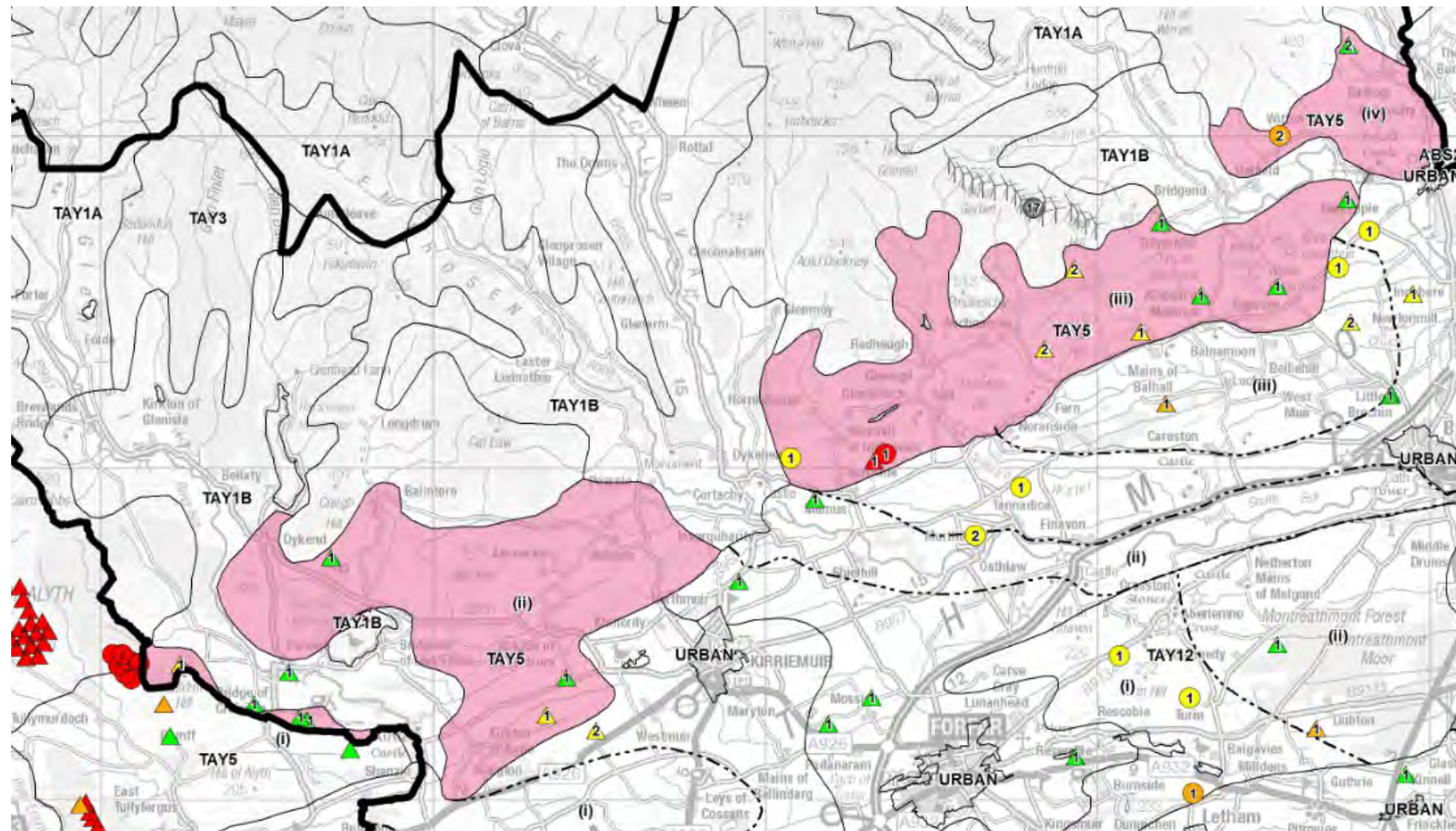
An area of complex topography including hills, small glens, small settlements and a network of roads extending into Strathmore. A key feature is Mile Hill, which as highest landform at 409m is dominant locally and more widely visible across Strathmore and the lower end of Glen Clova. It is separated from the Highland Summits and Plateaux and the prominent summit of Cat Law to the north by the narrow glen of Quharty Burn. The foothills also provide a setting to Balintore Castle, the Designed Landscape at Ascreavie and the Loch of Lintrathen. An electricity transmission line crosses the southern slopes.

(iii) MENMUIR FOOTHILLS

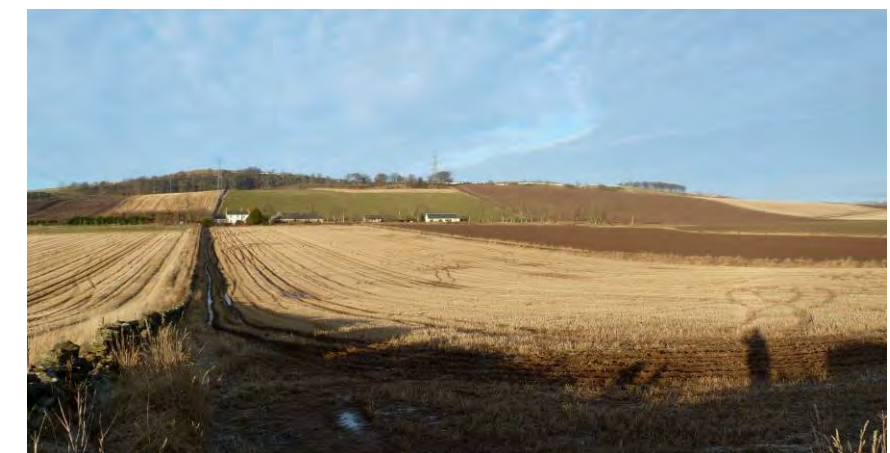
Simpler in topography than the western LCAs, lying between Glen Clova and West Water. Predominantly a long ridge of hills parallel to Strathmore, with parallel small glens on the Highland side. Two small glens (Glen Ogil and Cruick Water) penetrate the Highland Summits and Plateaux to the north. Some small settlements, but mainly isolated houses accessed by small roads. Two small lochs located at western end. There are a number of SAMs, including the hillforts at White and Brown Catherthun in the northeast, which are also key viewpoints overlooking Strathmore and the Highland Boundary Fault. An electricity transmission line passing from southwest to northeast crosses the ridge above Noranside to pass north of the hills.

(iv) EDZELL FOOTHILLS

This is much the smallest of the LCAs, lying between West water and Glen Esk. It predominantly comprises a single hill above Strathmore and the lower slopes of the *Highland Summits and Plateaux* to the north. It lies adjacent to the village of Edzell, but has mainly isolated houses accessed by small roads. Hill of Edzell is the main feature, which forms the backdrop to Edzell village and castle on the southern edge. An electricity transmission line passes north of the hill.



Kirriemuir Foothills: Looking across Strathmore to Mile Hill



Menmuir Foothills: site of the consented and proposed Memus Turbines

Table 6.1(c): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Highland Foothills

LANDSCAPE CHARACTER TYPE TAY 5: HIGHLAND FOOTHILLS																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input checked="" type="radio"/> Medium Capacity <input checked="" type="radio"/> High Capacity					Turbine Size: Small/Medium=15- $<$ 30m; Medium=30- $<$ 50m; Medium/Large=50- $<$ 80m; Large=80- $<$ 125m; Very Large=125m+													
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT				PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)									
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: (i) Alyth Foothills (eastern edge only in Angus)																		
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Drumderg within P&K lies within 3km of this LCA in Angus. Another medium large turbine in P&K within 1km of the boundary near Balduff Hill. A scattering of single small/medium turbines and one medium (45m) turbine at Kilry all on slopes overlooking Glen Isla. 4x99.5m turbines at Wellton of Creuchies are in the LCA but 5km west of the border.	Highland Foothills with Wind Turbines	Highland Foothills with Wind Turbines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Proposed 7x120m windfarm at Tullymurdoch is located in P&K but adjacent to Angus boundary.	Landscape Analysis: Most of LCA lies within Perth & Kinross but the northeastern edge encloses Glen Clova, forming the skyline. Comments on Consented and Proposed Turbines: Wind farms and turbines in Perth& Kinross, together with scattered turbines in Angus create <i>Highland Foothills with Wind Turbines</i> over much of the area including the part in Angus. There is no further capacity for turbines of any size within Angus. Further windfarm proposed at Tullymurdoch would extend <i>Highland Foothills with Wind Turbines</i> type and create an area of <i>Wind Turbine Landscape</i> across the boundary between <i>Highland Summits and Plateaux</i> and <i>Highland Foothills</i> above Glen Isla.
									Max. Numbers in Group									
									Min Group Separation Distances (km)									
Landscape Character Area: (ii) Kirriemuir Foothills																		
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently two small/medium and one medium turbine consented.	Highland Foothills with Occasional Wind Turbines/ No Wind Turbines	Highland Foothills with Occasional Wind Turbines	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	No further proposals	Landscape Analysis: Only suitable for turbines below 50m due to modest scale and the complexity of the landscape and sensitive receptors. Avoid prominent summits and sensitive areas Comments on Consented and Proposed Turbines: Current consented development remains well within capacity. A proposed development of 9 large turbines at Carrach below Mile Hill was recently dismissed at appeal on grounds of landscape and visual impact.
									Max. Numbers in Group	1-3	1-3							
									Min Group Separation Distances (km)	2-4	3-6							

LANDSCAPE CHARACTER TYPE TAY 5: HIGHLAND FOOTHILLS																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity																		
Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: (iii) Menmuir Foothills																		
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11 turbines consented within or close to this area. Largest is 86m at Memus on boundary with Strathmore. Other turbines are 4 small/medium and 5 medium further northeast, located on either side of the main ridge.	Highland Foothills with no Wind Turbines/ Occasional Wind Turbines/ with Wind Turbines	Highland Foothills with no Wind Turbines/ Occasional Wind Turbines/ with Wind Turbines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Proposed 17x135m turbine windfarm at Nathro above Glen Lethnot in neighbouring Highland Summits and Plateaux; A further large turbine proposed at Memus. One medium turbine at western end above Glen Clova and two in Strathmore at eastern end.	<p>Landscape Analysis: Simpler than western LCAs. Predominantly a long ridge of hills parallel to Strathmore with parallel small glens on the highland side. Only suitable for turbines below 50m. Turbines should not be sited on prominent ridgelines or affect the sensitive settings of the hillforts.</p> <p>Comments on Consented and Proposed Turbines: Current consented development remains mainly within capacity, although the Memus turbine is significantly larger than the recommended maximum 50m. Turbines located near the Caterthuns are small enough not to affect setting/view. Remaining capacity for siting further turbines restricted by current turbines.</p> <p>The proposed turbines at Nathro would dominate the Menmuir LCA. The further large turbine at Memus would reinforce the effects of the consented turbine. Current proposals elsewhere may create peripheral areas of <i>Highland Foothills with Wind Turbines</i> at south and west edges of the LCA.</p>
												Max. Numbers in Group	1-3	1-3				
												Min Group Separation Distances (km)	2-4	3-6				
Landscape Character Area: (iv) Edzell Foothills																		
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently only two small/medium turbines consented in the north.	Highland Foothills with No Wind Turbines/ Occasional Wind Turbines	Highland Foothills with Occasional Wind Turbines	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Two medium/large (74m) turbines at Witton in the west above West Water.	<p>Landscape Analysis: Smallest of the LCAs. Predominantly a single hill above Strathmore with lower slopes of <i>Highland Summits and Plateaux</i> to the north. Only suitable for turbines below 50m. Consideration should be given to the setting of and views from Edzell Castle, grounds and village.</p> <p>Comments on Consented and Proposed Turbines: Current consented development remains well within capacity.</p> <p>The proposed turbines at Witton are significantly taller than the recommended 50m maximum for this LCA and <i>Middle Highland Glens</i> LCA, although would not affect the setting of Edzell castle and village.</p>
												Max. Numbers in Group	1-3	1-3				
												Min Group Separation Distances (km)	2-4	3-6				

GUIDANCE: TAY5 HIGHLAND FOOTHILLS

Detailed Guidance for Highland Foothills LCT

The *Highland Foothills* LCT is not suitable for larger turbines of 50m or greater height due to their modest scale and elevation and complexity of topography, landscape patterns and settled character in many parts. There is capacity for occasional small/medium and medium turbines within the LCAs. Locate turbines in the enclosed farmland or on lower slopes of the hills, avoiding skylines and reducing intervisibility between turbine groups. The height of turbines should relate to the scale of the landscape, with particular regard to the vertical scale of the hills. Locate larger turbines away from the smaller scale hills and valleys to avoid diminishing the apparent scale of the slopes or breaking the skyline. Proximity to residential properties or settlements may also limit opportunities for locating larger turbines and/or turbine groups. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

Position turbines to relate clearly to landscape features such as field boundaries, breaks in slope and larger farm buildings. Separation between turbine groupings should ensure that clear intervisibility is infrequent. This can be achieved through selecting appropriate turbine sizes, separation distances and/or through the intervention of landforms and tree groups. Place smaller turbines in locations where they are not close to, or readily intervisible with, larger turbines. Smaller turbines should be more closely associated with buildings. Care should be taken to avoid visual clutter when locating larger turbines in close proximity to the electricity transmission line that passes through all the LCAs excepting the Alyth Foothills.

Specific Guidance for Individual LCAs

(i) ALYTH FOOTHILLS

Due to windfarm development in Perth & Kinross in combination with consented turbines in the Angus area, no further turbine development is recommended.

(ii) KIRRIEMUIR FOOTHILLS

Proposed Limits to Future Development: Highland Foothills with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-3 (small/medium and medium)

Separation Distances: 2-4km (small/medium); 3-6km (medium)

Only suitable for turbines below 50m, with the medium size turbines sited on lower ground towards Strathmore and small/medium turbines elsewhere. There should be no turbines in the more sensitive settings such as Balintore Castle, Ascreavie and Loch of Lintrathen. Turbines should not be located near the summit of Mile Hill due to its wide prominence. The currently consented three small/ medium and medium turbines are well within the capacity of the landscape.

(iii) MENMUIR FOOTHILLS

Proposed Limits to Future Development: Highland Foothills with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-3 (small/medium and medium)

Separation Distances: 2-4km (small/medium); 3-6km (medium)

The Menmuir Foothills are only suitable for turbines below 50m due to their limited scale. Do not site turbines on or close to the main ridgeline overlooking Strathmore, where they may break the horizon. Protect the views from and sensitive settings of the hillforts by limiting development to sensitively sited smaller turbines, or no turbines, within approximately 2km. Turbines should not be located north of the trees in Glen Ogil, which lies in the Draft Lochnagar and Mount Keen Core Area of Wild Land.

There are several consented small/medium and medium turbines located in this LCA, which will reduce the capacity for accommodating further turbines. The large (86m) turbine at Memus is significantly larger than the recommended limit of 50m. This will dominate its surroundings, restricting the scope for accommodating further turbines in its vicinity, both in the *Highland Foothills* and the adjacent *Broad Valley Lowland*.



Menmuir Foothills showing the transition in elevation between Strathmore and the Highland Summits and Plateaux and White Caterthun hillfort (right) Turbines should avoid the skyline and not affect the setting of the hillfort.

(iv) EDZELL FOOTHILLS

Proposed Limits to Future Development: Highland Foothills with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-3 (small/medium and medium)

Separation Distances: 2-4km (small/medium); 3-6km (medium)

The Edzell Foothills are only suitable for turbines below 50m due to their limited scale. In this LCA consideration should be given to the setting of and views from Edzell Castle and Edzell village by not siting larger turbines on the southern or eastern side of Hill of Edzell.

TAY8: IGNEOUS HILLS

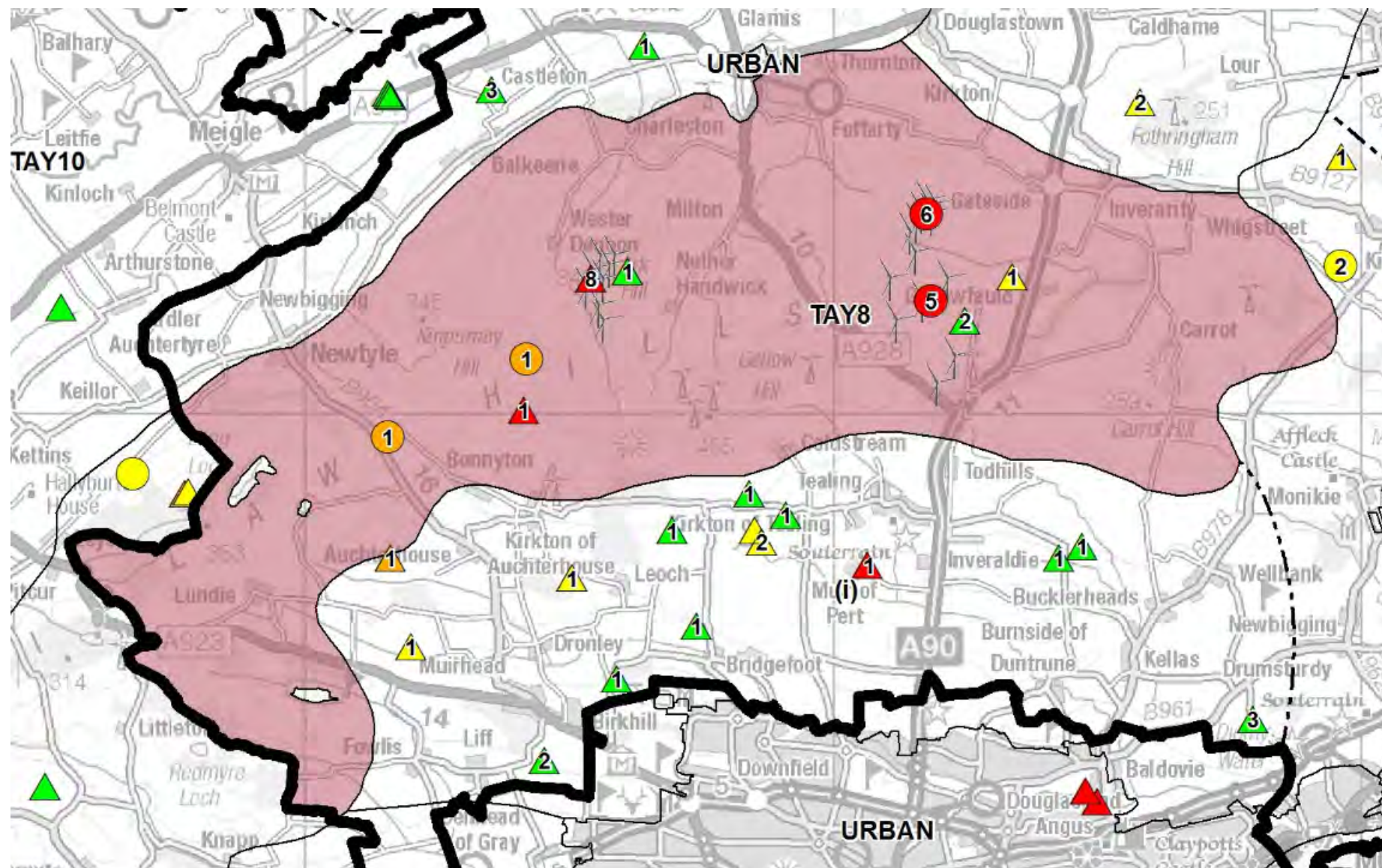
The Sidlaw Hills are a varied landscape of distinctive, predominantly steep open hills and enclosed valley farmland that extends through Perth & Kinross and Angus, where they merge into the *Dipslope Farmland* and Forfar Hills. The hills provide a northern backdrop to Dundee and define the southern edge of Strathmore to the north.

The hills are crossed at lower points by a number of roads, including the A90. The farmland associated with these lower passes divides the hills into at least four main groupings. The largest area uncrossed by roads, with the highest hills, lies between the A928 in the east and B954 in the west. Craigowl Hill rises to 455m AOD and is very prominent when seen from the A90, particularly due to the several transmission towers and infrastructure located on its summit and slopes.

Typically there is a 150-250m height difference between ridges and the surrounding *Dipslope Farmland* and *Broad Valley Lowland*. This is less to the east of the A90 around Carrot Hill (259m) where the hills are lower, more rounded and merge with the *Dipslope Farmland*.

This landscape varies around a medium scale; from enclosed valley farmland to larger open heather/grassland hillsides and ridges. Whilst the highest hills have an open, upland character, the majority of smaller hills have a more lowland character, particularly when compared with the highlands visible to the north across Strathmore. There are a number of hillforts and noted panoramic viewpoints within the Sidlaws, including Kinpurney Hill, Auchterhouse Hill and Carrot Hill. These have extensive views across the surrounding lowlands including Strathmore and the *Dipslope Farmland*.

There are four electricity transmission lines crossing the hills at various points. The only operational windfarm in Angus is located around Ark Hill, in the central part of the hills.



The Western Sidlaw Hills form distinct ridges and valleys



View west to Craigowl Hill from near Carrot Hill: The Eastern Sidlaws are more rounded, merging into *Dipslope Farmland*

Table 6.1(d): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Igneous Hills

LANDSCAPE CHARACTER TYPE TAY 8: IGNEOUS HILLS																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input checked="" type="radio"/> Medium Capacity <input type="radio"/> High Capacity					Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+													
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: Sidlaw Hills																		
Med	Med/ High	Med	Med	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	One windfarm with 8 large (81m) turbines at Ark Hill in central Sidlaws. One similar turbine 3km southwest at Scotston. Six other turbines at small/medium or medium mainly on lower slopes	<i>Igneous Hills with Wind Turbines/ Occasional Wind Turbines/ No Wind Turbines</i>	<i>Igneous Hills with Wind Turbines/ No Wind Turbines</i>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Two windfarm proposals in the east: Frawney (5x100m turbines) and Govals (6x87m turbines) west of the A90.	<p>Landscape Analysis: A varied landscape of distinctive steep hills and valley farmland. The hills provide a backdrop to Dundee to the south and define the southern edge of Strathmore to the north. Very visible from surrounding lowlands.</p> <p>This landscape type is generally of a medium scale and suitable for turbines up to medium/large size. Large or very large turbines would be too tall for this scale of landform. Large groups of turbines would overwhelm other key elements of the character. Proposals should also keep clear of key skyline ridges and summits.</p> <p>Comments on Consented and Proposed Turbines: Current developments occupy capacity in the centre of the hills but not east or west. At 81m the Ark Hill and Scotston turbines are at the upper end of acceptable height.</p> <p>Current proposals at Govals and Frawney would exceed recommended turbine height, group numbers, and separation if both were consented.</p> <p>A proposal for Dodd Hill (5x126.5m) east of A90 was recently refused due to adverse landscape and visual impacts relating to the size of the turbines.</p>
										<i>Max. Numbers in Group</i>	1-3	1-3	1-10					
										<i>Min Group Separation Distances (km)</i>	2-4	3-6	5-10					

GUIDANCE: TAY8 IGNEOUS HILLS

Proposed Limits to Future Development: Igneous Hills with Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium); 50-<80m (medium/large)

Group Sizes: 1-3 (small/medium; medium); 1-10 (medium/large)

Separation Distances: 2-4km (small/medium); 3-6km (medium); 5-10km (medium/large)

Detailed Guidance

The *Igneous Hills* have the capacity to accommodate smaller windfarms of up to 10 medium/large turbines; clusters of smaller turbines and single turbines that are in well separated groupings; as an overall *Landscape with Wind Turbines*. Large or very large turbines would be out of scale with the medium size hill landform and larger groups of turbines would overwhelm the pattern of distinctively shaped and separated hill landforms and small valleys that characterise much of this LCA.

Windfarms should not be located close to key skyline ridges and summits, and particularly the escarpments facing south over Dundee and the Firth of Tay and north over Strathmore. These areas are highly visible to a large resident and travelling population. Make use of surrounding landforms in siting turbines to limit visibility and skylining.

Separate the turbine groupings sufficiently to ensure they do not dominate the *Igneous Hills* character of distinctive, separate hills and ridges. This should be achieved by respecting the pattern of ridges and valleys and avoiding close intervisibility between turbine groupings on nearby hilltops. Do not place larger developments in close proximity to key panoramic viewpoints such as Kinpurney or Auchterhouse Hills.

Small/medium and medium turbines should be clustered in smaller groups (3 or less), situated in valley areas associated with farms and enclosed land so that they are seen as a distinctly separate development type to the larger turbines in windfarms on open hillsides and ridges.

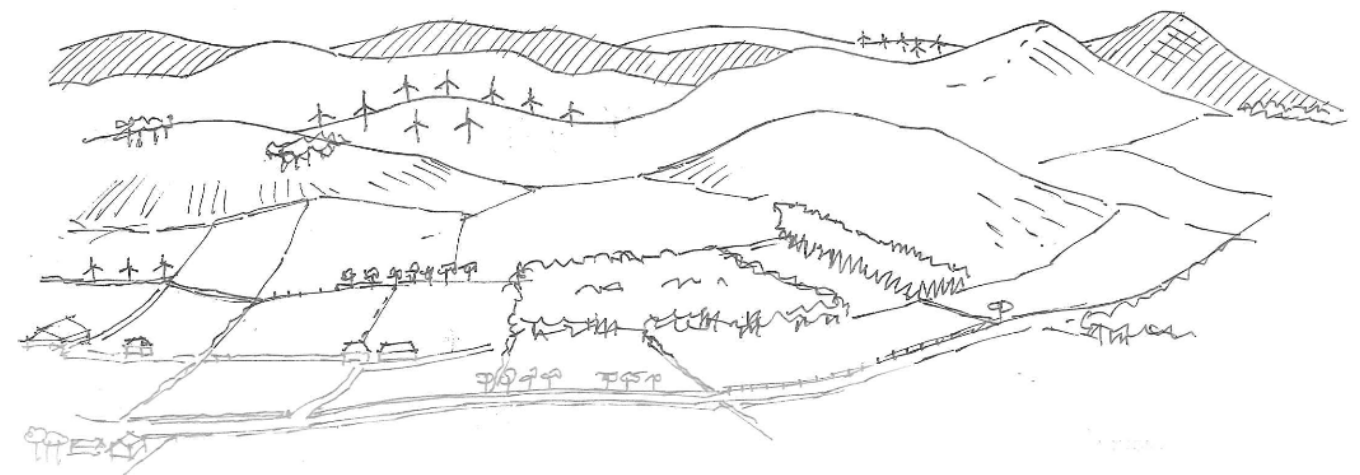
Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

Turbines should be carefully positioned in relation to the numerous electricity transmission lines and transmission masts in these hills in order to avoid cumulative clutter.

The Sidlaw Hills accommodate the only currently consented windfarm in Angus, with 8x81m turbines at Ark Hill and a single 81m turbine 2km to the southwest at Scotston. Although falling into the 'large' category these are just over the proposed 80m height limit for further development.



Scotston Turbine



The Sidlaw Hills can accommodate small to medium size windfarms and single turbines up to ca. 80m tall if well separated and sited on the lower ridges of open hillside. Smaller turbines can be accommodated in the same view if sited in lower enclosed land nearer to houses and roads



Ark Hill Windfarm

TAY 10: BROAD VALLEY LOWLAND

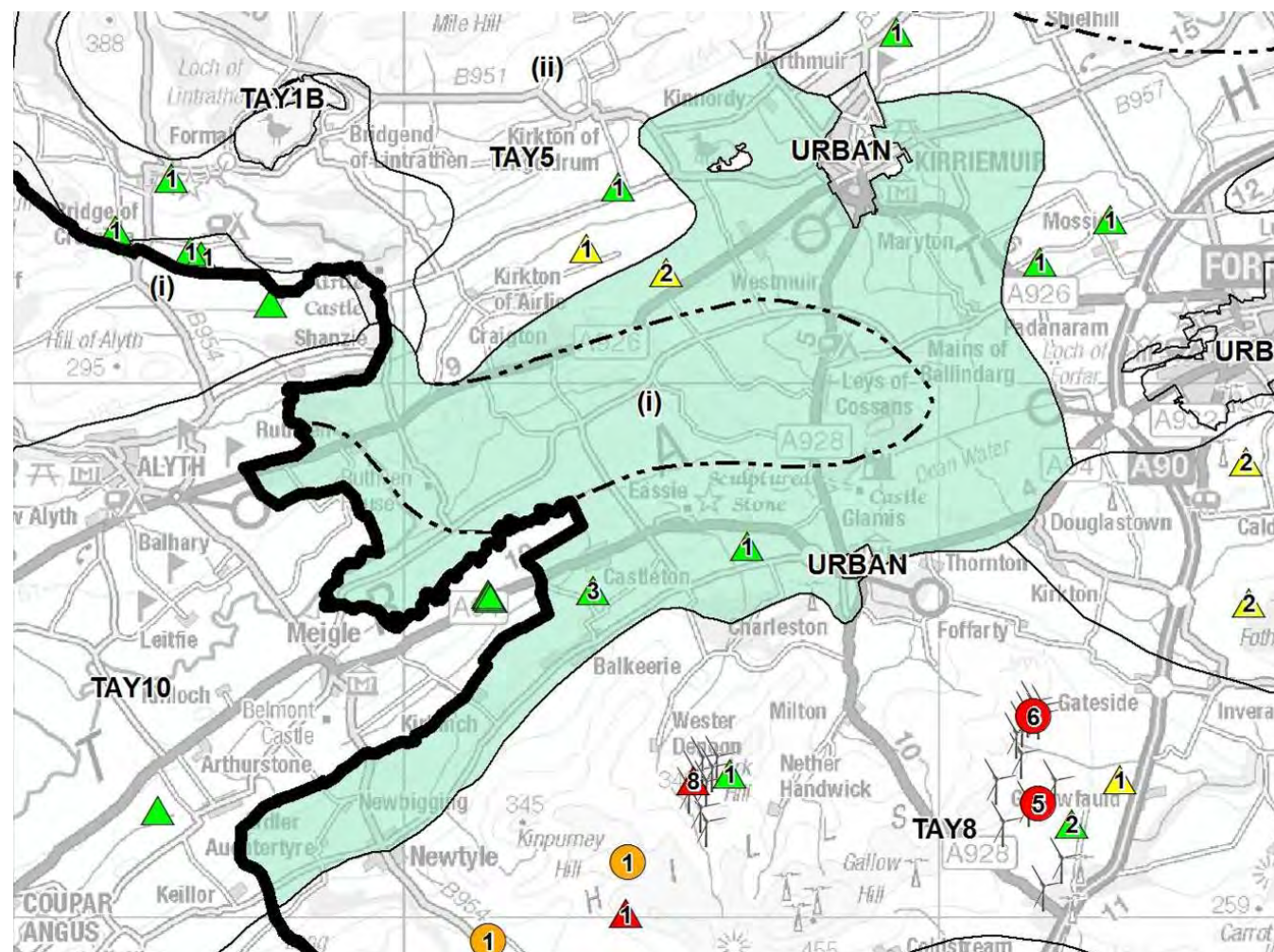
The *Broad Valley Lowland* comprises two LCAs (Strathmore and the Lower South and North Esk Valleys) located in Strathmore; a broad, settled, lowland agricultural valley stretching over 60km from the River Tay in Perthshire in the southwest through Angus to Aberdeenshire in the northeast. Whilst the horizontal topographic scale and backdrop is large, this is a settled fertile landscape with many settlements and human scale features. The LCAs are similar but there are potentially significant variations across them relating to topography. These are identified as smaller numbered sub-areas within the main types.

STRATHMORE

This LCA is broader, more open and framed by higher hills to the south compared with the Lower South & North Esk.

Whilst appearing from a distance to have a flat or gently sloping floor, there are significant variations in topography in one part of the valley:

- (i) A sub-area of complex rolling fluvio-glacial landforms are concentrated at south and south east of Kirriemuir. Field sizes in this area are smaller and less regular. Sand and gravel extraction is taking place at Powmyre.



LOWER SOUTH AND NORTH ESK VALLEYS

Compared to the Strathmore LCA west of Forfar this LCA is narrower and less enclosed to the south by topography. It is similarly dominated by arable farmland but has two significant rivers, a greater level of tree cover and more topographic variation than the Strathmore LCA. Whilst the LCA as a whole conforms with the *Broad Valley Lowland* type, there are a number of smaller, distinct topographic sub-areas lying within it that have potentially differing capacities for wind energy development:

- (ii) The corridor of the South Esk between Glen Clova and Brechin is encompasses the meandering course of the river which is a focus to the landscape. It is generally characterised by a degree of topographic enclosure; more shelter and enclosure by mature trees, a number of large houses and designed landscapes. There are a number of bridges and place name references to water mills.
- (iii) A significant area lying between the A90 and the Menmuir Hills is topographically separated by a curved ridge of land from the area draining into the South Esk. This area of undulating arable land drains to the North Esk and not to Montrose Basin. The ridge screens the land to the north from the A90 corridor.
- (iv) An elevated area at Muir of Pert between Brechin, the A90 and Montrose, which separates the North Esk and Montrose Basin. Although included in the Broad Valley Lowland it rises to a plateau of over 100m AOD, has steep escarpments to the north and south, and has many of the more exposed characteristics of the *Dipslope Farmland*.

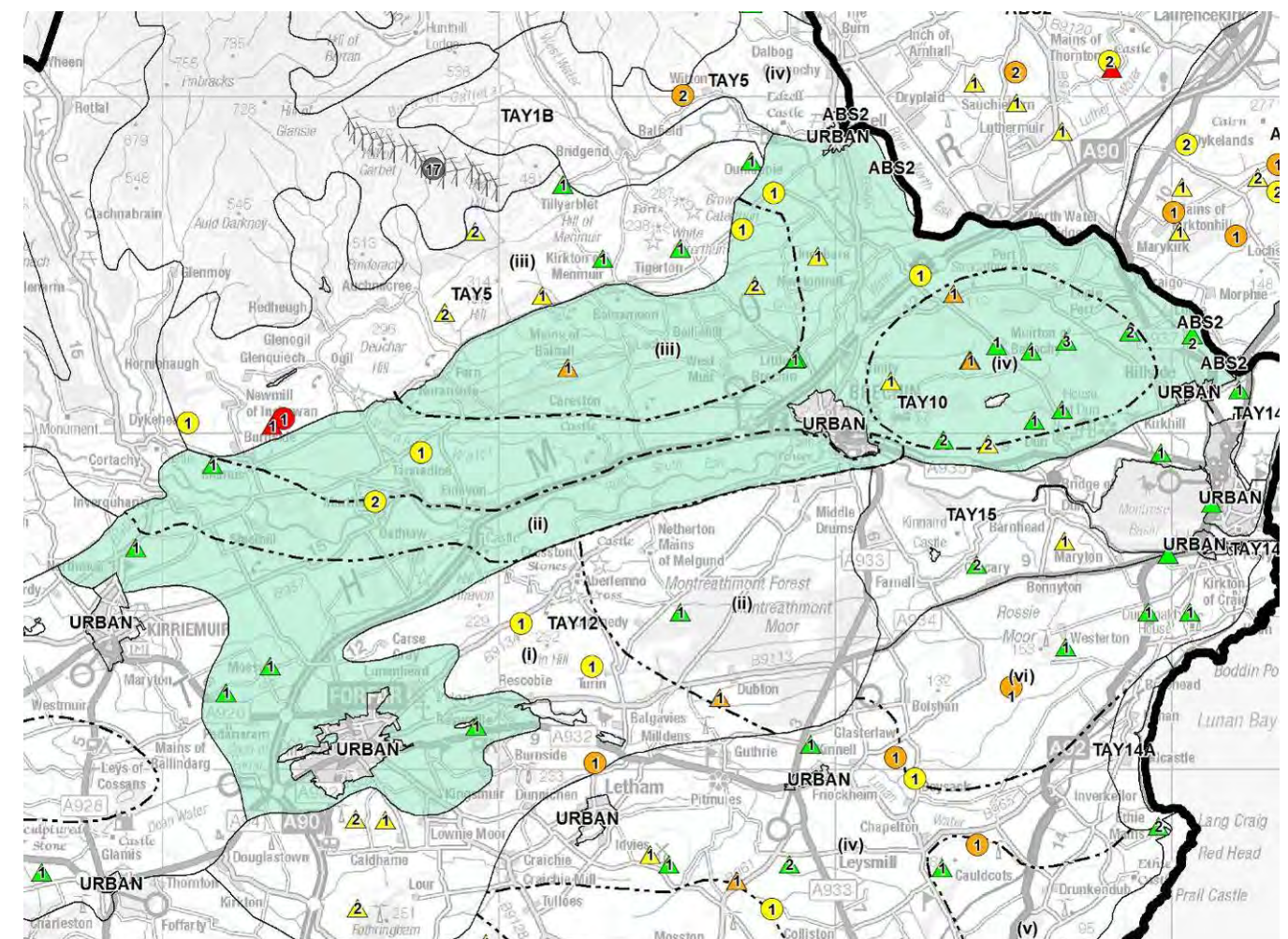


Table 6.1(e): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Broad Valley Lowland

LANDSCAPE CHARACTER TYPE TAY 10: BROAD VALLEY LOWLAND																		
Key: No Capacity Low Capacity Medium Capacity High Capacity Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: Strathmore																		
Med	Med/ High	Med	Med						4 small/medium turbines on southern side near Eassie and two medium near Westmuir on north side. Few similar within neighbouring P&K section of Strathmore.	Broad Valley Lowland with Occasional Wind Turbines/ No Wind Turbines	Broad Valley Lowland with Occasional Wind Turbines						Currently no further proposals	Landscape Analysis: Broader, more open and framed by higher hills to the south compared with the Lower South & North Esk. Whilst appearing from a distance to have a flat or gently sloping floor, there are significant variations in topography in one part of the valley: The scale of the landscape in the flatter areas would be capable of accommodating turbines up to medium/ large size. However the density of settlement and other smaller reference features and extent of the more complex topography in (i) would severely limit the opportunity for siting turbines of up to 80m height. Turbines should be limited to 50m height. Comments on Consented and Proposed Turbines: Current consented turbines are well within the capacity of this area.
									<i>Max. Numbers in Group</i>	1-5	1-3							
									<i>Min Group Separation Distances (km)</i>	2-4	4-8							
Landscape Character Area: Lower South and North Esk Valleys																		
Med	Med/ High	Med	Med						A significant number (over 25) turbines throughout or adjacent to this LCA. All single or paired and predominantly small/medium or medium. Although there are also three medium/large and one large (at Memus within the <i>Highland Foothills</i>). Most significant concentration is in the east on an area of higher ground between Brechin	Broad Valley Lowland with No Wind Turbines Occasional Wind Turbines/ with Wind Turbines	Broad Valley Lowland with Occasional Wind Turbines/ with Wind Turbines						Further proposals include 6 individual/paired medium scale turbines in Angus and further similar across Aberdeenshire border in Howe of Mearns. Also in nearby <i>Highland Foothills</i> another large (86m) turbine at Memus, close to the consented turbine.	Landscape Analysis: Narrower, less enclosed to the south by topography and more tree-covered than Strathmore LCA to the west. There are a number of distinctive smaller sub-areas within the LCA having potentially differing capacities for wind energy development: (ii) The course of the South Esk between Glen Clova and Brechin is a more enclosed landscape focused around the meandering river. There is less capacity for wind turbine development in this area. (iii) A significant area lying between the A90 and the Menmuir Hills is topographically separated from the area draining into the South Esk by a curved
									<i>Max. Numbers in Group</i>	1-5	1-3	1						
									<i>Min Group Separation Distances (km)</i>	2-4	3-6	5-10						

LANDSCAPE CHARACTER TYPE TAY 10: BROAD VALLEY LOWLAND																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity				Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+														
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
									A90 and Montrose Basin. This pattern continues across the Aberdeenshire border into Howe of Means.									ridge of land. The ridge would be visually sensitive to turbine development but the area to the north would be screened from the A90 corridor. (iv) An elevated area around Muir of Pert between Brechin, the A90 and Montrose, which separates the North Esk and Montrose Basin. This has many of the more exposed characteristics of the <i>Dipslope Farmland</i> and is the sub-area most suited for wind turbine development. Comments on Consented and Proposed Turbines: Current consented small/medium, medium and medium/large turbines are concentrated in areas (iii) and (iv), creating a <i>Broad Valley Lowland with Wind Turbines</i> north and east of Brechin. Further medium size turbines proposed would slightly extend and intensify this landscape type towards the highland area. Elsewhere the density of development is closer to <i>Broad Valley Lowland with Occasional Wind Turbines</i> . The nearby consented and proposed turbines at Memus are larger than recommended for this LCT or the <i>Highland Foothills</i> .

GUIDANCE: TAY10 BROAD VALLEY LOWLAND

STRATHMORE

Proposed Limits to Future Development: Broad Valley Lowland with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium).

Group Sizes: 1-5 (small/medium); 1-3 (medium).

Separation Distances: 2-4km (small/medium) and 4-8km (medium).

Detailed Guidance

The scale of the landscape in the flatter areas of Strathmore would be capable of accommodating turbines up to medium/large size. However the density of settlement and other smaller reference features and extent of the more complex topography in the area of complex fluvioglacial landforms (i) limits the opportunity for accommodating turbines of up to 80m height. Turbines should therefore be limited to less than 50m height (medium or small/medium).



Typical open arable Strathmore landscape



Complex fluvioglacial landforms in sub-area (i) contrast with the flatter landform characteristic of most of Strathmore

Position turbines so that they clearly relate to landscape features such as field boundaries and larger farm buildings. Positioning in relation to the electricity transmission line in the west should also be carefully considered to avoid cumulative visual clutter.

Separate turbine groupings sufficiently to ensure that clear intervisibility between the groupings is infrequent. This can be achieved through selecting appropriate turbine sizes and separation distances and through exploiting belts of tree planting and landforms to screen views. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

In particular it will be possible to use tree belts and landforms to discretely accommodate small/medium turbines in area (i), whereas the siting of medium turbines would be more appropriate to the flatter landforms in the rest of the LCA. Care should be taken in the siting of medium size turbines close to sensitive locations such as the Glamis Designed Landscape, Kirriemuir Camera Obscura and Loch of Kinnordy.

LOWER SOUTH AND NORTH ESK VALLEYS

Proposed Limits to Future Development: Broad Valley Lowland with Occasional Wind Turbines/ Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium); 50-<80m (medium/large).

Group Sizes: 1-5 (small/medium); 1-3 (medium); 1 (medium/large).

Separation Distances: 2-4km (small/medium); 3-6km (medium); 5-10km (medium/large)

Detailed Guidance

This LCA offers varied potential for accommodating wind turbines, due to the variations in topography, but overall should be *Broad Valley Lowland with Occasional Wind Turbines*.

Allow sufficient separation between turbine groupings to ensure that the LCA as a whole is not dominated and that clear intervisibility between turbine groupings is infrequent. This can be achieved through selecting appropriate turbine sizes and separation distances and through exploiting the extensive areas of tree planting and topographic variations to limit views and intervisibility. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

Sub-area (ii) along the course of the South Esk is less suited to wind turbine development. Turbine sizes should predominantly be small/medium with some medium in more open areas. There should be no medium/large turbines. Relate positioning of turbines clearly to landscape features such as field boundaries, river terraces and larger farm buildings. Position turbines carefully to avoid cumulative clutter with the electricity transmission lines that cross the river at Cortachy and west of Brechin. Avoid positioning larger turbines near/within the Designed Landscapes at Cortachy and Brechin Castle and within the setting of listed buildings such as the two castles and the village of Tannadice. Currently only one small/medium turbine is located in this sub-area.

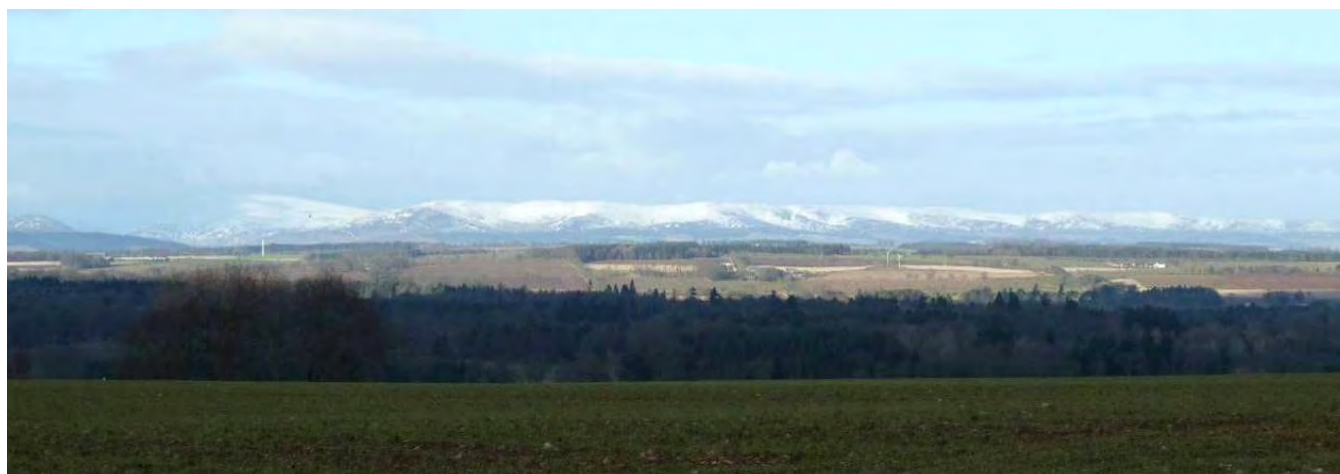
Sub-area (iii) between the A90 and the Menmuir Hills provides both opportunity and limitations for accommodating turbines. There is a sometimes sharp ridge of land forming the southern boundary, which lies above the Noran Water and South Esk between Noranside and the A90 at Brechin. This visually separates the river corridors from an extensive area of farmland which drains north-eastwards to the North Esk. Turbines should not be placed close to the crest of the ridge; small/medium turbines

would be suitable on the south side of the ridge above the A90 and medium turbines in the extensive undulating farmland to the north. There is sufficient separation from the base of the Menmuir Hills to the Caterthun hillforts for turbines in this LCA not to affect the setting of these monuments. There are two medium and one small/medium turbines in or adjacent to this area. One medium/large turbine (77m) is located at Milton of Balhall. This is larger than the recommended maximum limit of 50m, but is placed well back from the sensitive ridge to the south and the modestly scaled Menmuir Hills to the north. Nevertheless it reduces capacity for other wind turbines in the west of the sub area.



Sub-area (iii) between the A90 and the Menmuir Hills seen looking south from the foot of the Menmuir Hills The extensive area is partially enclosed by a ridge to the south

Muir of Pert (sub-area iv) has the highest capacity for wind turbines, being more elevated and open than other parts of the LCA and therefore more compatible in landscape character terms. The area is suitable for turbine sizes up to 80m. Medium/large turbines should be single and located towards the middle of the area rather than the modestly scaled escarpments above Strathmore and Montrose Basin, including the Designed Landscape of House of Dun, where they would be too dominant. Avoid proximity of larger turbines to the two electricity transmission lines skirting this area.



The elevated Muir of Pert sub-area (iv) (middle ground above the trees) is most suited in character for wind turbine development and already accommodates several turbines

There is a significant number of turbines already consented in this area, varying from small/medium to medium/large, and creating an area of *Broad Valley Lowland with Wind Turbines*. Further turbines should be limited in number and located at suitable separation distances from these to avoid creating areas of *Wind Turbine Landscape*.

Remaining areas of the LCA outside the three sub-areas currently have few consented small and medium turbines. These are within the proposed capacity, being of an appropriate size and separation. Nevertheless the large Memus turbine is located within 500m of the LCA and this will restrict the potential for locating turbines within close proximity. Potentially sensitive locations include the residential edges of the three main settlements within or bordering this LCA and the setting of Edzell castle which lies just north of the boundary. Limit turbine sizes and numbers in these locations.

There are potential cross boundary cumulative effects with Aberdeenshire at the north eastern boundary of this LCA. Within the *Agricultural Heartlands* in Aberdeenshire there are 8 medium turbines consented within ca. 5km of the boundary; Tullo windfarm within 10km and applications for several further medium and medium/large turbines within 5km.

Care should be taken to ensure that the *Landscape with Wind Turbines* in Aberdeenshire does not spread across the border and coalesce with concentrations of turbines in Angus. In particular, the North Esk river corridor currently forms a gap between the concentrations of turbines located in the higher areas of Muir of Pert (sub-area iv) and the Hill of Garvock in Aberdeenshire. Development here should be limited to occasional small/medium turbines.



Tullo windfarm viewed across the north eastern part of the Lower South and North Esk Valleys. A further ten turbines are to be added.

TAY12: LOW MOORLAND HILLS

The Low Moorland Hills LCA is situated to the east and south of Forfar and lies between Strathmore and the *Dipslope Farmland*, continuing a gradually diminishing line of hills from the Sidlaws in the west to near sea level farmland at the Montrose Basin in the east. The LCA has been divided into two sub-areas on the basis of differences in landscape character and sensitivity: the Forfar Hills in the south and west and Montreathmont Moor in the north and east.

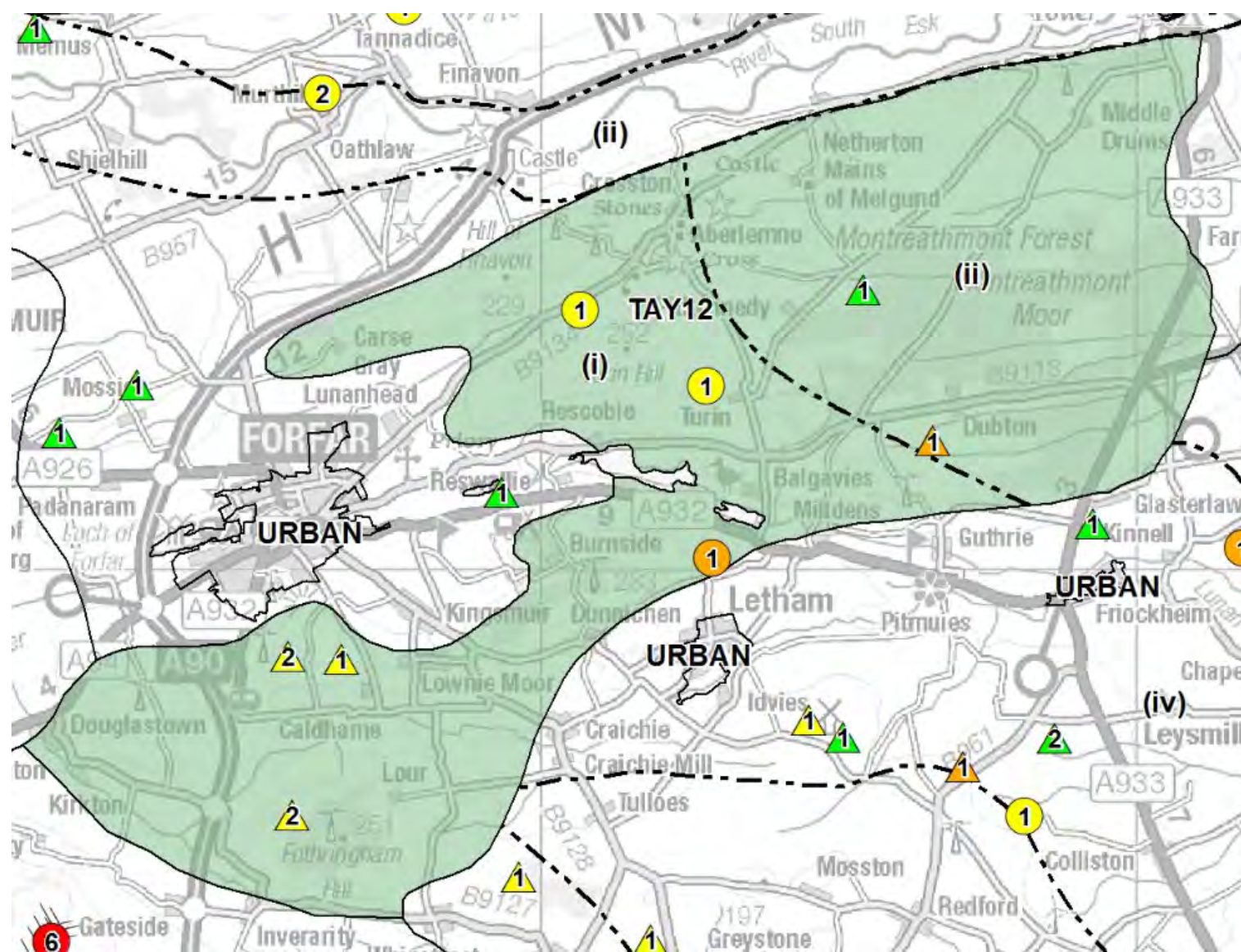
(i) FORFAR HILLS

A varied landscape of small steep hills and ridges set within a wider area of medium scale rolling/undulating farmland. The hills provide a backdrop to Forfar and define the southern edge of the South Esk section of Strathmore. Most of the hills are very visible from the A90. There are a number of hillforts and viewpoints located on the hills and other points of interest such as the standing stones at Aberlemno. There are scattered small settlements throughout the farmland, connected by a network of

small lanes, sometimes twisting over the hills. The distinctive Rescobie Lochs and A932 lie in a valley separating the distinctly bald ridges north east of Forfar from the more tree covered hills to the east and south of the town. An electricity transmission line crosses the northern edge of the LCA at Hill of Finavon. This sub-area has higher visual sensitivity and complex, modest scale landforms compared with the sub-area further to the east.

(ii) MONTREATHMONT MOOR

This LCA, lying east of the Forfar Hills, is distinctly different in character. The landform is predominantly gently undulating and gradually slopes down to the lower Montrose Basin LCA to the east. There are no distinctive hill landforms, although the northern edge forms an escarpment of some 100m descending to the River South Esk. It is a medium to large scale farming and forestry landscape dominated by Montreathmont Forest which is a distinctively large mature lowland forest dominated by coniferous planting. It is well populated by scattered properties and farmhouses in the farmland areas outside the forest, with a network of small roads.



Area (i) the Forfar Hills, with a distinctive series of hill landforms



Area (ii) Montreathmont Moor: a gently undulating landform with farmland surrounding an extensive area of forest

Table 6.1(f): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Low Moorland Hills

LANDSCAPE CHARACTER TYPE TAY 12: LOW MOORLAND HILLS																		
Key: No Capacity Low Capacity Medium Capacity High Capacity Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)				CURRENT CONSENTED DEVELOPMENT				PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development		Landscape Capacity (Related to turbine size)		Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)					
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value				S/M	M	M/L	L	VL			S/M	M	M/L	L	VL
Landscape Character Area: Forfar Hills Sub Area: (i) Forfar Hills																		
Med/ High	Med/ High	Med/ High	Med						5 medium size turbines scattered south of Forfar. One medium/ large (77m) turbine at Pickerton just outwith sub area boundary north of Guthrie.	<i>Low Moorland Hills with Wind Turbines/ Occasional Wind Turbines/ No Wind Turbines</i>	<i>Low Moorland Hills with Wind Turbines/ Occasional Wind Turbines</i>						Two medium turbines either side of Turin Hill east of Forfar and one medium/large (66m) turbine on southern boundary with <i>Dipslope Farmland</i> at Letham.	Landscape Analysis: A varied landscape of small steep hills and rolling/undulating farmland. Both the higher visual sensitivity and complex, modest scale landforms indicate that only small groups of turbines up to 50m would be appropriate to this area.
																		Comments on Consented and Proposed Turbines: Current medium turbines south of Forfar within capacity of this area although two turbines on Fotheringham Hill are high up the hillside. Proposals for turbines at Turin Hill are within capacity and suitably located. Medium/large turbine N of Letham larger than recommended maximum size. Recent proposal for three large turbines at Finavon Hill dismissed at appeal due to adverse landscape/visual impacts relating to the size of the turbines.
Landscape Character Area: Forfar Hills Sub Area: (ii) Montreathmont Moor																		
Med/ Low	Med	Med	Med						Currently one medium/large turbine in the S at Pickerton and one small/medium turbine 3km north of this consented.	<i>Low Moorland Hills with Occasional Wind Turbines/ No Wind Turbines</i>	<i>Low Moorland Hills with Occasional Wind Turbines</i>						No current applications.	Landscape analysis: Medium to large scale farming and forestry landscape dominated by Montreathmont forest. Simple undulating landform with no distinctive hills. It is well populated agricultural land outside the forest. The landscape is able to accommodate larger turbine sizes.
																		Comments on Consented and Proposed Turbines: The current consented turbines fall well within capacity. Pickerton turbine is larger than maximum for adjacent sub-area, which it influences. A proposal for 11 very large turbines in Montreathmont Forest was dismissed at appeal in 2009 due to adverse landscape and visual effects, particularly on the amenity of surrounding properties.

GUIDANCE: TAY12 LOW MOORLAND HILLS

(i) FORFAR HILLS

Proposed Limits to Future Development:

Low Moorland Hills with Occasional Wind Turbines (east of Forfar)

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-5 (small/medium; medium)

Separation Distances: 2-4km (small/medium); 3-6km (medium)

Low Moorland Hills with Wind Turbines (south of Forfar)

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

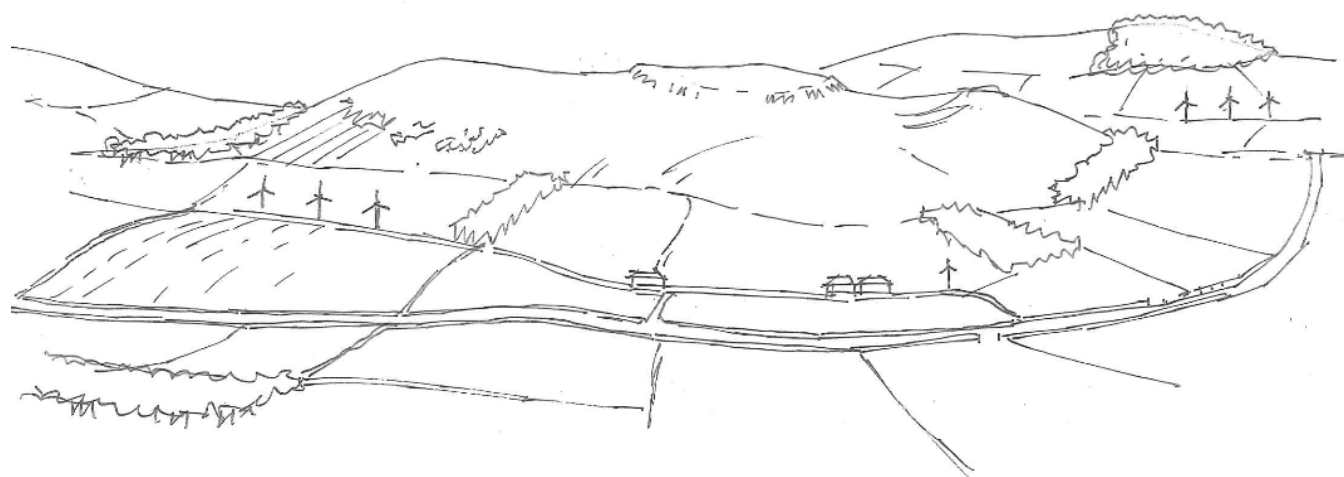
Group Sizes: 1-5 (small/medium); 1-3 (medium)

Separation Distances: 2-4km (small/medium and medium)

Detailed Guidance

Locate turbines in the enclosed farmland or on lower slopes of the hills, avoiding skylines and reducing intervisibility between turbine groups. Relate the height of turbines to the scale of the landscape, with particular regard to the vertical scale of the hills. Larger turbines should be located away from the smaller scale hills and hill slopes to avoid diminishing the apparent scale of the slopes or breaking the skyline. Proximity to residential properties or settlements may also limit opportunities for locating larger turbines and/or turbine groups. Site turbines away from the electricity transmission line on Hill of Finavon to avoid cumulative clutter.

Position turbines so that they relate clearly to landscape features such as field boundaries, breaks in slope and larger farm buildings. Separate turbine groupings sufficiently to ensure that clear intervisibility is infrequent. This can be achieved through selecting appropriate turbine sizes, separation distances and/or the intervention of landforms and tree groups. Place smaller turbines in locations where they are not close to, or readily intervisible with, larger turbines and are more closely associated with built development. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.



Forfar Hills cannot accommodate larger turbines without adverse scale effects. Small/medium or medium turbines will not dominate the landforms. Turbine groups in the enclosed farmland can also be visually separated. Smaller turbines may be accommodated in the same view if closely associated with buildings

There is a higher proportion of enclosed farmland south of Forfar compared with the greater preponderance of open hills to the east. A number of medium size turbines are already consented in this area. Given the current pattern of development further medium size turbines could be located in this area to create a landscape with wind turbines between hills. Separation of turbines/groups by distance or landform should be sufficient to avoid loose clustering of turbines within or between groupings dominating an area. Turbines should be located to avoid breaking the skyline on Balmashanner Hill above Forfar.

(ii) MONTREATHMONT MOOR

Proposed Limits to Future Development: Low Moorland Hills with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium); 50-<80m (medium/large)

Group Sizes: 1-5 (small/medium and medium); 1-3 (medium/large)

Separation Distances: 2-4km (small/medium); 3-6km (medium); 5-10km (medium/large)

Detailed Guidance

Turbines can be located in most parts of this undulating landscape; the farmland area or the forest, with the key determining issues being the need to avoid domination of the landscape character and of views from residential properties. The size of turbines should relate to the scale of the landscape, which is principally determined by the pattern of field boundaries and forestry but also by proximity to features such as buildings and small tree groups. To the north the escarpment above Strathmore forms a taller and steeper landform than elsewhere in the sub-area.

Locate larger turbines (medium/large) in areas further from residential properties, the forest being the most suitable area in terms of low population density and uniform landscape character. Smaller size turbines (small/medium, medium and potentially medium/large) are more suitably sited in farmland areas. Proximity to residential properties or settlements may limit opportunities for locating larger turbines and/or turbine groups.

Position turbines so that they relate clearly to landscape features such as field boundaries, rolling ridges and farm buildings. Within the forest existing clearings would be most suitable and the most mature and diverse areas should be avoided. Separate turbine groupings sufficiently to ensure that the landscape is not dominated and that significant areas with clear intervisibility between developments is infrequent. This may be achieved through selecting appropriate turbine sizes and separation distances and through exploiting areas of trees and forestry to screen views. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

Avoid locating medium/large turbines close to the escarpment slope above Strathmore (typically rising 60m-100m from valley floor) and to the eastern Forfar Hills (ranging from 50m-140m higher than the farmland). The turbines would dominate the modest scale of these landforms.

TAY13: DIPSLOPE FARMLAND

The *Dipslope Farmland* LCA is an extensive area of lowland farmland extending from Dundee in the west to Montrose in the north. It slopes gradually from the Sidlaw and Forfar Hills in the north and west to near sea level in the south and east. At over 40km by a maximum of 15km the often open character is dominated by productive predominantly arable land use with simple geometric field patterns. Nevertheless there are subtle variations according to elevation, tree cover and surrounding landscape context. Generally medium scale, but with areas of medium-large scale, as well as more intimate settled areas. The LCA has been divided into six sub-areas on the basis of differences in landscape character and potential sensitivity to wind energy. There is a linear ridge which delineates the different relationship of *Dipslope Farmland* with the coast to the south and undulating plateau to the north, defining the scale of acceptable turbines. This is further developed in the detailed sub-area guidance.

(i) TEALING FARMLAND

The sub-area north of Dundee is characterised by the backdrop of the Sidlaw Hills and the influence of development including several electricity transmission lines converging on a major substation (proposed for expansion); the A90 and a higher density of settlement, although Dundee itself is substantially screened from areas north of the city by a rounded ridgeline. Nevertheless there are areas of less developed character in the east and north where the farmland merges into the lower slopes of the Sidlaw Hills.



Electricity lines, settlement and lines of trees characterise the Tealing Farmland

(ii) CROMBIE/ MONIKIE FARMLAND

The sub-area northeast of Dundee is less contained to the north than sub-area (i) and is characterised by farmland and extensive woodland and forestry planting. There is settlement over much of the area, two country parks and estate policies of the former Panmure house. This has a slightly smaller more enclosed scale than much of the surrounding *Dipslope Farmland*. It is visually sensitive due to its proximity to roads, settlements and nearby hills, although tree cover limits visibility in many areas. It is crossed by an electricity transmission line.

(iii) REDFORD FARMLAND

This centrally placed sub-area is the largest scale, highest and most open within the *Dipslope Farmland*. This is partly reflected in the scale of farms and field sizes. There are significant areas of large open fields with scattered settlement and roads, although it borders more populated areas. There are more sensitive areas including the Guynd designed landscape, and to the south of the linear ridge referred to above, proximity to the Coast LCA and settlements. An electricity transmission line crosses the southern part, descending to Arbroath.



Open panoramic views near Redford

(iv) LETHAM, LUNAN WATER AND ARBROATH VALLEYS

This sub-area, lying between three areas of higher *Dipslope Farmland* and the *Low Moorland Hills*, follows the Lunan Water and other more minor drainage lines flowing to Arbroath. In places there is a distinct valley landform. There is extensive settlement and road network through much of the area. This has a smaller more enclosed scale than the higher areas of *Dipslope Farmland* and is visually sensitive due to the higher resident population. There are designed landscapes and listed buildings at Guthrie and Pitmuies in the north.



More enclosed landscape in the Lunan Valley

(v) ETHIE FARMLAND

This small sub-area of higher farmland is adjacent to the coast and bordered on the inland sides by the Lunan Water and other drainage lines flowing to Arbroath. Settlement and the road network are relatively sparse. There are two large houses with policies that operate as country house hotels. The high exposed boundary with a *Coast with Cliffs* LCA is potentially sensitive.

(vi) ROSSIE MOOR

This sub-area of isolated higher ground at the north eastern end of the LCA is widely visible. It has coastal exposure, merging with the *Usan Coast with Cliffs* and *Lunan Bay Coast with Sand* LCAs to the east, and Montrose Basin to the north. It is also bordered by the Lunan Water to the south where it slopes into a distinctive valley. It forms a backdrop to Montrose Basin and town.

Settlement and the road network is relatively sparse and fields are often large scale.

A relatively extensive area of unimproved moorland popular with walkers lies on the higher ground. There is a designed landscape and listed buildings at Dunninald Castle.

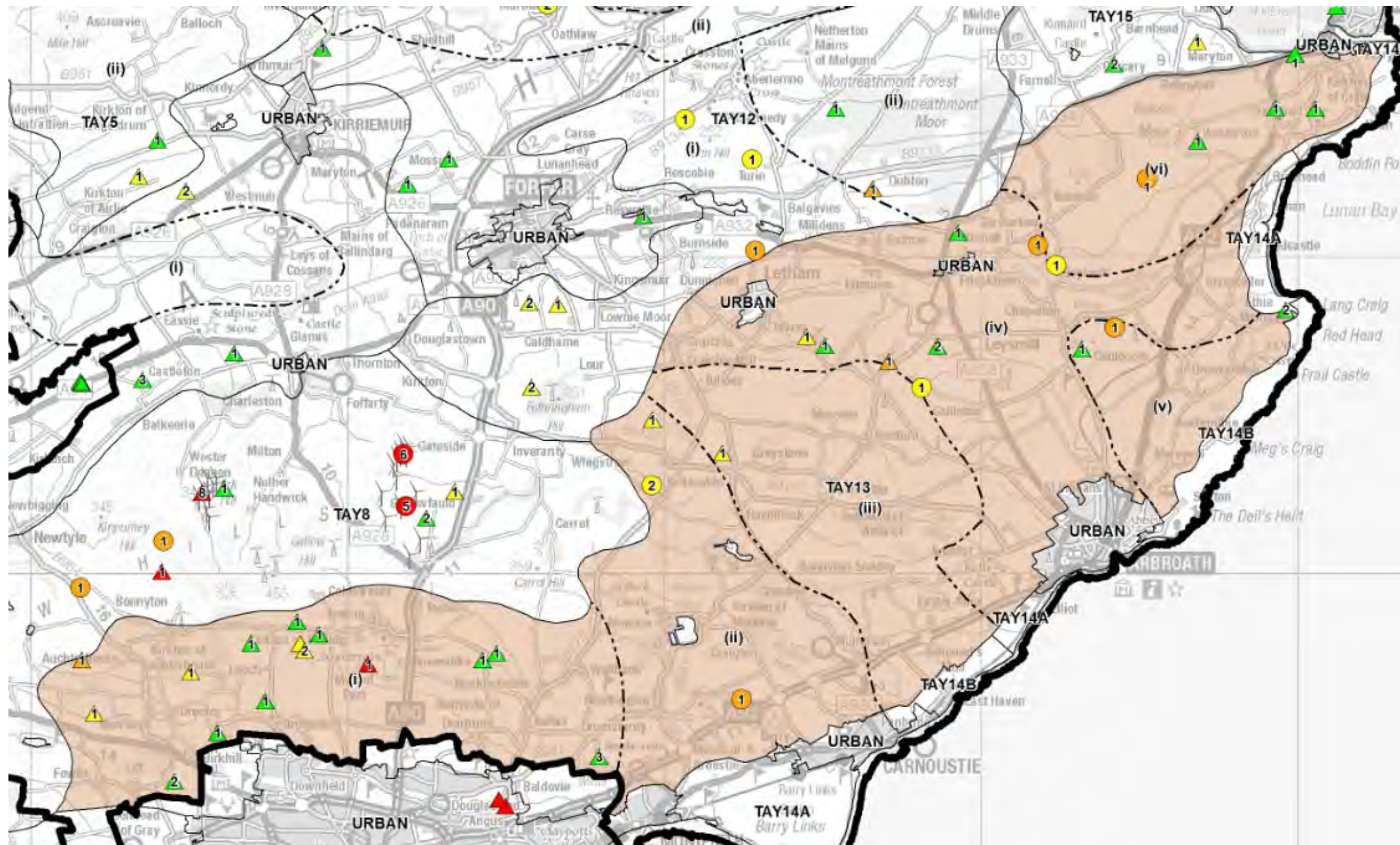


Table 6.1(g) Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Dipslope Farmland

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity					Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+													
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT					PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)								
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: Southeast Angus Lowland Sub Area: (i)Tealing Farmland																		
Med	Med	Med	Med	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently a concentration of single and paired turbines ranging from small/medium to large between Dundee and the Sidlaw Hills. Predominantly small/medium and medium, but Tealing turbine is over 90m	Dipslope Farmland with Wind Turbines/ Occasional Wind Turbines	Dipslope Farmland with Wind Turbines	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently no further applications within the area. Current application for windfarm with large turbines in the southern edge of the Sidlaws at Frawney lies close to this area.	Landscape analysis: This sub-area north of Dundee is characterised by the backdrop of the Sidlaw Hills and the influence of development. Limited opportunity for larger turbines due to potential scaling against hill backdrop and overbearing effects on residential amenity. Turbine development should follow established pattern of small/medium and medium turbines. Comments on Consented and Proposed Turbines: Current turbines are of varied sizes and lie in closely spaced clusters with potential capacity issues. The large Tealing turbine is significantly larger than other consented turbines. Current applications for medium turbines would continue the established pattern of turbines. Current applications for windfarms in the southern Sidlaws would have strong visual influence on the east of this sub-area.
											Max. Numbers in Group	1-3	1-3					
											Min Group Separation Distances (km)	2-4	2-4					
Landscape Character Area: Southeast Angus Lowland Sub Area: (ii)Monikie/ Crombie Farmland																		
Med	Med/ High	Med/ High	Med/ High	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently one consented medium turbine in the north and one just east of boundary near Kirkbuddo	Dipslope Farmland with Occasional/ No Wind Turbines	Dipslope Farmland with Occasional Wind Turbines/ with Wind Turbines	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently applications for 2 medium turbines S of Kirkbuddo. Application for one medium/large turbine N of A92 near Barry at New Downie.	Landscape analysis: This sub area has a slightly smaller more enclosed scale than the surrounding <i>Dipslope Farmland</i> and is visually sensitive due to its proximity to roads, settlements and nearby hills. Small/medium and medium turbines can be accommodated, but only limited opportunities for medium/large turbines in more open areas to the north. Comments on Consented and Proposed Turbines: Current consents and applications are within capacity An application for 3 large turbines at East Skichen was turned down in 2009 due to visual impacts on the village and Country Park at Monikie.
											Max. Numbers in Group	1-5	1-3	1				
											Min Group Separation Distances (km)	2-4	3-6	5-10				

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input checked="" type="radio"/> Medium Capacity <input type="radio"/> High Capacity																		
Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: Southeast Angus Lowland Sub Area: (iii)Redford Farmland																		
Med	Med	Med	Med/ Low	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently 1 medium/large turbine at Cononsyth on sub area boundary in the northeast; one medium east of Kirkbuddo and one near Hayhillock	Dipslope Farmland with Occasional / No Wind Turbines	Dipslope Farmland with Wind Turbines	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Current application for one medium turbine in the NE.	<p>Landscape analysis: This sub-area is the largest scale, highest and most open within the <i>Dipslope Farmland</i> and this is partly reflected in the scale of farms and field sizes. There are areas with minimal settlement and roads although it borders the populated coastal area in the south. This has the highest capacity for wind energy in the <i>Dipslope Farmland</i> and can accommodate medium/large turbines, subject to local constraints. Groupings should remain relatively small and well separated to avoid overwhelming the underlying character. Turbines should not interfere with the ridge that marks the break of slope above the A92.</p> <p>Comments on Consented and Proposed Turbines: Current consented turbines and applications fall well within capacity. A previous application for 3x110m turbines at Dusty Drum in the centre of this area was refused in 2009 due to aviation issues but also due to landscape and visual impacts. 7 very large turbines at Corse Hill between Carnoustie and Arbroath on the boundary with the Coast LCA were dismissed at appeal in 2013.</p>
											Max. Numbers in Group	1-5	1-5	1-5				
											Min Group Separation Distances (km)	2-4	3-6	5-10				

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input checked="" type="radio"/> Medium Capacity <input checked="" type="radio"/> High Capacity																		
Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: Southeast Angus Lowland Sub Area: (iv)Letham, Lunan and Arbroath																		
Med	Med	Med	Med/High	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently one small/medium consented turbine N of Friockheim and 2 to the south. One small/medium and one medium SE of Letham and 1 med/large on boundary with Redford sub area at Cononsyth.	Dipslope Farmland with Wind Turbines/ Occasional Wind Turbines/ No Wind Turbines	Dipslope Farmland with Occasional Wind Turbines/ with wind Turbines	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently scattered applications for 5 turbines (2 medium and 3 medium/ large) all lying on the sub area boundary.	<p>Landscape analysis: This sub-area, lying between three sub-areas of higher <i>Dipslope Farmland</i> and the <i>Low Moorland Hills</i>, follows the Lunan Water and other more minor drainage lines flowing to Arbroath. There is extensive settlement and road network throughout. This has a smaller more enclosed scale than much of the <i>Dipslope Farmland</i> and is visually sensitive. More suited to small/medium and medium turbines associated with settlement or intensive agriculture.</p> <p>Comments on Consented and Proposed Turbines: Current turbines mainly within capacity. Three proposed medium/ large turbines along edge of Lunan valley and close to Letham are taller than recommended.</p>
												Max. Numbers in Group	1-5	1-3				
												Min Group Separation Distances (km)	2-4	3-6				
Landscape Character Area: Southeast Angus Lowland Sub Area: (v)Ethie Farmland																		
Med	Med/High	Med/High	Med	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently one consented small/med turbine at Kinblethmont and two near the coast at Ethie.	Dipslope Farmland with Occasional/ No Wind Turbines	Dipslope Farmland with Occasional Wind Turbines	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	One medium/large turbine near Lunan valley.	<p>Landscape analysis: This small sub-area of higher ground is adjacent to the coast, bordered by the Lunan Water and other drainage lines flowing to Arbroath. Settlement and road network is relatively sparse. There is capacity mainly for smaller turbines in small groupings. Max turbine size should be limited to 50m and should be set well back from the visually exposed coastal area.</p> <p>Comments on Consented and Proposed Turbines: Current turbines within capacity but proposed medium/large turbine is taller than recommended.</p>
												Max. Numbers in Group	1-5	1-5				
												Min Group Separation Distances (km)	2-4	3-6				

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input checked="" type="radio"/> Medium Capacity <input type="radio"/> High Capacity																		
Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)										
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Area: <i>Southeast Angus Lowland</i> Sub Area: <i>(vi)Rossie Moor</i>																		
Med	Med/High	Med/High	Med	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Currently 4 consented small/medium turbines in the northeast.	<i>Dipslope Farmland with Occasional/ No Wind Turbines</i>	<i>Dipslope Farmland with Occasional Wind Turbines</i>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	One application for a single medium/large turbine at Pamphry. Applications for a medium and medium/large turbine on edge of the sub area at Lunan Valley near Friockheim.	<p>Landscape analysis: This sub-area of higher ground is adjacent to the coast, also bordered by the Lunan Water to the south and Montrose Basin to the north. Settlement and road network is relatively sparse and fields often large scale. There is capacity mainly for smaller turbines in small groupings. Medium/large turbines should be set well back from the coastal area.</p> <p>Comments on Consented and Proposed Turbines: Current consents and applications would not exceed capacity. An application for 3x110m turbines at Mountboy near Rossie School was dismissed on appeal in 2009. Two very large (137m) turbines at GSK Montrose adjacent to this area were dismissed on appeal. Both due partly to landscape and visual impacts.</p>
											Max. Numbers in Group	1-5	1-5	1-3				
											Min Group Separation Distances (km)	2-4	3-6	5-10				

GUIDANCE: TAY13 DIPSLOPE FARMLAND

The *Dipslope Farmland* LCA is capable of accommodating wind energy development due to its scale, often open character and productive land use with simple geometric field patterns. The capacity varies according to subtle variations between the six sub-areas as described below. The sub-areas are identified on the basis of differences in landscape character and sensitivity to wind energy. There is a linear ridge which delineates the different relationship of *Dipslope Farmland* with the coast to the south and undulating plateau to the north, defining the scale of acceptable turbines. This theme is further developed in the relevant detailed sub-area guidance.

(i) TEALING FARMLAND

Proposed Limits to Future Development: Dipslope Farmland with Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium).

Group Sizes: 1-5 (small/medium; medium).

Separation Distances: 2-4km (small/medium and medium)

Detailed Guidance

This sub-area has an establishing pattern of medium turbines at just under 50m, and small/medium turbines under 30m. One large (93m) turbine has been consented at the former Tealing airfield. Whilst medium/large turbines could theoretically be accommodated in this scale of landscape, continuation of the establishing development pattern is more appropriate. The medium turbines should primarily be located in central areas of the farmland, avoiding skyline effects on/ domination of Dundee suburbs and scale effects on the Sidlaw Hills to the north and west (slope heights varying from 100m-250m above adjacent farmland). Small/medium turbines can be accommodated closer to the Sidlaw escarpment. Proximity to residential properties may also limit opportunities for locating larger turbines and/or turbine groups.

Relate turbines clearly to landscape features such as field boundaries, breaks in slope and larger farm buildings. Carefully assess positioning in relation to the several electricity transmission lines and substation to avoid cumulative visual clutter.

Provide sufficient separation between turbine groupings to ensure that proximity and intervisibility is moderated and turbine groupings do not dominate the landscape or visually coalesce to create a *Wind Turbine Landscape*. This can be achieved through selecting appropriate turbine sizes, separation distances and/or the intervention of landforms and tree groups. Existing small/medium turbines are often screened from longer distance visibility by trees. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

(ii) CROMBIE/ MONIKIE FARMLAND

Proposed Limits to Future Development: Dipslope Farmland with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium); 50-<80m (medium/large).

Group Sizes: 1-5 (small/medium; medium); 1-3 (medium/large).

Separation Distances: 2-4km (small/medium); 3-6km (medium); 5-10km (medium/large)

Detailed Guidance

The principal concern in this sub-area is to avoid locating larger turbines close to visually sensitive areas including settlements, country parks and listed buildings. An application for 3 large turbines at East Skichen was turned down in 2009 due to visual impacts on the village and Country Park at Monikie.

Medium/large turbines may be located in the limited more open larger scale areas to the north of Monikie and Crombie.

Position of turbines so as to relate clearly to landscape features such as field boundaries, breaks in slope and larger farm buildings. Positioning in relation to the electricity transmission line should be carefully considered to avoid cumulative clutter.

Allow sufficient separation between turbine groupings to ensure that the landscape is not dominated and that clear intervisibility between turbine groupings is infrequent. This can be achieved through selecting appropriate turbine sizes and separation distances and through exploiting the extensive areas of trees and forestry in this sub-area to screen views. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation. Use tree belts to discretely accommodate small/medium turbines amongst larger turbines in this area.

(iii) REDFORD FARMLAND

Proposed Limits to Future Development: Dipslope Farmland with Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium); 50-<80m (medium/large).

Group Sizes: 1-5 (small/medium; medium and medium/large); 1-3 (large).

Separation Distances: 2-4km (small/medium and medium); 5-10km (medium/large)

Detailed Guidance

This sub-area has the highest underlying capacity for wind energy in the *Dipslope Farmland* and is capable of accommodating medium/large turbines, subject to local constraints. It is noted that a previous application for 3 large (110m) turbines at Dusty Drum in the centre of this area was recommended for refusal in 2009 due to aviation issues but also due to landscape and visual impacts. However a single 67m turbine is now operational at Cononsyth in the north.

The largest size turbines (medium/large) would be most suitable in the largest scale areas located in the centre and north of the sub area. Turbine groupings should remain relatively small and well separated to avoid overwhelming the underlying character. Proximity to residential properties may also limit opportunities for locating larger turbines and/or turbine groups in most other locations. The designed landscape at Guynd and areas towards the *Coast LCA* are more sensitive and medium/large turbines should not be used in close proximity to these. A recent application for 7x125m turbines at Corse Hill on the boundary with the *Coast LCA* was dismissed at appeal in 2013. Medium/large turbines should be located north of the break in slope above the A92, north of a line marked by the course of the Rottenraw Burn from the B9128 in the west and then north of Kellyfield and Cuthlie in the east.

Relate turbines clearly to landscape features such as field boundaries, ridges and larger farm buildings. Where the flatness and featurelessness of the terrain in some locations gives no obvious local clues, group composition from key viewpoints and other environmental factors should guide positioning. Positioning in relation to the electricity transmission line should also be carefully considered to avoid cumulative visual clutter.

Separation between turbine groupings should ensure that intervisibility is moderated and that turbine groupings do not dominate the landscape or visually coalesce to create a *Wind Turbine Landscape*. This may be achieved through selecting appropriate turbine sizes, separation distances and/or the intervention of landforms and tree groups.

Due to the openness of the landscape in the highest part of this sub-area, mixing of turbine sizes will be more difficult to achieve than in areas to the east or west. It is therefore recommended that, where a suitable development pattern becomes established, this is followed. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

(iv) LETHAM, LUNAN WATER AND ARBROATH VALLEYS

Proposed Limits to Future Development: Dipslope Farmland with Occasional Wind Turbines/ with Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-5 (small/medium); 1-3 (medium)

Separation Distances: 2-4km (small/medium); 3-6km (medium)

Detailed Guidance

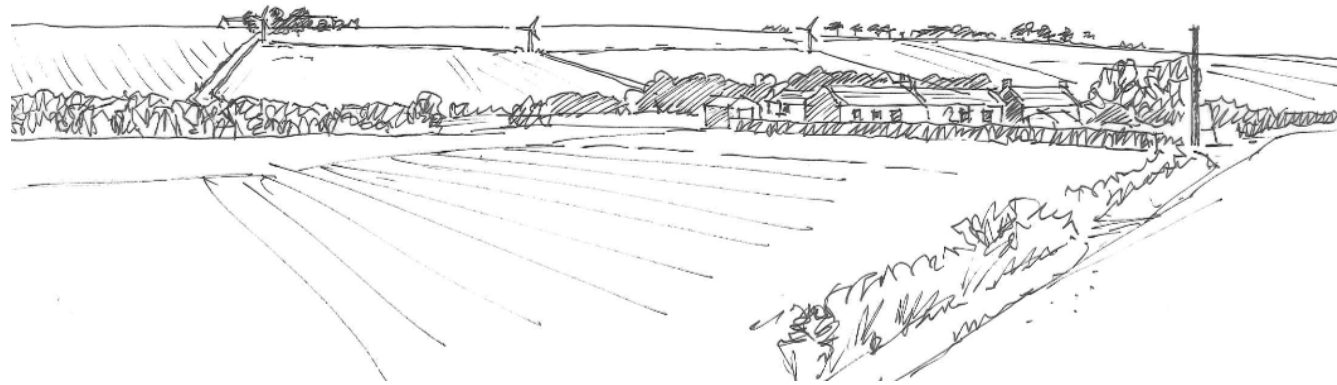
This sub-area has a smaller more enclosed scale than much of the *Dipslope Farmland*, is visually sensitive and is more suited to smaller turbines associated with settlement or intensive agriculture.

The principal concern in this sub area is to avoid dominating smaller scale and/or sensitive landscapes, settlements and modest valley side landforms. This includes the two Designed Landscapes and numerous listed buildings at Guthrie and Pitmuies as well as the smaller settlements of Letham, Friockheim, Arbilot and Inverkeilor. Medium turbines would be most appropriate in flatter, larger scale

areas around Friockheim, whereas small/medium turbines (15-<30m tall) would be more appropriate to the smaller scale landscapes of the Lunan Valley where larger turbines could exceed the height of the valley slopes in locations where these are clearly expressed (50m-100m from valley floor to crest). Views towards and from Lunan Bay along the valley should also be protected.

Positioning turbines to relate clearly to landscape features such as field boundaries, breaks in slope and larger farm buildings, industrial or mineral extraction locations. Avoid excessive skylining.

Separate groups of turbines sufficiently to ensure that the landscape is not dominated and that clear intervisibility between turbines is infrequent. This can be achieved through selecting appropriate turbine sizes and separation distances and through exploiting landforms and areas of trees to screen views. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.



Lunan Water Valley: Small/medium (15-30m high) turbines do not dominate the modest valley slope and blade tips can be aligned with trees and buildings on the horizon

(v) ETHIE FARMLAND

Proposed Limits to Future Development: Dipslope Farmland with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium)

Group Sizes: 1-3 (small/medium; medium)

Separation Distances: 2-4km (small/medium); 3-6km (medium)

Detailed Guidance

This small sub-area has capacity mainly for small/medium and medium turbines in small groupings. The principal concern is to avoid dominating sensitive landscape settings associated with large estate houses (now hotels) at Kinblethmont and Ethie Castle and the coastal strip. Medium size turbines should be sited west of the A82 due to the high exposed position of the boundary with the *Coast with Cliffs* LCAs on this headland.

Position turbines so that they relate clearly to landscape features such as field boundaries, breaks in slope and larger farm buildings. Avoided excessive skylining or domination.

Separation between turbine groupings should be sufficient to ensure that clear intervisibility is infrequent. This can be achieved through selecting appropriate turbine sizes and separation distances and through exploiting landforms and areas of trees and forestry to screen views. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

(vi) ROSSIE MOOR

Proposed Limits to Future Development: Dipslope Farmland with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium); 30-<50m (medium); 50-<80m (medium/large).

Group Sizes: 1-5 (small/medium; medium); 1-3 (medium/large).

Separation Distances: 2-4km (small/medium); 3-6km (medium); 5-10km (medium/large)

Detailed Guidance

Further to the findings of an inquiry which dismissed an application for three large (110m) turbines at Mountboy, the largest recommended size of turbine is 50-<80m (medium/large). These would be most suitable in the largest scale areas located in the centre and south of the sub area.

The principal issues in this sub-area include the avoidance of skylining effects on Montrose Basin and the visual domination of sensitive landscape and visual receptors, including residential properties, Rossie Moor, Rossie School, Dunninald designed landscape and A listed buildings. Medium/large turbines should be located well to the west of the A92 and well north of the Lunan Water to avoid effects on the coastal landscapes, Lunan valley and Lunan Bay.

Position turbines to relate clearly to landscape features such as ridges, field boundaries and larger farm buildings. In some locations the removal of field boundaries gives no obvious local clues for positioning. In this case landform, composition from key views and other environmental factors should take precedence.

Separation turbine groupings sufficiently to ensure that the landscape is not dominated and that clear intervisibility between turbines is infrequent. This can be achieved through selecting appropriate turbine sizes and separation distances and through exploiting landforms and areas of trees and forestry to screen views. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation.

TAY14: COAST

The *Coast* LCAs are mainly narrow, usually 1km or less in width. They comprise areas of predominantly arable coastal farmland which merge into coastal grasslands and scrub, or end abruptly at a beach or cliff. They are defined by their general openness and exposure to coastal views and weather. Inland most of these LCAs merge with the *Dipslope Farmland* LCA. Most of the *Coast* LCAs are visually sensitive due to their proximity to a large resident population and as a recreational destination, as exemplified by a concentration of paths and cycle routes.

14A: COAST WITH SAND

These mainly narrow *Coast* LCAs are low, open and exposed, comprising areas of coastal farmland and links golf courses which merge into coastal grasslands and sandy shorelines. They alternate with stretches of coastline with low cliffs and rocks (see below) and with coastal settlements. There are a number of caravan parks between the settlements and the LCAs. The most southern area, at Barry Links, is considerably wider than the rest of the LCAs, forming a sandy headland of stabilised dunes and slacks at the mouth of the Firth of Tay. Inland, three of the LCAs merge with *Dipslope Farmland*. The most northern area, at Montrose, differs slightly in that it is predominantly a links area with little agriculture, bordering the flat farmlands of the Montrose Basin and the edge of the town. Lunan Bay forms a crescent of sand framed by higher bluffs and is located by a castle and other areas of archaeological interest.

14A: COAST WITH CLIFFS

These narrow *Coast* LCAs are open and exposed. They alternate with stretches of coastline with sandy beaches (see above) and with coastal settlements. These areas are generally more elevated and exposed than the sandy LCAs, as their landforms end on rocky headlands comprising cliffs, escarpments and rocky pavements. The areas are more predominantly agricultural and there are no golf courses or caravan parks. Most of the cliffs and headlands are nevertheless of modest scale (maximum at Red Head is 81m AOD but most such as Scurdie Ness and Boddin Point are much lower). In the case of the Carnoustie LCA, there are rocky pavements bordering the sea, rather than cliffs, and the farmland is of a similar elevation to the neighbouring sandy LCA. All of all these LCAs merge inland with the *Dipslope Farmland* LCA. A notable feature of the *Coast with Cliffs* LCAs is that the cultivated farmland tends to end abruptly with a sharp boundary at the edge of the cliffs or escarpments. There are also occasional small fishing stations associated with coves or inlets and ancient forts on some of the higher cliffs.

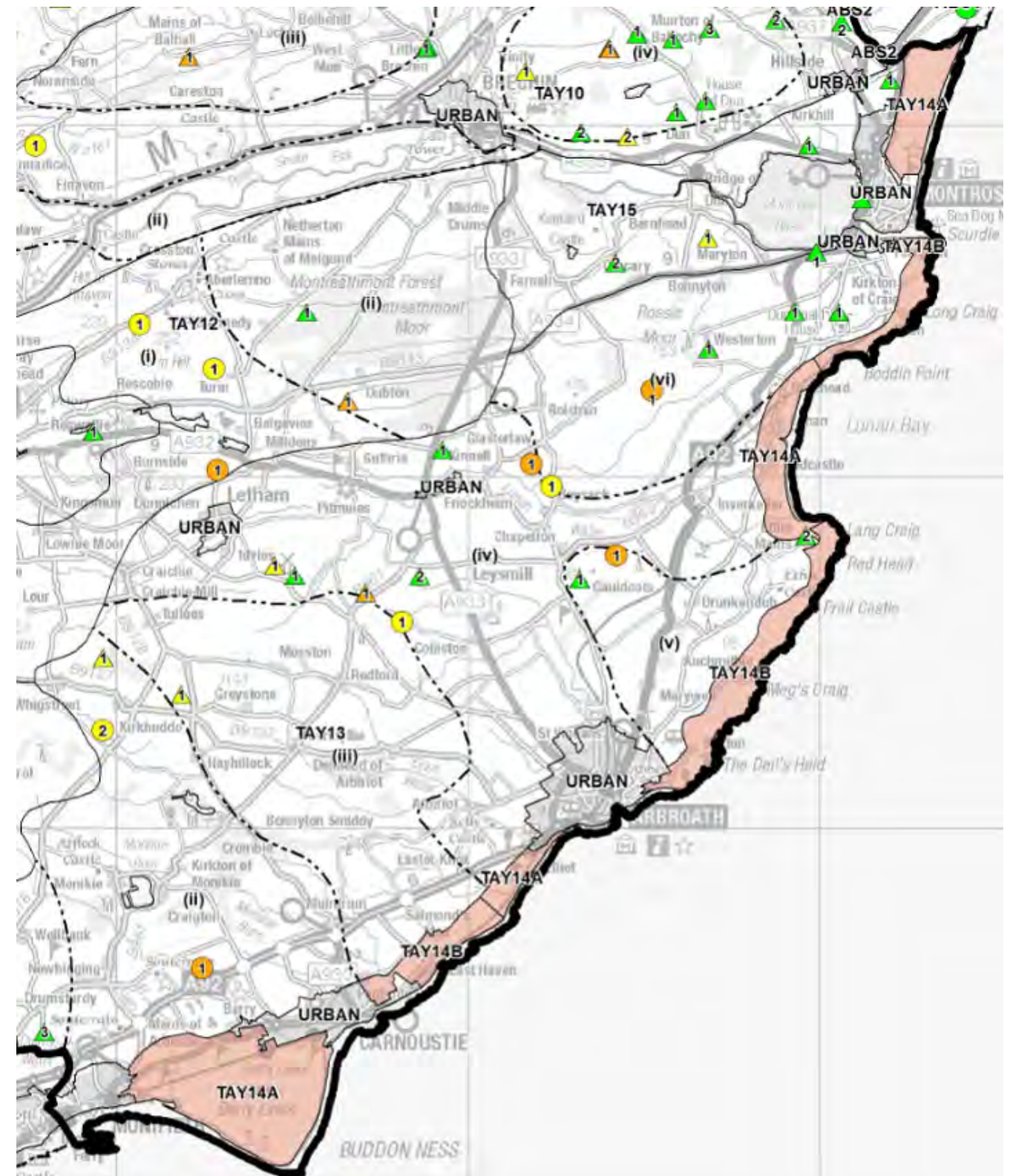


Table 6.1(h) Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Coast

LANDSCAPE CHARACTER TYPE TAY 14: COAST																			
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity																			
Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																			
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT			PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)											
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)	
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL			
14a Coast with Sand Landscape Character Areas: Barry Links, Elliott, Lunan Bay, Montrose																			
Med	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 small/medium turbines on Ethie headland above Lunan Bay.	<i>Coast with No Wind Turbines/ Occasional Wind Turbines</i>	<i>Coast with Occasional Wind Turbines</i>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	No current applications	<p>Landscape Analysis: Low open exposed areas of coastal farmland, links and sandy beaches. Whilst the open windswept character is suitable for wind energy, larger scale turbines would be highly intrusive, being highly visible against the sea and sky and out of scale with the landform, low buildings and wind pruned trees. Turbines should be no larger than 30m and associated with built development.</p> <p>Comments on Consented and Proposed Turbines: Two small/medium turbines and no current applications. Offshore windfarm at 30km distance will have a slight visual effect on this LCT. Proposed Inchcape windfarm at 15km would have a significant visual effect.</p> <p>Two recent proposals located in or near this type have recently been dismissed on appeal due to landscape and visual impacts: 7 very large turbines at Corse Hill between Carnoustie and Arbroath and two very large turbines at GSK Montrose.</p>	
																	Scoping for offshore windfarm at Inchcape and 125x197m turbines at Neart na Gaoithe 15km and 30km SE from Angus coast		
																	Max. Numbers in Group 1-3		
																		Min Group Separation Distances (km) 2-4	
14b Coast with Cliffs Landscape Character Areas: Carnoustie, Auchmithie, Usan																			
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 small/medium turbines by Ethie Mains above Lunan Bay lie within 200m.	<i>Coast with No Wind Turbines/ Occasional Wind Turbines</i>	<i>Coast with Occasional Wind Turbines</i>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	No current applications	<p>Landscape analysis: Whilst more elevated than the surrounding <i>Coast with Sand</i> the cliffs are nevertheless of modest scale. Larger scale turbines would be highly intrusive, being highly visible against sea and sky and out of scale with the cliffs, low buildings and wind pruned trees. Turbines should be no larger than 30m, set back from clifflines to avoid scaling effects.</p> <p>Comments on Consented and Proposed Turbines: No current consented turbines and no applications. See above for commentary on proposals within or close to this LCA.</p>	
																			Scoping for offshore windfarm at Inchcape and 125x197m turbines at Neart na Gaoithe 15km and 30km SE from Angus coast
																			Max. Numbers in Group 1-3
																		Min Group Separation Distances (km) 2-4	

GUIDANCE: TAY14 COAST

14A COAST WITH SAND

Proposed Limits to Future Development: Coast with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium)

Group Sizes: 1-3 (small/medium)

Separation Distances: 2-4km (small/medium)

Detailed Guidance

Whilst the open windswept character is suitable for wind energy, larger scale turbines would be highly intrusive, being highly visible against the sea and sky and out of scale with the landform, low buildings and wind pruned trees. Turbines should be no larger than 30m and associated with built development. Where there are two or three closely located applications for single turbines of the same size, exploit opportunities for clustering as a group in preference to separation. Consideration is given in the *Dipslope Farmland* guidance to ensuring larger turbines in the neighbouring LCAs do not dominate the coastal strip.

There are currently two small/medium turbines and no applications. A proposal for 7 very large turbines at Corse Hill between Carnoustie and Arbroath was partially located in this LCA. and has been dismissed on appeal due to adverse landscape and visual impacts resulting from the scale of the proposals.

A proposal for two very large turbines at GSK Montrose was also dismissed on appeal due to visual impacts on the setting of Montrose and on nearby residential properties. This was located within the urban area but would have had significant effects on views south from the Montrose LCA.

14B COAST WITH CLIFFS

Proposed Limits to Future Development: Coast with Occasional Wind Turbines

Turbine Sizes: 15-<30m (small/medium)

Group Sizes: 1-3 (small/medium)

Separation Distances: 2-4km (small/medium)

Detailed Guidance

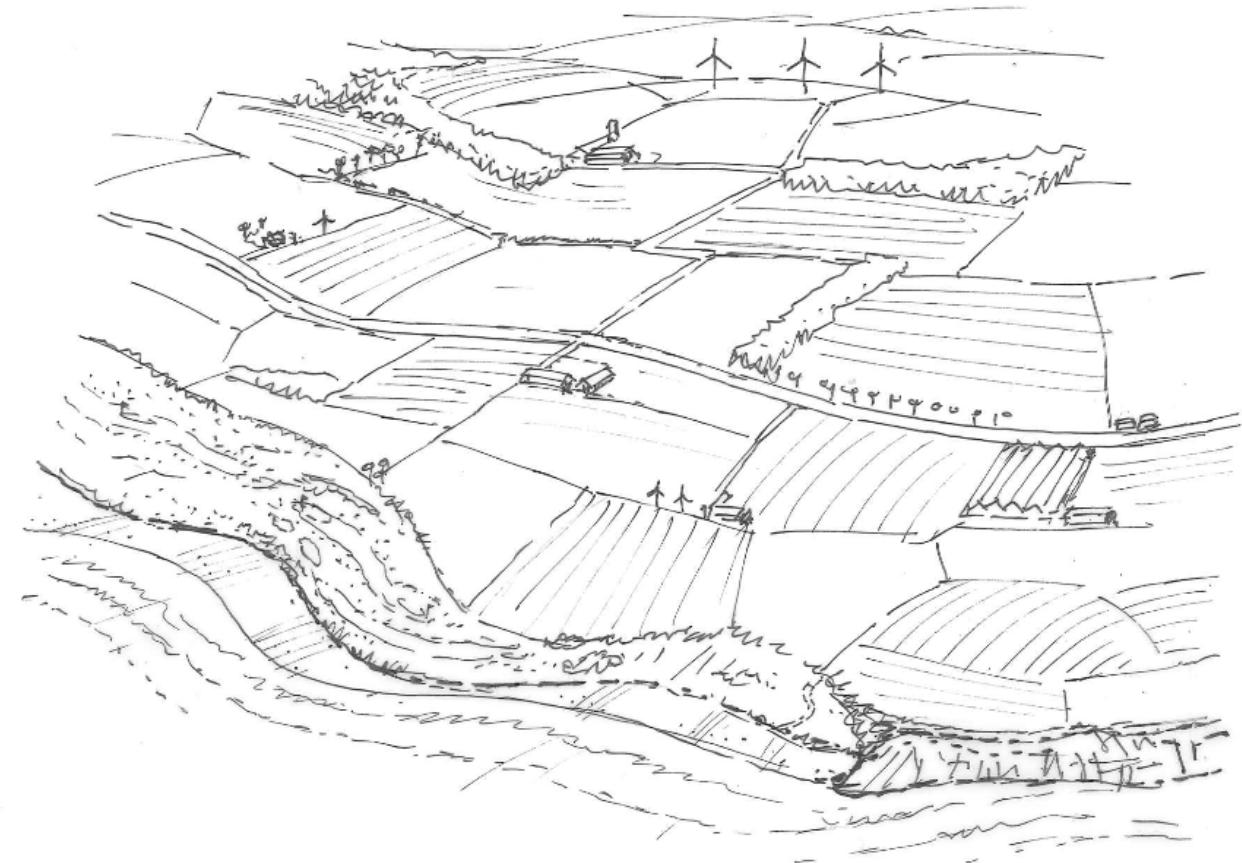
Whilst the open windswept character is suitable for wind energy, larger scale turbines would be highly intrusive, being highly visible against the sea and sky and out of scale with the landform, low buildings and wind pruned trees. Turbines should be no larger than 30m, set back from the modest sized cliffs to avoid scaling effects and associated with built development. Consideration is given in the *Dipslope Farmland* guidance to ensuring larger turbines in these neighbouring LCAs also do not dominate the coastal strip.

The dismissed Corse Hill proposal (see above) was located mainly in the Carnoustie LCA. The GSK proposal at Montrose would have had significant effects on the northern edge of the Usan LCA.

Offshore Wind Energy Developments

The proposed offshore windfarm at Neart na Gaoithe lies some 30km south east of the Angus coastline. Although comprising 125 turbines at 197m height, at this distance it is not likely to have a significant

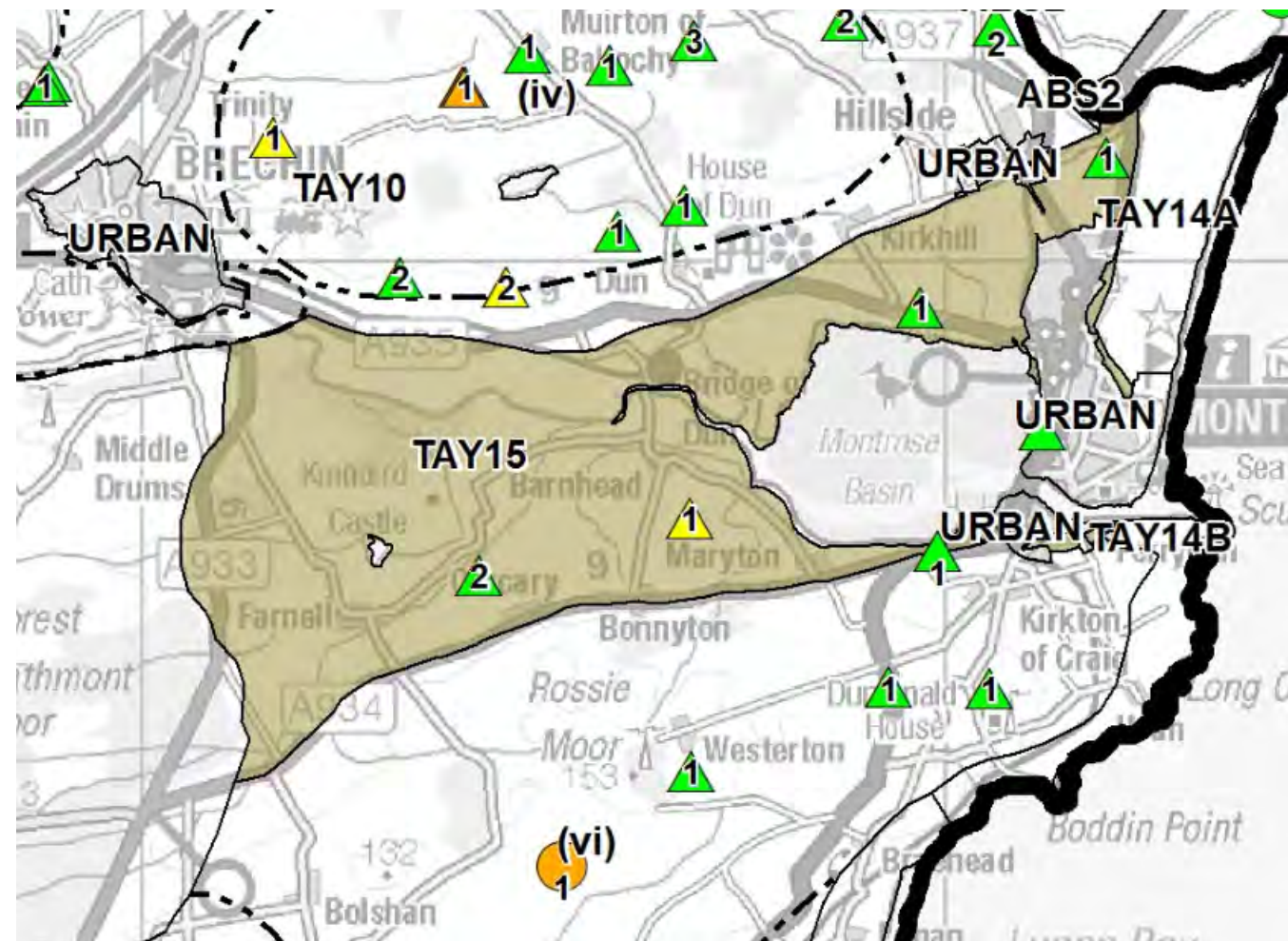
effect on the coastal LCAs. Seaenergy Alpha and Bravo proposals 27-38km to the east would be similar. However the proposed Inchcape windfarm, with over 200 turbines at 15km distance, may have a significant landscape and visual effects on the closest coastal LCAs which are also the most scenic areas of cliffs and sand lying between Arbroath and Montrose.



Coastal landscapes and Dipslope Farmland often merge seamlessly. Large turbines should be set well back into the Dipslope Farmland with turbines under 30m associated with development near the coast.

TAY15: INLAND LOCH BASIN

Montrose Basin is an unusual landscape type: an enclosed tidal basin and area of low lying farmland set between slightly more elevated areas of farmland and forest. It provides a unique setting for the town of Montrose which lies between the basin and the sea: the town has a characteristic profile seen across the basin and silhouetted against the North Sea. There is wide visibility across the basin, although the enclosing landform, despite being of modest elevation, encloses views north and south. The farmland is less open due to hedgerow tree cover and extensive areas of woodland planting associated with the designed landscape around Kinnaird Castle, which covers much of the western end. Inland of this the land slowly rises to Montreathmont Moor.



Montrose Basin viewed from the Dipslope Farmland to the south. The steeple of the Old and St Andrew's Church in Montrose is silhouetted against the North Sea.



View towards the east slopes of Rossie Moor and the trees of Kinnaird Park from Bridge of Dun.

Guidance is provided below in Table 6.1(i)

Table 6.1(i) Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Lowland Loch Basin

LANDSCAPE CHARACTER TYPE TAY 15: LOWLAND LOCH BASIN																		
Key: <input type="radio"/> No Capacity <input type="radio"/> Low Capacity <input type="radio"/> Medium Capacity <input type="radio"/> High Capacity																		
Turbine Size: Small/Medium=15-<30m; Medium=30-<50m; Medium/Large=50-<80m; Large=80-<125m; Very Large=125m+																		
BASE LANDSCAPE CAPACITY (i.e. not taking account of current wind energy development)					CURRENT CONSENTED DEVELOPMENT					PROPOSED LIMITS TO FUTURE DEVELOPMENT (i.e. proposed acceptable level of wind energy development)								
Landscape Sensitivity to Wind Energy Development				Landscape Capacity (Related to turbine size)					Existing/ Consented Developments	Current Wind Energy Landscape Type(s)	Future Wind Energy Landscape Type(s)	Remaining Landscape Capacity (Related to turbine size)					Current Applications	Analysis & Guidelines (Refer to Detailed Guidance for Further Information on Siting and Design)
Landscape Character Sensitivity	Visual Sensitivity	Landscape Sensitivity	Landscape Value	S/M	M	M/L	L	VL				S/M	M	M/L	L	VL		
Landscape Character Areas: <i>Montrose Basin</i>																		
Med/High	Med/High	Med/High	Med/High	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3 small/medium and one medium turbine within the LCA. Several small/medium and medium turbine in close proximity, particularly on higher ground to the north.	<i>Lowland Loch Basin with Occasional Wind Turbines/ no Wind Turbines</i>	<i>Lowland Loch Basin with Occasional Wind Turbines</i>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	No current applications	<p>Landscape Analysis: Montrose Basin is an uncommon landscape type, set between slightly more elevated areas of farmland and providing a setting for the town of Montrose. Some turbines could be accommodated in the farmland area. However due to wide visibility across the basin, modest elevation of enclosing landform (ca. 100m) and extensive areas of designed landscape around Kinnaird Castle, turbines taller than 50m would not be appropriate.</p> <p>Comments on Consented and Proposed Turbines: Consented turbines are within the capacity of the landscape. A proposal for two very large turbines at GSK Montrose was recently dismissed on appeal due to visual impacts on the setting of Montrose and on nearby residential properties. Although located within the urban area, this proposal would have affected views of the town seen across the basin.</p>

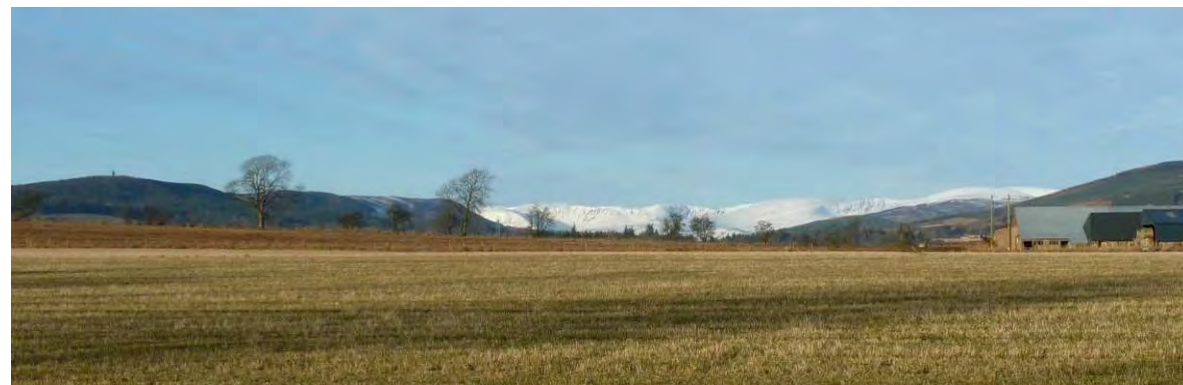
6.3 Overall Assessment of Capacity and Cumulative Development

6.3.1 Summary of Landscape Character, Sensitivity and Underlying Capacity

(Refer to Figures 6.1a-f for details of landscape capacity for turbines of different sizes).

The landscape of Angus is characterised by a transition from coastal landscapes in the southeast progressing northwest through agricultural lowland and lowland hills, thence to highland landscapes in the north. The bulk of the population lives in small towns and villages in the lowland area, through which the main transport routes pass.

The transition between highland and lowland is particularly dramatically presented in the form of the Highland Boundary Fault separating the broad valley of Strathmore from the Grampian Mountains, and is key in determining the underlying capacity of the landscape to accommodate wind turbines.



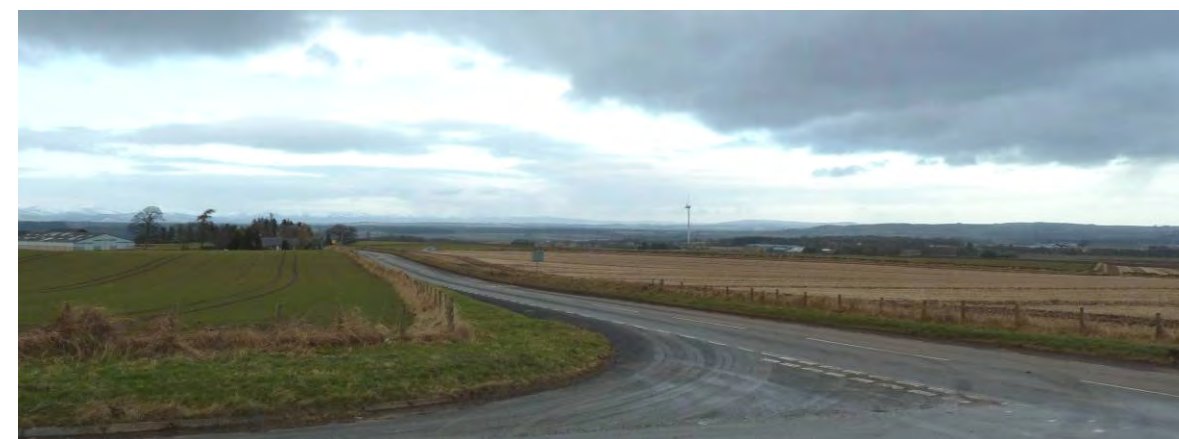
The Highland Boundary fault provides a sharp transition between the fertile settled lowlands of Strathmore and the wild scenery of the Grampian Mountains in the north of Angus

The openness of Strathmore and the ever present backdrop of the Grampian Mountains and Angus Glens is more simply and dramatically expressed as the key landscape feature of Angus than in the more extensive neighbouring areas of Perthshire and Aberdeenshire. This makes the highland area including the transitional foothills very sensitive to wind turbine development due to elevated levels of visual sensitivity and landscape value.

The assessment has determined that there is no capacity for wind turbine development in the highest mountain areas of the highland area, the *Highland Summits and Plateaux*, and that the capacity elsewhere in the highlands is limited to single or small groups of smaller turbines. This conclusion is in contrast with the current upland predominance in the pattern of Scottish wind energy development. Whilst the landscape character type in Angus has some suitable characteristics of scale, simplicity of landform and lack of small scale development; their landscape importance, visual prominence and status as a popular recreational and visitor location severely limits capacity.

The limitation in the highlands notwithstanding, there is varied underlying capacity for wind energy development throughout much of the lowland and hills area. In areas suitable for development, the differing landscape characters could accommodate different turbine sizes, groupings and spacings.

In Angus the lowland landscape represents the best opportunity for wind energy development. Two LCTs (*Broad Valley Lowland* and *Dipslope Farmland*) cover very extensive areas, with a medium or medium/large scale simple landscape pattern of arable fields, roads and plantations. These lowland LCTs are the hinterland for most of the principal towns of Angus and are influenced in places by urban fringes, industry, mineral extraction and major transport routes. These areas therefore have many of the characteristics that are considered compatible with wind turbine development and have underlying capacity for larger turbines in some locations.

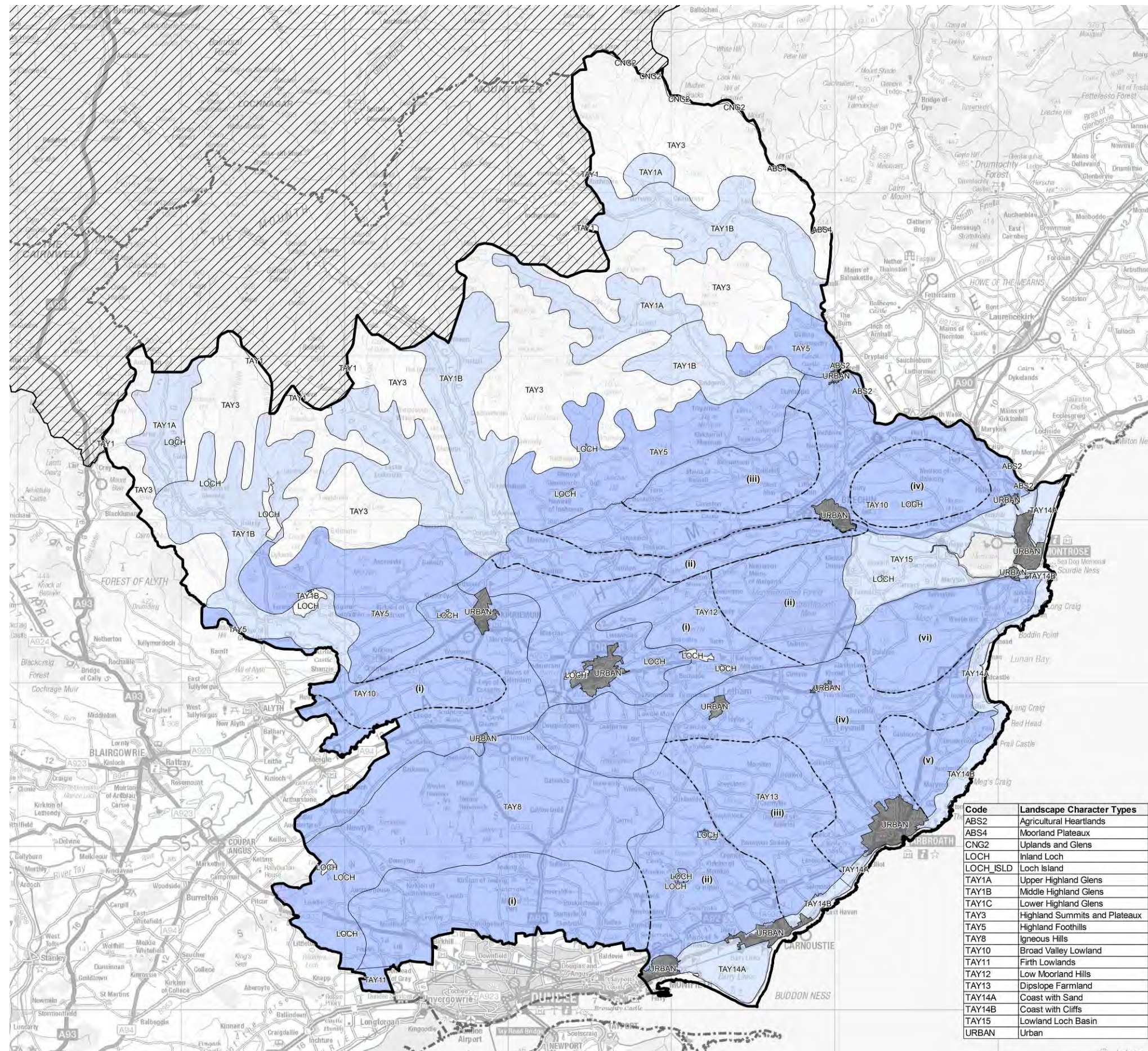


The higher more open areas of Dipslope Farmland can accommodate larger turbines

However they also have the sensitivities of a substantial local residential and travelling population and domestic scale landscape features such as houses and trees. There are also areas of more complex and smaller scale landform. This restricts the potential size and extent of development compared with other parts of Scotland that have, for example, extensive unpopulated moorland plateau areas developed with large windfarms and turbines.

Other lowland landscape types within Angus (*Igneous Hills* and *Low Moorland Hills*) are smaller in extent and higher in elevation, with generally more complex patterns of landform and landuse. However there are open ridges in the Sidlaw Hills which have capacity for a modest scale of windfarm development with turbines up to about 80m blade tip height, as exemplified by Ark Hill. The relatively flat Montreathmont Forest area has potential capacity for small groups of larger turbines. However the neighbouring Forfar Hills are more sensitive due to the prominent modestly scaled hills, often with hillforts or viewpoints, providing a setting for the town of Forfar and there is no capacity for larger turbines.

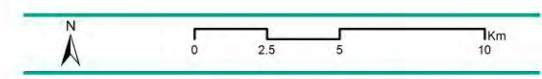
The main coastal types (*Coastal with Sand*; *Coast with Cliffs*) have some of the landscape characteristics considered suitable for wind turbine development. However these areas are limited in extent, being particularly narrow, and have very modest landforms and a low tree cover. They are visually sensitive, as turbines would stand out clearly against sea and sky and only smaller turbines can be accommodated. The *Lowland Loch Basin* of Montrose Basin has a slightly greater underlying capacity in its farmland, but the open basin is visually sensitive, limiting capacity.



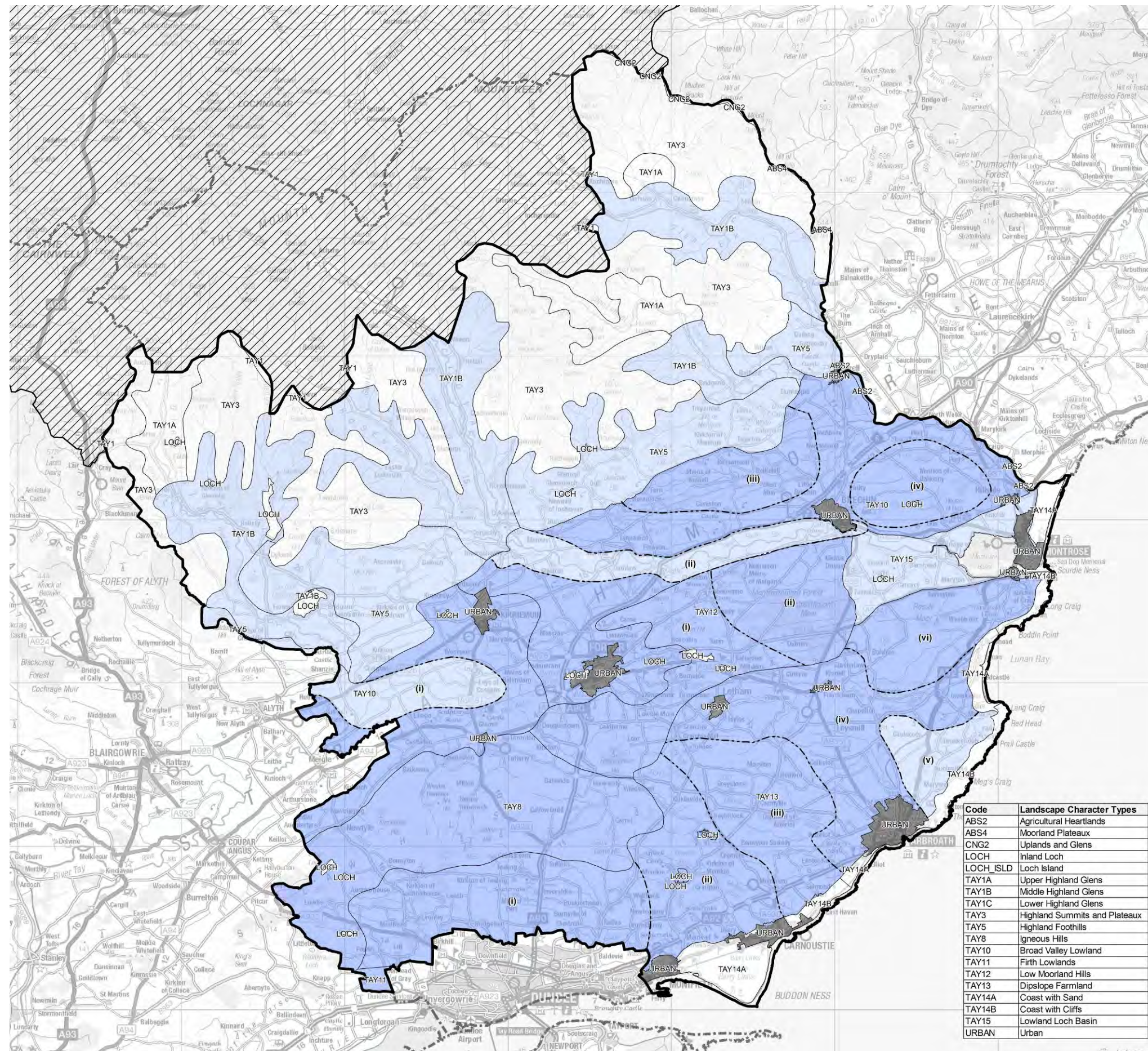
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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Cairngorms National Park
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Capacity**
- High Capacity
 - Medium Capacity
 - Low Capacity
 - No Capacity
 - Urban

Figure 6.1a
Underlying Landscape Capacity
(15 to 30m Turbines)



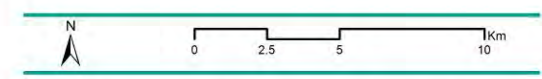
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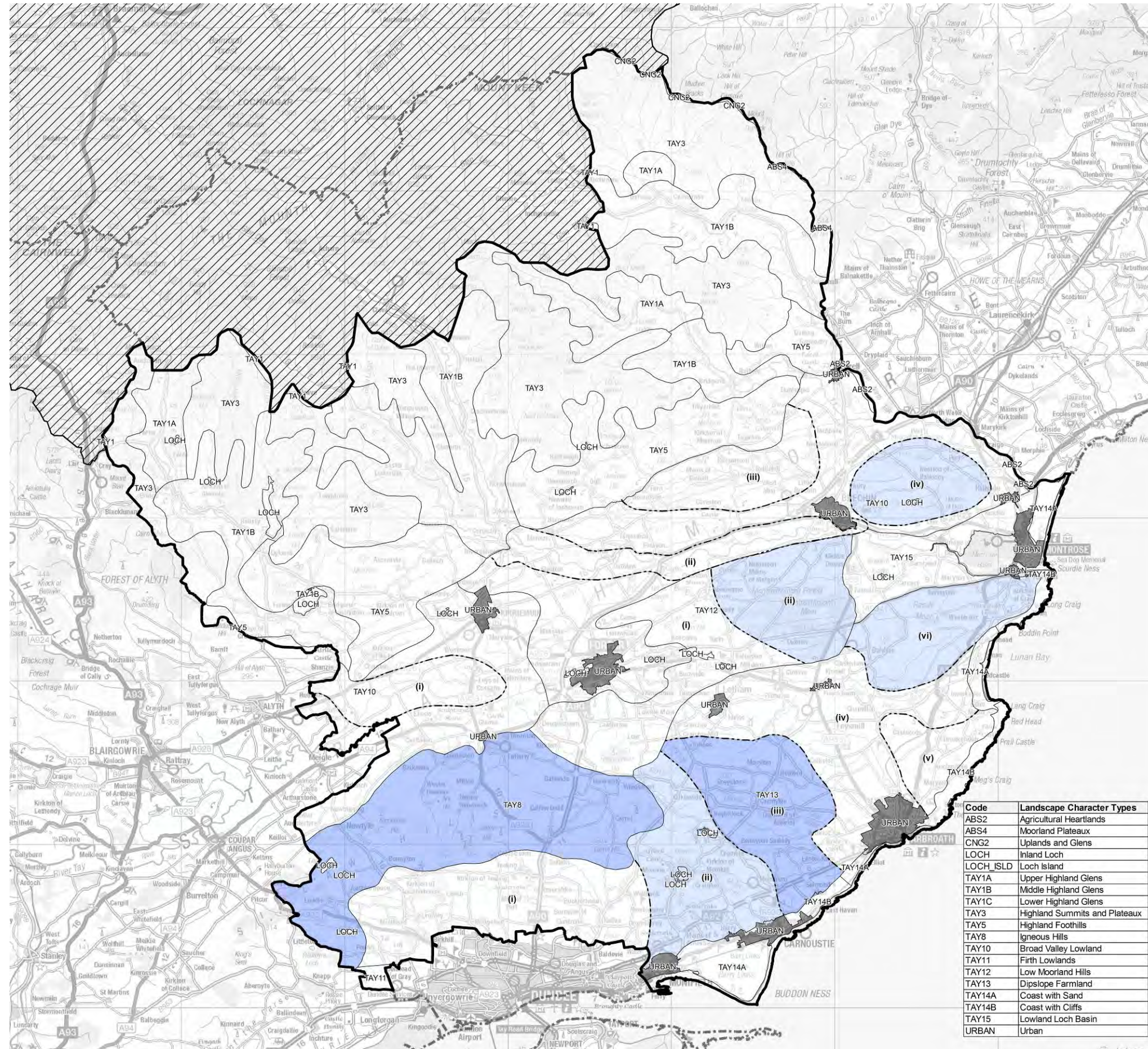
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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Cairngorms National Park
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Capacity**
- High Capacity
 - Medium Capacity
 - Low Capacity
 - No Capacity
 - Urban

Figure 6.1b
Underlying Landscape Capacity
(30 to 50m Turbines)



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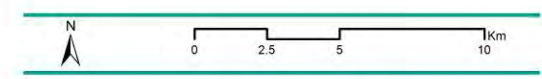


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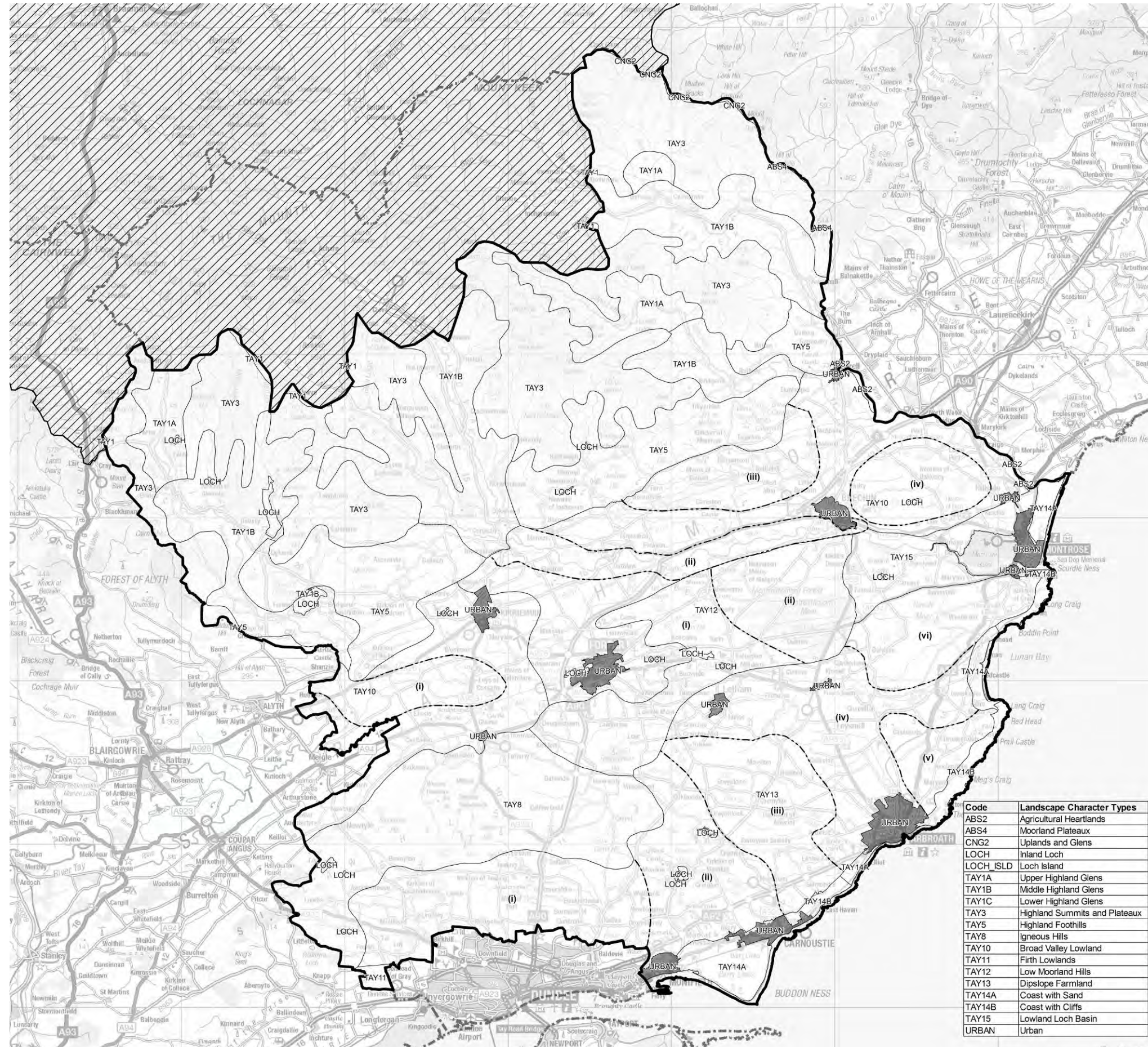
- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Cairngorms National Park
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Capacity**
- High Capacity
 - Medium Capacity
 - Low Capacity
 - No Capacity
 - Urban

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 6.1c
Underlying Landscape Capacity
(50 to 80m Turbines)



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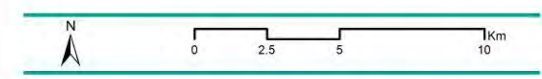


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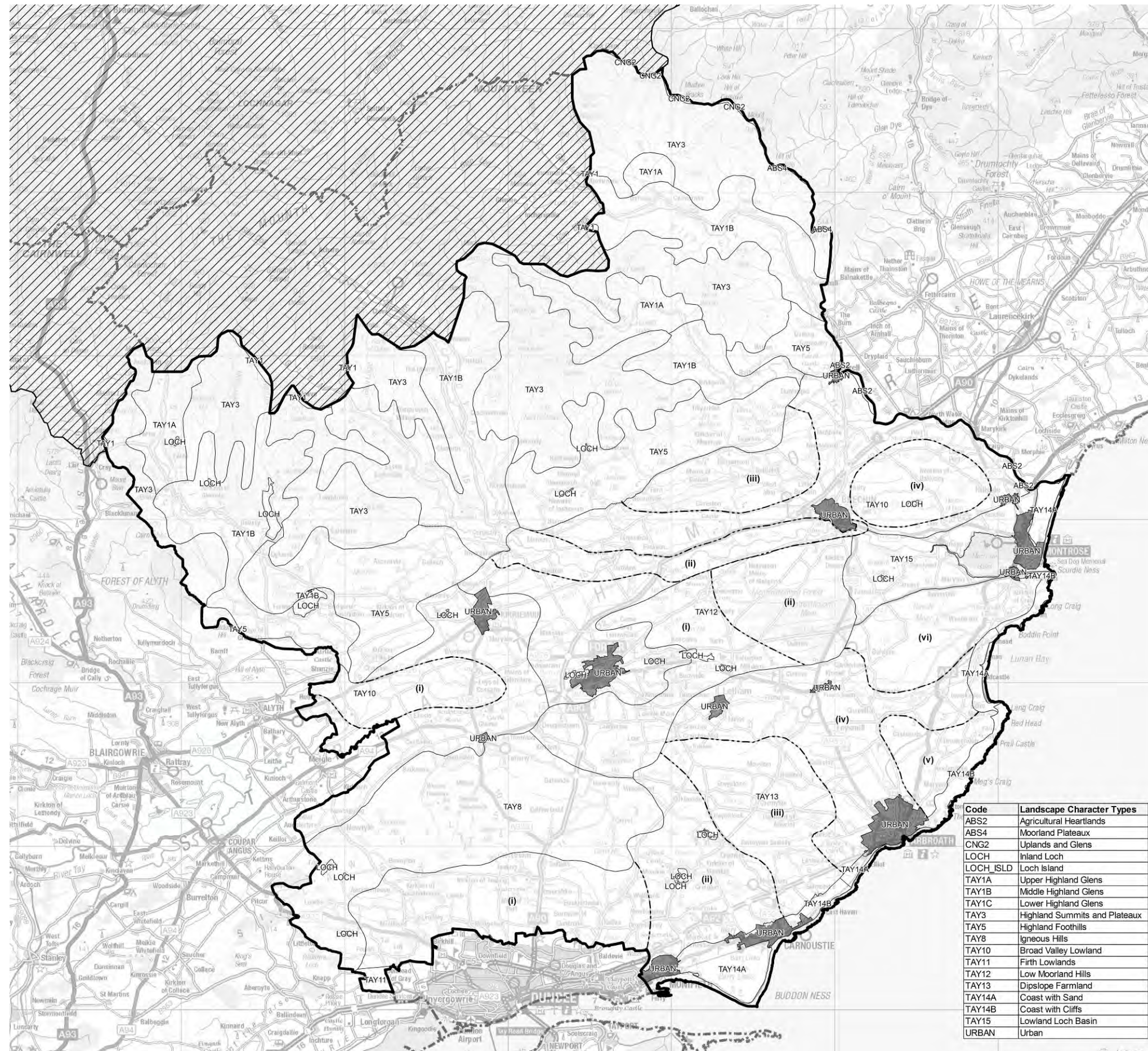
- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Cairngorms National Park
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Capacity**
- High Capacity
 - Medium Capacity
 - Low Capacity
 - No Capacity
 - Urban

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 6.1d
Underlying Landscape Capacity
(80 to 125m Turbines)



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Legend

- Study Area
- Scottish Local Authority Boundaries
- Cairngorms National Park
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- LCA Sub Areas (Ref. Table 6.1)

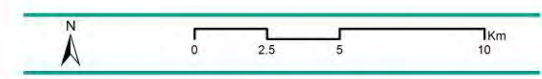
Capacity

- High Capacity
- Medium Capacity
- Low Capacity
- No Capacity
- Urban

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 6.1e

Underlying Landscape Capacity (125m+ Turbines)



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The offshore area of Angus comprises the Firth of Tay in the south, opening out to the North Sea east of Buddon Ness. Developments in this area have the potential to affect the coastal landscape types, potentially limiting capacity in areas closer to the coast.

6.3.2 Existing and Consented Wind Turbines in May 2013

At 116 turbines, mostly below 50m to blade tip, the level of operational and consented development on shore in May 2013 is very modest compared with many areas in Scotland. Whilst there is a large number of individual schemes, almost all are small scale, involving single or small clusters of small/medium to medium/large size turbines. There are nevertheless concentrations of consented turbines which are leading to significant cumulative change in some areas of Angus:

- 1) Drumderg and Welton of Creuchies windfarms and several smaller turbines in the Alyth Foothills on the border with Perthshire
- 2) Ark Hill windfarm and Scotston turbine in the central Sidlaw Hills.
- 3) A concentration of single and paired small/medium to large turbines in the *Dipslope Farmland* between the Sidlaw Hills and Dundee
- 4) A concentration of small/medium to medium/large turbines on an elevated area of *Broad Valley Lowland* to the east of Brechin

There are a few other areas in the lowlands and the *Highland Foothills* with single larger turbines or smaller concentrations of varied turbines. Elsewhere, locations throughout lowland Angus have scatterings of single predominantly small/medium or medium size turbines.

There are currently no, or minimal numbers, of wind turbines in the *Highland Summits and Plateaux* and the *Highland Glens* and the coastal LCTs. However, some limited areas of these are influenced by close proximity of turbines in other LCTs.

There are significant numbers of consented turbines in the 30km buffer area beyond Angus. Some of these developments (such as Drumderg in Perthshire and Tullo in Aberdeenshire) have an influence on the landscape character of, or views out of Angus. There is one consented offshore windfarm lying to the south east of Angus, just on the 30km edge of the study area.

6.3.3 Proposed Wind Turbines in May 2013

At May 2013 there were 51 further proposed turbines within Angus and many more beyond in Perth, Aberdeenshire and offshore, some of which may have significant effects on the Angus landscape:

- 1) A large windfarm at Nathro in the *Highland Summits and Plateaux* above Glen Lethnot
- 2) Seven further large turbines in Tullymurdoch windfarm on the Perthshire side of the Alyth Foothills.
- 3) Two offshore windfarms at 15km and 50km from the Angus coast.

- 4) Two closely spaced small/medium windfarms of large turbines in the eastern Sidlaw Hills.
- 5) A further large turbine adjacent to a consented large turbine in the Menmuir Foothills.

There are no or minimal numbers of proposed turbines in the rest of the *Highland Summits and Plateaux* and the *Highland Glens* and the coastal LCTs. However, some limited areas of these would be influenced by the close proximity of turbines in other LCTs and local authority areas.

Applications for turbines continue to be submitted and there is no indication of a diminution of wind related activity. Proposed turbines are generally of a larger size distribution than the consented turbines, with the majority of the single turbines in the medium or medium/large categories rather than small/medium (see chapter 5 for details).

There are two proposed offshore windfarms lying to the south east of Angus, one at Inchcape 15km offshore and the other at Neart na Goaithe just on the 30km edge of the study area.

6.4 Landscape Capacity and Cumulative Landscape Effects

Refer to Figure 6.2 for a map of current cumulative wind turbine landscape types and Figure 6.3 for a map illustrating the proposed future limit to wind turbine landscape types, as described in Table 6.1 and summarised in the sections below.

6.4.1 Summary of Capacity and Cumulative Development in the Highlands

The Highland area in Angus comprises four LCTs: *Upper Highland Glens*; *Mid Highland Glens*; *Highland Summits and Plateaux* and *Highland Foothills*.

The assessment of Highland LCTs has determined that this area of Angus mostly has a low or no underlying capacity for wind turbine development despite extensive areas of large scale open landscapes. This is primarily due to the highland area's high landscape value, both as a backdrop to the lowland area of Angus and as an extensive area of scenic and dramatic landscape with areas of remote and wild land qualities. The latter is underlined by the draft Core Area of Wild Land designation that covers a significant part of this area in Angus. The highland area is an important recreational and visitor destination and a substantial proportion of it lies within the Cairngorms National Park and a National Scenic Area that overlaps with Angus and extends further north into a wider area of higher mountains and wilderness.

It is recommended that no turbines are located in the high hills of the *Highland Summits and Plateaux*. Within the *Highland Glens* and *Highland Foothills* there would be only limited opportunities for smaller scale developments, with single turbines under 30m in the *Upper Highland Glens* and single or small groups of turbines under 50m height elsewhere. Turbines should preferably be located in suitable areas screened by topography or trees and away from sensitive receptors such as the Caterthun hillforts and Airlie Monument.

Restricting development in upland areas is counter to the development pattern that has taken place elsewhere in many other areas of Scotland. Nevertheless it reflects the sensitivity and value of all the LCTs within this area; their particular contribution to the

overall landscape character of Angus and their continuity with the Cairngorms National Park.

In May 2013 there were no operational or consented developments within the *Highland Summits and Plateaux* of Angus, although the 16 turbines of Drumderg in Perth & Kinross are within 3km to the west. Mid Hill in upland Aberdeenshire is over 15km to the northeast. As Drumderg lies within a *Highland Summits and Plateaux* landscape area crossing the local authority boundary a small part of the Angus highland area is effectively a *Highland Summits and Plateaux with Wind Turbines* landscape. *Highland Foothills* nearby would similarly be affected. Most of the rest of the highland area is remote enough from windfarms or screened to remain virtually unaffected. There are a few small/medium and medium turbines consented in the *Highland Foothills* and one or two in the *Mid Highland Glens*, creating areas of *Occasional Wind Turbine*, with one large turbine in the Menmuir Hills creating a small area of *Highland Foothills with Wind Turbines*.

Most of the proposed wind turbines are located in or near the *Highland Foothills* and would not lead to a significant change on the current situation. However the proposed seventeen 134m tall turbines at Nathro in the *Highland Summits and Plateaux* would lead to a *Wind Turbine Landscape* in the surrounding area including parts of the West Water Valley, Glen Lethnot and the Menmuir Hills; as well as significant effects on views of the Highland Boundary Fault seen from the Lower South and North Esk Valley and the Forfar Hills further to the south.

6.4.2 Summary of Capacity and Cumulative Development in the Lowland and Hills

The Lowland and Hills area comprises four LCTs: *Igneous Hills*; *Broad Valley Lowland*; *Low Moorland Hills* and *Dipslope Farmland*.

The assessment has determined that the lowland landscape of Angus has overall a medium underlying capacity for wind turbines of up to 50m tall, with medium or low underlying capacity for medium/large turbines in more limited locations such as the Sidlaw Hills; parts of the *Dipslope Farmland* and *Broad Valley Lowland* and Montreathmont Moor. Conversely some smaller scale areas of more complex landform and enclosed character in the *Broad Valley Lowland* and the hilltops of the *Low Moorland Hills* have relatively little or no capacity.

The landscape is generally of a medium scale and visually sensitive due to widespread settlement (including a number of towns and villages) and transport routes (including the A90 trunk route); together with openness of much of the landscape. Nevertheless, unlike the highland area, this is a mainly a settled, working agricultural landscape, with some medium scale hills. There are significant areas of sufficient scale and simplicity in landform and landcover pattern to accommodate some degree of wind turbine development.

The overall character means that smaller scale developments including single turbines are appropriate, with relatively little capacity for medium windfarms and no capacity for large scale windfarms such as may be found in many upland areas of Scotland. Developments should be sufficiently separated to ensure the landscape does not exceed a *Landscape with Occasional Wind Turbines* over most of the lowland LCAs, with some areas of *Landscape with Wind Turbines* in the largest scale most open and least populated areas. It is worth noting that a number of proposed developments in the lowlands with large or

very large turbines have been refused consent and/or dismissed at appeal. This suggests a turbine height limit of ca. 80m (i.e. up to medium/large) can be acceptably accommodated in the areas with the largest scale and simplest landforms, subject to detailed assessment.

Currently the only consented windfarm development in Angus is for eight 81m turbines (borderline large in size) at Ark Hill within the Sidlaw Hills, within the lowland area. Other developments within the lowlands are predominantly for single turbines, which are scattered across the lowlands with the greatest concentrations in the northeast of Strathmore and the *Dipslope Farmland* to the north of Dundee. Outside Angus there are two large operational turbines in Dundee close to the *Dipslope Farmland*; a number of single turbines in the Howe of Mearns in Aberdeenshire at the northeastern end of Strathmore, and a windfarm at Tullo 10km to the NE of the lowland area. Extensive areas of the lowlands are a *Landscape with no Wind Turbines*. Areas mainly in the northeast and southwest are a *Landscape with Wind Turbines* or *Landscape with Occasional Wind Turbines*. Further isolated areas of *Landscape with Occasional Wind Turbines* or *With Wind Turbines* are scattered across the lowlands between the main areas.

The current extent of development lies mainly within the capacity of the landscape to accommodate wind turbines. Nevertheless cumulative development in some areas is beginning to significantly reduce residual capacity for further wind turbines. This is discussed further in section 6.5 below.

The currently proposed developments comprise mainly single or paired turbines scattered across or close to the lowland areas. These would not in general lead to a significant adverse level of development. Currently proposed turbines and/or windfarms in the *Igneous Hills* may lead to a significant adverse level of cumulative impact due to the number and size of turbines and juxtaposition of differing layouts.

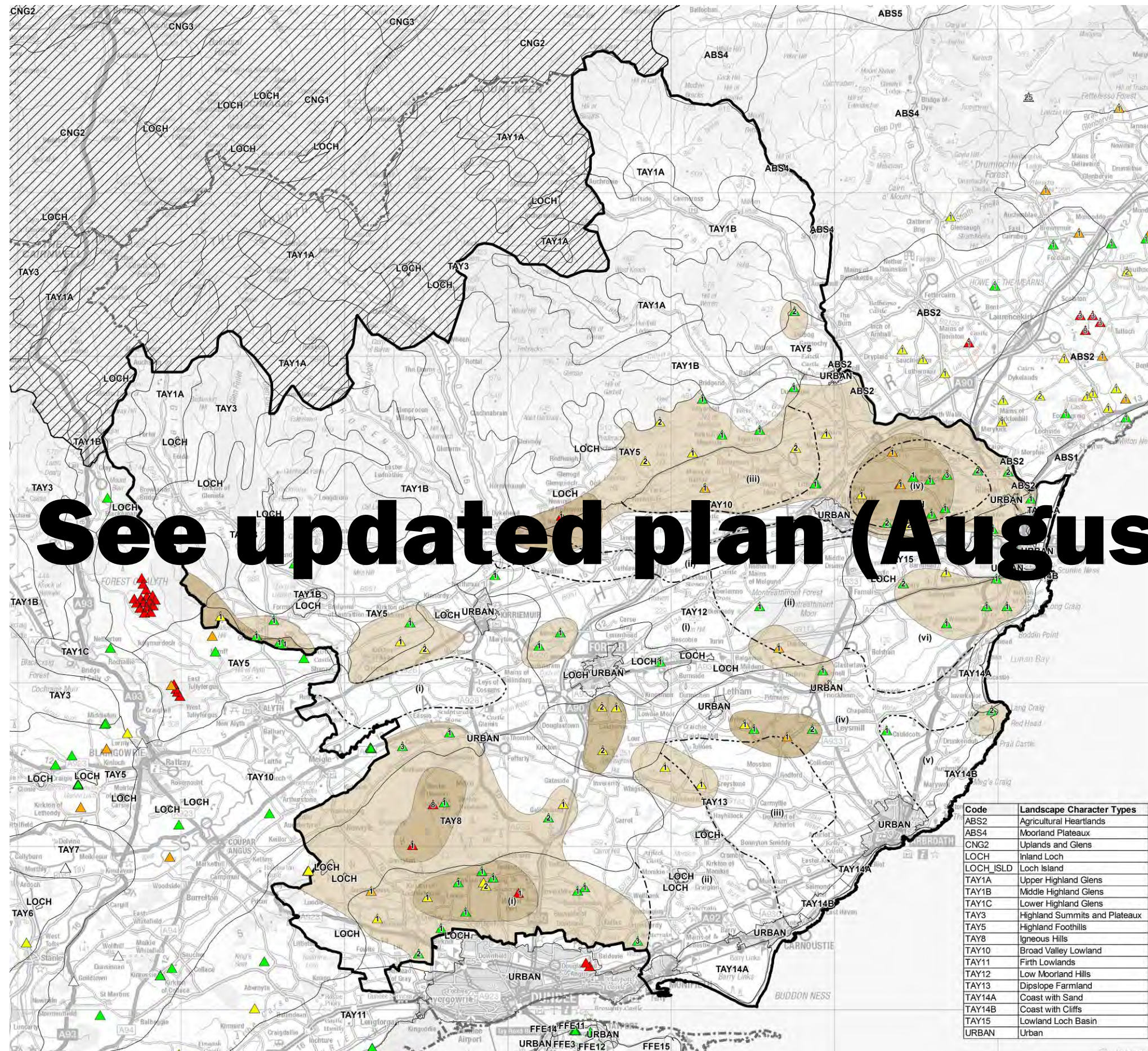
6.4.3 Summary of Capacity and Cumulative Development in the Coast

The Coastal Landscapes comprise three LCTs: *Coast with Sand*; *Coast with Cliffs* and *Lowland Loch Basin*.

The Coastal LCTs in Angus have a low capacity for wind turbine development due to their open character, relatively small extent and scenic coastal character of cliffs and sand together with the unique tidal basin at Montrose. The predominantly narrow strips of *Coast with Sand* and *Coast with Cliffs* can accommodate single turbines up to 30m as a *Coast with Occasional Wind Turbines* and the *Lowland Loch Basin* around Montrose can accommodate occasional turbines below 50m tall.

Currently there are two small/medium wind turbines in the coast areas and six small/medium and one medium consented within the Montrose Basin LCA, making small areas of coastal landscapes *Landscape with Occasional Wind Turbines*.

There are no current proposals within the coastal area. Two proposed 137m turbines at GSK in Montrose that would have adversely affected the landscape of adjacent areas, exceeding proposed acceptable capacity, have recently been dismissed at appeal.



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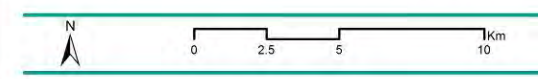
- Legend**
- Study Area
 - Cairngorms National Park
 - Scottish Local Authority Boundaries
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
- Typology**
- Landscape with no Wind Turbines
 - Landscape with Occasional Wind Turbines
 - Landscape with Wind Turbines
 - Wind Turbine Landscape
- Consented Turbines:**
(Height Category and No. of Turbines)
- 15 to 30m
 - 30 to 50m
 - 50 to <80m
 - 80 to <125m
 - 125m+

See updated plan (August 2016)

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 6.2

Current Consented Development:
Wind Energy Landscape Type



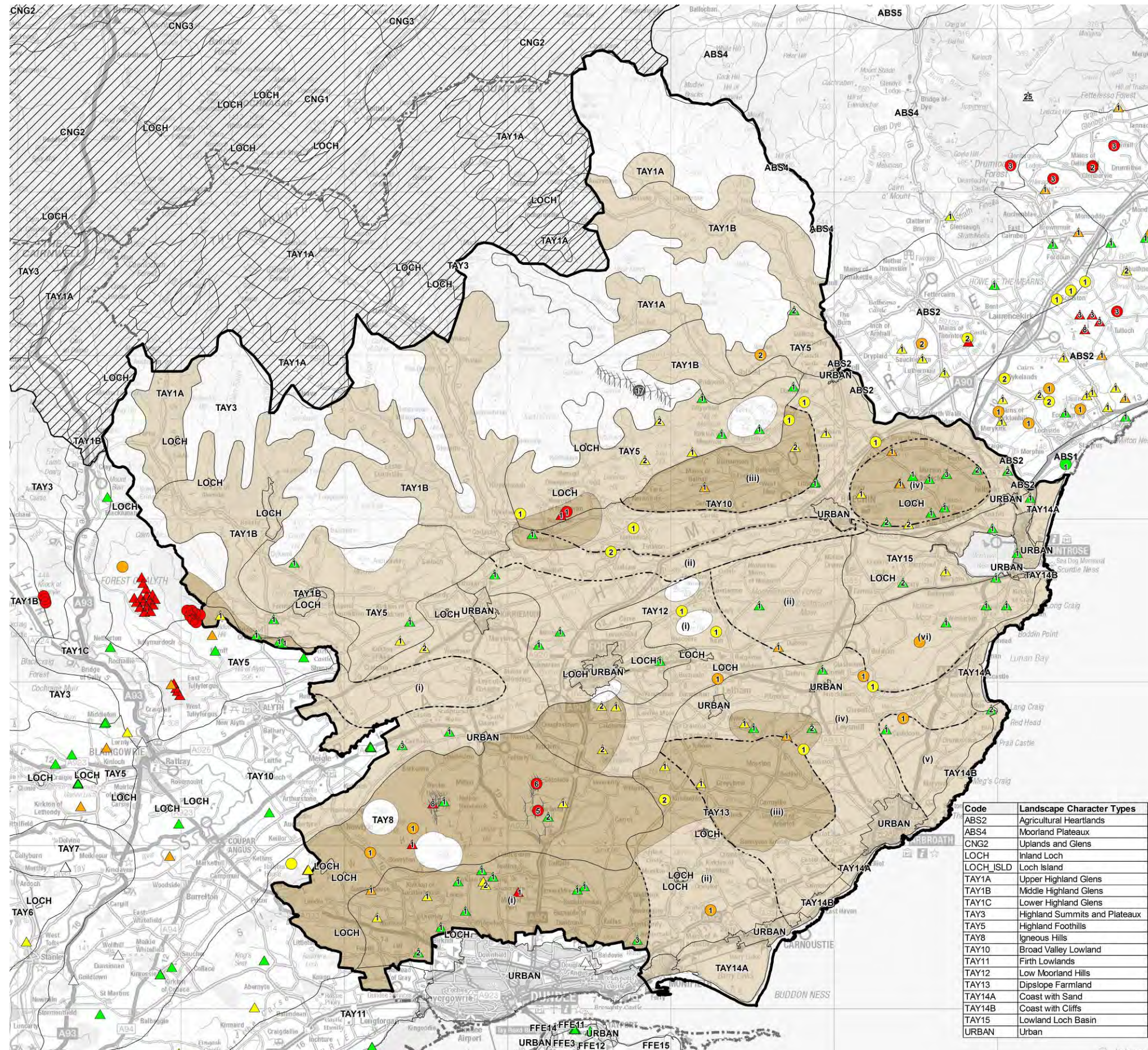
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**Angus Council
Wind Energy Consultancy**

March 2014

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Legend

- Study Area
- Scottish Local Authority Boundaries
- Cairngorms National Park
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- LCA Sub Areas (Ref. Table 6.1)

Typology

- Landscape with no Wind Turbines
- Landscape with Occasional Wind Turbines
- Landscape with Wind Turbines
- Wind Turbine Landscape

Consented Turbines:

(Height Category and No. of Turbines)

- Unknown Height
- 15 to <30m
- 30 to <50m
- 50 to <80m
- 80 to <125m
- 125m+

Application Turbines:

(Height Category and No. of Turbines)

- Unknown Height
- 15 to <30m
- 30 to <50m
- 50 to <80m
- 80 to <125m
- 125m+

Turbine Locations

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
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TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 6.3

**Proposed Limits to Development:
Wind Energy Landscape Type**



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6.5 Residual Capacity for Further Development

This assessment has demonstrated that the landscape of Angus has the underlying capacity to accommodate wind energy development of an appropriate type and extent. Appropriate development relates to the varied characteristics of the landscape; the visual sensitivities of the population spread across lowland Angus and the higher value or sensitive context of some areas of landscape, in particular the extensive large scale, open, unpopulated upland areas north of the Highland Boundary Fault and contiguous with the Cairngorms National Park. The particular characteristics of Angus means there is no scope for the larger scale of windfarm development seen elsewhere in Scotland.

The main underlying capacity for development lies within some of the larger scale more extensive lowland areas which can accommodate larger turbine sizes, but not the largest sizes and not in large groupings. Other areas have a more limited underlying capacity, which would not be appropriate for larger turbine sizes, and some areas have very limited or no capacity for wind energy development.

At current levels of development there is residual capacity in Angus for further appropriate wind energy development in most areas that have underlying capacity. Future development in each landscape type or area should follow the guidance given in Table 6.1 and following in order to remain within the proposed wind turbine landscape types set out in Figure 6.3. The aim of the guidance is to ensure that the acceptable capacity for development in terms of turbine sizes, group sizes and spacing between turbines and groups is not exceeded, and that other issues guiding or limiting development are taken into account.

Some of the residual capacity would be fully used and could be exceeded if all current proposals were implemented. The main opportunities and limitations on capacity are discussed below and the areas concerned illustrated in schematic form in Figure 6.4.

6.5.1 Areas with Highest Underlying Capacity

Figure 6.4 identifies in dark green four areas which have the highest underlying capacity in Angus for wind energy development. By this it is meant that they have the capacity to accommodate larger sizes of turbine and/or greater numbers and concentrations relative to other areas of landscape in Angus. This is based on a combination of one or more factors including suitable larger scale simple landforms and landscape patterns; existing development/ land use affecting character; lower visual sensitivity and lower landscape value. Not all of these factors are present in every area identified and the analysis and guidance in Table 6.1 and following should be followed.

The main areas are:

- 1) Careston Broad Valley Lowland to the north west of Brechin.
- 2) Muir of Pert Broad Valley Lowland to the east of Brechin.
- 3) Montreathmont Forest and farmland to the south of Brechin.
- 4) The Sidlaw Hills with contiguous areas of Dipslope Farmland to the south and east and Low Moorland Hills south of Forfar.

Wind turbines are already located in some of these areas, utilising some of the underlying capacity and therefore reducing residual capacity. The limitations resulting from this are discussed in 6.5.4 below.

6.5.2 Areas with Limited Underlying Capacity

Most of the remaining lowland and coastal areas of Angus have some underlying capacity for wind energy development but are generally not suited to larger turbines, large groupings or extensive concentrations of wind turbine development. The areas are shown in light green in figure 6.4. Capacity varies from the ability to accommodate only very occasional small/medium wind turbines in some of the *Upper Highland Glens* to more frequent medium turbines across much of the *Highland Foothills*, *Broad Valley Lowlands* and *Dipslope Farmland*. Some areas of the *Dipslope Farmland* may be able to accommodate occasional single medium/large turbines subject to detailed assessment of local characteristics.

Currently there are limited numbers of existing, consented and proposed smaller scale developments (mainly single small/medium and medium size turbines). Guidance in Table 6.1 is intended to steer future development in these areas to an acceptable level.

6.5.3 Areas with No Underlying Capacity

Significant areas of Angus have no underlying capacity for wind turbine development. These are left uncoloured in Figure 6.4:

- 1) All of the *Highland Summits and Plateaux* LCAs, due to their importance to the Angus landscape, connectivity with the Cairngorms National Park, high visual prominence, high relative wildness and recreational value;
- 2) Some upper parts of *Highland Glens* and *Highland Foothills* which extend into the Lochanagar and Mount Keen draft Core Area of Wild Land and are contiguous with the *Highland Summits and Plateaux*.
- 3) Some prominent summits, viewpoints and hillforts in the Sidlaw Hills, *Highland Foothills* and *Low Moorland Hills*.

It is recommended that these landscape types and areas remain undeveloped with turbines to protect their character, avoid widespread visibility, protect key viewpoints and features and particularly to protect the key feature of the Highland Boundary Fault and its backdrop of the Grampian Mountains.

When assessing the acceptability of larger turbine proposals in neighbouring landscape character areas, proximity to the sensitive areas described above should be taken into account.

6.5.4 Areas Where Cumulative Impact Limits Further Development

As described above, a number of landscape types and areas in Angus have an underlying capacity to accommodate wind energy development. However, existing and consented development in or nearby some of these areas means that further significant development may exceed the acceptable cumulative capacity of the landscape. The areas where current

cumulative impact limits capacity for further development are shown as hatched areas in Figure 6.4.

- 1) Alyth Foothills / Glen Clova
- 2) Menmuir / Hill of Ogil
- 3) Brechin and Muir of Pert
- 4) Letham to Firth Muir of Boysack
- 5) Central Sidlaws and Tealing

The areas are defined by the following criteria:

- 1) The developed areas of windfarms and turbines (operational and consented) and the cumulative extent of their impacts on the surrounding landscape;
- 2) The underlying landscape capacity within the LCAs and for those surrounding them;
- 3) The extent of area within which further significant development should be limited to avoid extending cumulative landscape and visual impacts between the groups of turbines within the cumulative area and other turbines outside the area.

The boundaries shown in Figure 6.4 are indicative. They are described in more detail for each area in Table 6.2 below, together with the main objectives for limiting further development. In the case of specific development proposals there should be an assessment relating to the detailed criteria.

6.5.5 Development within Built up Areas

Whilst it is recognised that some parts of built up areas and settlements may be able to accommodate wind turbines, and indeed do, they have not been included in this landscape character based capacity assessment. Factors specific to townscape and urban planning are likely to guide location. Consequently urban areas have been left out of the constraints and opportunities map in 6.4, Table 6.1 and the guidance.

Nevertheless it is noted in this study that the setting of settlements and the presence of settlements within a wider landscape type has a bearing on landscape character and on capacity for development.

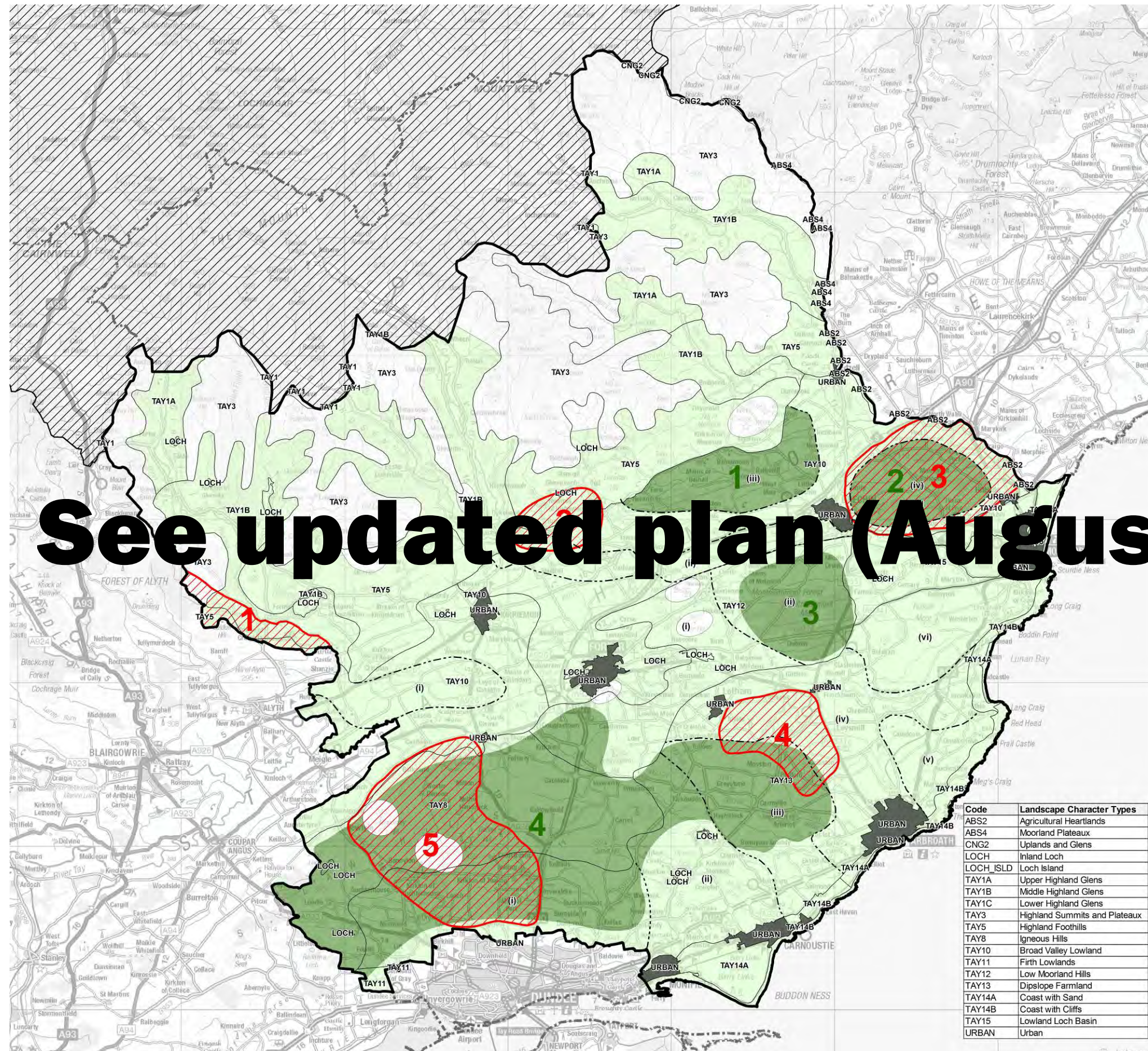
6.6 Guidance for Small Turbines

This cumulative assessment and capacity study has detailed the current distribution of all sizes of wind turbines of 15m or greater blade tip height. The strategic guidance above therefore applies to turbines 15m and greater in height when determining capacity for further development. This is because the smallest turbines below 15m have a similar scale to built structures and trees found commonly throughout the landscape and do not have the same eye-catching prominence and extensive visibility of larger turbines. They do not therefore have the same issues of wide scale cumulative effects across extensive landscape areas.

The issues relating to design and siting of small turbines concern mainly their localised effects on the area in which they are sited rather than wider cumulative effects on landscape character. Small wind turbines should be judged on their own merits, assessed against the criteria that apply to most other domestic or farm scale built structures. Landscape and visual considerations may include the following:

- Effects on designations including landscape quality designations, SAMs, listed buildings, conservation areas;
- Location in relation to scenic viewpoints;
- Relationship to skylines and seascapes;
- Relationship to other structures and buildings;
- Location in relation to approaches to and setting of settlements;
- Type and appearance of towers, rotors and nacelles;
- Proximity to residential properties;
- Localised cumulative effects including potential for visual confusion or cluttering areas with significant numbers of small turbines and/or close proximity to other similar larger structures including taller wind turbines and electricity pylons.

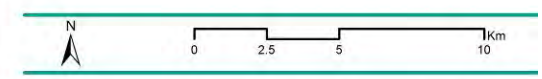
Larger wind turbines are more often than not seen against the sky. The approach to colouring has been to adopt a neutral light grey colour relating to the sky colour most likely to be encountered as a backdrop. Small wind turbines are often fully or partially backclothed against landforms and/or trees, giving a closer relationship to the ground than the larger structures. It may therefore be appropriate to consider colouring small wind turbines a darker grey, green or brown to reduce their visibility when seen against backdrops, or close to buildings.



- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Cairngorms National Park
 - Landscape Character Type / Area Boundary (see Table 3.1 for list)
 - LCA Sub Areas (Ref. Table 6.1)
 - Settlements
 - Areas with Highest Underlying Capacity:
 1. Careston Farmland
 2. Muir of Pert
 3. Montreatmont Forest
 4. Sidlaw Hills and Dipslope Farmland
 - Areas with Limited Underlying Capacity
 - Areas with No Underlying Capacity
 - Areas where Cumulative Impact Limits Development:
 1. Forest of Althly
 2. Sidlaw Hills and Ogilvie
 3. Forest of Plean
 4. Forest of Plean
 5. Central Sidlaws and Tealing

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 6.4
Wind Turbine Development Opportunities and Constraints



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Table 6.2: Areas Where Cumulative Impact Limits Further Development: Description and Key Objectives (see Figure 6.4 for Map)

1. Alyth Foothills and Glen Clova	
<p>Description</p> <p>The boundaries of this area include:</p> <ul style="list-style-type: none"> • The Angus/ Perthshire boundary between Black Hill in the north and Airlie Castle to the south; • The crest of Black Hill and Hill of Fernyhirst though Little Kilry to the River Isla at Bridge of Craigisla; • The course of the River Isla to Airlie Castle 	<p>Development Situation and Key Objectives</p> <p>The Alyth Hills on the boundary with Perthshire are <i>Highland Foothills with Wind Turbines</i> due to the presence of Drumderg Windfarm in Perthshire and several small/medium to medium/large turbines along the border within the Alyth Hills LCA and Glen Isla. Several further large turbines are proposed at Tullymurdoch in Perthshire on the border with Angus. The objectives governing the area are:</p> <ol style="list-style-type: none"> 1) Retaining sufficient spacing between individual windfarms and turbines to maintain the <i>Landscape with Wind Turbines</i> character and avoid a <i>Wind Turbine Landscape</i> character in the <i>Highland Foothills</i>; 2) To prevent further extension of the <i>Landscape with Wind Turbines</i> onto the floor of Glen Isla; 3) To protect the skyline ridge to the southwest of Glen Isla from over-development with turbines; 4) To protect the setting of and views from visually sensitive locations including Reekie Linn, Airlie Castle and Designed Landscape and small settlements in Glen Isla.
2. Memus and Hill of Ogil	
<p>Description</p> <p>The boundaries of this area include:</p> <ul style="list-style-type: none"> • the <i>Highland Foothills</i> LCA between the Noran Water and Glen Clova, including Hill of Ogil and Den of Ogil; • <i>The Broad Valley Lowland</i> south of Hill of Ogil east of the Cortachy policies and the River South Esk to Shielhill Bridge and thence northeast across farmland to Meikle Couil and the Noran Water at Milton of Ogil; 	<p>Development Situation and Key Objectives</p> <p>Currently this area has a single large turbine consented at Memus and a small/medium turbine near Cortachy. The visual influence of the large turbine creates an area of <i>Highland Foothills with Wind Turbines</i> on the south side of Hill of Ogil, extending south into the <i>Broad Valley Lowland</i>. A further medium size turbine is proposed near Cortachy. The objectives governing the area are:</p> <ol style="list-style-type: none"> 1) Avoiding further extension of the <i>Landscape with Wind Turbines</i> character into the <i>Highland Foothills</i>, <i>Broad Valley Lowland</i> and <i>Mid Highland Glens</i> 2) Retaining sufficient spacing between turbines so as not to exceed the <i>Landscape with Wind Turbines</i> character and avoid areas of <i>Wind Turbine Landscape</i> character in the <i>Highland Foothills</i> and <i>Broad Valley Lowland</i>; 3) To prevent development of or influence of large turbines on the north side of Hill of Ogil and into Den of Ogil; 4) To protect the setting of and views from Cortachy designed landscape; 5) To support an organised pattern of development by maintaining sufficient spacing/ screening between groups of larger and smaller turbines. 6) To prevent potential cumulative visual clutter by proximity of turbines to the electricity transmission line crossing the hills in this location.
3. Broad Valley Lowland: Brechin and Muir of Pert	
<p>Description</p> <p>The boundaries of this area include:</p> <ul style="list-style-type: none"> • The A90 between Brechin and the North Esk • The North Esk east to Hillside Village • The edge of Hillside, the House of Dun and the A935 from Mains of Dun to Brechin • The northeastern edge of Brechin 	<p>Development Situation and Key Objectives</p> <p>Currently this area has consents for eleven small turbines, three medium turbines and two medium/large turbines, creating an extensive area of <i>Broad Valley Lowland with Wind Turbines</i>. There is a proposal for a further medium turbine. The objectives governing the area are:</p> <ol style="list-style-type: none"> 1) Avoiding coalescence with the <i>Landscape with Wind Turbines</i> in Aberdeenshire by minimising development in the North Esk corridor; 2) Retaining sufficient spacing between individual turbines to maintain a <i>Landscape with Wind Turbines</i> and avoid a <i>Wind Turbine Landscape</i> character; 3) Avoiding excessive skylining of larger wind turbines to the crests of the escarpments which important but modestly scaled backdrops to the A90, Brechin and Montrose Basin; 4) To support an organised pattern of development by maintaining sufficient spacing/ screening between groups of larger and smaller turbines; 5) To prevent unacceptable proximity of larger turbines to settlements and other visually sensitive locations including Brechin, Hillside, Craigo, House of Dun and the Caledonian Railway.

4. Dipslope Farmland Between Letham and Firth Muir of Boysack	
<p>Description</p> <p>The boundaries of this area include:</p> <ul style="list-style-type: none"> • The village of Letham to the northwest and the small settlement of Firth Muir of Boysack to the southeast • The course of the Lunan Water between Letham and Friokheim • The A933 between Friockheim and Colliston • A line south of the hill crests between Hillhead, Boath Hill and West Grange of Conon. 	<p>Development Situation and Key Objectives</p> <p>Currently this area has one medium/large turbine, three small turbines and one medium turbine creating a small area of <i>Dipslope Farmland with Wind Turbines</i>, with proposals for a further medium size turbine. The objectives governing the area are:</p> <ol style="list-style-type: none"> 1) Retaining sufficient spacing between individual turbines to maintain a <i>Landscape with Wind Turbines</i> and avoid a <i>Wind Turbine Landscape</i> character; 2) Avoiding excessive skylining of larger wind turbines to the crest of the farmland either side of Boath Hill which forms an important but modestly scaled backdrop to lower ground in the north and east; 3) To support an organised pattern of development by maintaining sufficient spacing/ screening between groups of larger and smaller turbines; 4) To prevent unacceptable proximity of larger turbines to settlements and other visually sensitive locations including Letham, Colliston and the smaller scale more settled landscape surrounding the Lunan Water.
5. Central Sidlaw Hills and Tealing Farmland	
<p>Description</p> <p>The boundaries of this area include:</p> <ul style="list-style-type: none"> • The <i>Igneous Hills</i> between the B954, Newtyle to Glamis; A928 to Milton of Ogilvie and Gallow Hill Ridge descending to Tealing; • The <i>Dipslope Farmland</i> south of the Igneous Hills between Auchterhouse, Dronley, Bridgefoot and the A90 north to Tealing; 	<p>Development Situation and Key Objectives</p> <p>Ark Hill Windfarm and Scotston with large size turbines creates a <i>Landscape with Wind Turbines</i> in the central Sidlaw Hills. There are several turbines consented in the <i>Dipslope Farmland</i> between Tealing and Auchterhouse including a large turbine at former Tealing Airfield. There are proposals for two other medium/large turbines in the central Sidlaw Hills. The objectives governing the area are:</p> <ol style="list-style-type: none"> 1) Retaining sufficient spacing between individual windfarms and turbines to maintain the <i>Landscape with Wind Turbines</i> character and avoid areas of <i>Wind Turbine Landscape</i> character in the <i>Igneous Hills</i> and <i>Dipslope Farmland</i>; 2) To prevent development of turbines on the southern escarpment and skyline of the Sidlaw Hills which is prominent from areas to the south of Dundee; 3) To protect the setting of and views from the prominent hillforts and hilltop viewpoints of Kinpurney Hill, Auchterhouse Hill and Balluderon Hill; 4) To support an organised pattern of development by maintaining sufficient spacing/ screening between groups of larger and smaller turbines; 5) To prevent unacceptable proximity of larger turbines to settlements and other visually sensitive locations. 6) To prevent potential cumulative visual clutter by proximity of turbines to other structures prevalent in this area including transmitter masts, electricity transmission lines and the Tealing substation.

GLOSSARY

Acceptability The likely acceptability of a proposed level of development determined by considering it against the underlying capacity of the landscape and other policy criteria and objectives.

Cumulative Impacts Additional changes caused by a proposed development in conjunction with other similar developments, or as the combined effect of a set of developments, taken together.

Cumulative Wind Turbine Development Typology A gradated landscape typology that defines terms of reference for increasing levels of development with turbines; describing their effect on landscape character and the experience of those living in or travelling through the landscape.

Designated Landscape Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in development plans or other documents.

Key Characteristics Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.

Landscape An area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors.

Landscape Accommodation A degree of change that does not fundamentally alter key landscape characteristics and visual resources.

Landscape Capacity The degree to which a particular landscape character type or area is able to accommodate change without significant effects on its key characteristics, or overall change of landscape character type. Capacity is likely to vary according to the character of the landscape and nature of change being proposed.

Landscape Change Large amounts of change that may fundamentally alter key landscape characteristics and visual resources.

Landscape Character A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Landscape Character Areas (LCAs) These are single unique areas which are the discrete geographical areas of a particular landscape type.

Landscape Character Types (LCTs) These are distinct types of landscape that are relatively homogenous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.

Landscape Protection Maintaining existing landscape character.

Landscape Quality (Condition) A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.

Landscape Value The relative value that is attached to different landscape by society. A landscape may be valued by different stakeholders for a whole variety of reasons.

Perception Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).

Residual Landscape Capacity The remaining landscape capacity of an area for a specific type of development, determined by considering the extent to which current levels of this development already occupies the underlying landscape capacity. This can vary according to the amount of underlying capacity and extent of consented development.

Sensitivity A term applied to specific receptors (eg. landscape or visual), combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that source.

Susceptibility The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.

Underlying Landscape Capacity The inherent capacity of a landscape to accommodate a type of change (eg. wind energy developments) without significant effects on its key characteristics; specifically not accounting for levels of the same type of change that have already taken place in that landscape.

Visual Effects Effects on specific views and on the general visual amenity experienced by people

Visual Receptors Individuals and/or defined groups of people who have the potential to be affected by a proposal

Visibility Analysis An assessment of the potential visibility of a development or area of land from an identified viewpoint or viewpoints. It is often accompanied by an analysis of the number of people of different types who are likely to see it and the scope to modify visual impacts of the specified development by appropriate mitigation.

Wild Land An area which has physical attributes which evoke a range of perceptual responses (such as a sense of solitude, risk and of fulfilment from physical challenge), which people experience as a 'sense of wildness', namely:

- i. A high degree of perceived naturalness in the setting and in the natural processes affecting the land, as well as little evidence of contemporary human uses of the land;
- ii. The lack of any modern artefacts or structures;
- iii. Landform which is rugged or otherwise physically challenging; and
- iv. Remoteness and/or inaccessibility.

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APPENDICES

APPENDIX 1: CURRENT POLICY AND GUIDANCE FOR ONSHORE WIND ENERGY

1.1 National Policy and Guidance

1.1.1 Scottish Planning Policy

National policy in relation to renewable energy development is expressed in SPP with related web-based guidance reflecting the Scottish Government's commitment to greatly increasing the amount of energy produced by renewable sources. Inevitably it focuses on land based wind power as, at least in the short term, the most available resource suitable for expansion.

SPP is thus very positively disposed to renewable energy production and directs all councils to create development plan policies that encourage renewable energy generation capacity, including onshore wind power.

SPP and published guidance recognise that wind energy developments are likely to have significant impacts on the environment, including the landscape. SPP therefore underlines the need to ensure that developments do not have *unacceptable* impacts. In this respect Government describes the need for local authority development plans to set out a Spatial Framework for windfarms of more than 20MW capacity. Web based guidance lists the criteria that should be considered in the location of windfarms. It suggests the extent to which developments below the 20MW capacity are considered in this way would depend on the scale of the development proposed.

SPP is to be updated and has undergone a consultation process. The proposed policy continues the strong support for onshore wind energy and the development of spatial frameworks. Key proposed changes in emphasis compared with the 2010 SPP include:

- Inclusion of all scales of wind energy development in spatial frameworks, not just those above 20MW
- Further clarification on the hierarchy of constraints to wind energy development.
 - Group 1: national parks and national scenic areas as an absolute constraint;
 - Group 2: Areas of Significant Protection as a secondary but high level of constraint, including many national designations; a 2.5km area around settlements; Core Areas of Wild Land and Areas where cumulative impact limits further development, including areas identified in capacity studies as having reached their carrying capacity;
 - Group 3: Many local constraints including local designations and areas identified as high or medium constraints in landscape capacity studies placed in a third category;
 - Group 4: areas where wind energy development is likely to be supported.

1.1.2 Scottish Government Guidance

Scottish Government provides frequently updated web based guidance on onshore wind energy:

<http://www.scotland.gov.uk/Resource/0042/00427805.pdf>

and the process for preparing spatial frameworks for windfarms:

<http://www.scotland.gov.uk/Resource/0040/00400726.pdf>

The guidance highlights the issue of cumulative impact.

1.1.3 Scottish Natural Heritage Guidance

Scottish Natural Heritage provides comprehensive guidance on most aspects of onshore wind energy development and the landscape:

- Assessment of landscape and visual impacts and visual representation of wind turbines;
- Siting and design guidance;
- Assessment of cumulative impacts.

This information can be found on the SNH website:

<http://www.snh.gov.uk/planning-and-development/renewable-energy/onshore-wind/landscape-impacts-guidance/>

1.2 Development Plan Policies

1.2.1 Angus Development Plan Context

Planning legislation indicates that planning decisions should be made in accordance with the development plan unless material considerations indicate otherwise.

The development plan in Angus comprises: -

- TAYplan Strategic Development Plan (Approved 2012);
- Angus Local Plan Review (Adopted 2009)

1.2.2 TAYplan Strategic Development Plan

TAYplan sets out policies where development should be over the next 20 years and how to shape better quality places by the location, design and layout of development from the outset. At its heart are sustainable economic growth and a better quality of life through a stronger and more resilient economy, better quality places, reduced resource consumption and better resilience to climate change and peak oil.

Policy themes cover 1 Location Priorities; 2 Shaping Better Quality Places; 3 Managing TAYplan's Assets; 4 Strategic Development Areas; 5 Housing; and 6 Energy and Waste Resource Management Infrastructure; 7 Town Centres; and 8 Delivering the Strategic Plan.

The general policies of TAYplan provide the strategic context for energy infrastructure including wind. There is no location framework or areas of search the strategic level.

Further information on TAYplan can be viewed at www.tayplan-sdpa.gov.uk/publications

1.2.3 Angus Local Plan Review

The Local Plan Review provides the policy framework to guide future development, land use and investment in Angus. It provides a range of policy relating to Building Sustainable Communities and Environment and Resources.

There is a specific chapter dealing with Energy including policies on Energy Efficiency (ER33); renewable Energy Developments (ER34) and Wind Energy Development (ER35). In terms of wind energy the section sets out broad locational guidance based on Tayside Landscape Character areas identifying three basic areas as follows (1) Highland; (2) Lowland and Hills; and (3) Coast as illustrated in Fig 3.4 (Geographic Areas) of the Local Plan Review.

Further information on the Angus Local Plan review can be viewed at www.angus.gov.uk/localplan

Implementation Guide for Renewable Energy Proposals (June 2012)

Subsequent to this the Council also prepared and published an Implementation Guide for Renewable Energy Proposals (June 2012) which explains and clarifies for developers and the general public the existing Angus Local Plan Review policy base that will be used by Angus Council in determining renewable energy planning applications. It also provides links to a wide range of related information sources.

Further information on the implementation guide can be viewed at <http://www.angus.gov.uk/renewableenergy/>

Angus Local Development Plan

Angus Council is currently progressing with a new Local Development Plan to replace the Local Plan Review. A Main Issues Report (MIR) was published in November 2012 and a Proposed Plan is expected in spring 2014. The MIR preferred option indicates a spatial framework for wind turbines including a map based approach to considering cumulative impacts would be prepared. The Landscape Capacity Assessment for Angus will be a key input into the development of refreshed policy and spatial framework/guidance. Further information on the Landscape Capacity Assessment can be viewed at www.angus.gov.uk/renewableenergy

APPENDIX 2: CUMULATIVE IMPACT AND LANDSCAPE CAPACITY ASSESSMENT METHODOLOGIES

1.0 Background

Cumulative environmental impact is the impact that results from incremental changes caused by past, present or reasonably foreseeable actions. Scottish Government Guidance on wind energy states:

‘Assessing the cumulative impact of a number of wind turbines or a number of wind farms involves considering the combined effects of siting proposals in proximity to each other’.

Cumulative impact is a critical consideration in the case of landscape and visual impacts of onshore wind turbines and windfarms in Scotland due to the current number of existing and consented developments in the landscape, proposed developments in the planning system and the long term implications of national policy that encourages the development of onshore wind energy generation.

The characteristics of wind turbines that lead to cumulative impacts include:

- The large scale and striking visual appearance of wind turbines and windfarms in most landscapes;
- The great extent of their visibility and the potential for intervisibility between wind turbine developments and as seen by receptors;

The larger modern turbines are prominent, large scale, man-made features and there are few other precedents in terms of scale, height and appearance in most landscapes. Topography aside, they are much taller than any natural features such as trees or most buildings and other structures. Of similar built structures in rural landscapes, electricity pylons are significantly smaller than the largest turbines and although broadcasting masts are often taller they are usually singular and infrequent, whereas wind turbines are built in multiples, often in great numbers. Furthermore, most landscape features are static whereas wind turbines rotate. Smaller turbines may also present issues of scale and appearance in more localised contexts, as well as visual confusion when seen together with larger turbines.

This study on behalf of Angus Council requires the assessment of cumulative development and landscape capacity. However it is recognised in guidance that the determination of landscape capacity and cumulative impacts is not a straightforward exercise. The background and considerations involved in this process are detailed in this Appendix.

Definitions of the term ‘capacity’ applied to landscape generally refer to the ability to accept a development without a ‘significant’ or ‘unacceptable’ level of change to a landscape. This implies that criteria must be identified and thresholds must be determined to give meaning to the words ‘significant’ and ‘unacceptable’.

Guidance on the assessment of cumulative impacts and landscape capacity is available from a number of sources, most particularly Scottish Natural Heritage *Assessing the cumulative impact of onshore wind energy developments (March 2012)* but also in UK guidance (e.g. *Landscape Character Assessment Guidance for England and Scotland Topic paper 6: Techniques and Criteria for Judging Capacity and Sensitivity. SNH and The Countryside Agency, 2002*) and will be referred to in the following sections.

The determination of ‘cumulative impacts’ and ‘capacity’ is subject to debate. No clear guidance is given in the published information beyond the need for the individual impact assessor or Development Plans to determine what the assessment criteria and significance thresholds are. Reasoned argument applicable to the specific circumstances applies, rather than the establishment of an absolute or universal definition. Inevitably this approach is subject to differences of opinion, with thresholds of significance and views on acceptability often differing depending on the background or vested interests of those involved in the debate.

In the absence of any clearly stated or agreed criteria or thresholds and to progress this study some form of threshold or thresholds need to be defined. In order to do this a number of terms and concepts need to be clarified, defining exactly what is being assessed and how. The purpose of the following section is to focus the subsequent assessment and to provide guidance and a basis for decisions to be made by the appropriate authorities.

2.0 Defining Terms: Sensitivity, Significance, Capacity and Acceptability of Change

Topic Paper 6 of Landscape Character Assessment: Guidance for England and Scotland (2002) refers to the fact that the terms ‘sensitivity’ and ‘capacity’ have often been used in an interchangeable manner in landscape character assessment, essentially referring to the ability of a landscape to absorb change without a significant effect on its character. A landscape of high sensitivity is often considered to have a low capacity for change, and vice-versa. Furthermore sensitivity is used as a key criterion in determining both significance of impact and landscape capacity. In fact there are subtle but important differences between sensitivity and capacity. This section discusses the differences and interrelationships between sensitivity, capacity and significance in landscape character assessment and how the acceptability of change may be determined.

2.1 Landscape Sensitivity

The sensitivity of a landscape is a measure of its inherent vulnerability to potential changes and their effects on fabric and character. Vulnerability to change can be considered in two ways:

- 1) As an inherent part of the landscape’s characteristics, regardless of possible types or scales of change that may occur; or
- 2) In relation to a specific proposed type and scale of change.

In the former case the assessment of sensitivity would be applied in landscape character assessment where no particular change is being contemplated or assessed, and the landscape is being considered in a resource planning context. In the latter case the assessment of sensitivity would typically be applied in an environmental impact assessment where specific changes are envisaged. In the EIA case the sensitivity of the receiving landscape would be assessed against the magnitude of change in order to determine impact significance.

2.2 Landscape Capacity

Landscape capacity is variously described as the ability of a landscape to accommodate (or absorb) change without a significant (or unacceptable) change in fabric or character. This is usually taken to mean whether or not one or more of the key defining characteristics of the landscape is changed such that the overall fabric or character of the landscape is changed, i.e. a 'capacity threshold' is crossed. In the case of windfarms it is primarily landscape character that is being considered, particularly in cumulative assessments.

The determination of landscape capacity is closely related to landscape sensitivity and the determination of significance of impact. However assessment of capacity is a not necessarily based around the assessment of known development proposals, but rather the hypothetical ability to accommodate particular types of development, such as windfarms before a threshold or series of increasing thresholds are crossed.

According to *Topic Paper 6*, in determining capacity not only the sensitivity of the landscape to the particular type of development is considered but also the *landscape value* of the area concerned. Value may be determined in a number of ways, including by landscape designations (national, regional or local); cultural and historic associations and in terms of how it is valued by those who live in it or use it in some way.

The determination of capacity is primarily a planning tool rather than a reactive or assessment tool. Nevertheless the determination of capacity thresholds can also be used to assess existing levels of development or potential development scenarios such as is the case with windfarm developments in Angus.

2.3 Determination of Impact Significance

The principles involved in determining impact significance are the same whether a single or multiple developments are being considered. This involves assessing:

- 1) The sensitivity of the receptor to the type of change proposed; and
- 2) The magnitude of change that would result from the proposals.

Sensitivity and magnitude are considered in combination, leading to an overall assessment of impact. This informs a determination of whether the impact is significant in terms of the EIA regulations. In doing this the considerations about what exactly is being assessed should be taken into account and clearly delineated including baseline, types of impacts and specific developments.

The threshold at which significance is determined in relation to the EIA regulations should also be defined prior to assessment. However, this threshold is particularly open to debate and often subject to the perceptions of different groups of stakeholders.

2.4 The Nature of Impacts

The issue of whether impacts are positive, beneficial or neutral is also an important consideration when making decisions on the acceptability of impacts, regardless of their significance. If an impact were considered positive or neutral in nature it is likely that its level of significance would be considered less critical than were it considered negative. Most windfarm developers equivocate this issue by reference to public opinion polls indicating support for renewable energy and the division of public opinion that is apparent over most windfarm developments. This masks the underlying landscape issue that should be considered independently of a windfarm's primary function or other effects.

The purpose of a windfarm is to provide renewable energy involving low levels atmospheric carbon pollution. This accords with current policy and is considered positive and beneficial. Conversely, wind turbines are objects that are unprecedented in scale and appearance in most landscapes, especially the rural areas in which they are mainly located. Many published landscape character assessments of rural areas do not specifically mention wind turbines and windfarms, although increasingly there are guidelines relating to placing them within particular character types. Furthermore, whilst government policy and advice (e.g. SPP, web based guidance, SNH guidance) and local authority policy (Development Plans) support their development, it is always with a precautionary note relating to balancing benefits and impacts.

The tone of most guidance is that of achieving a balance of impacts against the positive returns of renewable energy. For example SPP states in paragraph 187:

'Planning authorities should support the development of wind farms in locations where the technology can operate efficiently and environmental and cumulative impacts can be satisfactorily addressed.'

and;

'The design and location of any wind farm development should reflect the scale and character of the landscape. The location of turbines should be considered carefully to ensure that the landscape and visual impact is minimised.'

Web based guidance for onshore wind states:

'Wind turbines can impact upon the landscape by virtue of their number, size or layout, how they impact on the skyline, their design and colour, any land form change, access tracks and ancillary components anemometers, substations and power lines. The ability of the landscape to absorb development often depends largely on features of landscape character such as landform, ridges, hills, valleys, and vegetation.'

and:

'As more areas of search are taken up and as more sites are proposed within or near sensitive landscapes, landscape protection and designing appropriate mitigation through conditions and/or legal agreements, will become a more routine consideration alongside maximising the potential of wind energy. In relation to landscape impact, a cautious approach is necessary in relation to particular landscapes which are rare or valued, such as National Scenic Areas and National Parks'.

Wind turbines are placed in the landscape for a specific purpose other than landscape change. Given this fact and the nature of Government advice, a precautionary approach should be taken in the assessment of impacts by concluding that in most cases the impacts are to some degree negative. The degree of negative impact and level of significance will of course depend on the characteristics of the landscape in which the windfarm is located. It is conceivable that in some degraded or industrial landscapes the construction of a windfarm could be considered a neutral or positive change.

In terms of visual impacts the issue of public opinion is more relevant, but a precautionary note applies in this case as well. Particularly the issue of positive responses to the provision of clean energy needs to be separated from the consideration of visual impact of turbines in the landscape.

2.5 Acceptability of Change

As discussed above there is published guidance on methods of assessment of cumulative landscape and visual impacts of windfarms (e.g. SNH, 2012) and separate guidance on the factors that determine impact significance (e.g. LI & IEMA, 2002). However there is currently no generic guidance that defines how to determine the *acceptability* of impacts. Indeed generic guidance on acceptability may be inappropriate as any judgement on this is contextual and often a case of weighing perceived impacts against perceived benefits. The impacts and benefits will often be different in type and the balance of judgement is to an extent subjective. The acceptability of change in any particular landscape will depend on the nature of the landscape, the significance of the impacts and the purpose of the change. The final judgement is often informed by and weighed against specific development plan policies and material considerations.

The determination of significant change should theoretically be a clearly defined stage in this process, similar to an impact assessment. Nevertheless, as previously discussed, significance in landscape and visual impact assessment is not universally defined and is open to debate. If the significance of change is open to interpretation, then 'acceptability' of change is a still less definable term that is often based on opinion and is open to debate.

What is acceptable to one individual or organisation may not be acceptable to another. What may be seen as unacceptable change in a narrow context (e.g. landscape and visual impacts) may be seen as acceptable when considering the overall balance of positive and negative impacts (e.g. provision of carbon-neutral energy). In a study of windfarms in the Western Isles (SNH, 2004) the idea of a predetermined 'carrying capacity' is questioned and the concept of *Limits of Acceptable Change* (LAC) is discussed:

'LAC is first and foremost a process through which decisions are made on the conditions which are acceptable and then prescriptions are made for the actions needed to protect or achieve those conditions. So the objective of the LAC process is not to prevent change but rather to control it and to decide on the actions required to maintain or achieve the desired conditions. Other key features of LAC are the use of indicators and a monitoring programme. As a process, LAC is always participatory and multi-disciplinary, and may or may not involve a wide range of stakeholders. Whilst the term capacity may still be used in LAC, (recreational) carrying capacity is not a simple, single, absolute value. It is the amount, kind and distribution of use that can occur without causing unacceptable impacts on either natural resources or the perceptions and experiences of the users'.

This concept requires qualitative judgements about what is important in a landscape or to people using that landscape and what level of change is acceptable (i.e. what types and levels of change can take place before the landscape is considered to be critically or significantly changed). In the context of this study, acceptability of change will be related to cumulative landscape and visual impacts judged against landscape capacity as determined by structured a process of judgement; the provisions of criteria-based landscape policies; other material considerations and the wider Scottish picture of windfarm development. No account will be taken of the other potential impacts or benefits of windfarms. The resulting judgements of this study will need to be balanced against the other benefits or disadvantages of the proposals.

2.6 National and Local Policy

The acceptability of proposed windfarms and cumulative landscape and visual impacts of multiple windfarm development has to be considered in the light of national and development plan policy. National policies and Angus structure and local plan policies are described in Appendix 1 above.

2.7 Developing a Cumulative Impact Assessment Methodology

2.7.1 Cumulative Impacts

For the purposes of this study, cumulative impacts are taken to be those arising from more than one development of the same type, rather than the accumulation of changes making up one development. In the case of windfarms, cumulative studies concentrate on other windfarms. In practice, other features in the landscape or views (e.g. communications masts or electricity pylons) should also be taken into account. Nevertheless, given the singular appearance of windfarms and their generally isolated rural locations, the potential for overlap of cumulative impacts with other developments is more limited.

2.7.2 Baseline

The baseline for a cumulative, or indeed any, assessment is usually taken to include the existing landscape and visual receptors in the study area at the time of assessment. The baseline should include all operating windfarms and, arguably, all consented windfarms as this is effectively the 'permitted landscape'. The assessment of change and significance of

impact should be carried out relative to this baseline whether carrying out a standard or cumulative assessment.

Nevertheless, a landscape capacity study leading to the determination of an ‘acceptable’ level of windfarm development requires consideration of a full picture of all the windfarms in the landscape: operating, consented and proposed, in order to determine the extent and acceptability of change. The fact that there are operating or consented windfarms in an area is not necessarily an indication that the landscape is less sensitive to further development and that capacity is available. Indeed, depending on the landscape type, degree of development and objectives of policy in relation to landscape character, it may mean that most or all of the capacity is already occupied. Therefore, despite the existing baseline, the development must also in effect be considered relative to the underlying landscape.

2.7.3 Types of Cumulative Impact

Landscape

The assessment of cumulative landscape impacts involves an assessment of change in the fabric and character of the landscape as a result of the combined changes of more than one development. The changes are assessed in relation to defined areas of landscape such as a project study area, landscape character area or designated landscape. As previously discussed, it is effects on landscape character that are the primary focus in relation to windfarms from which all other assessments are derived.

Visual

The assessment of cumulative visual impacts involves an assessment of the change in views and visual amenity as a result of combined changes of more than one development, as experienced by people at their homes and during recreation, travel or work. There are three types of cumulative impact in relation to visual receptors:

- 1) Combined: more than one development is seen from a single static viewpoint in one arc of view (i.e. within the span of one view, without the receptor turning around). This would include particular directional viewpoints or the view from the principal aspect of a residential property.
- 2) Successive: more than one development is seen from a single static viewpoint by a receptor turning around to encompass more than one arc of view, up to 360°. This includes high and open viewpoints, or views from all aspects of a residential property.
- 3) Sequential: more than one development is seen by a receptor visiting a series of viewpoints. This may involve travelling along a linear route or through an area in which views of the developments may be continuous or intermittent and different developments may be seen at different locations. This includes roads, railways, paths and other defined routes or could involve an area such as a designated landscape.

In practice most assessment will include all of these types of impact in order to gain a full picture of how cumulative impacts will be experienced by receptors.

2.7.4 Effect of Pattern of Development on Perception of Impact

Cumulative studies tend to focus on the number of windfarms, turbines or output capacities within a particular area as an indication of level of cumulative impact. Nevertheless, there is not necessarily a simple relationship between numbers, areas and cumulative impact. The pattern of windfarm and wind turbine development, in terms of size, layout and proximity may also affect the perception of cumulative impacts.

The effect of proximity of different windfarms and turbines to one another has a bearing on impacts. Whilst close proximity of two or more windfarms may reduce the total area visually affected, the level of perceived cumulative impact may be increased by juxtaposition of windfarms or turbines of significantly different appearance (due for example to differing turbine sizes or site layouts) leading to a jarring visual clash or an untidy, disorganised appearance.

Furthermore, studies and planning decisions have indicated that there is less resistance to expansion of existing windfarms than to creation of separate new windfarms. In particular, respondents to a survey on impacts of windfarms on tourism in Scotland (Glasgow Caledonian University and others, March 2008) showed little concern about views being affected by one windfarm compared with more than one windfarm being visible in the same view.

“A significant proportion of respondents (44%) agreed that they don’t like to see several Wind farms in the same view. These results suggest that those respondents who have indicated having a neutral or even positive perspective on individual wind farm sites are less likely to have a similar opinion on a landscape that has several developments in view.

This clear result compares with analysis in the previous section where there was a small increase in the negative response as the visual impact increased for an individual wind farm development. This suggests that people see one large scale development in an area as preferable to several smaller scale developments dotted on the landscape.

On the other hand, both sets of results also confirm that a definite tipping point exists where wind farm development becomes untenable for a significant number of visitors”.

Current guidance and recent planning decisions are tending towards the concept of concentration of wind turbines into large clusters in certain areas. This is on the basis that this reduces the potential for a widespread dispersal of effects over a larger area and allows areas more sensitive to windfarm development to remain free of windfarm development. SNH guidance now highlights this issue and supports this type of approach where appropriate (SNH, 2009).

The policy may also offer advantages in terms of economies of scale for site servicing and electricity transmission. The disadvantages are likely to be that areas chosen for concentration of the turbines are likely to be significantly and adversely affected by development – this being effectively a ‘sacrificial’ landscape policy. Furthermore, this concept does not necessarily sit well with recent encouragement for smaller scale wind

energy development promoted by the Feed in Tariff where turbines are likely to relate to individual properties scattered across the landscape.

2.7.5 Setting Assessment Objectives

What exactly is being assessed depends on the purpose of the cumulative assessment. In the case of an EIA for a single development it is primarily the impacts of the proposal and its contribution to cumulative impacts that is being assessed. Such a study would therefore typically concentrate on areas in which the impact of the windfarm under consideration is significant and give only slight consideration to areas in which it is not, even if there were significant cumulative impacts from other windfarms.

In the case of a more broad-based cumulative study such as this, it is the overall impact of windfarm developments on a defined study area that is being assessed. Nevertheless this study requires a consideration of the both the full cumulative impact *and* the contribution that specific developments (proposed or operating) make to that impact, in order to inform decisions.

2.7.6 Defining Thresholds of Cumulative Development

The discussion above has defined the terminology and our approach to cumulative assessment. It has isolated the central issues that inform the assessment of acceptability of levels of change. The key requirement is to develop a methodology for defining thresholds of significance and acceptability that are clear and robust enough to be accepted by all sides of the debate. This study as a stage in the debate about acceptable levels of change in the landscape of Angus. Whilst we can describe and define what those levels of change might be it is difficult to enforce a universal view as to what levels of change are significant or acceptable.

Scottish Government Guidance underlines the landscape and visual issues associated with increasing levels of cumulative wind turbine development:

'In areas approaching their carrying capacity the assessment of cumulative effects is likely to become more pertinent in considering new wind turbines, either as stand alone groups or extensions to existing wind farms. In other cases, where proposals are being considered in more remote places, the thresholds of cumulative impact are likely to be lower, although there may be other planning considerations.'

'In assessing cumulative landscape and visual impacts, the scale and pattern of the turbines plus the tracks, power lines and ancillary development will be relevant considerations. It will also be necessary to consider the significance of the landscape and the views, proximity and inter-visibility and the sensitivity of visual receptors.'

SNH guidance Siting and Designing Windfarms in the Landscape (SNH, Dec 2009) lists the factors that affect the perception of cumulative impact of windfarm development:

'The cumulative impact of windfarm development on landscape and visual amenity is a product of:

- *the distance between individual windfarms (or turbines),*
- *the distance over which they are visible,*
- *the overall character of the landscape and its sensitivity to windfarms,*

- *the siting and design of the windfarms themselves, and*
- *the way in which the landscape is experienced.*

'The combination of single turbines and small clusters of turbines can raise the same issues'.

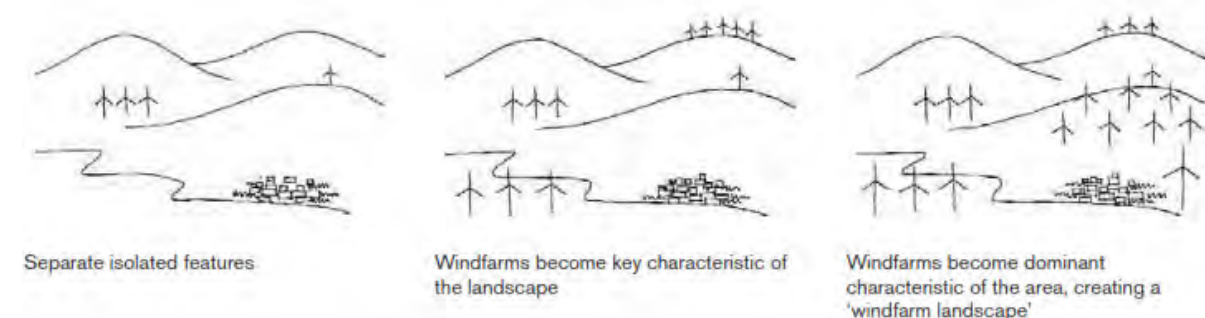
To this list might be added turbine height and windfarm size. In determining an acceptable level of development, it is necessary to clearly define what differing levels of development actually entail.

The SNH guidance identifies three broad levels of cumulative change in the landscape that may be set by local authorities depending on landscape sensitivity and value and local policy objectives:

- **Landscape Protection:** Maintain existing landscape character.
- **Landscape Accommodation:** Accept a degree of change providing this is not detrimental to key landscape characteristics and key visual resources.
- **Landscape Change:** Accept large amounts of change that may have detrimental effects on key landscape characteristics and visual resources.

In determining an acceptable level of development, it is necessary to clearly define what differing levels of development actually entail. The methodology therefore sets out defined levels of change to the landscape and visual environment that might occur or be experienced depending on the size, number and location of turbines to be built within an area.

The descriptions in Table 2.1 below set out a graduated landscape typology that defines the terms of reference for increasing levels of cumulative landscape and visual impact of turbines. It does this by describing their effect on landscape character and the experience of those living in or travelling through the landscape. Further generic illustration of this concept is provided in Part 1 section 5 of the SNH guidance:



The purpose of this approach is to address the gap between results of cumulative impact assessment and judgements on acceptability of change. It does not set thresholds of significance or acceptability but it does present a framework that describes levels of change in landscape character and the experience of visual receptors in the landscape. This can then be used to inform and shape the debate concerning the degree of change in a landscape and the acceptability of cumulative impacts and the *Limits of Acceptable Change*.

Table 1: Description of Levels of Cumulative Wind Turbine Development

Landscape Type	Landscape Character	Visual Experience
Landscape with no Wind Turbines	A landscape type or area in which no or very few wind turbines are present, and none are clearly visible from neighbouring areas.	There would be no discernible effects on visual receptors.
Landscape with Occasional Wind Turbines	A landscape type or area in which windfarms or wind turbines are located and/or are close to and visible. However they are not of such a size, number, extent or contrast in character that they become one of the defining characteristics of the landscape's character.	Visual receptors would experience occasional close-quarters views of a windfarm or turbine and more frequent background views of windfarms or turbines. Some of the turbines would not be perceived as being located in the landscape character type or area. No overall perception of wind turbines being a defining feature of the landscape.
Landscape with Wind Turbines	A landscape type or area in which a windfarm, windfarms or wind turbines are located and/or visible to such an extent that they become one of the defining characteristics of the landscape character. However, they are clearly separated and not the single most dominant characteristic of the landscape.	Visual receptors would experience frequent views of windfarms or wind turbines as foreground, mid-ground or background features, affecting their perception of the landscape character. However there would be sufficient separation between windfarms and turbines and sufficient areas from which wind turbines are not visible such that they would not be seen as dominating the landscape over all other landscape features.
Wind Turbine Landscape	A landscape type or area in which windfarms or wind turbines are extensive, frequent and nearly always visible. They become the dominant, defining characteristic of the landscape. Nevertheless there is a clearly defined separation between developed areas.	Visual receptors would experience views of windfarms as foreground, mid-ground and background features, to the extent that they are seen to dominate landscape character. Few areas would be free of views of wind turbines.
Windfarm	Landscape fully developed as a windfarm with no clear separation between groups of turbines. Few if any areas where turbines not visible.	Visual receptors would always be close to and nearly always in full view of wind turbines.

The above descriptions of levels of turbine development within a landscape are necessarily simple, factual and generic. They can be applied to any chosen scale of study area, from a region to a landscape type or a single landscape character area. They do not apply to any specific baseline landscape type or types: indeed the character of the landscape is likely to affect judgements on the assignment to a particular level of development. For instance, a large scale landscape may be less dominated and affected than a smaller scale landscape; or a more complex topography, or a densely wooded landscape may reduce the visibility of wind turbines within an area and hence affect the perception by visual receptors. A large landscape character area will require a greater extent and frequency of development than a smaller area to become affected by wind turbines. Furthermore, as

discussed in Chapter 5 of this report, there are a number of design and siting factors that affect the perception of cumulative impacts. This includes not only size and number of turbines and windfarms in an area but also the juxtaposition of different layouts including turbine size, positioning and distribution.

The descriptions assume conditions of good visibility covering the 30-35km range that visibility studies and visual impact assessments of larger windfarms adopt as best practice. Clearly this exceeds the requirements for assessments of smaller turbines.

The descriptions are intended to be neutral in that they are purely descriptions of levels of development and the frequency or proximity at which wind turbines and windfarms may be seen. They do not attempt to define the levels of development as being good, bad, acceptable or unacceptable. This is a judgement that would be made when considering specific cases against the landscape type, its capacity for windfarm development, the development policy framework and other material considerations. In this case it is the determination of areas in which cumulative impact has reached the capacity of the landscape.

2.8 Capacity Assessment Method

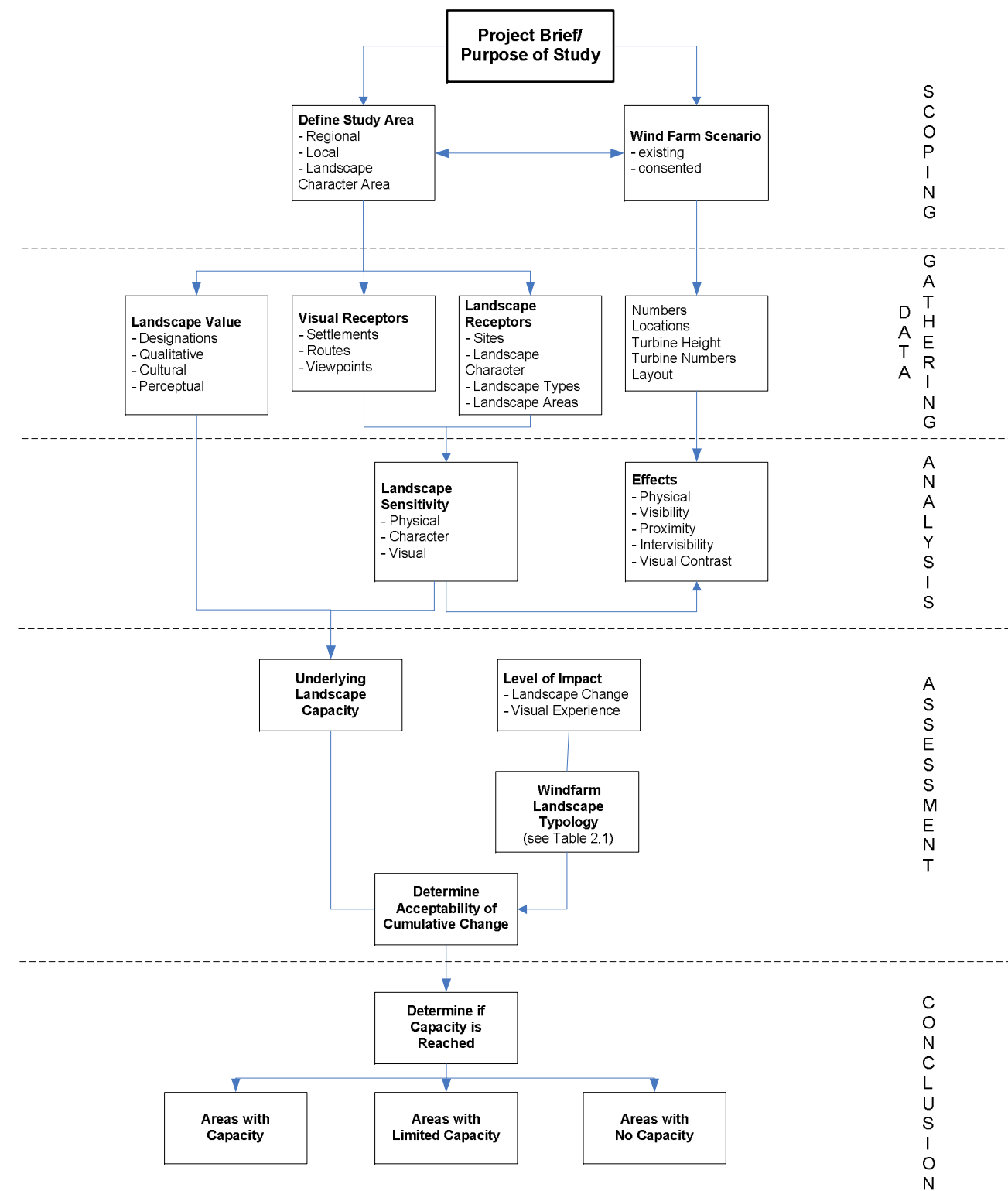
2.8.1 Assessment Process

The considerations discussed above have been taken into account in the staged methodology. This is illustrated by the flow diagram in Figure 1 overleaf. There are 5 stages in the process as shown in Table 2 below:

Table 2: Stages in Landscape Capacity Assessment

Scoping:	Define the purpose of the study, the study area and the wind energy development scenario that is to be assessed.
Data Gathering:	Gather information on receptors (visual and/or landscape); landscape designations and potential constraints; windfarms/ turbines (existing, proposed etc).
Analysis:	Determine landscape character sensitivity, visual sensitivity and landscape value. Determine visibility, direct and indirect landscape effects of the consented windfarms and turbines.
Assessment:	Determine landscape capacity from landscape sensitivity and value. Determine level of cumulative change caused by consented wind turbines, leading to a wind turbine landscape/ visual typology.
Conclusions:	Determine significance and/ or acceptability of existing and future potential cumulative change to the landscape and visual environment.

Figure 1: Cumulative Impact and Landscape Capacity Methodology Flowchart



This is a flexible framework which can be adapted to include the whole study area or focus on subdivisions of landscape, windfarm groupings or development scenarios as required. In this case local landscape character types have been considered, then building up to a picture of the whole of Angus.

The assessment for Angus includes:

- 1) Assessment of landscape capacity, cumulative change and acceptable limits of cumulative development in:
 - landscape character types and units in Angus;
 - broad regional landscape character areas of Angus;
 - Angus as a whole.

The cumulative development in each case is expressed via the wind turbine landscape/visual typologies described in Table 2.1.

The cumulative and capacity assessment for onshore wind energy in Angus considers:

- 1) Current wind turbine landscape typology resulting from operating and consented wind turbines, where there is a high degree of certainty in the cumulative assessment scenario.
- 2) The limits of acceptable cumulative change expressed in terms of the wind turbine landscape typologies (e.g. acceptable level of development in an area might be judged as no more than a *Landscape with Occasional Windfarms*). This is based on a judgement considering landscape capacity but also including policy considerations, emerging guidance on wind turbine development and strategic landscape considerations in Angus.
- 3) The effects of consented wind turbines together with wind turbines currently under planning application – where there is a level of uncertainty regarding the potential cumulative scenario.

Further comment is made on the extent to which the current and proposed type and pattern of development (e.g. turbine size, windfarm size and separation between developments) affects the cumulative impacts and, if appropriate, how the area should be developed in order to keep within an acceptable cumulative change.

This information is used to determine where existing development has reached or come close to reaching landscape capacity and further development should be limited. On a more strategic level it identifies areas where development should be limited to provide separation between concentrations of wind turbine development. It also allows the identification of areas where further development may be possible and, in these cases, what level of development would be acceptable.

The assessment is carried out on the basis of the structured methodology in line with SPP and Scottish Government web based guidance in combination with professional judgement, on the basis of a desk analysis of available information on the landscape, on wind turbine developments and through site visits. Whilst a GIS application has been used, this is only as a tool for managing, mapping and illustrating spatial data.

The following sections detail the stages in determining landscape capacity.

2.8.2 Determining Landscape Character Sensitivity

The determination of landscape character sensitivity for a landscape character type involves a breakdown of the physical and perceptual characteristics that contribute to landscape character. Each criterion described below is evaluated in terms of **high**, **medium** or **low** for sensitivity to wind energy development. An overall assessment is derived from a composite of all the criteria. Whilst scale is often important, there is no consistent relative weighting for each criterion, as in each landscape type different criteria may be critical to the ability to accommodate wind energy development.

Table 3. Determination of Landscape Character Sensitivity

Landscape Character Criteria	Factors affecting level of sensitivity
Scale (primarily in character but also in geographical size of area)	Consideration of horizontal and vertical scale. Larger scale landscapes are generally considered more able to accommodate commercial wind turbines, although a smaller size of turbine may reduce impacts. A larger physical area would be able to accommodate more development depending on other aspects determining capacity.
Landform	The relationship between wind turbines and landform is complex and also dependent on scale. Generally simple landforms: flat, undulating or gently rolling, are considered less sensitive and complex landforms more sensitive, especially if smaller scale. Landforms of sufficient scale may provide opportunities for screening or backgrounding turbines, reducing their visual sensitivity.
Pattern	The pattern of landcover (woodland, field boundaries, crops, roads, settlements etc). Degree of strength, regularity, fragmentation. Minimal or simple landscape patterns are considered less sensitive to wind turbine development. Again the relationship to scale is important.
Development	The degree of built or infrastructure development will affect suitability. In general a greater level of development is more suitable, particularly large scale industrial and extractive industries, or potentially large scale agriculture. Areas with small scale residential development would potentially be more sensitive. Undeveloped areas with remote or wilderness characteristics would also be more sensitive.
Quality	This is a measure of the condition and integrity of the landscape fabric and character. A landscape in good condition with a high degree of integrity is more likely to be sensitive to development. A landscape of poor quality may represent an opportunity to compensate for impacts.
Elements and Features	The elements that make up a landscape, such as woodlands, fields, hedges, buildings and landforms create its pattern but add to its distinctive composition and character. Prominent or distinctive focal features such as steep hills, towers, lochs add further distinctiveness. The relationship of wind turbines to these affects overall sensitivity.
Context	The characteristics of surrounding landscape areas provide a context that affects perception of a landscape and may affect how wind turbine developments are perceived. Landscapes acting as a backdrop or foreground to other areas are particularly sensitive.
OVERALL RATING	High/ Medium/ Low

The following definitions apply to the thresholds of low, medium and high landscape character sensitivity:

Low Sensitivity: A landscape type or area with key characteristics that would be capable of successfully accommodating or co-existing with wind energy development of all or most scales.

Medium Sensitivity: A landscape type or area with some key characteristics that would be capable of successfully accommodating or co-existing with wind energy development but also some characteristics that would be adversely affected and where scale of development may be a limiting factor.

High Sensitivity: A landscape type or area in which most or all key characteristics would be adversely affected by wind energy development and is not capable of successfully accommodating this type of change.

2.8.3 Determining Visual Sensitivity

The visual sensitivity of a landscape area is determined by who is likely to see it, (types and numbers of receptors) and how visible in general the area is. The assessment is made in relation to the visibility of tall structures.

2.8.4 Visibility Analysis

A systematic analysis of the relative visibility of areas of Angus has been undertaken. Three sets of visual receptors were determined as follows, and these are identified in Section 4:

- Settlements;
- Routes;
- Viewpoints

Each of the receptor types and locations is representative of locations frequented by people in Angus. The visibility analysis included each set of receptors, and generated visibility diagrams of different scenarios for different heights of objects in the landscape.

The analysis was carried out using a computer based technique in which the intervisibility between receptors and landforms, or objects of specific heights on the landforms, is determined. The more intervisibility, the greater the visual sensitivity is likely to be. In the case of area receptors (settlements) or linear receptors (routes) these are broken up into units of the same area or length such that this represents different population sizes or length exposed to view. No value judgement has been made as to relative sensitivity of receptors.

The extent of the visibility assessment was limited to a 15km radius from the receptors. In our experience, this is the distance within which the great majority of significant impacts from wind farms are likely to occur. Whilst it is recognised that impacts occur beyond this distance, up to 35km and beyond, as recognised by EIA best practice, this is not an EIA assessment and the results are considered to adequately distinguish between locations of potentially greater or lesser sensitivity.

Each receptor type was assessed at six different heights above ground level in order to distinguish between the potential visibility of windfarm infrastructure and turbines of differing height:

- 0m representing objects at or near existing ground levels such as tracks and small buildings;
- 15m representing maximum height of small domestic and farm scale turbines;
- 30m representing blade tip height of typical farm scale turbines;
- 50m representing blade tip height of many commercial windfarm turbines and some single Feed in Tariff turbines;
- 80m representing blade tip height of many commercial windfarm turbines and some single Feed in Tariff turbines;
- 125m representing blade tip height of typical commercial turbines currently in use

A receptor height of 2m was assumed.

Results of the visibility analysis are illustrated in Figures 4.2a-f to 4.4a-f. The colours show the differences in visual sensitivity across Angus. Red colours indicate areas that are most visible from the greatest numbers of receptors, grading through orange, yellow and green to blue areas that are seen by fewest receptors and uncoloured areas where objects of that height would not be seen at all from receptors.

The three key criteria which determine visual sensitivity are listed in Table 4 below. Each is rated in terms of high, medium or low and a composite rating derived based on professional judgement. The following definitions apply to the thresholds of low, medium and high visual sensitivity:

Low Visual Sensitivity: A landscape type or area which due to its location and characteristics has limited internal and/or external visibility and where wind energy developments would not be visible to many sensitive receptors.

Medium Visual Sensitivity: A landscape type or area which due to its location and characteristics has a moderate degree of internal and/or external visibility and where wind energy developments would be potentially visible to a wide range of receptors, some of which are sensitive.

High Visual Sensitivity: A landscape type or area which due to its location and characteristics has extensive internal and external visibility and where wind energy developments would be potentially visible to a wide range and number of sensitive receptors.

Table 4. Determination of Visual Sensitivity

Visual Sensitivity Criteria	Factors affecting level of sensitivity
Receptors	A greater number of potential receptors including higher population densities, visitor attractions or the presence of busy transport routes will lead to a higher visual sensitivity. The sensitivity and expectations of the receptors is also a contributory factor.
Internal Visibility	Views within a landscape area may be open or restricted by landform, vegetation or buildings. The greater the degree of openness and intervisibility the greater the sensitivity.
External Visibility	A landscape area that is visible from surrounding areas by virtue of its prominence or being overlooked is more visually sensitive than an area that is seldom seen.
OVERALL RATING	High/ Medium/ Low

The combination of landscape character and visual sensitivities leads to an overall assessment of landscape sensitivity for an area. Whilst landscape character is likely carry more weight in determining sensitivity, no consistent weighting is given to either factor as it is likely that different landscapes will express them to varying extents depending on their unique characteristics. Professional judgement is used in the case of each landscape type.

2.8.5 Determining Landscape Value

Landscape value reflects the value that society and individuals put on a landscape. This can be officially recognised by some form of local or national designation, or simply by its value to a ‘community of interest’ (this could be for example a local population, recreational users or conservation interest).

Other characteristics affecting value of a landscape include its historic and cultural associations, particularly if expressed by surviving features and patterns in the landscape. Finally there are more intangible characteristics generally valued by society, such as tranquillity remoteness and wilderness.

The key criteria which determine value are listed in Table 5 below. Each is rated in terms of high, medium or low and a composite rating derived based on professional judgement. The following definitions apply to the thresholds of low, medium and high landscape value:

Low Landscape Value: A landscape type or area which has no landscape designation; little apparent value to communities; no or few

cultural heritage designations or associations and has no distinctive or unusual perceptual values.

Medium Landscape Value: A landscape type or area which has at least in part local landscape or landscape related designations; value to local communities; some cultural heritage designations or associations and has some distinctive perceptual values.

High Landscape Value: A landscape type or area, all or much of which is covered by national landscape or landscape related designations; has value to local and wider communities; widely recognised cultural heritage designations or associations and has clearly distinctive and/or unusual perceptual values.

Table 5. Determination of Landscape Value

Landscape Value Criteria	Factors contributing to value
Designations	International, national, regional or local designations relating to landscape in particular, although ecological designations also contribute to the landscape value of an area.
Community value	An undesignated area may be particularly valued by a community of interest: local, or activity-based.
Cultural value	Valued landscapes will have historic associations, be rich in historic features and buildings and/or have literary or artistic associations.
Perceptual	Tranquillity, remoteness or wilderness are valued characteristics, whereas landscapes that are highly modified, developed and populated would have low value in this respect. Landscapes regarded as particularly scenic would also be more sensitive.
OVERALL RATING	High/ Medium/ Low

2.8.6 Determining Landscape Capacity

The final assessment of capacity combines sensitivity and value and is expressed as **High, Medium** or **Low**. The following definitions broadly define the relationship between landscape sensitivity/ value and capacity:

Low Capacity: A landscape that is both sensitive to wind turbine development and has a high value, and where only a slight level of change can be accommodated without significantly affecting any of the key defining criteria.

Medium Capacity: A landscape that has some sensitivity to wind turbine development and has some aspects of value, and where a moderate level of change can be accommodated which may significantly affect some of the defining criteria

High Capacity: A landscape that has low sensitivity to wind turbine development and has low value, and can accommodate substantial change that significantly affects many of the key defining criteria

Broadly speaking there is an inverse relationship between capacity and landscape sensitivity and value. Nevertheless it is not a simple relationship and we have not employed the use of a matrix in this study: a balance of judgement is made in each case as landscape value may be a more important factor than sensitivity in some cases; and vice versa in others.

It should be noted that in landscapes where there is existing wind turbine development the capacity for turbines may be reduced. This is because the landscape would be approaching the maximum level of change that it can acceptably accommodate.

2.9 Determining Acceptability of Change

The final stage involves bringing together the cumulative impact assessment and the landscape capacity assessment in a reasoned judgement of the effects of windfarm development on the Angus landscape. As explained above, the likely acceptability of a proposed level of development may be determined by considering against the underlying capacity of the landscape. This should also be considered against policy criteria and objectives.

2.10 Scope of Assessment

The scope of the assessment can be varied according to the extent of the study area and the purpose of the study. It can also vary according to the depth and detail required to assess impacts within the defined study area. In the case of a detailed study the method should build up to the wider study area from smaller units.

The current study focuses primarily on the local authority area of Angus, although areas beyond the boundary are being considered in terms of the visual influence of nearby windfarms and neighbouring contiguous landscape types. Nevertheless the results of the study will be discussed in terms of Angus and its landscapes.

Wind Energy Development Types

The study considers all sizes of turbines and developments operating, consented or proposed, as well as potential future scenarios where appropriate. However the capacity assessment and guidance for smaller turbines (under 15m to blade tip) is limited to localised generic siting and design considerations. The smallest turbines are not considered to have the same qualities of scale, prominence and widespread visibility that lead to the wider cumulative impacts that characterise larger turbines.

APPENDIX 3: CHANGES AND SUBDIVISIONS TO ANGUS LANDSCAPE CHARACTER AREAS

1.0 Background

A number of minor adjustments have been made to landscape character areas determined by the between the SNH 1999 assessment and the boundaries used in this study. There are also a number of landscape character areas in which sub-areas have been identified.

The changes to main LCA boundaries are principally derived from draft changes proposed by Angus Council. Most of these are minor. Ironside Farrar has also proposed two changes to LCA boundaries and defined the boundaries a number of settlements that were not previously distinguished.

2.0 Boundary Changes

The following proposed changes are intended to give a more accurate definition to LCA boundaries, relating more closely to well defined landscape features on the ground including (singly or in combination): breaks in slopes; clear changes in land use; roads, field boundaries, woodland/ plantation edges and built up areas.

Most of the changes have been derived from Angus Council (email from S. Roberts 16.01.13) and reviewed by Ironside Farrar, as detailed below, with a clear rationale for the change given. The numbered areas are illustrated in the attached figure A3.1.

Area Reference	Angus Council Change	IFL Change	Rationale
Area 1 Barry Links	Moves boundary between LCT 13 (Dipslope Farmland) and 14a (Coast with Sand) further south except for reclaimed flat land around Buddon Burn.	Accept change but adjust LCTs to Carnoustie urban area boundary.	Better reflection of changes in topography and/or land use between Dipslope Farmland, Coast with Sand and Urban area.
Area 2 Carnoustie	Moves boundary between LCT 13 and 14b (Coast with Cliffs) further north to minor road	Accept change but adjust LCTs to Carnoustie urban area boundary and around Hatton House.	Road and urban edge a more clearly defined boundary than mid-field.
Area 3 Arbroath West	Moves 13/14a boundary near Arbroath slightly further south.	Accept change and adjust edge of urban area to reflect current	Boundary aligned with urban area boundary and moved closer to change between cultivated and uncultivated open areas.

Area Reference	Angus Council Change	IFL Change	Rationale
Area 4 Arbroath East	Very minor change between urban and LCT 14b	Accept change and adjust edge of urban area to reflect latest built up area.	Boundary aligned along new urban edge of Arbroath.
Area 5 Deil's Head	Move short section of 13/14b boundary inland	Accept change	Boundary aligned with change in slope facing towards sea.
Area 6 Ethie Castle	Move very short section of 13/14b boundary inland	Accept change	Boundary aligned with minor road.
Area 7 Ethie Mains	Move section of 13/14a boundary inland	Accept change	Boundary more clearly aligned with crest of landform.
Area 8 Dunninald House	13/14a boundary moved inland to minor road	Accept change	Boundary more clearly defined by alignment with road on crest of landform
Area 9 Montrose Basin south	Moves boundary between LCT 13 and 15 (Lowland Loch Basin) to north of A934	Move boundary to follow A934	Road is a better defined boundary: on the main break in slope and change in land use between pasture in 15 and arable in 13.
Area 10 Montrose Basin north	Moves boundary between LCT 10 (Broad Valley Lowland) and LCT 15 (Lowland Loch Basin) further downslope to the south, mainly aligned along the A935	Accept change	Boundary is better defined to edge of basin and road rather than part way down the side of the enclosing slope.
Area 11 Menmuir Hills - Noranside	Moves boundary between LCT 5 (Highland Foothills) and 10 (Broad Valley Lowland) south around a hill and along the minor road.	Accept change	Boundary between hill and valley is better defined around the hill and along minor roads.

Area Reference	Angus Council Change	IFL Change	Rationale
Areas 12 and 13 Menmuir Hills - Memus and Derachie	Moves boundary between LCT 5 (Highland Foothills) and 10 (North and South Esk) to align with field boundaries.	Accept change	Boundary more clearly defined by field and woodland boundary features on the ground.
Area 14 Glen Prosen and Glen Clova - Cortachy	Extends LCT 1b (Mid Highland Glen) further south into LCT10 (Strathmore) by including policies of Cortachy and Inverquaharity Castles	Accept Change	Boundary follows edge of river floodplain and treebelts before it narrows downstream into Strathmore. Includes most of estate policies in one landscape type.
Area 15 Kirkton of Airlie	Moves boundary between LCT 5 (Highland Foothills) and 10 (Broad Valley Lowland) further south to include small valley around Canty Burn and align with field/ woodland boundaries on hill crest above Strathmore.	Accept Change	Small valley is more characteristic of Highland Foothills and new boundary defines topographic edge of the larger valley of Strathmore
Area 16 Glen Isla - Mains of Airlie	Minor realignment of boundary between LCT 1b (Mid Highland Glen) and 10 (Broad Valley Lowland)	Accept Change	Better tie-in with realigned Area 15
IFL 1	n/a	Realignment of boundary between LCT 5 (Highland Foothills) and LCT 10 (North and South Esk) up valley side to align with minor road between Fern Den and Tigerton	Road is placed on main break of slope between steep slopes (predominantly pasture) to the north and less steep (predominantly arable land) to the south.
IFL 2	n/a	Realignment of boundary between LCT 5 (Highland Foothills) and LCT 10 (North and South Esk) down valley side to align with minor road east of Tigerton and then around base of hillslopes.	Road is placed on main break of slope with realignment further east grading back into existing defined boundary.

Area Reference	Angus Council Change	IFL Change	Rationale
IFL	n/a	Larger built up areas defined as 'Urban'.	More consistent approach than existing data which defined Dundee and Arbroath but no other settlements.

In respect of the urban areas these have been identified separately for two reasons: (a) to be consistent across Angus and (b) for clarity, as the study concentrates on the rural landscape of Angus. The separate identification of these areas makes no significant difference to the assessment of the Landscape Character Areas in which they lie or indeed to commentary on potential effects on residential amenity or setting of settlements.

3.0 Proposed Landscape Sub-Areas

The following proposals are subdivisions of the main Angus LCAs. They reflect differences across the LCA that may be distinctive enough to influence landscape sensitivity and capacity in respect of wind energy. The differences include (singly or in combination): scale, elevation, landform, tree cover, development and influence of neighbouring character areas. The proposed sub-areas, their extents and the rationale for subdivision are detailed in the table below. The extents are illustrated in the attached figure.

In most cases the differences are not sufficient to define new landscape character types or areas, although some areas could well be sufficiently distinctive to be reclassified under a fully detailed review of landscape character in Angus.

Landscape Type/Location	Proposed Sub-Area	Rationale
LCT10: Broad Valley Lowland - Strathmore. (i) Area between Ruthven House and Leys of Cossans	Area of fluvio-glacial landforms expressed as small hillocks and ridges in the farmland.	More complex small scale landforms contrast with flatter more open landscape in the rest of Strathmore. Field sizes smaller and boundaries more irregular than rectilinear shapes elsewhere. More small woodlands. This may affect size/ numbers of wind turbines.
LCT 10: Broad Valley Lowland - North and South Esk Valley (ii) River South Esk between Cortachy and Brechin	Character is defined by the river which meanders through the core of this area and the surrounding land which is more characterised by woodland policies, large houses and mills than the surrounding farmland.	A more complex and scenic landscape than the surrounding valley with smaller more irregular fields and woodlands.

Landscape Type/Location	Proposed Sub-Area	Rationale
LCT 10: Broad Valley Lowland - North and South Esk Valley (iii) River North Esk catchment.	This area is topographically separated from the South Esk and its tributaries by glacial landforms, draining to the east/ northeast into the North Esk.	Separated from the main river corridor and transport routes. Characterised by a network of minor roads and subtle east-west undulations in the landform due to the drainage lines.
LCT 10: Broad Valley Lowland - North and South Esk Valley (iv) Higher ground around Muir of Pert separating the Rivers North and South Esk.	This area is elevated above the valley floors of Strathmore (North Esk) and Montrose Basin (South Esk).	Higher more exposed ground more similar to <i>Dipslope Farmland</i> than a valley. Forms containing slopes to Strathmore to the north and Montrose Basin to the south.
LCT 12: Low Moorland Hills (i) Forfar Hills (volcanic hills and farmland surrounding Forfar)	The area is characteristic of the landscape described in the SNH 1999 Landscape Character Assessment, with individual low but distinctive hills interspersed across an area of undulating farmland.	The modest scale and landform characteristics of the hills and spaces between make this area less suitable for larger scale wind energy projects.
LCT 12: Low Moorland Hills (ii) Montreathmont Moor (farmland and forestry between the Forfar Hills and Montrose Basin)	The area is not characterised by distinctive hills. Similar undulating farmland is centred around a large area of forestry on Montreathmont Moor.	The simple undulating landform and rectilinear landscape pattern would be more suitable for larger wind energy projects by comparison with the Forfar Hills.
LCT 13: Dipslope Farmland (i) Tealing Farmland	The sub-area furthest west located between the Dundee to the south and the Sidlaw Hills to the north. Narrower strip than most of the Dipslope Farmland to the east. Elevation 100-200m AOD, sloping to the south and east but partially contained by a ridge of land just north of Dundee.	Character is influenced by the location between the urban area and the hills. Generally more densely settled and affected by infrastructure including roads, electricity pylons and telecoms masts.
LCT 13: Dipslope Farmland (ii) Monikie/Crombie Farmland	Lying between the Sidlaw Hills and Forfar Hills to the north and the coastal area to the south. Elevation 200m AOD in N falling to 10m AOD near coast.	Character is influenced by greater tree cover than most of the Dipslope Farmland, in areas that include two country parks and estate policies of Panmure. More settlement in lower part to the south where the A92 lies and some open unimproved areas to the north
LCT 13: Dipslope Farmland (iii) Redford Farmland	Lying between the Forfar Hills to the north and the coastal area to the south. Max. elevation 197m AOD in N falling to ca. 20m AOD near coast.	This area has a higher, more open and larger scale character than most of the Dipslope Farmland due to elevation, lack of trees and field boundaries.

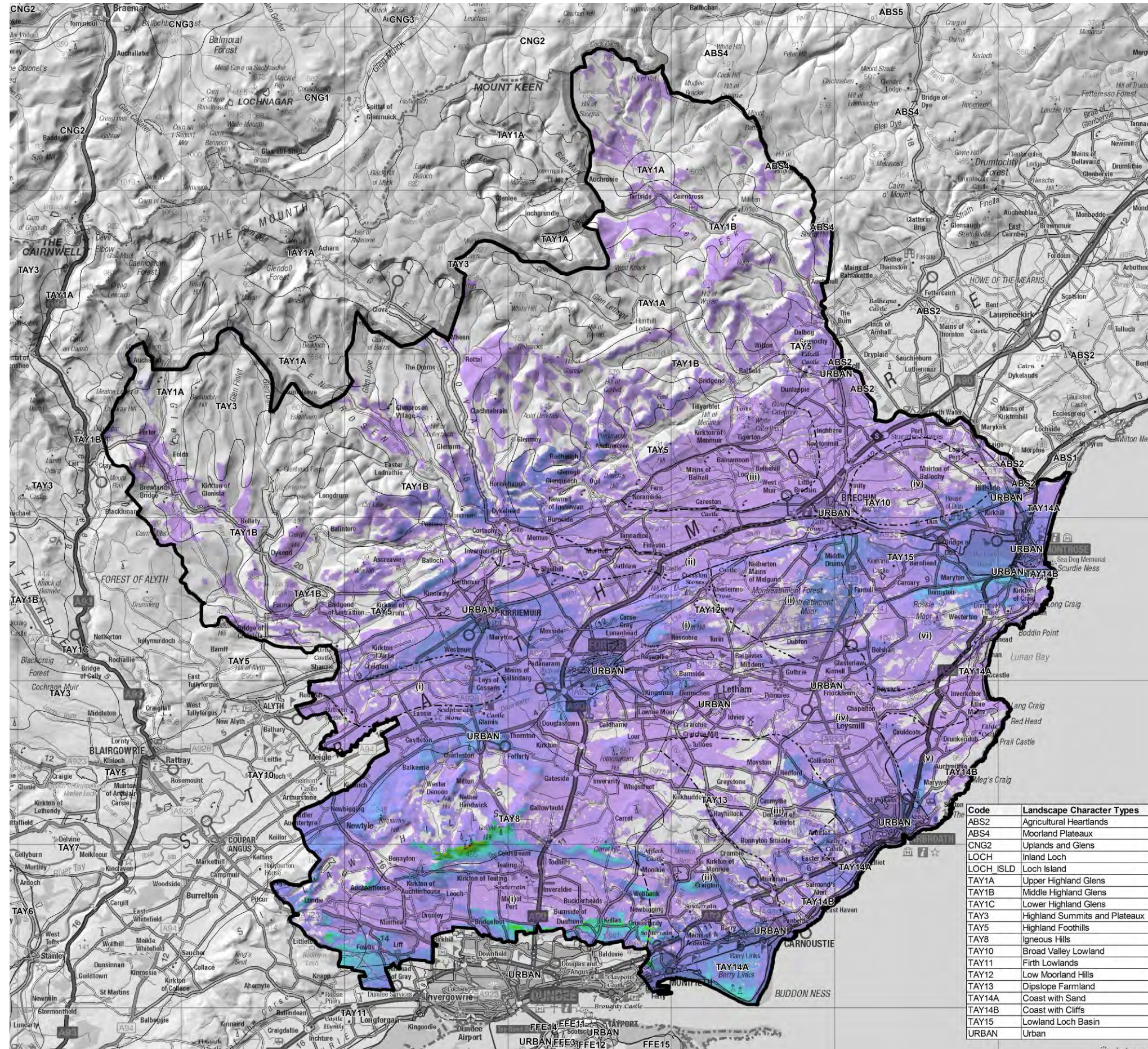
Landscape Type/Location	Proposed Sub-Area	Rationale
LCT 13: Dipslope Farmland (iv) Letham/ Lunan Water/ Arbroath Valleys	Lower and/or more sheltered ground lying between Letham, Friokheim, Arbroath and Lunan Bay. Max 165m AOD but generally below 100m AOD down to 10m AOD near Lunan Bay.	This lower area follows drainage lines including the Lunan Water, Brothock Water and Elliott Water and has a more settled, sheltered and contained character than the surrounding higher areas of Dipslope Farmland. Crossed by main roads including A92 and A933
LCT 13: Dipslope Farmland (v) Ethie Farmland	Higher/ exposed ground lying between Arbroath, Lunan Water and the coast. Ca. 30-95m AOD	This area has a predominantly open and exposed character, influenced by proximity of the coast and lower surrounding ground. Crossed at lowest point by main road A92 and railway. Limited in area.
LCT 13: Dipslope Farmland (vi) Rossie Moor	Higher ground lying between the Lunan Water, Montrose Basin and the coast. Ca. 30-150m AOD.	Characterised by an open character due to elevation, surrounding lower ground and coastal influence. Separated from other elevated Dipslope Farmland areas by the Lunan Water. Large fields and a small area of unimproved moorland on highest area. A92 passes across east near coast but most of area is sparsely populated and has few roads.

APPENDIX 4: VISIBILITY ANALYSIS FOR WIND TURBINES IN ANGUS

Figures 4.2 a-f: Visibility from Settlements

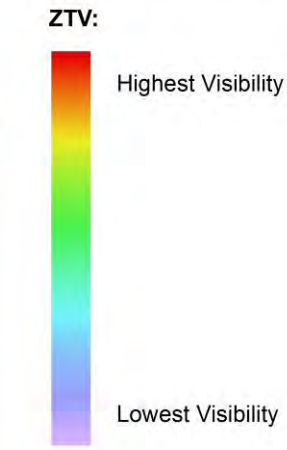
Figures 4.3 a-f: Visibility from Transport Routes

Figures 4.4 a-f: Visibility from Viewpoints



March 2014 7933 ANC 112

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

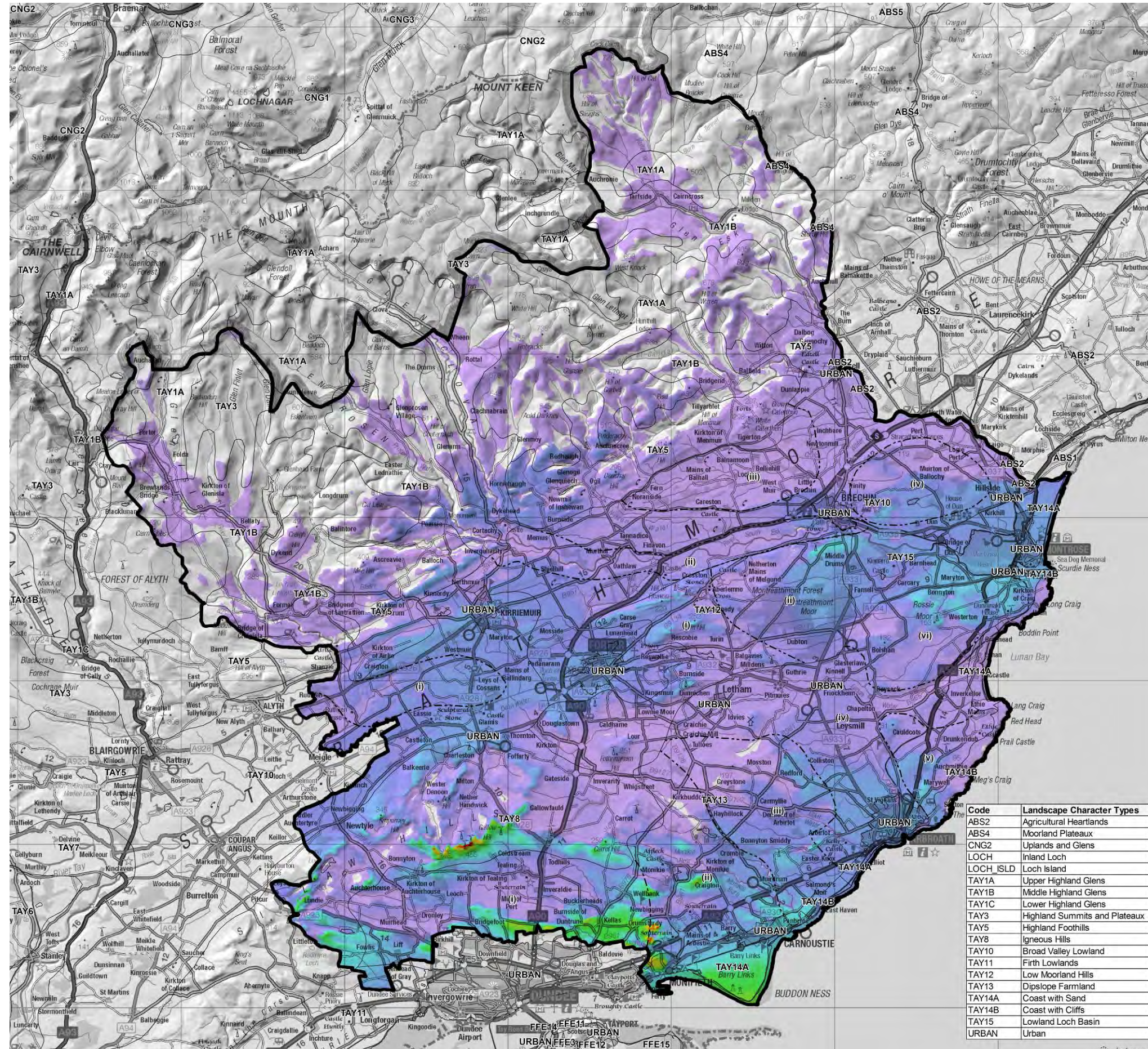


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.2a
Visibility from Settlements
(0m high object)



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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

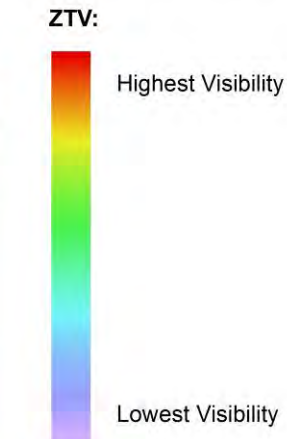
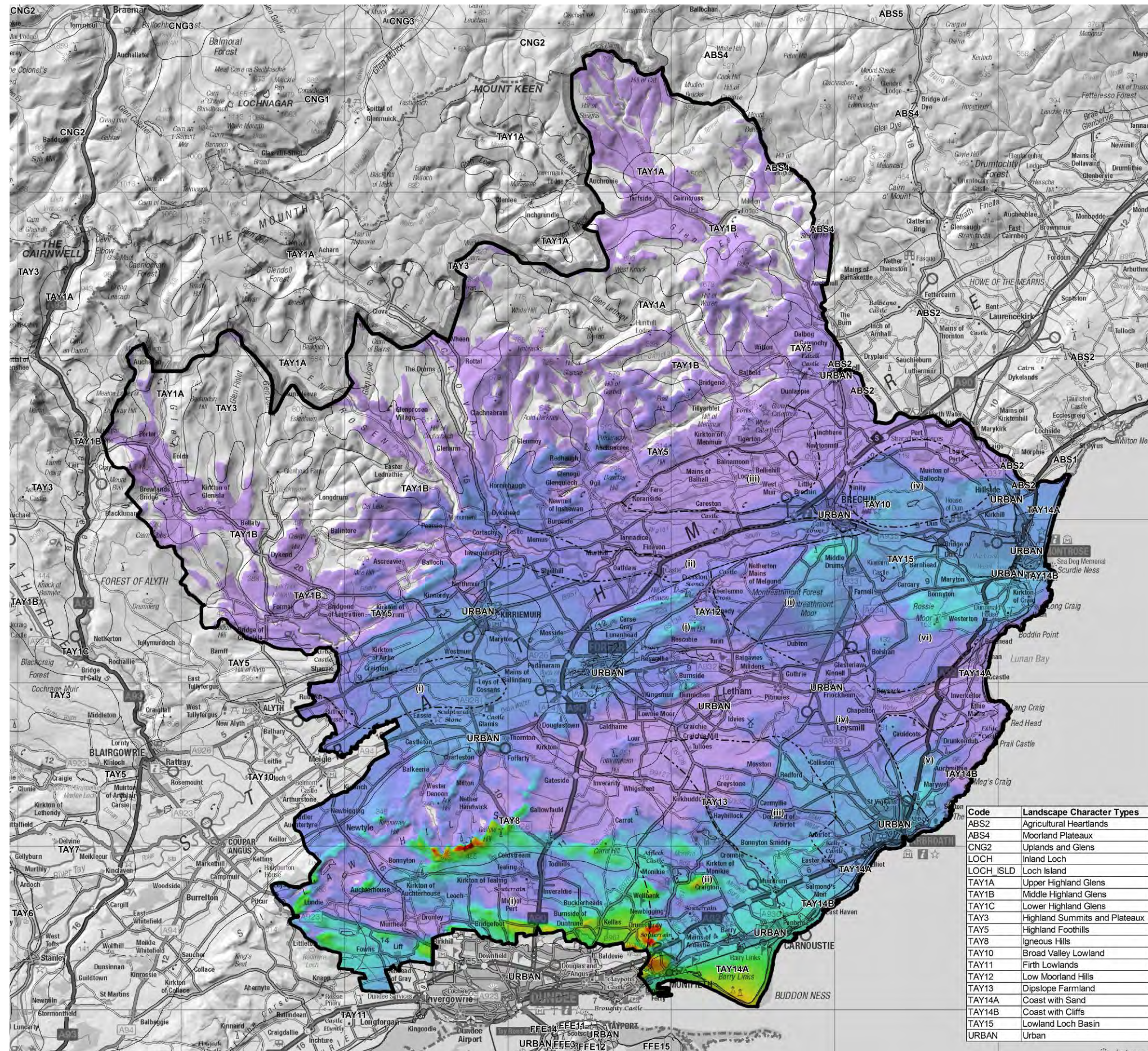


Figure 4.2b
 Visibility from Settlements
 (15m high object)

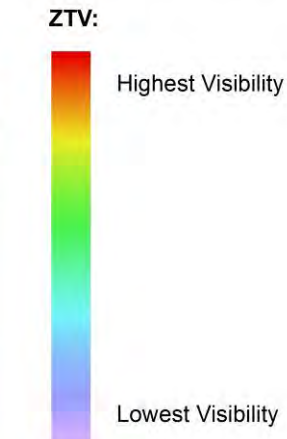


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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

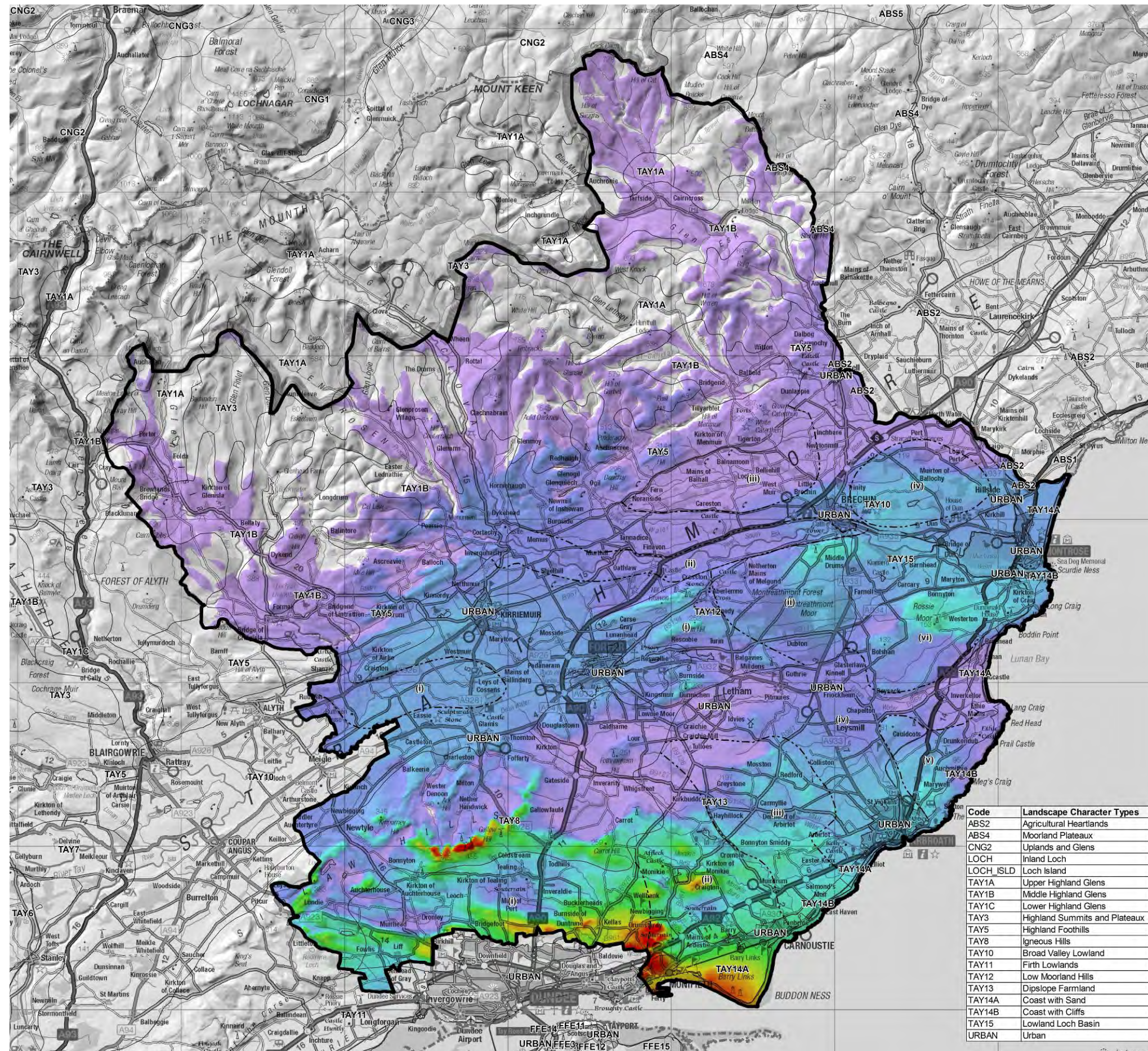


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.2c
 Visibility from Settlements
 (30m high object)

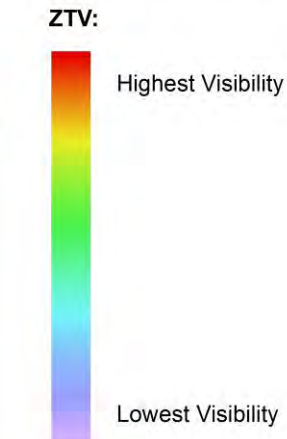


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- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

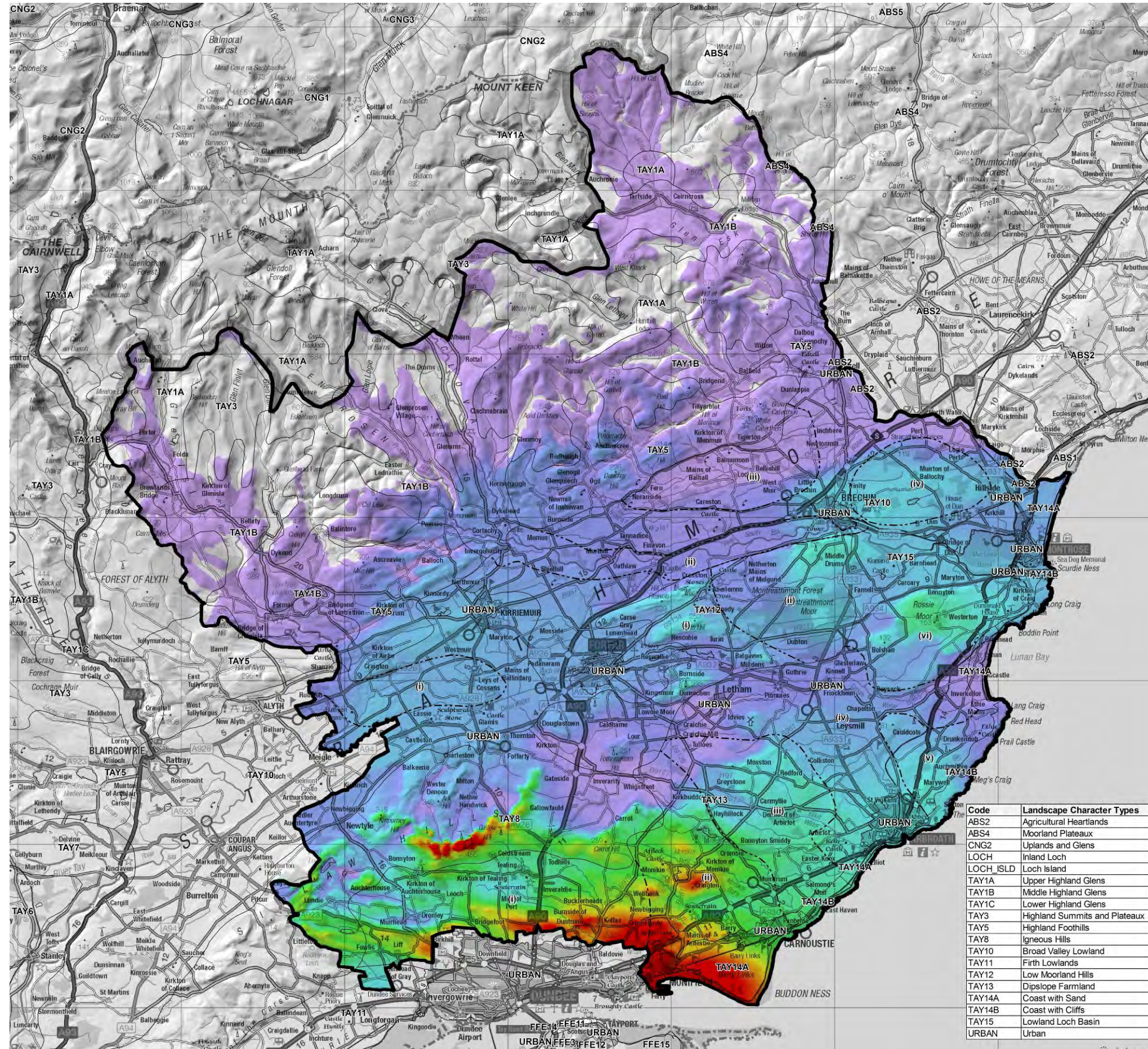


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.2d
 Visibility from Settlements
 (50m high object)



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Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- LCA Sub Areas (Ref. Table 6.1)

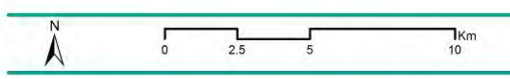
ZTV:

Highest Visibility

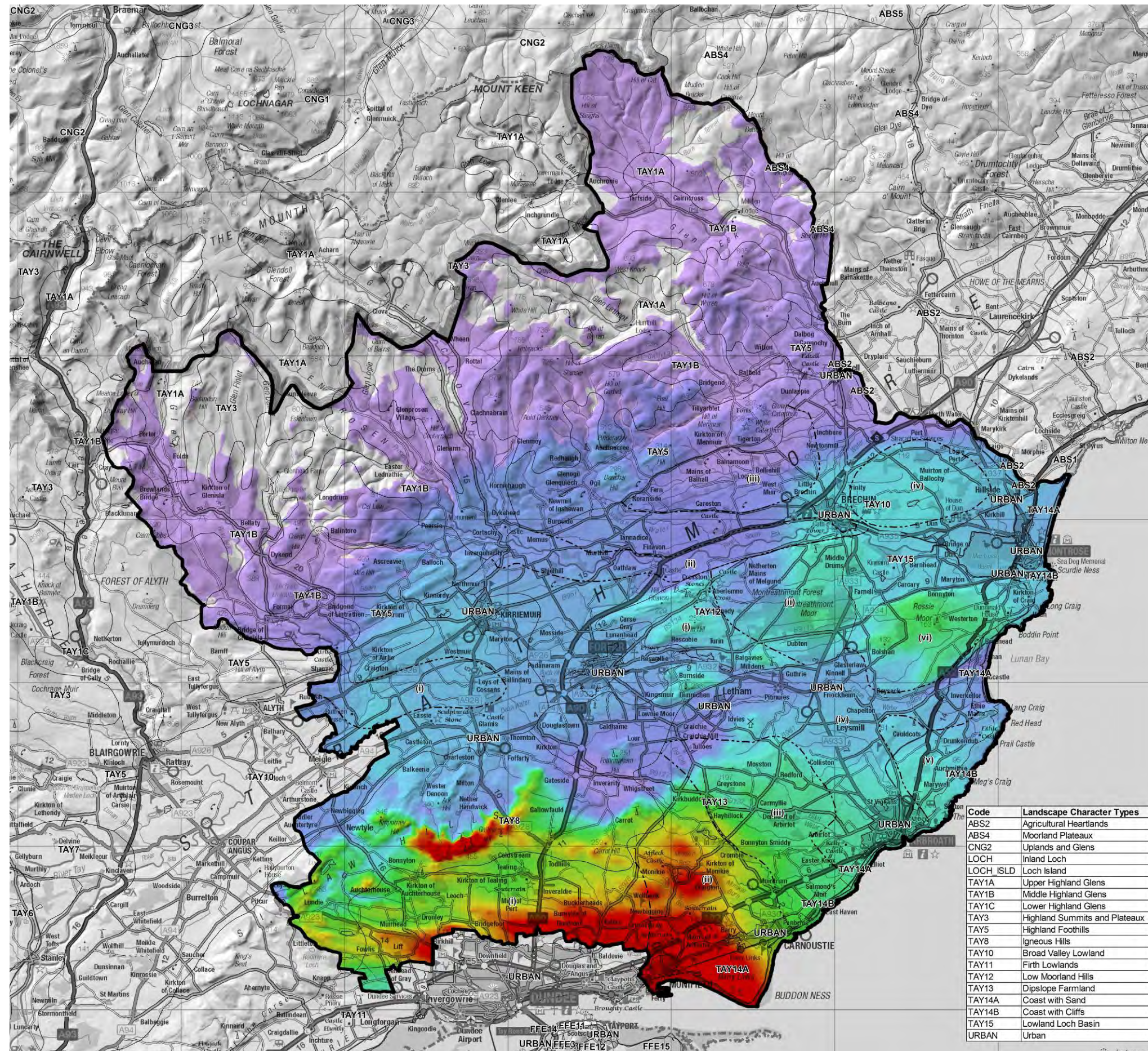
Lowest Visibility

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.2e
 Visibility from Settlements
 (80m high object)

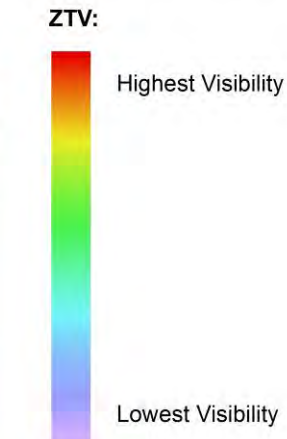


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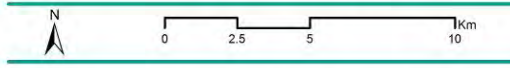
November 2013 7933 ANC 117

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

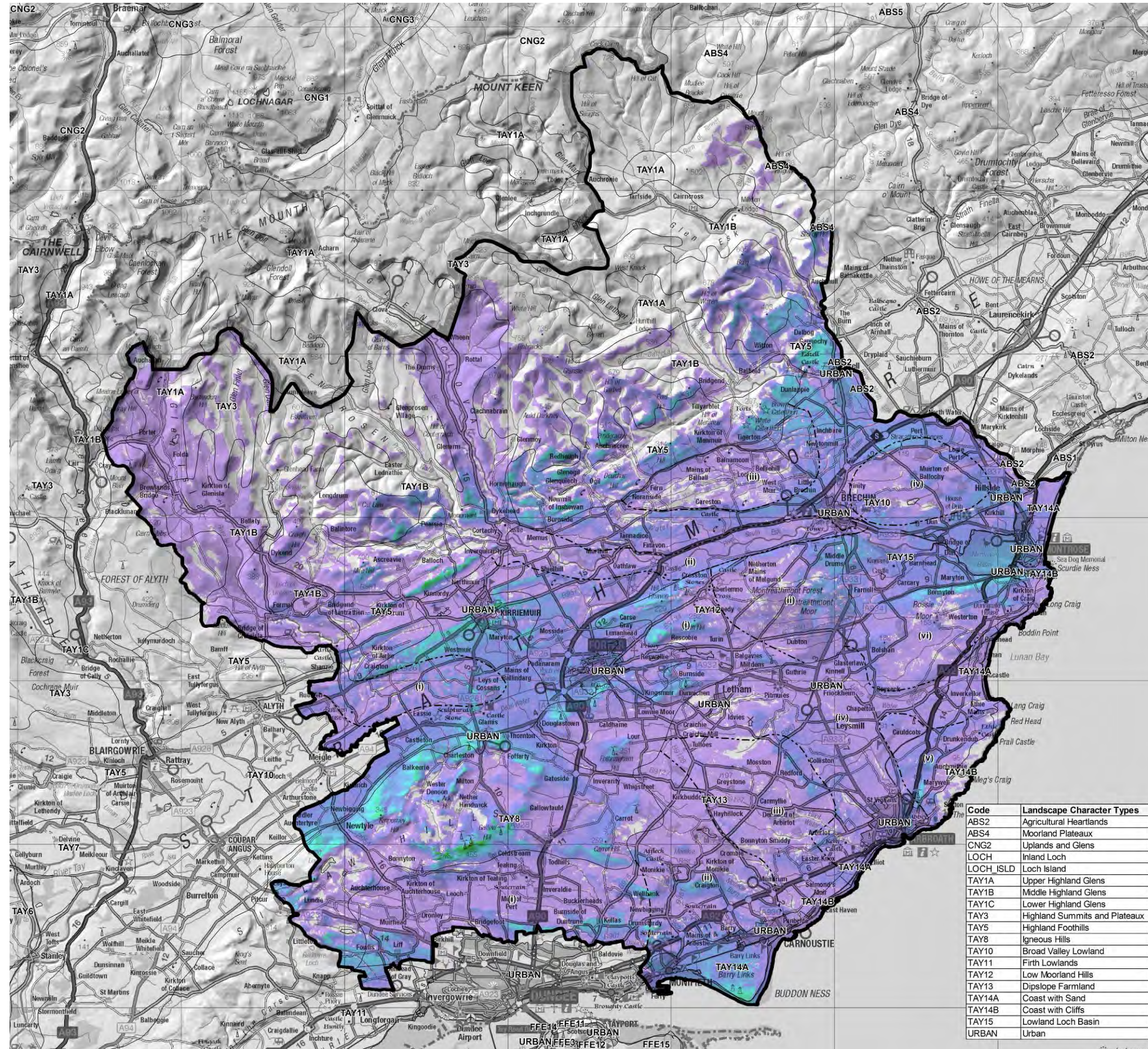


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.2f
Visibility from Settlements
(125m high object)

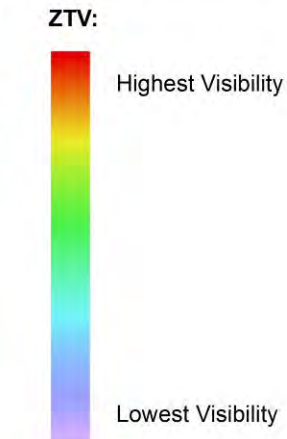


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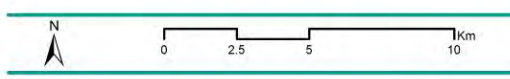
March 2014 7933 ANC 118

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

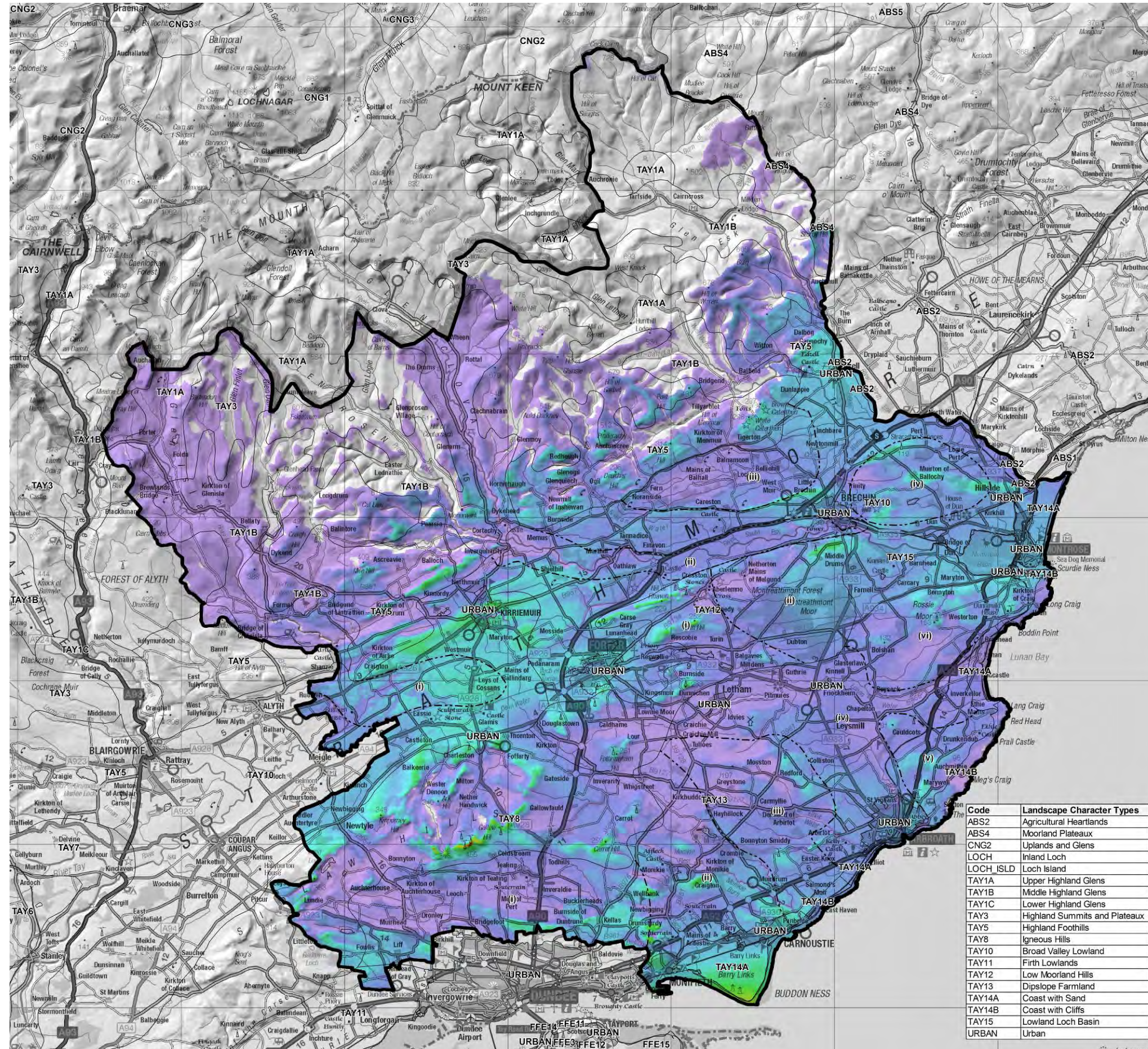


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.3a
Visibility from Transport Routes
(0m high object)



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March 2014 7933 ANC 119

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- LCA Sub Areas (Ref. Table 6.1)

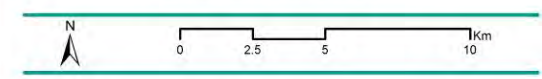
ZTV:

Highest Visibility

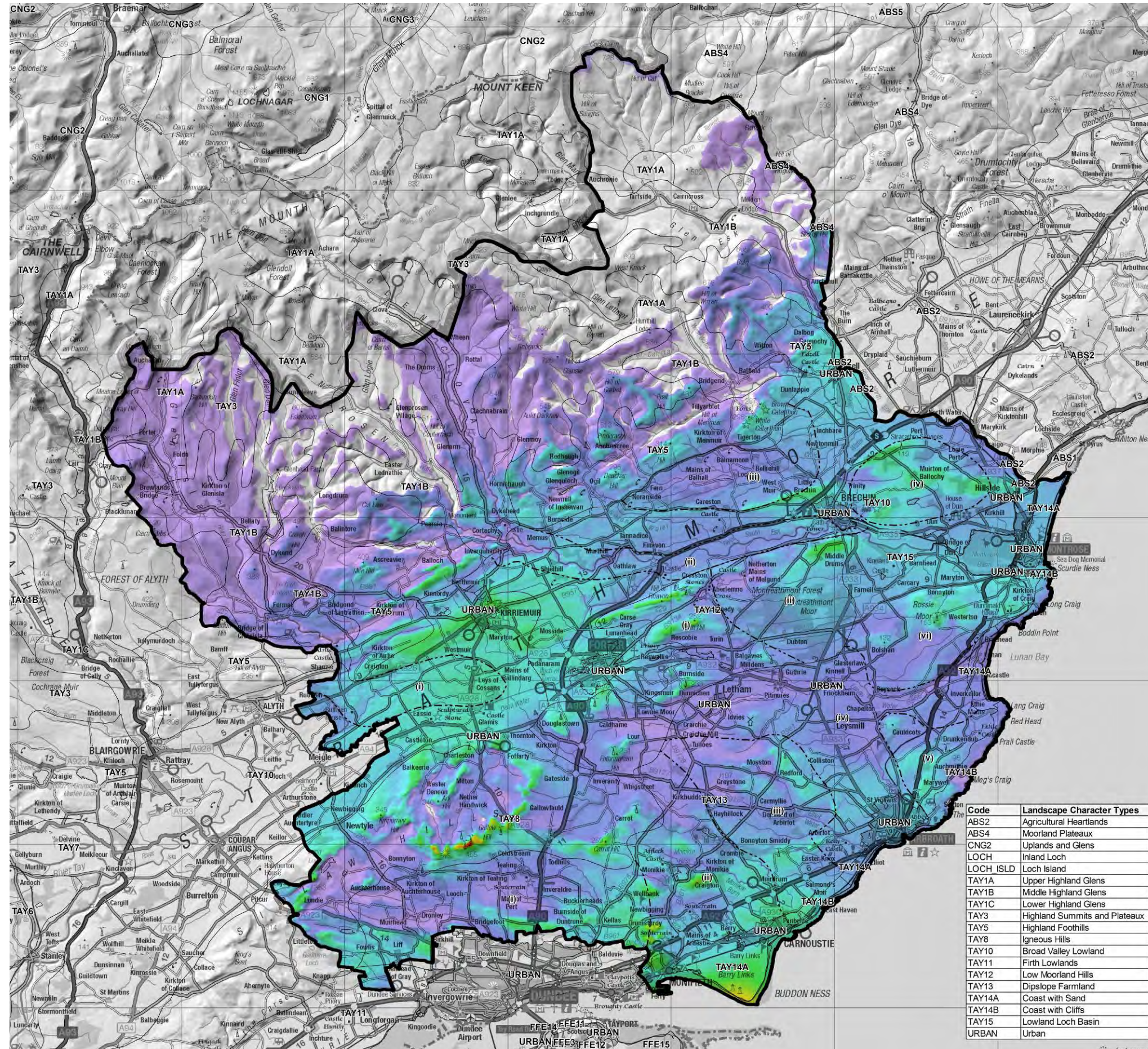
Lowest Visibility

Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.3b
 Visibility from Transport Routes
 (15m high object)

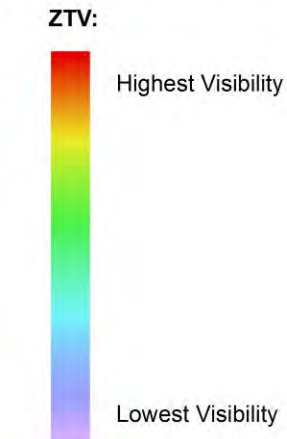


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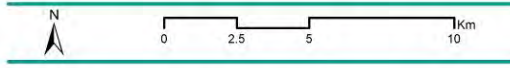
March 2014 7933 ANC 120

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

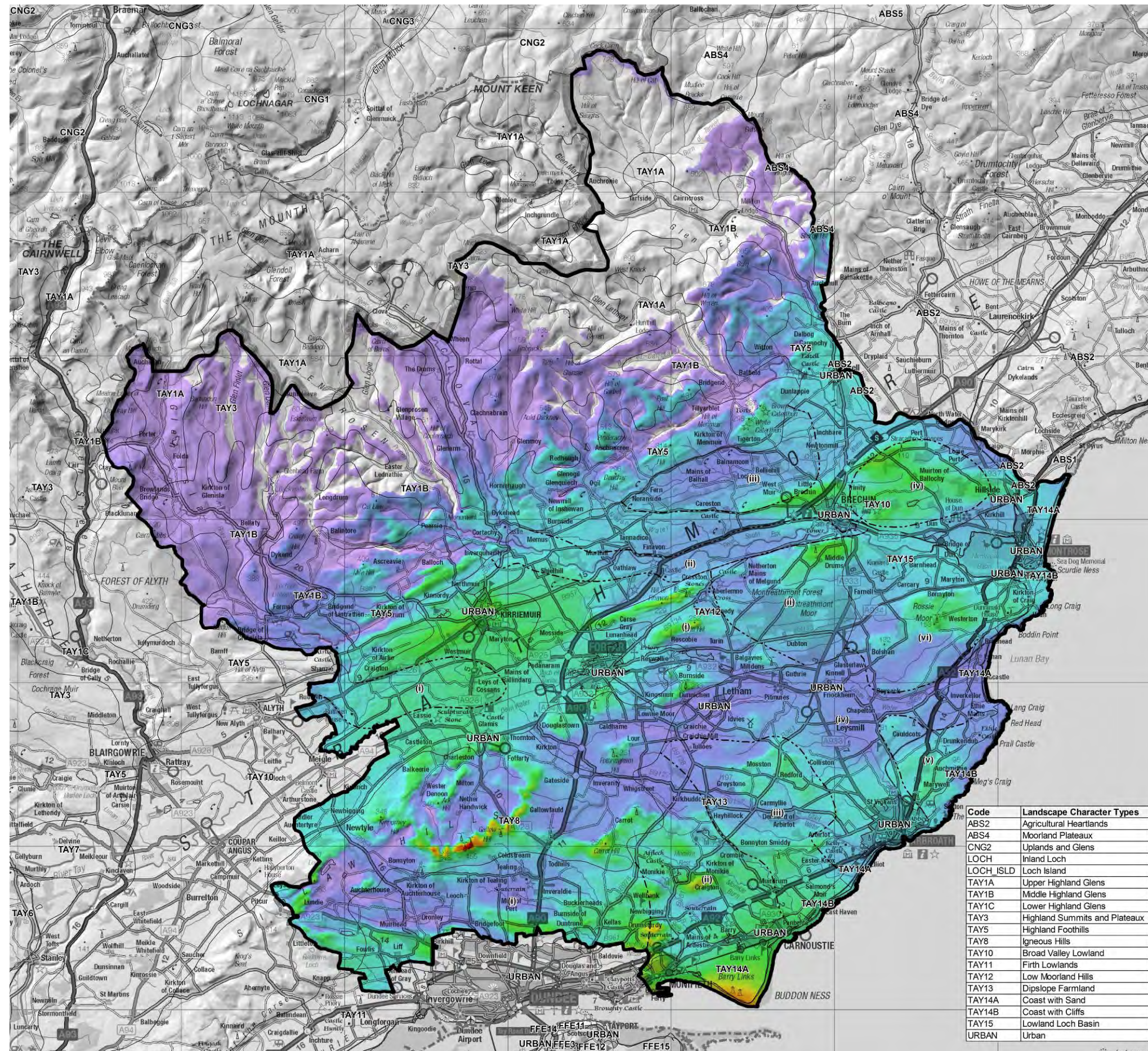


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.3c
Visibility from Transport Routes
(30m high object)

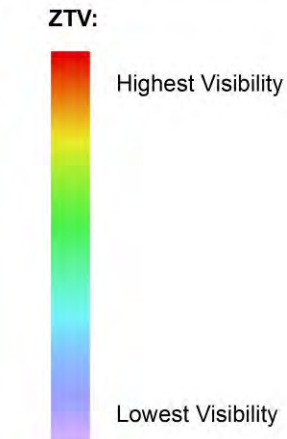


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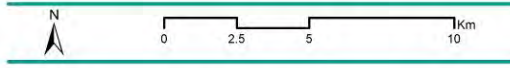
March 2014 7933 ANC 121

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

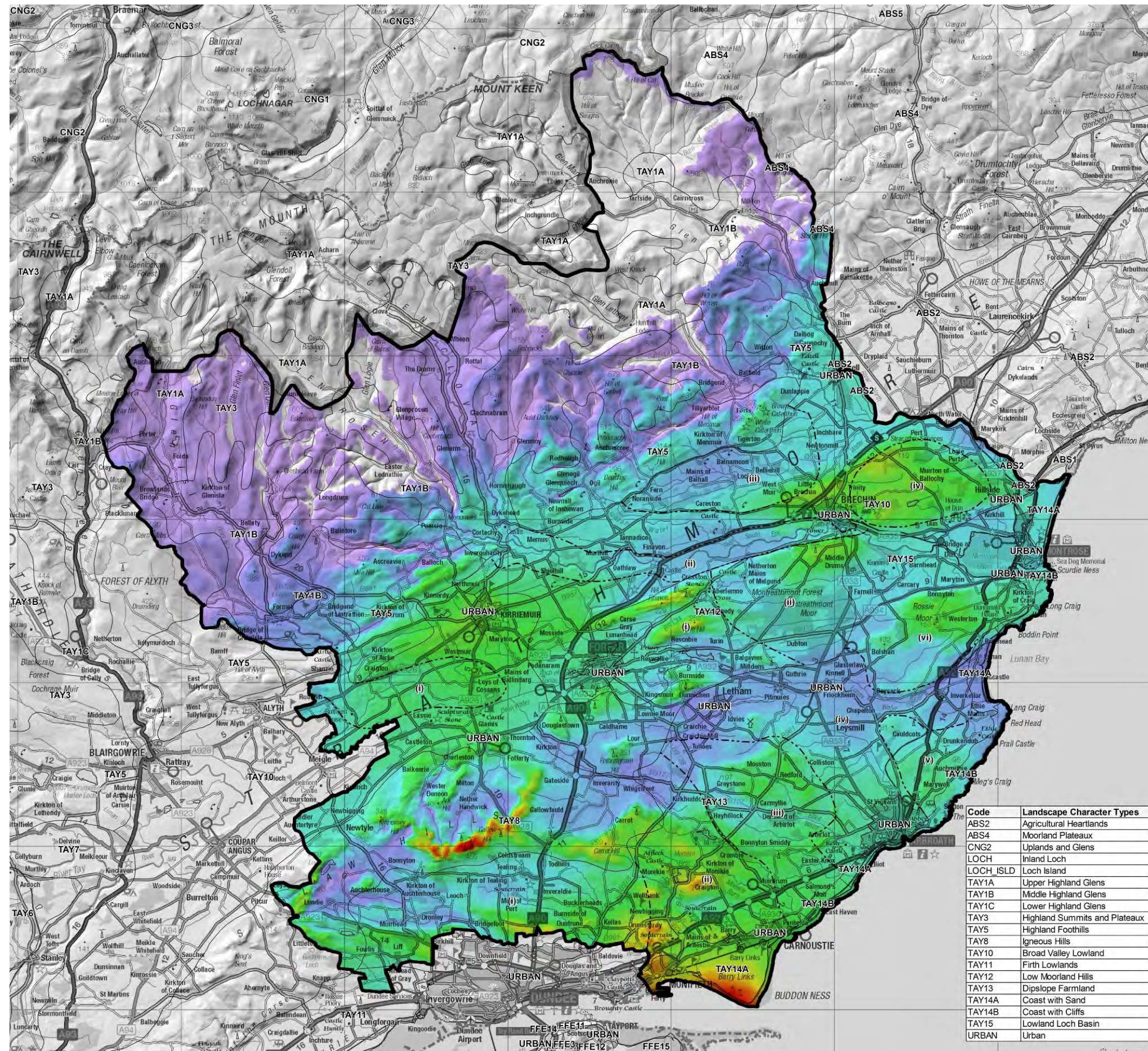


Code	Landscape Character Types
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ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.3d
 Visibility from Transport Routes
 (50m high object)

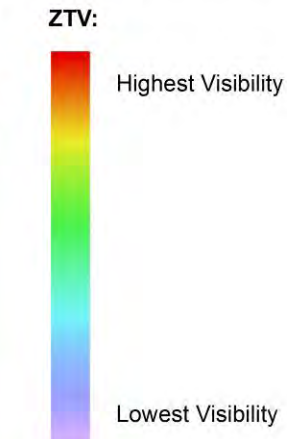


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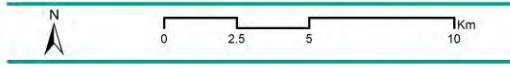
March 2014 7933 ANC 122

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

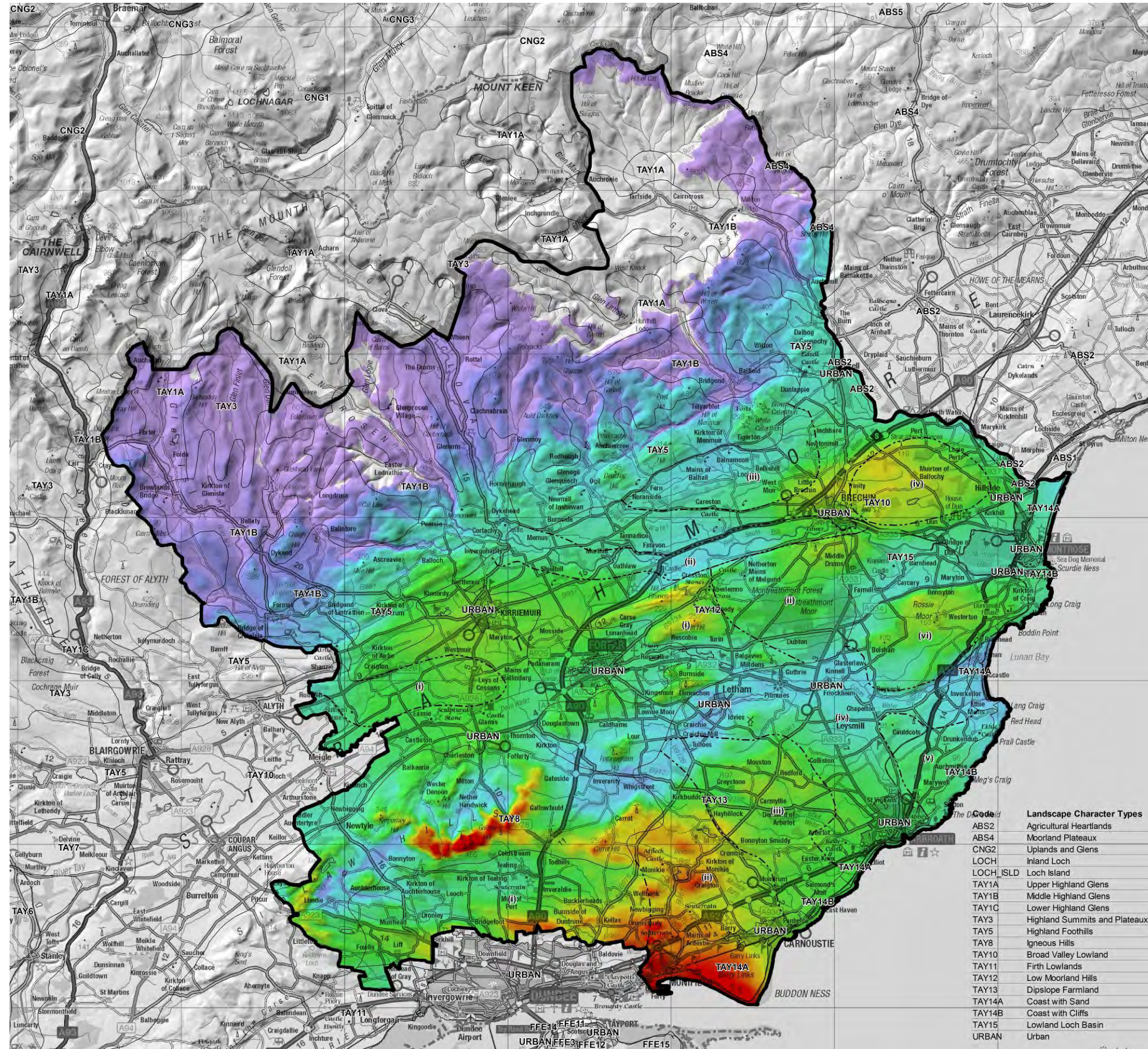


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.3e
 Visibility from Transport Routes
 (80m high object)

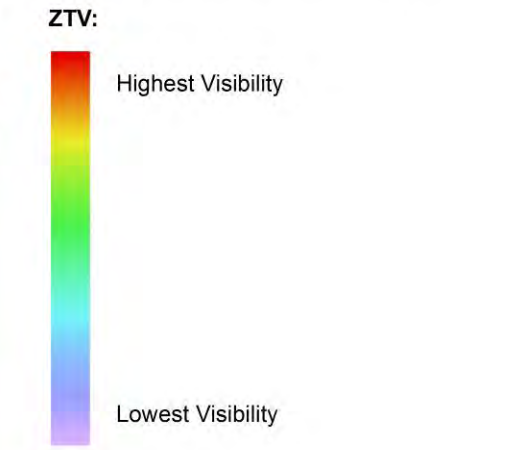


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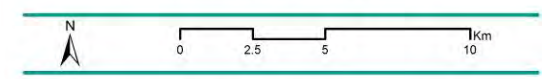
- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)



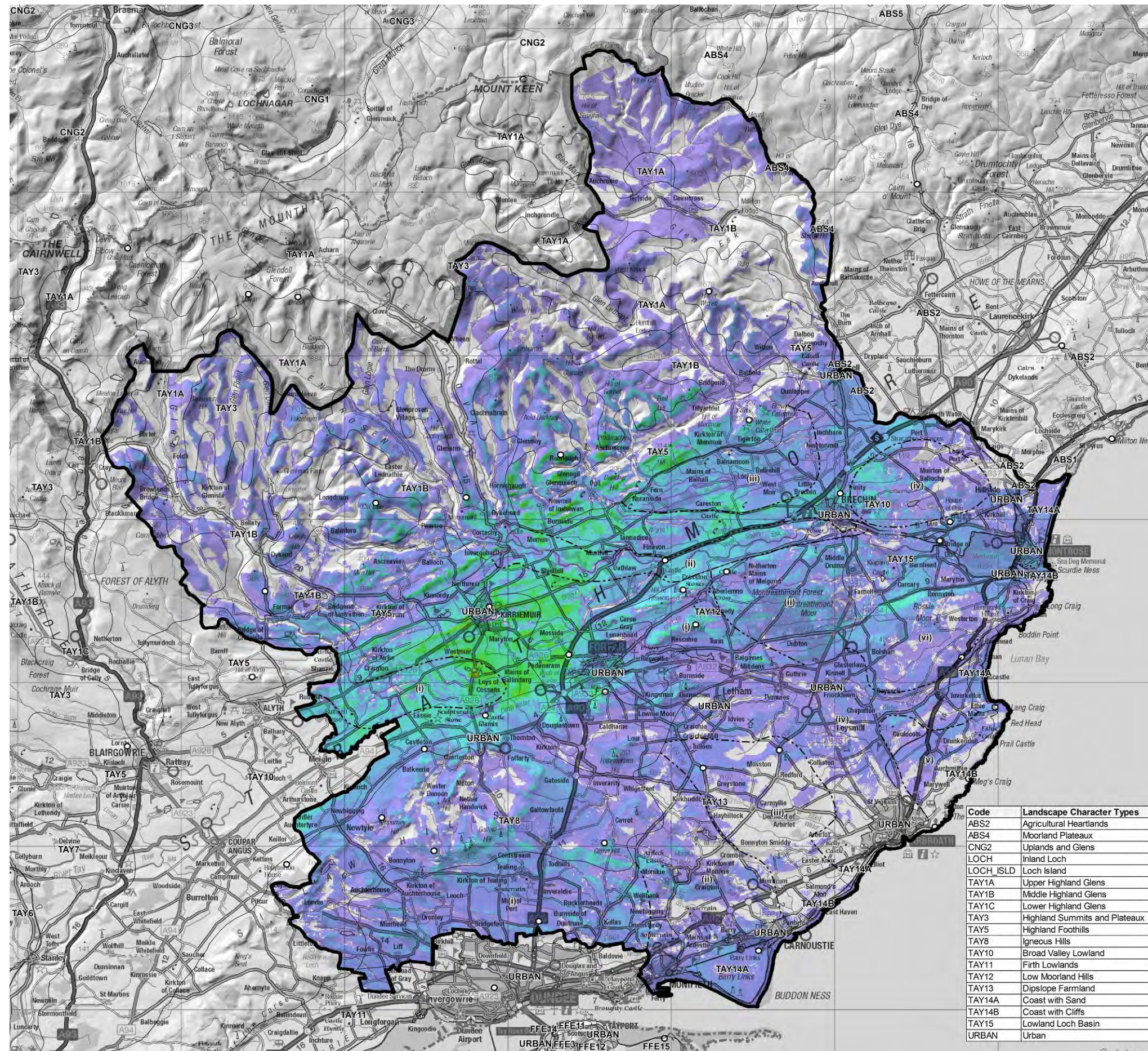
Landscape Character Types

ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH_ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.3f
Visibility from Transport Routes
(125m high object)

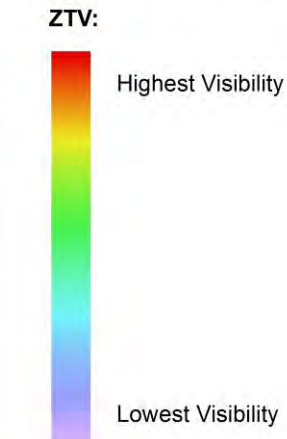


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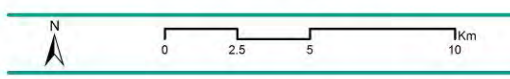
March 2014 7933 ANC 124

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

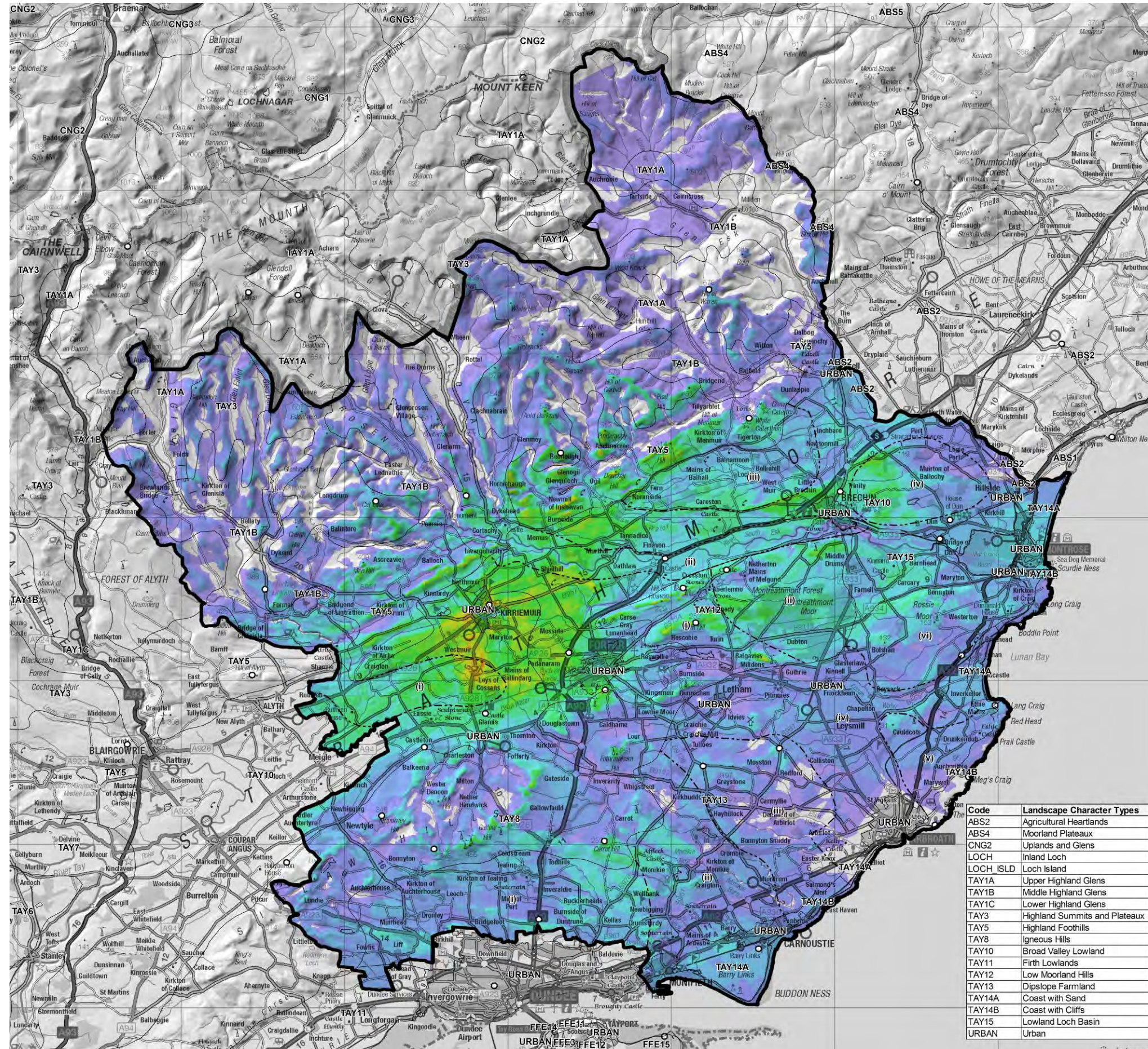


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.4a
Visibility from Viewpoints
(0m high object)

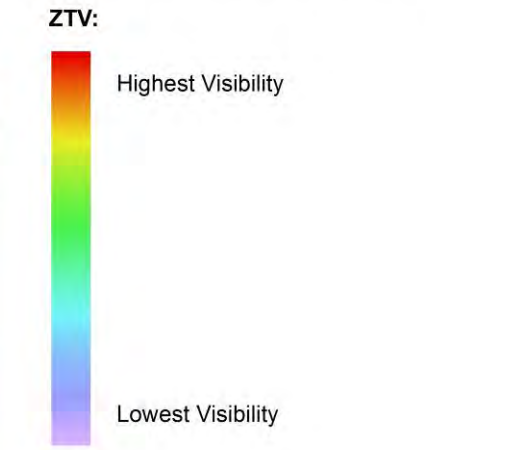


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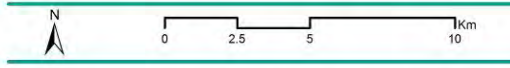
March 2014 7933 ANC 125

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

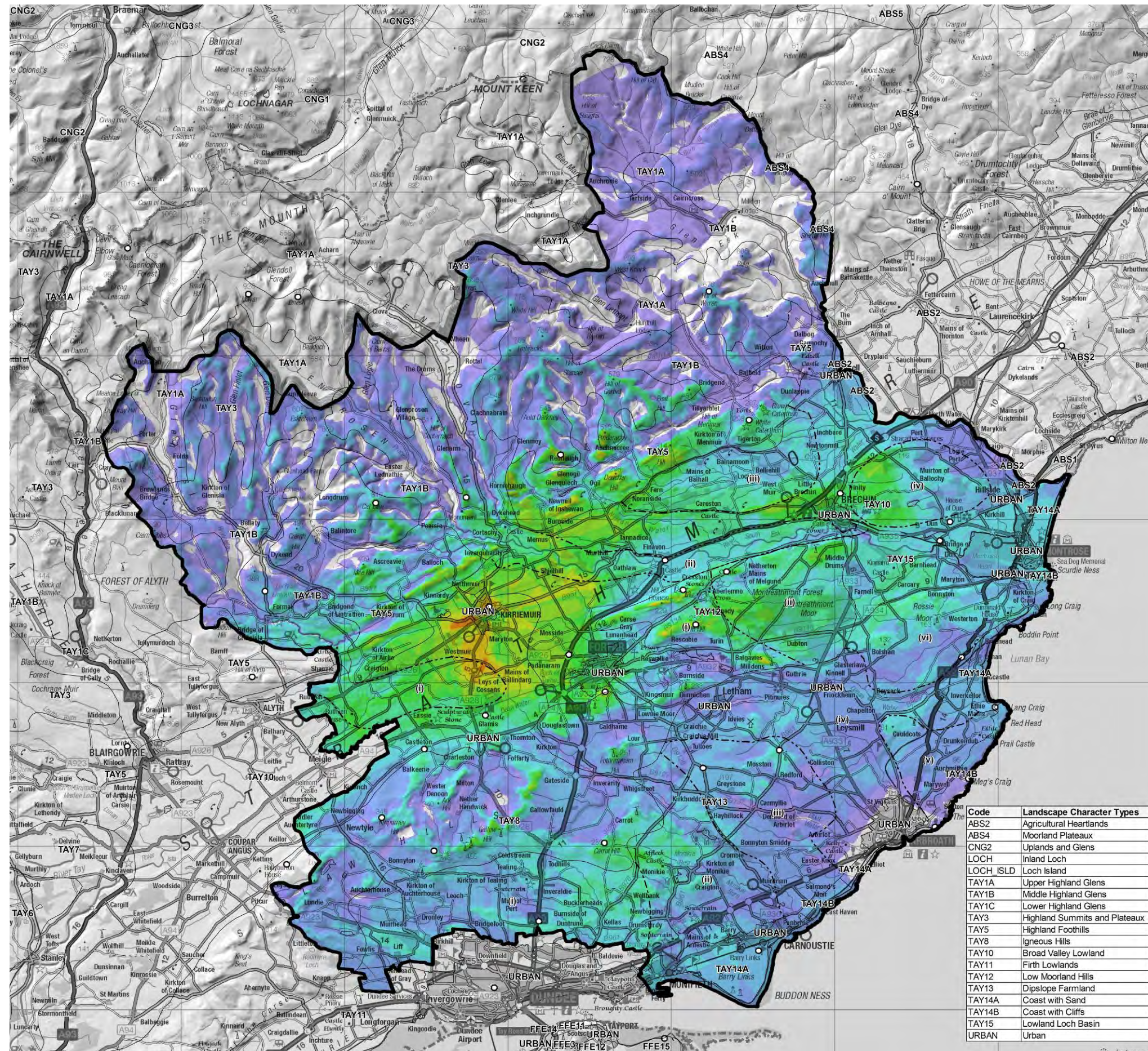


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.4b
Visibility from Viewpoints
(15m high object)

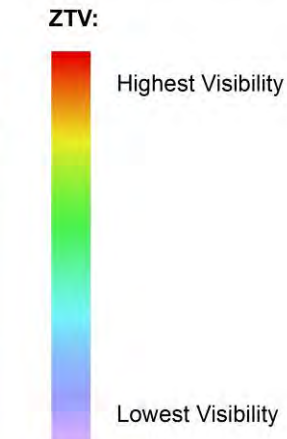


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March 2014 7933 ANC 126

- Legend**
- Study Area
 - Scottish Local Authority Boundaries
 - Landscape Character Areas
 - LCA Sub Areas (Ref. Table 6.1)

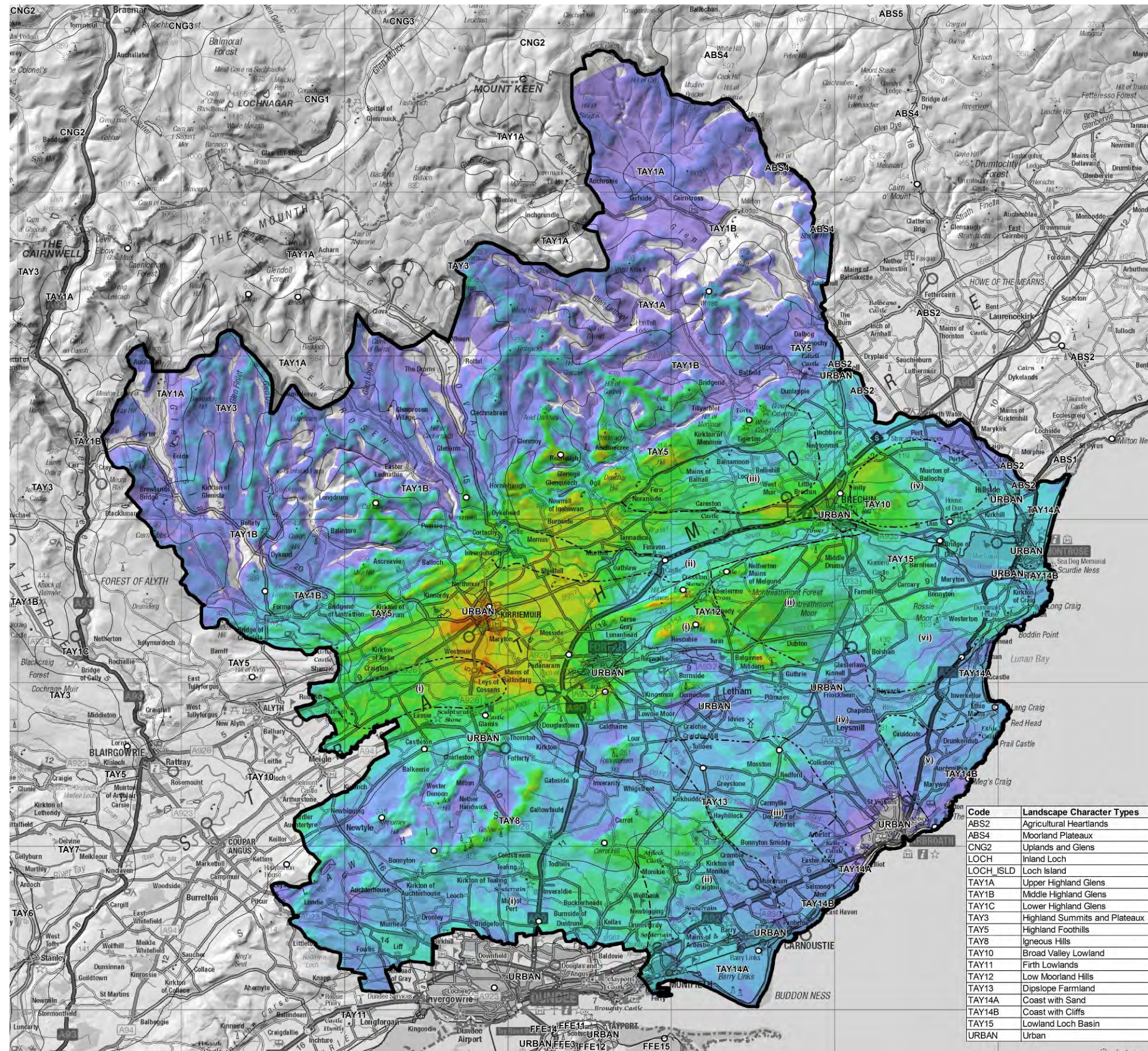


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.4c
Visibility from Viewpoints
(30m high object)



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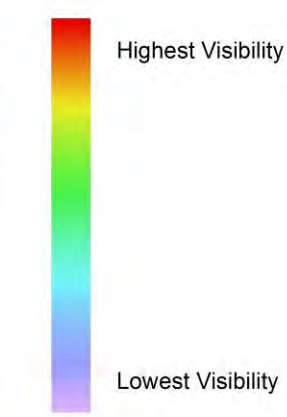


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Legend

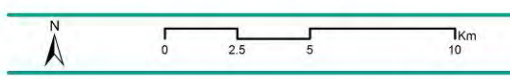
- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- LCA Sub Areas (Ref. Table 6.1)

ZTV:

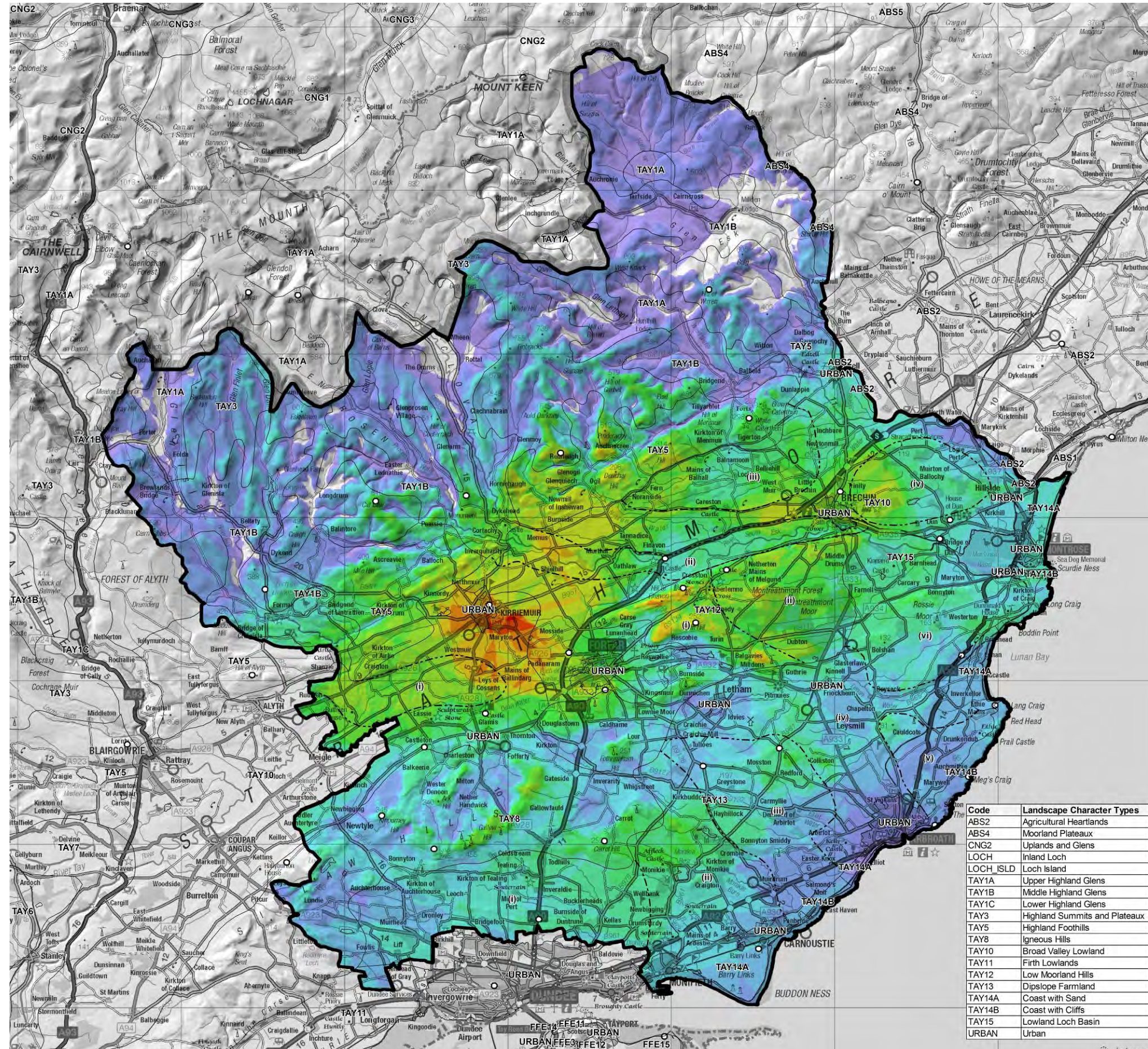


Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.4d
Visibility from Viewpoints
(50m high object)



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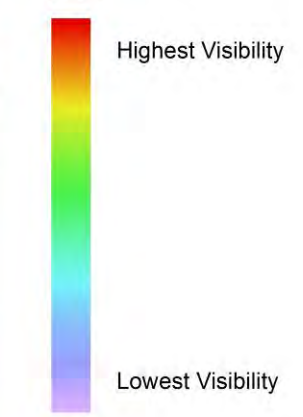
**Angus Council
Wind Energy Consultancy**

March 2014 7933 ANC 128

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- LCA Sub Areas (Ref. Table 6.1)

ZTV:



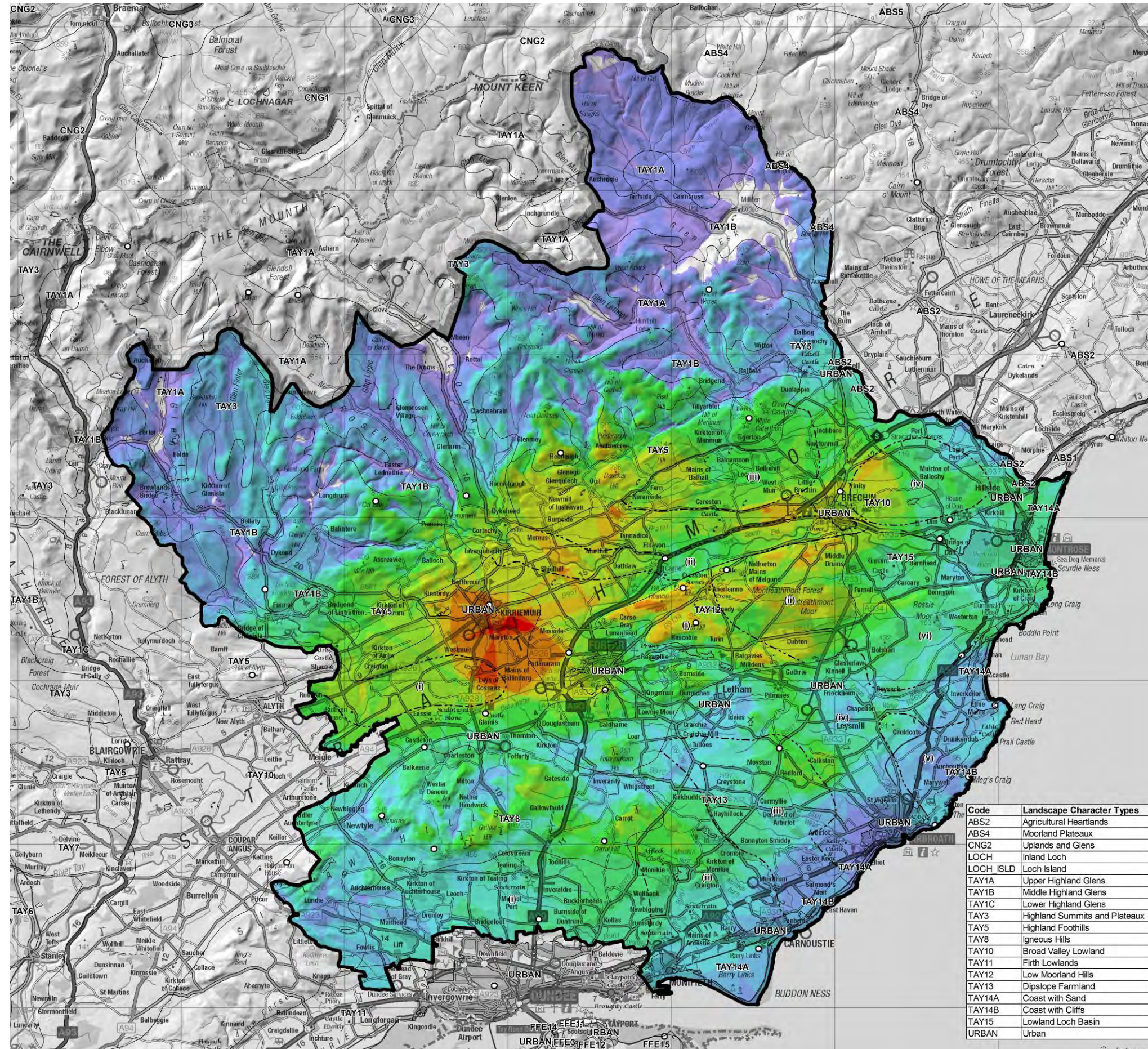
Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.4e

Visibility from Viewpoints
(80m high object)



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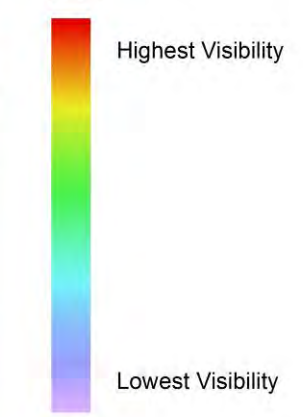


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Legend

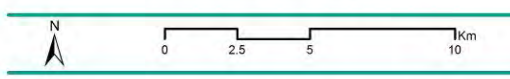
- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- LCA Sub Areas (Ref. Table 6.1)

ZTV:



Code	Landscape Character Types
ABS2	Agricultural Heartlands
ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
LOCH ISLD	Loch Island
TAY1A	Upper Highland Glens
TAY1B	Middle Highland Glens
TAY1C	Lower Highland Glens
TAY3	Highland Summits and Plateaux
TAY5	Highland Foothills
TAY8	Igneous Hills
TAY10	Broad Valley Lowland
TAY11	Firth Lowlands
TAY12	Low Moorland Hills
TAY13	Dipslope Farmland
TAY14A	Coast with Sand
TAY14B	Coast with Cliffs
TAY15	Lowland Loch Basin
URBAN	Urban

Figure 4.4f
Visibility from Viewpoints
(125m high object)



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APPENDIX 5: FACTORS AFFECTING THE LANDSCAPE AND VISUAL IMPACTS OF WIND TURBINES

5.1 Introduction

There are a number of overlapping and interacting factors which affect the potential landscape and visual effects of wind turbines. The four main turbine factors are:

- Size of turbine
- Turbine design (shape/ blades/ tower /colour)
- Numbers of turbines (within groups and/ or single turbines spread across an area)
- Distribution of turbine groupings (spacing between groups and/or single turbines)

The effects of these factors will in turn differ depending on the character of the landscape in which the turbines are located.

5.1.1 Turbine Size

Turbine size is the first factor to consider in assessing the impacts of wind turbines. In particular, smaller turbines are considered to be more appropriate in lowland landscapes, which are usually more complex and varied than uplands, and where there are generally smaller scale features such as trees and buildings that provide a ‘scale reference’ against a turbine. Conversely, upland landscapes are generally simpler in character, larger in scale and there are fewer human scale reference features, meaning that larger turbines are more easily accommodated (see SNH guidance, 2009).

Turbine size for installed or consented commercial windfarms in Scotland varies from ca. 55m to blade tip at the original Hagshaw Hill to a current maximum of 147m. However, considerably smaller turbines are now commonly installed for the non-commercial scale proposals typical of Feed in Tariff (FiT) schemes. Current consents within Angus vary from many turbines of under 15m height on various domestic FiT schemes to 93.5m at the Former Tealing Airfield, with further turbines up to 125m height in the wider 30km buffer zone.

In this study we have classified six blade tip height categories from ‘small’ to ‘very large’ which would have differing relationships with the scale and character of the landscape and with one another. These are listed in Table 5.1 below.

There is a significant range of available commercial turbines sizes. However even the smaller commercial turbines are very much larger than any other common vertical object in the landscape, such as a house or trees, with only electricity pylons (typically 25-50m tall) coming close in size. Even the medium size of turbine falls within this height bracket and is therefore significantly taller than most trees and buildings. Furthermore, by being kinetic structures, the visual prominence of turbines is increased relative to existing static features. In this respect smaller turbines may be more noticeable as their blades rotate more rapidly than those of large turbines.

The small domestic scale turbines (<15m) are however closer to the heights of common visual references such as houses and trees and their landscape and visual impacts tend to be much more localised due to localised screening and backclothing by landforms and trees.

Table 5.1. Turbine Size Categories in This Study

Size Category	Blade Tip Height	Typical Use
Small	Turbines less than 15m in height	Typically used for domestic FiT schemes
Small-Medium	Turbines 15m to <30m in height	Typically used for domestic and farm FiT schemes
Medium	Turbines 30m to <50m in height	Typically used for farm and industrial FiT schemes
Medium/Large	Turbines 50m to <80m in height	Single turbine FiT schemes and smaller turbines used in commercial schemes
Large	Turbines 80m to <125m in height	Typical turbines used in commercial windfarms but also on some single turbine schemes
Very Large	Turbines 125m in height and greater.	Used in commercial onshore windfarms, as well as offshore (up to ca. 200m in the latter)

SNH considers that smaller turbines can be used to mitigate landscape impacts in a lowland situation with a smaller scale landscape pattern and scale indicators. As it has to be balanced against losses in output, size reduction should be used in specific cases where a clearly identified benefit can be achieved. The following are criteria by which this may be judged:

- mitigating significant landscape or visual impacts on a highly valued or sensitive receptor;
- avoiding an adverse scale relationship with a landform or other key landscape element or feature;
- allowing an intervening landform and/or forest to screen views of turbines from certain receptors; or
- achieving a significant reduction in overall visibility by virtue of relationship to surrounding landform and trees.

Where reduction in impact would be a matter of degree rather than a clear quantitative change the benefits are less clear cut.

SNH guidance also recommends that where two or more developments are in close proximity to one another, turbines of a similar size should be used. The use of significantly different turbine sizes within a single windfarm or between two windfarms or turbine developments in close proximity can otherwise lead to adverse visual and scale effects which increase the appearance of clutter, or create odd perspectives when seen from certain viewpoints.

5.1.2 Turbine Design

Variations in size aside, the design of wind turbines can vary considerably. This is particularly the case with smaller turbines under ca. 50m in height. The main variations affecting appearance of wind turbines are:

- two or three bladed
- solid or lattice tower
- shape/ size of nacelle
- proportion of blade length to tower height
- hub faces into or away from the wind direction
- colour

Other factors such as tower and blade shape tend to be more subtle but in combination can lead to a significant difference in appearance, as the difference between the two turbines below demonstrates:



Enercon and Siemens turbines have different nacelles, blades and towers leading to significant differences in appearance

Colour is an issue that is a more important variable in smaller turbines. Colour choice for larger commercial turbines has settled on a neutral light grey with slight variations in lighter or darker shade between developments. It is generally agreed that this colour range is

most likely to reduce the prominence of turbines when seen under the most prevalent atmospheric conditions.

In the case of smaller turbines there is more variation in colour and more likelihood of being seen against land rather than sky. In particular many small turbines are white, which increases their prominence when seen from a distance, particularly seen against land.



A 47m high turbine seen from several kilometres distance reflects the evening light, contrasting with the dark backdrop of trees and grassland

Choices of turbine design, including colour, are of potential significance when considering the effects of individual turbines or wider cumulative effects on the landscape.

5.1.3 Windfarm Size

There is no current ‘accepted’ classification of commercial windfarm sizes in Scotland. Existing and proposed wind energy developments vary in turbine numbers and turbine sizes; from single small turbines to over 200 large turbines. Individual turbines vary in size from below 15m to more than 140m, with maximum outputs from a few kW to greater than 3MW.

To place Angus within context, it is worth considering the wider Scottish context of wind energy development. The table below refers to small, medium, large etc. size wind energy developments. For clarity we have adopted wind energy development size categories related wherever possible to published guidance or planning application procedures. The 20MW size above which SPG and SPP currently applies is shown in the Table 5.2 below, although it should be noted that emerging Government policy is recommending the abandonment of this scale threshold.

Table 5.2. Wind Energy Development Size Categories

Size Category	Size Criteria	Planning Criteria/ Illustrative Examples
Small	A development of 3 or fewer turbines.	As defined by SNH guidance on assessment of small scale wind energy development (<i>SNH 2012</i>)
Small/Medium	A windfarm of more than 3 turbines up to 20MW output	Current SPP recommends windfarms above 20MW are to be covered by SPG. <i>E.g. Between 4 turbines over 50m and 10x2MW turbines or 6x3MW turbines</i>
SPP 2010 'Cutoff' 20MW		
Medium	A windfarm between 20MW and 50MW output	Windfarms up to 50MW are dealt with as local planning authority applications. <i>E.g. Between 7x3MW and 16x3MW turbines</i>
Large	Windfarms greater than 50MW output	Windfarms over 50MW are section 36 Applications dealt with by Scottish Ministers. <i>A minimum size of 20x2.5MW or 17x3MW turbines</i>
Very Large	Windfarms greater than 100MW output	<i>A minimum size of 50 turbines over 125m tall</i>

5.1.4 Turbine Numbers and Landscape Impacts

Wind turbines considered out of their landscape context are usually simple, aerodynamic and functional structures that many consider to have a clear aesthetic of 'form following function' in their design. Landscape and visual impact issues relate primarily to their scale and potential incongruity in a landscape rather than to the aesthetics of the turbine design. In this case, the number of turbines in a wind energy development has a bearing on the visual image of the development that extends well beyond the landscape area that it physically covers:

- Small clusters of turbines still express the aesthetics of the individual turbines and the blade movement of each turbine is discernible. The cluster is seen as a discrete item within a landscape, becoming a significant feature but generally not dominating or changing the character of a large area.

- In large groupings of turbines there is area coverage of the landscape, rather than a discrete grouping. The individual turbines usually become lost in a mass, blade movements are perceived across the whole area and there is a more 'cluttered' appearance.
- As turbine numbers increase it is increasingly difficult to design a wind energy development such that overlap and clustered alignments are avoided when seen from surrounding viewpoints. Design mitigation becomes a matter of avoiding excessive clutter, skylining and proximity to sensitive receptors rather than creating aesthetically balanced groupings

It is recognised that these qualities grade into one another depending on the exact size of development (e.g. 3, 6, 12, 20, 50, 100+ turbines) and on how the turbines are grouped (e.g. in mass groupings or in lines along ridges). Nevertheless, to the extent that they are more easily contained and definable, single turbines and smaller windfarms would have a disproportionately lesser influence on the landscape than large windfarms and are less likely to dominate areas and blur boundaries between landscape types.

In small groupings, odd numbers of turbines (i.e. 1, 3 or 5) usually present a more balanced composition than even numbers, unless there is a strong regular pattern or line in the landscape to which the turbines can be related.

5.2 Turbine Layout

The layout of turbines within a windfarm is a critical consideration. Whilst the optimum layout, including turbine separation distances and position in relation to the prevailing wind will relate to maximising output, there will be other practicalities. Thus turbine layout may vary according to turbine numbers, the availability of land, topography, access and numerous environmental constraints. These factors are taken into consideration during the windfarm design development process in which the overall aesthetic of the windfarm is considered.

Layouts should relate to landforms and patterns in the landscape and present a coherent image from the surrounding viewpoints. Thus in lowland landscapes with a strong geometric pattern the turbines may be organised in lines of a grid, whereas in the case of a distinct landform such as a ridge or coastline they may be arranged in a curved line following the landform. In upland landscapes turbines may be arranged in a more organic pattern, following ridgelines or clustered around rounded hilltops. Attention should be paid to the relationship of outer turbines in large groups ensuring that there are no 'outliers' creating an untidy or disorganised appearance.

When two or more developments are in close proximity or a windfarm is being expanded there can be cumulative issues relating to site layout if these are clearly contrasting (e.g. a geometric layout adjacent to an organic layout). Such developments should be designed to achieve a harmonious layout and relationship.

5.3 Windfarm Distribution

5.3.1 Pattern of Windfarm Development

When considering cumulative impacts of turbines and windfarms it is not just the number of turbines in the landscape that affects impacts but also the development pattern. This has an effect on the ability of the landscape to absorb change and on visual receptors. The dispersal of the turbines in small groups has some advantages in that each grouping is less dominant within the landscape and presents a less cluttered visual image. There is also less likelihood of 'swamping' landscapes and blurring the boundaries between different landscape types and features if there are distinct gaps between clusters of wind turbines. However, the increased number of windfarms or turbine clusters also means that there is an increased likelihood of seeing a windfarm or turbine and at closer proximity than if the turbines were concentrated into fewer locations.

The trend in Scotland is for the concentration of wind turbines into fewer, larger, windfarms. This arises initially via large windfarm proposals and then through the later extension of many existing windfarms. The pattern may also play out on a wider regional scale or 'clusters and spaces' where groups of windfarms lie within large areas separated by significant areas without turbines.

The cluster and space pattern has become increasingly diluted by the recent proliferation of smaller FiT schemes and single turbines which relate more to the location of small scale consumers than to regional landscapes. In locations such as northeast Aberdeenshire spatial planning may be required to ensure an uncontrolled proliferation of turbines does not completely dominate the landscape.

5.3.2 Separation Distances between Turbines and Windfarms

Separation distance between turbines and windfarms has a bearing on how they are perceived together and within the landscape, particularly in relation to defining the limits of cumulative development. A clear visual separation between two or more windfarms can be achieved by a certain physical distance. This distance would depend on the size and number of the turbines or windfarms, the type of landscape(s) in which they are located and the degree to which they affect the character of the landscape.

Considering this in simple terms, turbines have both a direct effect on the landscape in which they lie and an indirect effect on the surrounding area. Therefore, although two turbines or windfarms may be separated by some distance and seen as clearly separate, the landscape in which they lie may be considered to be dominated by turbines. Only beyond a certain distance would the intervening landscape be considered to retain its original character, separating the two turbine dominated landscape areas.

Table 2.1 develops this concept further by considering the effects of multiple wind energy developments and describes cumulative development thresholds. Further to a capacity assessment, an acceptable limit to development within a landscape area may be agreed (e.g. *Landscape with Occasional Wind Turbines* or *Wind Turbine Landscape*). The accepted level of development would then be achieved by consenting a combination of

turbine sizes, windfarm sizes and separation distances between groupings, relating to the scale and character of the landscape (i.e. its capacity for that degree of development).

As an example a large scale upland plateau landscape accommodating a number of windfarms would be considered a *Wind Turbine Landscape* if the windfarms are large or very large, the topography is subordinate in scale to the turbines and the windfarms are separated by distances less than their typical extents. If the topography has a relief that is clearly greater than the turbine heights, and/or the windfarms are smaller and the separation between the windfarms is clearly greater than their extents, the landscape may be considered a *Landscape with Wind Turbines*. Finally a lowland landscape which is small in scale, with many small scale reference features, may easily be dominated by wind turbines. In this case the objective may be to limit development to a *Landscape with Occasional Windfarms* by allowing only small clusters of smaller turbines separated by substantial distances and with cumulative visibility reduced by localised tree or landform screening.

In each case different scales and patterns of landscape and development would require different turbine sizes, groupings and separation distances to lead to a particular windfarm landscape type. Such an approach has been adopted in this study and sizes and separation distances are recommended and explained in Chapter 6.

5.3.3 Distribution in Relation to Landscape Type

As discussed above, some landscape types have less capacity for development than others. In this case it would be appropriate to consider the relative merits of guiding development to the areas most capable of accommodating development, or to directing different types and scales of development to the areas most suited to each. Subject to the specific impacts of any particular proposal, this would reduce the potential for the most significant and adverse landscape impacts. It would also restrict the more developed wind turbine landscape types to a more clearly defined range of landscapes, thereby reducing the perception of unplanned proliferation of wind farms throughout a local authority area.

In strategic terms the established and evolving pattern of development should be taken into consideration as it reflects a clear rationale driven partly by landscape, visual and amenity issues (sensitive or valuable landscapes, proximity to settlements and recreational areas) and partly by technical issues (available land, available grid capacity, wind speed). This suggests that the number, size and distribution of further development should be considered very carefully in order to maintain differences in character between the uplands, the coast and the lowlands.

Also, in accordance with the guidance *Designing Windfarms in the Landscape* (SNH, 2009), consideration should be given to preserving areas in which no development is yet located or consented. These can provide significant gaps between clusters of wind turbines in which their visual influence is minimal. This again will reinforce distinctiveness between landscapes.

APPENDIX 6: WIND TURBINES IN ANGUS

Wind Turbine Database as at May 2013 (Permitted & Proposed) Showing Turbine Height Bands (grey = very large; pink = large; orange = medium/large; yellow = medium; green = medium/small) (see Figs. 5.1 and 5.2 for locations)

Turbine/Windfarm Name	No. of Turbines	Turbine Ht. (m)	Height Category	Landscape Type/ Other Comments
Angus – Consented Wind Turbines				
Near Na Gaoithe Offshore Windfarm	125	197.0	125m+	Offshore
East Memus, by Forfar	1	86.6	80 to <125m	Highland Foothills
Land at Scotston Hill, Auchterhouse	1	80.0	80 to <125m	Igneous Hills
Former Tealing Airfield	1	93.5	80 to <125m	Dipslope Farmland
Ark Hill, Glamis by Forfar	8	81.0	80 to <125m	Igneous Hills
510m NE of West Mains Farmhouse, Auchterhouse	1	61.0	50 to <80m	Dipslope Farmland
350M SW Of Whitefield of Dun Farm, Montrose	1	67.0	50 to <80m	Broad Valley Lowland
350m SW of Whitefield of Dun Farm, Montrose	1	67.0	50 to <80m	Broad Valley Lowland
1200M W Of Dunswood, Menmuir, Brechin	1	77.0	50 to <80m	Broad Valley Lowland
630m SE of Pickerton, Guthrie	1	77.0	50 to <80m	Low Moorland Hills
Hill of Stracathro, Brechin	1	79.6	50 to <80m	Broad Valley Lowland
North Mains of Cononsyth, Arbroath	1	66.7	50 to <80m	Dipslope Farmland
350m SW of Old Montrose Farm, Montrose	1	39.0	30 to <50m	Lowland Loch Basin
Cottertown, Kilry	1	45.5	30 to <50m	Highland Foothills
400m N of Greenhillock, Kirkbuddo	1	46.0	30 to <50m	Dipslope Farmland
975M W of North Leoch Farm, Strathmartine	1	46.0	30 to <50m	Dipslope Farmland
1020m W of Auchenreoch Farm, Inchbare, Edzell	1	46.0	30 to <50m	Broad Valley Lowland
Balkemback Farm, by Tealing	1	46.5	30 to <50m	Dipslope Farmland
N of East Pitforthie Farm, Brechin	1	47.0	30 to <50m	Broad Valley Lowland
W of Lochlair Farm, Carmyllie	1	47.0	30 to <50m	Dipslope Farmland
350m NE Of Newton of Idvies Farm, Letham	1	47.0	30 to <50m	Dipslope Farmland
Balhall Lodge, Menmuir	1	47.1	30 to <50m	Highland Foothills
West Adamston Farm, Muirhead	1	47.5	30 to <50m	Dipslope Farmland
250M SW Of Genty, Airlie	1	34.5	30 to <50m	Highland Foothills

Turbine/Windfarm Name	No. of Turbines	Turbine Ht. (m)	Height Category	Landscape Type/ Other Comments
470m E of Crainathro Farm, Forfar	1	35.0	30 to <50m	Low Moorland Hills
300M N Of North Tarbrax Farm, Kincaldrum	1	45.7	30 to <50m	Igneous Hills
1100m NE of Arrat Farm, Brechin	2	46.5	30 to <50m	Broad Valley Lowland
760m SW of Balkemback Farm, Tealing	2	46.5	30 to <50m	Dipslope Farmland
Weater Meathie Farm, Inverarity	2	46.5	30 to <50m	Low Moorland Hills
700m E of Balrownie Farm, Menmuir	2	46.5	30 to <50m	Broad Valley Lowland
Glen Trusta Estate, Fern, By Brechin	2	46.9	30 to <50m	Highland Foothills
Affloch Farm, by Brechin	2	46.9	30 to <50m	Highland Foothills
Reedie Farm Kirriemuir	2	46.9	30 to <50m	Broad Valley Lowland
Craignathro Farm, Forfar	2	33.0	30 to <50m	Low Moorland Hills
Bareyards House, Menmuir	1	17.75	15 to <30m	Highland Foothills
Sa'ty Dyke, Rossie Braes, Montrose	1	17.75	15 to <30m	Lowland Loch Basin
Dumbarrow House, Letham	1	17.75	15 to <30m	Dipslope Farmland
Woodfield House, Arbroath	1	17.75	15 to <30m	Igneous Hills
Netherbow, By Forfar	1	17.75	15 to <30m	Broad Valley Lowland
Tillyarblet Cottage, Glen Lethnot	1	17.75	15 to <30m	Highland Foothills
East Mains Of Dysart, Montrose	1	18.5	15 to <30m	Dipslope Farmland
75m SW of Leys of Dun Farm, Montrose	1	19.0	15 to <30m	Broad Valley Lowland
Sprottiesfauld, Eassie	1	19.25	15 to <30m	Broad Valley Lowland
West Balloch, Montrose	1	19.25	15 to <30m	Broad Valley Lowland
Easter Craig Farm, Alyth	1	19.8	15 to <30m	Highland Foothills
Cairnleith Farm, Kirriemuir	1	19.8	15 to <30m	Highland Foothills
Blackden Farm, Aberlemno	1	19.8	15 to <30m	Low Moorland Hills
Middle Lundie Farm, Edzell	1	19.8	15 to <30m	Highland Foothills
Forthill Farm, Glen Lethnot	1	19.8	15 to <30m	Highland Foothills
Templeton Christmas Tree Farm, Strathmartine	1	19.82	15 to <30m	Dipslope Farmland
Grosefield Farm, Little Brechin	1	19.90	15 to <30m	Broad Valley Lowland
Appletree Cottage, Ballinshoe	1	20.0	15 to <30m	Broad Valley Lowland
Murton, Forfar	1	20.5	15 to <30m	Broad Valley Lowland
Heughhead Farm, Friockheim	1	21.0	15 to <30m	Dipslope Farmland
Montrose Railway Station	1	21.0	15 to <30m	Urban
E of Formal Farm, Kilry	1	21.0	15 to <30m	Highland Glens
280m S of Newbigging Farm, Pugeston, Montrose	1	24.5	15 to <30m	Lowland Loch Basin

Turbine/Windfarm Name	No. of Turbines	Turbine Ht. (m)	Height Category	Landscape Type/ Other Comments
Newton Of Inshewan, Memus	1	24.5	15 to <30m	Broad Valley Lowland
W Mains of Kinblethmont, Arbroath	1	24.5	15 to <30m	Dipslope Farmland
Balkelo Farm, Kirkton of Auchterhouse	1	24.5	15 to <30m	Dipslope Farmland
Grosefield Farm, Little Brechin	1	24.8	15 to <30m	Broad Valley Lowland
Balkemback Farm, Tealing	1	24.8	15 to <30m	Dipslope Farmland
Incheoch Farms, Alyth	1	24.8	15 to <30m	Highland Glens
The Cotter House, Strathmartine	1	24.8	15 to <30m	Dipslope Farmland
Gamekeepers Cottage, Tealing	1	24.8	15 to <30m	Dipslope Farmland
Myreton Garage, Duntrune	1	24.8	15 to <30m	Dipslope Farmland
Muirhouses Farm, Cortachy	1	24.8	15 to <30m	Broad Valley Lowland
Muirton Of Balloch Farm, Montrose	1	24.8	15 to <30m	Broad Valley Lowland
Balkiellie Farm, Montrose	1	24.8	15 to <30m	Dipslope Farmland
Easter Craig Farm, Alyth	1	27.0	15 to <30m	Highland Foothills
Wester Coul Farm, Lintrathen, Kirriemuir	1	27.0	15 to <30m	Highland Foothills
Gagie Home Farm Holdings, Gagie, Tealing	1	27.0	15 to <30m	Dipslope Farmland
150m W Fordhouse Of Dun Farm, Montrose	1	27.0	15 to <30m	Broad Valley Lowland
NE of Charleton Farm, Montrose	1	27.0	15 to <30m	Lowland Loch Basin
WWTW Westerton of Rossie, Montrose	1	28.0	15 to <30m	Dipslope Farmland
Brae Of Pert Farm, Stracathro	2	19.8	15 to <30m	Brae Of Pert Farm, Stracathro
Mains of Logie, Montrose	2	19.9	15 to <30m	Broad Valley Lowland
195m NE of Stoneygroves Farm, Liff	2	24.5	15 to <30m	Dipslope Farmland
225m S of Muirhouses Farm, West Muirhouse, Arbroath	2	24.5	15 to <30m	Dipslope Farmland
Craigo Home Farm	2	24.8	15 to <30m	Broad Valley Lowland
230m NE of Windyedge Farm, Brechin	2	27.0	15 to <30m	Broad Valley Lowland
Ethie Mains Farm, Ethiehaven, By Inverkeilor	2	27.0	15 to <30m	Coast
500m NW of Meikle Tullo Farm, Edzell	2	27.0	15 to <30m	Highland Foothills
Nether Finlarg Kincaldrum	2	24.5	15 to <30m	Igneous Hills
460m S Of Castleton Of Eassie, By Glamis	3	24.8	15 to <30m	Broad Valley Lowland
350M W Of Ethiebeaton Farm, Monifieth	3	24.5	15 to <30m	Dipslope Farmland
Glen of Craigo, Montrose	3	24.8	15 to <30m	Broad Valley Lowland

Turbine Name	No. of Turbines	Turbine Ht. (m)	Height Category	Landscape Type/ Other Comments
Angus – Proposed Wind Turbines (Application/Scoping)				
Nathro Hill, by Edzell	17	135.0	125m+	Highland Summits and Plateaux
Firth of Forth and Tay	150	209.7	125m+	Offshore
720m N of East Memus Farm, Memus	1	86.5	80 to <125m	Highland Foothills
Frawney Windfarm, 1020m n of Over Finlarg Farm, Lumleyden	5	107.0	80 to <125m	Igneous Hills
NW of Govals Farm, Kincaldrum	6	87.0	80 to <125m	Igneous Hills
500m SW of New Downie Farm, Carnoustie	1	54.0	50 to <80m	Dipslope Farmland
800m SW of Gilchorn Farm, Inverkeilor	1	62.0	50 to <80m	Dipslope Farmland
400m N of Davidston Farm, Newtyle	1	62.0	50 to <80m	Igneous Hills
Henderston Quarry, Newtyle	1	66.0	50 to <80m	Igneous Hills
400M SW Of Newmill Of Balgavies Farm, Forfar	1	66.5	50 to <80m	Low Moorland Hills
500m NW of Renmure farm, Inverkeilor	1	77.0	50 to <80m	Dipslope Farmland
530m NE of Hatton Mill Farm	1	77.0	50 to <80m	Dipslope Farmland
600m W of Witton Farm, Lethnot, Edzell	2	74.0	50 to <80m	Highland Foothills
580M SE Of Carsegownie, Carsegownie, Forfar	1	34.6	30 to <50m	Low Moorland Hills
280M SW Of North Mains Of Turin, Forfar	1	40.5	30 to <50m	Low Moorland Hills
300m W of Parkconnon Farm, Colliston, Arbroath	1	41.5	30 to <50m	Dipslope Farmland
1057m SW of Chapelton of Menmuir farm, Brechin	1	46.0	30 to <50m	Broad Valley Lowland
150m NW of Balrennie Farm, Edzell	1	46.0	30 to <50m	Broad Valley Lowland
500m N of Boysack Farm, Friockheim	1	46.0	30 to <50m	Dipslope Farmland
Gallow Hill, Cortachy	1	46.5	30 to <50m	Highland Foothills
Land At Stracathro Service Area, Brechin	1	47.1	30 to <50m	Broad Valley Lowland
650m N of Broom Farm, Tannacice	1	49.5	30 to <50m	Broad Valley Lowland
Drowndubbs Farm, Kikbuddo	2	46.5	30 to <50m	Dipslope Farmland
189m NW of Kalulu House, East Murthill, Firfar	2	49.0	30 to <50m	Broad Valley Lowland

APPENDIX 7: ASSESSMENT OF LANDSCAPE SENSITIVITY AND VALUE FOR ANGUS LANDSCAPE CHARACTER TYPES

1A. Upper Highland Glens (outside National Park)

Landscape Character Sensitivity	Criteria /Sensitivity Levels
Scale	Medium, but with high sides. Medium
Landform	Steep sides enclosing flat or narrow valley floor. Medium/High
Pattern	Irregular. Relatively few boundaries or other pattern features. Dominated by landform. Medium
Development	Low to minimal development: tracks, occasional roads and houses. Small farmland areas. Medium/High
Quality	Most areas relatively natural and unaffected by development. A sense of wildness. High
Elements and Features	Dominated by landform features. Occasional farms and houses. Trackways. Occasional fields and forestry. Medium/High
Context	Glens form part of the highland backdrop to Angus and are the main access into the National Park. High
OVERALL RATING	Medium/High

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Minimal number of residential receptors. Main receptors are recreational visitors to highlands and National Park. High
Internal Visibility	Corridor views/ vistas and slightly wider visibility from upper valley sides. Medium
External Visibility	Only visible from Mid Highland Glens and Highland Summits and Plateaux. Medium/Low
OVERALL RATING	Medium

Landscape Value	Criteria/ Sensitivity Levels
Designations	No landscape designations although adjacent to National Park and NSA. Other designations include occasional listed buildings and SAMs. Cateran Trail in Glen Isla. Medium/High
Community value	Used by visitors and local population for outdoor recreation or access to highland summit areas. High
Cultural value	The Angus Glens are a key landscape feature of the local authority area. Former routes into/across Highlands. Occasional castles and hunting lodges. High
Perceptual	Tranquil, with a low level of development, elements of wildness and highly scenic views. Medium/High
OVERALL RATING	High

1B. Mid Highland Glens (outside National Park)

Landscape Character Sensitivity	Criteria /Sensitivity Levels
Scale	Medium to small, but with high sides. Medium/High
Landform	Steep sides enclosing flat or narrow valley floor. Medium
Pattern	Variable, dominated by landform but areas of flatter valley floors have field and woodland. Medium
Development	Some development. Scattered farms/ dwellings along valley floors, becoming less developed higher up towards the upper glens. Medium
Quality	Many areas relatively natural and unaffected by development. Settled areas generally in scale and harmony with rural glen setting. Medium/High
Elements and Features	Dominated by landform features. Clusters of dwellings, farms and isolated houses in valley floor areas. Fields on valley floor and lower sides. Extensive broadleaved woodland and conifer plantations. Medium/High
Context	Glens form part of the backdrop to Angus and are the main access into the highland area. High
OVERALL RATING	Medium/High

Visual Sensitivity	Criteria /Sensitivity Levels
Receptors	Low number residential receptors. Main receptors are recreational visitors to highlands and National Park. High
Internal Visibility	Corridor views/ vistas and slightly wider visibility from upper valley sides. Medium
External Visibility	Mainly visible from Upper Highland Glens and Highland Summits and Plateaux but lower sections extensively visible from lowland areas to the south. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria /Sensitivity Levels
Designations	No landscape designations although adjacent to National Park. Other designations include HGDL in Glens Isla and Clova, occasional SAMs, Many listed buildings. Cateran Trail in Glen Isla. Medium/High
Community value	Used by visitors and local population for outdoor recreation or access to highland summit areas. Visitor attractions. Medium/High
Cultural value	The Angus Glens are a key landscape feature of the local authority area. Former routes into/across Highlands. Castles, hunting lodges and estate policies. High
Perceptual	Tranquil, with a balanced rural character, transitional between settled and wilder areas with highly scenic views. Medium/High
OVERALL RATING	Medium/High

3. Highland Summits and Plateaux (Outside National Park)

Landscape Character Sensitivity	Criteria / Sensitivity Levels
Scale	Large. Low
Landform	Rolling but often steep sided hills of moderate elevation with occasional crags, steep corries, burns in gullies, folds or narrow upper glens. Medium
Pattern	Irregular patterns of heather, grassland and forestry, relating to landform. Medium/Low
Development	Little evidence of built development. Tracks, paths and occasional forestry. Medium/High
Quality	Generally well maintained/natural upland of heather with occasional planted forest. Medium/High
Elements and Features	Landform and vegetation cover is dominant. Few manmade features, boundaries etc. Medium/Low
Context	These uplands border the mountains of the National Park and contain the Angus Glens. Medium/High
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Outdoor recreation receptors. Low population of residential receptors within or adjacent. Visible at distance from a wider area including a number of larger settlements and main transport routes. Medium/High
Internal Visibility	Extensive views across the type from the summits and ridges, but restricted in narrow valley and drainage landforms. Medium/High
External Visibility	Generally very conspicuous backdrop from lowland areas to the south within and beyond Angus. Any tall objects would also be highly visible from higher ground to the north. High
OVERALL RATING	Medium/ High

Landscape Value	Criteria/ Sensitivity Levels
Designations	No landscape designations and few other designations but adjacent to National Park. Medium
Community value	Important for outdoor recreation and access to higher summits to the north. A resource for sporting estates. Medium/High
Cultural value	A setting to the Angus Glens. Some well known viewpoints. Medium
Perceptual	An open landscape with panoramic views and a sense of remoteness and wildness. Forming backdrop to lowland areas and foreground to National Park mountains. Enclosing skyline to many Angus Glens Medium/High
OVERALL RATING	Medium/High

5. Highland Foothills

Landscape Character Sensitivity	Criteria / Sensitivity Levels
Scale	Medium with some small scale areas. Medium
Landform	Varied. Rolling and steep hills above undulating lower ground and narrow valleys. Burns often in gullies, folds or narrow glens. Medium/High
Pattern	Varied pattern from open hills to enclosed farmland and shelterbelts. Medium
Development	Lack of larger settlements. Development limited to farms, isolated houses, steadings, small villages, minor roads. All areas traversed by a high voltage electricity line. Medium
Quality	Generally well maintained farmland and estate land. Medium/High
Elements and Features	Attractive hamlets, large houses/castles, woodland copses, hillforts, electricity transmission line. Field and road boundaries often have walls and hedges. Medium/High
Context	A transitional landscape marking the Highland boundary fault, separating the uplands of the Mounth from Strathmore. 'Gateway' to Angus Glens. Medium/High
OVERALL RATING	Medium/High

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Local population of residential receptors and travellers. More distant residential and travelling population in adjacent lowlands, Walkers, visitors to locations of interest. Medium/High
Internal Visibility	Varied visibility; between panoramic views from hilltops to narrow vistas from small glens. Medium
External Visibility	Generally quite visible from areas of population and transport corridors although set against a higher backdrop. Visible to receptors travelling to/from the Angus Glens. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	No landscape designations. Many ancient woodlands and several SAMs (mainly settlements and hillforts) Medium/High
Community value	Areas used by local residential population and visitors for informal recreation. Sites of historic/ archaeological/ natural history interest. Medium/High
Cultural value	Significant number of locations of archaeological/ historic interest including Caterthuns, Edzell Castle, Balintore Castle. Medium/High
Perceptual	Deeply rural landscape of highly varied interest and many attractive settings and views. Forms a 'gateway' to the Angus Glens. Medium/High
OVERALL RATING	Medium/High

8. Igneous Hills

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium with some larger scale. Medium
Landform	Rolling or conical hills and valleys of variable form. Occasional outcrops. Medium
Pattern	Diverse but typically higher ground is open and the lower areas with rectilinear patterns of medium-large scale fields and shelterbelts. Medium
Development	Varies between areas of low development in some of the hills to lower farmland areas with settlements main roads, pylons and other infrastructure. Wind turbines and transmitter masts on some hills. Medium
Quality	Well managed open and enclosed farmland. Heather Moor variably managed with some areas reverting to scrub. Medium
Elements and Features	Plantations, tree belts in lower areas. Transmitter towers, wind turbines (Ark Hill and Scotston). Electricity transmission lines. Medium
Context	The Sidlaws form a backdrop to Dundee and the Firth of Tay and divide the lowland farming areas of Angus and Perthshire. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Residential and travelling receptors within the LCA and surrounding areas. Outdoor recreational receptors on the hills. Medium/High
Internal Visibility	Extensive views from ridges and summits. More restricted views from valleys. Medium
External Visibility	Visible as a skyline landform from surrounding lower areas. Southern and eastern slopes particularly sensitive to views from large population but lower landforms well screened from surroundings. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	No landscape designations. Some SSSIs. Kinpurney/ Auchterhouse Hill Forts. Medium
Community value	Areas used by local residential population for informal recreation. Viewpoints and footpaths. Medium
Cultural value	Some archaeological/ historic interest including hillforts and cairns on summits and small castles on the periphery. Medium
Perceptual	Varied hill and farmland landscape forming backdrop to Dundee and the Tay, with some development of transmission towers windfarm. Open, but with little feeling of remoteness or naturalness. Medium/Low
OVERALL RATING	Medium

10. Broad Valley Lowland

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, although overall scale of valley is very large. Medium
Landform	Generally a simple, gently sloping or flat valley form but with areas of more complex fluvioglacial landform. Medium/Low
Pattern	Open, simple, regular large arable fields with variable field boundaries, predominantly post and wire fences. A network of shelterbelts and plantations although more open to the west. Medium
Development	Well settled landscape with small towns, villages and a significant density of farms and houses. Areas crossed by major roads and a network of minor roads Medium/Low
Quality	Farmland intensively managed. Generally a well managed landscape although hedgerows/ trees are declining with expanded field sizes/ lack of management. Some sand and gravel quarrying and peri-urban landscapes detract. Medium/High
Elements and Features	Typical lowland farmland features together with roads and settlements. Tree/hedgerow boundaries to many fields but also low wall and post and wire. A number of large houses/ castles and designed landscapes including Glamis Castle. Electricity lines. Some small-medium wind turbines singly or in small groups. Medium
Context	Mid section of a vast lowland valley stretching from the River Tay in the southwest to Howe of the Mearns in the northeast, set between the Highland Boundary and volcanic hills to the south. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Significant population of residential and transport receptors throughout. Visitors to attractions such as Glamis/ Kirriemuir. Medium/High
Internal Visibility	Wide open views across the valley and long distance views along it in which larger structures are prominent. Screening by shelterbelts and landforms from lower parts of the valley. Medium/High
External Visibility	Views over valley from all higher surrounding areas. Taller structures would be clearly visible. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	Some significant designed landscapes. Many SAMs and listed buildings. Ancient Woodlands and SSSIs. Medium/High
Community value	Setting and recreational amenity for a number of settlements and residents as well as visitor locations. Many core paths. Medium/High
Cultural value	Designations reflect a rich past history of settlement and activity. Literary associations include JM Barrie. Medium/High
Perceptual	A settled, developed, active landscape with roads, buildings and large agricultural enterprises, although there are also many tranquil spots. Medium/Low
OVERALL RATING	Medium

12(i). Low Moorland Hills (Forfar Hills)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with some smaller scale areas on hills. Medium/High
Landform	A series of east-west ridges rising above more gently undulating farmland, with steep slopes and outcrops in places. Medium/High
Pattern	Variable, with lower angled areas having rectangular medium/large field patterns and hills and steeper slopes with smaller, broken patterns rising to open pasture. Medium
Development	Small settlements, scattered houses and farms. A network of mainly small roads. Medium
Quality	Managed farmland and open hilltops. Scenic areas within the hills. Medium
Elements and Features	Varied. Dense network of small roads, tracks, farms, houses and cottages. Hillforts and standing stones. Stone wall and hedge field boundaries. Small lochs between some hills. Electricity lines and telecommunications towers on some hills are detractors. Medium/High
Context	Several distinctive hilltops provide views across surrounding farmland area which merges into the Dipslope Farmland and Strathmore. Hills provide a backdrop to Strathmore and Forfar. Medium/High
OVERALL RATING	Medium/High

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate to high population of residential and travelling receptors within area and close by. Hills visible from wider areas. Some visitors to hilltops, lochs etc. Medium/High
Internal Visibility	Fairly open landscape in which hills and tall objects are widely visible. Medium/High
External Visibility	Hills widely visible from surrounding areas but lower ground between hills less so. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	Hillfort and standing stone SAMs. SSSI Lochs. Small areas of inventory ancient woodland. Medium
Community value	Informal recreation for local people and visitors. Network of footpaths and several viewpoints. Medium
Cultural value	Hillforts, crosses (Aberlemno) and standing stones of historic interest. Viewpoint on Balmashanner Hill. Some estates with listed buildings. Medium
Perceptual	A varied rural landscape with distinctive hilltop views and relatively little development. Medium/High
OVERALL RATING	Medium

12(ii). Low Moorland Hills (Montreathmont Moor)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium to large, with smaller scale domestic reference features in farmland areas. Medium/Low
Landform	Undulating and gently rising to the north and west before sloping steeply down to Strathmore. Medium/Low
Pattern	Predominantly medium/large rectilinear patterns of fields and forestry. Medium/Low
Development	Small settlements, scattered houses and farms. A network of mainly small roads. Forestry area largely undeveloped. Medium
Quality	Managed farmland and forest. Deterioration in field boundaries. Medium
Elements and Features	Mainly arable farmland and mature forestry with intermittent stone wall and hedge field boundaries. Network of small roads, tracks, farms, houses and cottages in farmland area. Montreathmont forest is distinctive. Medium
Context	Elevated lowland farming area between Forfar Hills and Montrose Basin set between other lowland areas. Medium
OVERALL RATING	Medium/Low

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate population of residential receptors. Some visitors to forest area. Network of mainly minor roads. Medium
Internal Visibility	Fairly open landscape in which tall objects are widely visible, although Montreathmont forest provides significant screening across the centre. Medium
External Visibility	Edges visible from surrounding lower areas but central forest area mainly visible from higher ground including nearby hills and Rossie Moor. Medium
OVERALL RATING	Medium

Landscape Value	Criteria/ Sensitivity Levels
Designations	Montreathmont forest is in ancient woodland inventory. Medium
Community value	Network of forest paths provides informal recreation for local people and visitors. Medium
Cultural value	Little of note. Melgund Castle. Some listed buildings. Medium/Low
Perceptual	A typical rural arable landscape with a distinctive large lowland forest that offers a sense of tranquillity and naturalness. Medium
OVERALL RATING	Medium

13. Dipslope Farmland (Overall Assessment)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with some larger scale areas on highest ground but also with smaller domestic scale features. Medium
Landform	Gently rolling or undulating, with a north-south dip towards the sea and steeper northern slopes above Montrose Basin. Medium
Pattern	Large or medium rectilinear arable fields, woodland blocks, broken by watercourses on lower ground. Occasional open uncultivated areas on higher ground (e.g. Rossie Moor) or where field boundaries have been removed. Medium
Development	Bordering urban areas (Dundee, Carnoustie, Arbroath). Occasional villages and scattered hamlets, farms and houses. Main roads, railway line and a network of smaller roads. Disused quarries and airfields. Medium
Quality	Intensively managed agricultural landscape with some areas of unimproved land and woodland and some areas of former mineral extraction. Areas of well maintained designed landscape. Medium
Elements and Features	Arable farmland predominates. Scattered settlement dispersed throughout. Occasional large houses and policies. Large farm buildings. Electricity pylons. Medium
Context	A large slightly elevated lowland farmland area set between igneous hills, Dundee and the North Sea. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate number of both travelling and residential receptors. Medium
Internal Visibility	Generally open views from higher areas, with some lower valley areas more restricted. Tree cover in the west restricts views. Any larger structures are prominent at a distance. Medium/High
External Visibility	Varied. Few areas are prominent when seen from surroundings although the areas north and east of Dundee are potentially visible from a large population and Rossie Moor is visible from surrounding lower ground. Medium
OVERALL RATING	Medium

Landscape Value	Criteria/ Sensitivity Levels
Designations	Designed landscapes at Pitmuies, Guthrie and Guynd. Large areas of SAMs along Lunan Water and Bay area. SSSIs. Scattered ancient woodland. Two country parks at Crombie and Monikie. Medium
Community value	Setting to a number of settlements. Country parks, Golf Course, Medium
Cultural value	Policy woodlands, SAMs. Castles. Medium
Perceptual	A vast area of open, intensively managed agricultural land with areas of more sheltered and intimate landscape in shallow valleys, settlements, designed landscapes and country parks. Medium
OVERALL RATING	Medium

13(i) Dipslope Farmland (Dundee/Tealing)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, but also with smaller domestic scale features. Medium
Landform	Gently rolling or undulating, falling south and east from the Sidlaw Hills towards Dundee and the Firth of Tay. Medium
Pattern	Large or medium rectilinear arable fields, woodland blocks, broken by occasional watercourses on lower ground. Medium
Development	Bordering urban area of Dundee although city screened. Villages and scattered hamlets, farms and houses. Main roads and a network of smaller roads. Disused airfield. Large electricity substation. Medium
Quality	Intensively managed agricultural landscape with woodland areas. Medium
Elements and Features	Arable farmland predominates. Scattered settlement dispersed throughout. Large farm buildings. Golf courses. Quarry. Several electricity transmission lines. Occasional wind turbines. Medium
Context	A settled area of elevated lowland arable farmland area set between the Sidlaw hills and Dundee. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate number of both travelling and residential receptors. Close to Dundee (although southern edge is a screening ridge). Overlooked by walkers/ viewpoints on Sidlaw Hills Medium
Internal Visibility	Mainly open with small woodlands partially screening views. Any larger structures are prominent at a distance. Medium/High
External Visibility	Limited. Although overlooked by Sidlaws they screen views from further north and west. Although close to Dundee views from the city are limited by containing landform. Medium
OVERALL RATING	Medium

Landscape Value	Criteria/ Sensitivity Levels
Designations	Small areas of inventory ancient woodland. Occasional SAMs. Listed buildings Medium
Community value	Setting to a number of small settlements and backdrop to Dundee. Adjacent country parks in Dundee. Forest access land. Golf Course. Medium/High
Cultural value	No notable features. Some SAMs and listed buildings. Medium/Low
Perceptual	An area of open, intensively managed agricultural land with a number of settlements forming a hinterland to Dundee and rising into the Sidlaw Hills. Medium
OVERALL RATING	Medium

13(ii) Dipslope Farmland (Monikie/Crombie)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with some smaller scale areas and features associated with villages and country parks and larger open areas to the north. Medium
Landform	Gently rolling or undulating, with a north-south dip towards the sea. Medium/Low
Pattern	Medium rectilinear arable fields broken up by woodlands. Occasional open uncultivated areas on higher ground. Medium
Development	Bordering urban areas in south (Monifieth, Carnoustie). Occasional villages and scattered hamlets, farms and houses. Less populated in the north. Main road in south and a network of smaller roads. Medium/High
Quality	Intensively managed agricultural landscape with some areas of unimproved land and significant areas of well maintained recreational and designed landscape. Medium/High
Elements and Features	Arable farmland predominates but also significant areas of country parks and estate policies (Panmure house demolished in 1950s). Settlement dispersed throughout. Large farm buildings. Electricity pylons. Medium/High
Context	A slightly elevated arable farmland area close to Dundee with significant areas of enclosure and recreational landscapes. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	High number of both travelling and residential receptors within or nearby. Medium/High
Internal Visibility	Generally open views from higher and treeless areas to N and S. Tree cover restricts views elsewhere. Any larger structures prominent at a distance. Medium
External Visibility	Varied. Few areas are prominent when seen from surroundings although overlooked by higher ground to N and E and from edge of Dundee. Visible as backdrop from coast. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	Two country parks at Crombie and Monikie. Inventory ancient woodland at Panmure estate. Some SAMs and listed buildings associated with estates. National Trust site at Barry Mill. Peat bog SSSI. Medium/High
Community value	Setting to a number of settlements. Two country parks. Medium/High
Cultural value	Panmure estate and a number of SAMs. Medium
Perceptual	A varied area of farmland close to Dundee with a number of settlements significant enclosed areas of mature woodland including two country parks and a relict estate landscape. Medium/High
OVERALL RATING	Medium/High

13(iii) Dipslope Farmland (Redford Farmland)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with some larger scale areas on highest ground where field boundaries are removed and trees are few. Also smaller domestic scale features. Medium/Low
Landform	Gently rolling or undulating, with a NW-SE dip towards the sea and lower farmland. Medium/Low
Pattern	Large or medium rectilinear arable fields, many where field boundaries have been removed. Occasional woodland blocks. Medium
Development	Scattered hamlets, farms and houses. Main roads and a network of smaller roads. Disused quarries. Medium
Quality	Intensively managed agricultural landscape with declining field boundaries, some areas of woodland and some former mineral extraction. Area of well maintained designed landscape. Medium
Elements and Features	Arable farmland with intermittent boundaries predominates. Scattered minor settlement dispersed throughout. Large house and policies at Guynd. Large farm buildings. Electricity pylons. Medium
Context	A large, intensively managed elevated arable farmland area set above the North Sea and surrounded by similar farmland. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate number of travelling and low number of residential receptors. Medium/Low
Internal Visibility	Generally open views, although tree cover around Guynd restricts views. Any larger structures are prominent at a distance. Medium/High
External Visibility	Varied. Few areas are prominent when seen from surroundings, but often forming a low horizon on which tall structures would be widely visible. Medium/High
OVERALL RATING	Medium

Landscape Value	Criteria/ Sensitivity Levels
Designations	Designed landscape at Guynd. Some SAMs and listed buildings. Little inventory ancient woodland. Medium
Community value	Setting to small settlements and houses. Medium/ Low
Cultural value	House and designed landscape at Guynd. A few SAMs and listed buildings. Medium
Perceptual	An area of open, intensively managed arable land with few features and limited areas of more sheltered and intimate landscape. Medium/Low
OVERALL RATING	Medium/Low

13(iv) Dipslope Farmland (Letham/ Lunan Water/ Arbroath)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with many smaller scale areas/ features associated with settlements and watercourses. Medium/High
Landform	Gently rolling or undulating, shallow and sometimes indistinct valley sides, and often flat valley floors gradually descending to the North Sea coast. Medium
Pattern	Medium rectilinear arable fields, woodland blocks, broken by watercourses on lower ground. Medium
Development	Bordering or containing urban areas/ villages (Arbroath, Letham, Friockheim). Hamlets, farms and houses. Main roads, railway line and a network of smaller roads. Golf course. Disused quarries and airfields. Medium/High
Quality	Intensively managed agricultural landscape with some areas of woodland and some areas of former mineral extraction. Areas of well maintained designed landscape and golf course. Medium
Elements and Features	Arable farmland predominates. Mixture of stone walls, post and wire fences and open field edges. Areas of polytunnels. Watercourses. Settlement dispersed throughout. Main roads often following valley and linking settlements. Network of minor roads. Large farm buildings. Occasional wind turbines. Medium
Context	A settled, lowland, arable farmland area situated mainly in shallow valleys and often sheltered by areas of higher farmland. Medium/High
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate to high number of both travelling and residential receptors. Medium/High
Internal Visibility	Generally open mid distance views, although tree cover restricts views in many locations. Any larger structures are prominent at a distance. Medium
External Visibility	Varied but some parts are less visible than surrounding <i>Dipslope Farmland</i> areas. Tall objects would be fairly widely visible. Medium
OVERALL RATING	Medium

Landscape Value	Criteria/ Sensitivity Levels
Designations	Designed landscapes at Pitmuies and Guthrie. Large areas of SAMs along Lunan Water and Bay area. Significant numbers of listed buildings. Scattered inventory ancient woodland. Medium/High
Community value	Setting and travel routes to a number of settlements. Golf Course. Medium/High
Cultural value	Designed landscapes, SAMs and listed buildings. Medium/High
Perceptual	An area of intensively managed agricultural land with areas of more sheltered and intimate landscape in shallow valleys, settlements and designed landscapes. Medium
OVERALL RATING	Medium/High

13(v) Dipslope Farmland (Ethie)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium but also with smaller domestic scale features in more sheltered and woodland/ plantation areas. Fairly limited extent. Medium/High
Landform	Gently rolling or undulating, falling inland to shallow valleys and towards the sea. Medium
Pattern	Large or medium rectilinear arable fields and woodland blocks, broken by watercourses on lower ground. Medium
Development	Occasional farms and houses. Main road and railway line and a network of smaller roads. Medium
Quality	Intensively managed agricultural landscape with small areas of estate policies/ plantation woodland. Medium/High
Elements and Features	Arable farmland predominates. Low stone walls towards the sea but more mixed boundaries including hedges inland. Scattered houses dispersed throughout including large listed houses/ castles which are now hotels. Large farm buildings. Communications masts. Medium/High
Context	A slightly elevated lowland farmland area set above Arbroath and surrounding shallow valleys and exposed to the North Sea, but with more intimate and sheltered inland areas. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate number of both travelling and residential receptors within or nearby. Coastal walkers and cycleway. Guests at hotels. Medium/High
Internal Visibility	Generally open exposed views from higher areas, with some lower areas more restricted. Tree cover further inland restricts views. Any larger structures prominent at a distance. Medium/High
External Visibility	Mainly visible at close or middle distance from surrounding farmland and coastal areas. Tall objects would be fairly widely visible. Medium
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	Scattered inventory ancient woodland. Occasional SAMs and a number of listed buildings. Medium
Community value	Background setting to Arbroath. Cycle route. Medium/Low
Cultural value	Large houses/ castle and policy woodlands, SAMs. Medium
Perceptual	A small area of open, intensively managed agricultural land elevated above its surroundings and exposed to the North Sea coast, with areas of more sheltered and intimate landscape in small estate landscapes. Medium/High
OVERALL RATING	Medium

13(vi) Dipslope Farmland (Rossie Moor)

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with some larger scale areas on highest ground but also with smaller domestic scale features. Medium
Landform	Rolling or undulating. A broad hill with a south and east dip towards the sea and the Lunan Water and steeper northern slopes above Montrose Basin. Medium
Pattern	Large or medium rectilinear arable fields often with boundaries removed, woodland blocks, broken by watercourses on lower ground. Open uncultivated area on higher ground at Rossie Moor. Medium
Development	No villages. Scattered hamlets, farms and houses. Main road, railway line in east. Sparse network of smaller roads in west. Medium
Quality	Intensively managed agricultural landscape with varied field boundaries, some areas of natural moorland and woodland and a quarry. Medium
Elements and Features	Arable farmland predominates. Scattered small settlement throughout. Occasional castle/ large houses and policies. Rossie school. Large farm buildings. Communications mast. Medium
Context	A large elevated lowland farmland area set between Montrose Basin, Lunan Water and the North Sea. Medium/High
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate number of travelling and residential receptors. Coastal walkers and cycle route nearby. Medium
Internal Visibility	Generally open views. Tree cover and landform restricts views in places. Any larger structures are prominent at a distance. Medium/High
External Visibility	Generally visible and sometimes prominent from surrounding lower ground and further afield. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	Designed landscape at Dunninald Castle. SSSI at Rossie Moor. Grade A listed buildings at Braikie and Dunninald. Scattered inventory ancient woodland. Medium
Community value	Walks across Rossie Moor and adjacent woodlands. Cycle route. Medium
Cultural value	Two castles. Designed landscape. Medium
Perceptual	A large area of open, intensively managed agricultural land and scattered houses, with a small area of more natural moorland landscape. Forms a backdrop to Montrose Basin and town. Unfrequented in the west but transport corridors pass through the east. Medium/High
OVERALL RATING	Medium

14a. Coast with Sand

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with smaller scale features. Generally limited in area. Medium/High
Landform	Flat, open, low lying, with mature dunes and small escarpments. Medium
Pattern	Predominantly simple but varied between regular pattern in cultivated farmland areas, linear pattern in beach areas, organic pattern in golf courses and irregular pattern in dunes. Medium
Development	Varies between influence of adjacent urban margins to occasional isolated hamlets and houses. Roads (mainly minor) and railway. One small fishing village. Golf courses. Medium
Quality	Varied. Generally scenic due to open sea views. Often intensively managed (golf courses and arable farming). In places character is compromised by adjacent urban development. Medium
Elements and Features	Sandy beaches and mature dunes. Flatness and open sea views. Golf courses. Former WW2 airstrips and defences (current military range at Barry Budden) Medium/High
Context	Mainly a narrow strip between farmland, settlements and the sea. Sometimes indistinct transition into inland farmland areas. Medium
OVERALL RATING	Medium

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Low population of residential receptors with greater numbers immediately adjacent. Travelling population on road and rail. Cyclists. Beachwalkers and golfers. Sailors and Kayakers. Medium/High
Internal Visibility	Wide open views with some local restrictions due to dunes/ landforms and occasional blocks of trees at Barry Budden and Montrose. Tall structures would be prominent in this landscape type. High
External Visibility	Visible from adjacent higher ground and urban areas. Tall objects would be seen silhouetted against the sea. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	SSSI and SAC at Barry Budden and SSSI north of Montrose. SAMs at Lunan Bay. Medium
Community value	Setting for local residents in houses/ villages. Most areas easily accessible from neighbouring settlements and holiday caravan parks for formal and informal recreation. Golf courses. Cycle routes. Beach walks. High
Cultural value	Historic/ attractive villages. Some locations of archaeological/ historic interest. Medium
Perceptual	Windswept coastal strips with accessible sandy beaches and hinterland which whilst undramatic in landform provide tranquillity, recreational access and open views. Medium/High
OVERALL RATING	Medium/High

14b. Coast with Cliffs

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium, with smaller scale features (cliffs generally up to 30m but escarpments up to 80m). Generally limited in area. Medium/High
Landform	Gently sloping with small rocky cliffs, rocky reefs, bays, inlets and rocky escarpments. Medium/High
Pattern	Varied between regular pattern in cultivated farmland areas to complex and irregular pattern in rocky cliff areas. Medium
Development	Varies between influence of adjacent urban margins to occasional isolated hamlets and houses and stretches with no settlement/ roads. A number of small fishing villages/ havens and harbours. Roads (mainly minor) and railway. Golf courses. Medium/High
Quality	Varied. Generally scenic due to open sea views and cliff landforms. Hinterland often intensively managed (arable farming). In places character is compromised by adjacent urban development. Medium/High
Elements and Features	Rocky outcrops and cliffs characterised by very varied eroded form with many caves, arches and small stacks/ outcrops. Small coves, havens and harbours. Lighthouse at Scurdie Ness. Open and distant sea views. Medium/High
Context	A narrow strip between farmland, settlements and the sea but with dramatic elevated views and considerable detail and interest. Medium/High
OVERALL RATING	Medium/High

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Low population of residential receptors with greater numbers immediately adjacent. Travelling population on road and rail. Cyclists and walkers. Sailors and Kayakers. Medium/High
Internal Visibility	Wide open views. Tall structures would be prominent in this landscape type. High
External Visibility	Visible from adjacent urban areas, hinterland, sandy coastline and other headlands. Tall objects would be seen silhouetted against the sea from inland. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	SSSI along most lengths of rocky coast. Medium/High
Community value	Setting for local residents in houses/ villages. Most areas easily accessible from neighbouring settlements and holiday caravan parks for formal and informal recreation. Cycle routes. Clifftop walks. High
Cultural value	Historic/ attractive fishing villages. Some locations of archaeological/ historic interest including clifftop forts and castles. Medium
Perceptual	Windswept coastal strips with accessible clifftop walks and secluded beaches/ havens providing tranquillity, dramatic interest, recreational access and open views. Medium/High
OVERALL RATING	Medium/High

15. Lowland Loch Basin

Landscape Character Sensitivity	Criteria/ Sensitivity Levels
Scale	Medium to large. Medium/Low
Landform	Flat, open, low lying tidal basin and farmland contained by surrounding higher areas of farmland. Small scale steep slopes on raised beaches and river embankments Medium
Pattern	Varied. Open, large-scale basin to E. Rectilinear farmed fields to W and more organic patterns within Kinnaird deer park. Medium
Development	Montrose to E of basin, otherwise small hamlets and scattered farms/ houses. Fringed by main roads, crossed by minor roads, railways Medium
Quality	Well managed farmland. Estate policies. Basin managed for wildlife. Attractive rural settlements. Medium/High
Elements and Features	Tidal basin is unique in Scotland. Shorelines, mudflats and tidal watercourses. Rich natural heritage. Arable farmland with mature deciduous/mixed woodlands, avenue trees, hedges. Town of Montrose. Attractive hamlets. Kinnaird House and deer park. Medium/ High
Context	Generally lowland surroundings. Unique basin provides a setting for Montrose. Medium/High
OVERALL RATING	Medium/High

Visual Sensitivity	Criteria/ Sensitivity Levels
Receptors	Moderate/ high number of residential receptors as overlooked by Montrose in addition to small settlements. Significant travelling population along peripheral main roads. Visitors to attractions including wildlife centre, House of Dun, Montrose. Medium/High
Internal Visibility	Clear inter-visibility within basin area but some screening by trees in western part and any tall structure would be highly visible. Medium/High
External Visibility	Overlooked from higher surrounding areas but screened from a distance. Tall structures would be prominent in this type. Medium/High
OVERALL RATING	Medium/High

Landscape Value	Criteria/ Sensitivity Levels
Designations	Basin is a SSSI. HGDLs and listed buildings at Kinnaird castle and House of Dun (adjacent). Medium/High
Community value	Areas used by local residential population and visitors for formal/informal recreation. Visitor attractions including SWT visitor centre, Caledonian railway. Medium/High
Cultural value	HGDLs. Some SAMs. Caledonian Railway. Historic town of Montrose Medium/High
Perceptual	A unique tidal basin feature with water and sky reflections, set in a wider lowland farmland landscape. Provides a setting for the town of Montrose. Hinterland of well managed farmland, mature trees and attractive hamlets and houses. Medium/High
OVERALL RATING	Medium/High