Angus Local Plan Review (2009)

Implementation Guide for Renewable Energy Proposals

Policies ER34 Renewable Energy Developments
&
ER35 Wind Energy Development

Angus Council
June 2012

PREFACE

There is increasing interest through both informal enquiries and planning applications for the establishment of renewable energy projects in Angus. While the majority are in connection with a range of wind turbine projects, proposals for a number of hydro schemes have also come forward.

The Angus Local Plan Review, formally adopted in February 2009, establishes the Council's land use planning policies in relation to dealing with renewable energy proposals. This Implementation Guide therefore clarifies and expands on Local Plan Review Policies ER34 Renewable Energy Development and ER35 Wind Energy Development and those factors that will be taken into account in considering and advising on proposals for renewable energy projects in Angus. It also directs developers and other interested parties to other relevant documents, policies, regulations and guidance.

The Implementation Guide has been developed through consultation with a wide range of stake holders.

A Strategic Environmental Assessment of the Implementation Guide has also been undertaken and the Environmental Report is published alongside the Implementation Guide and submitted to the Scottish Gateway.

Angus Council
June 2012

Glossary

Watt (W)	a unit of power defined as one joule per second measures the rate of energy conversion
Kilowatt (kW)	equal to one thousand (10^3) watts. One kilowatt of power is approximately equal to 1.34 horsepower. The average annual electrical energy consumption of the average UK household is approx 4,700 kilowatt-hours
Megawatt (MW)	equal to one million (10^6) watts. A large residential or commercial building may consume several megawatts in electric power and heat. Nuclear power plants have net summer capacities between about 500 and 1300 MW
Gigawatt (GW)	equal to one billion (10^9) watts or 1 gigawatt = 1000 megawatts. This unit is sometimes used for large power plants or power grids
Wind croft	development of group of 3 small (less than 15m) wind turbines
Wind cluster	development of group of three or four turbines 15-50m
Wind farm	development of three or more turbines over 50m
Run of river	A hydro electric scheme that abstracts water depending on the flow available within the watercourse at any given time. No storage reservoir.
ZTV	Zone of Theoretical Visibility – a mapped visualisation of the areas over which a development can theoretically be seen.
VIA	Visual Impact Assessment - part of the LVIA process, which considers potential changes that arise to available views in a landscape from a development proposal, the resultant effects on visual amenity and people's responses to the changes
LVIA	Landscape and Visual Impact Assessment - a standard process for examining the landscape and visual effects of a development.
SAS	Scottish Government on-line planning Specific Advice Sheet
Sensitive Properties	Residential properties including care homes; educational buildings, hospitals, cemeteries; some visitor facilities and accommodation; and proposed development areas
EIA	Environmental Impact Assessment - the process by which the identification, prediction and evaluation of the key environmental effects of a development are undertaken, and by which the information gathered is used to reduce likely negative effects during the design of the project and then to inform the decision-making process.
ALPR	Angus Local Plan Review 2009
DASP	Dundee and Angus Structure Plan 2002
HSE	Health and Safety Executive

Contents

Appendices

*The print maps are illustrative of detailed information that can be accessed via the web-based version of the Implementation Guide, They are intended to indicate the location and range of International, National and Local designation within the ALPR area.

1. Purpose and Scope of this Implementation Guide

1.1 Context

Tackling climate change is, potentially, one of the biggest challenges we face. In 1992 the United Nations Framework Convention on Climate Change (http://unfccc.int/2860.php) was adopted as the basis of a global response to the problem. Signatory governments have since agreed to reduce emissions which contribute to climate change and global warming. To help achieve this, the Scottish Government set initial targets to generate 80% of Scotland's electricity (8GW) from renewable sources by 2020, with an interim target 31% by 2011 (5GW). In May 2011 the Scottish Government announced that the 2011 interim target had been exceeded and raised the renewable energy target for 2020 to 100% and 16GW of installed capacity. The planning system will contribute to achieving these targets by ensuring that projects are well located and designed.

The Angus Local Plan Review establishes the development plan policies to be taken into account when assessing proposals for renewable energy projects – policies ER34 Renewable Energy Development and ER35 Wind Energy Development.

In support of the development plan position the Implementation Guide provides:-

- more detailed information and clarification of the main factors that will be taken into account in considering and determining renewable energy proposals in Angus;
- an application checklist (Section 3.3);
- specific guidance for landscape and visual assessment issues in relation to wind turbines (Section 4); and
- specific guidance for guidance on noise assessment in relation to wind turbines (Section 5).

Commentary on technical constraints such as landform, access to the transmission network, accessibility, etc is included as these may have implications for effective development. The Implementation Guide also directs developers and other interested parties to relevant documents, policies and regulations.

Angus Council has reservations about mapping specific areas of search and constraint for wind energy proposals. The identified constraints will naturally restrict development opportunity, but need not prevent it. Applying cumulative impact as a significant constraint is problematic - as each planning application approved alters the potential cumulative impact. Also, there is not a direct correlation between the number of wind energy proposals and the degree of impact. It is appropriate to consider each proposal within the development context of each application rather than apply a theoretical limit. (The Council expressed concerns during the consultation on SPP 6 Renewable Energy Development in 2006, relating to the 20MW threshold in the Location Framework given that the area, turbine size and siting are the cause of impact, not output. Committee Report 1196/06 can be viewed at www.angus.gov.uk/ccmeetings/reports-committee2006/infrastructure/1196.pdf)

1.2 Supporting Documents

This Implementation Guide has been prepared under the provisions of the Town and Country Planning (Scotland) Act 1997 and is subject to the following supporting assessments:-

- Strategic Environmental Assessment
  This Implementation Guide qualifies for the requirements of a Strategic Environmental Assessment (SEA) under the Environmental Assessment (Scotland) Act 2005. An Environmental Report (ER) has been prepared which illustrates the SEA process and all potentially significant environmental effects associated with the Implementation Guide.

- Habitats Regulation Assessment
  Consideration has been given to the requirements of the EC Habitats Directive (92/43EEC) as applied in Scotland through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). The Angus Local Plan Review 2009 and the policies that are the subject of this Implementation Guide (ER 34 and ER35) have been subject to an Appropriate Assessment.

  There is no requirement to apply the Regulations to the Implementation Guide. The existing local plan policies aim to protect all sites designated for their natural heritage value from adverse impacts. In addition, any subsequent proposals for renewable energy development will be subject to specific environmental regulation.

- Equalities Impact Assessment screening determined full Equality Impact Assessment in not required.

2. Renewable Energy Overview

Planning permission will be required for most renewable energy developments from either the local planning authority or the Scottish Government. Some small scale renewable energy proposals on both domestic and non domestic buildings are allowed under Permitted Development Rights as defined in Planning Circular 2/2010 http://www.scotland.gov.uk/Publications/2010/03/05114236/0 and as amended in 2010 http://www.oqps.gov.uk/legislation/ssi/ssi2010/ssi_20100027_en_1 and Circular 2/2011 http://www.scotland.gov.uk/Publications/2011/03/17092643/0

There are a wide range of renewable energy technologies which may be considered, and in many cases the scale of the proposal correlates with the scale of potential planning matters that may arise. It should be noted that some developments will also require to be considered under other legislation including, noise, emissions, pollution control which are not part of the planning process and may therefore require additional consents or licences.

2.1 Hydro

The primary source of hydroelectric power in Angus is anticipated to be run of river schemes where water is abstracted from a water course, diverted through pipes to a turbine and returned to the water course. The main elements for the panning system include:-

- Water abstraction – usually by a low, ground or underwater intake weir;
- Pipeline route;
- Turbine house and ancillary structures;
- Water return – usually in the form of a tailrace;
- Access routes; and
- Effect on the water course and its ecology.

Where dams are constructed these are likely to be small scale and planning matters will include:-

- Location and scale of the dam itself;
- Turbine house and other associated structures;
- Outflow/spillway; and
- Hydrogeology.

In all cases the transmission of power, construction works/compound and access routes, and environmental impact should be considered by the applicant.

Landscaping and planting proposals may reduce landscape and/or visual impact and improve biodiversity.

2.2 Bio-energy

Bio-energy or biomass ranges from small scale domestic boilers up to major commercial generators. The main issues will relate to commercial electricity generation, but proposals for domestic bio-energy facilities will still require to demonstrate there are no unacceptable adverse effects, particularly emissions. For commercial generators, not only are there the effects of the plant itself to consider, but the Scottish Government has indicated that fuel source over the life of the plant will be a valid planning consideration to ensure sustainable bio-energy can be sourced. While woody biomass is the major source, there are projects based on straw, distillery waste etc. These later sources are likely to be utilised in smaller facilities, often based around an existing business and reducing their energy costs. The primary planning issues relating to large biomass plants will include:-

- Scale, design and location;
- Emissions;
- Fuel Source;
- Access; and
- Storage facilities.

2.3 Landfill Gas

There will be limited opportunity for this method of generation in Angus, given limited landfill sites and the current waste to heat plant in operation at Lochhead Landfill site. The main planning issues will relate to:-

- Suitability of the location in terms of design and compatibility with surrounding land uses etc. Obviously the choice of location will be restricted by where landfill sites are located;
- Emissions; and
- Design.

2.4 Solar/photovoltaics

There has been no large scale commercial proposal in Angus to date. The primary interest is for roof mounted or free standing arrays associated with existing or proposed properties. In many cases small scale proposals are permitted development, but localised planning concerns can arise and include:-

- Visual impact and surrounding amenity;
- Visual impact where the property is a Listed Building or within a Conservation Area and compatibility with these designations;

2.5 Anaerobic Digestion

This generation method is likely to be of interest to the agriculture and food processing sectors in Angus, where biodegradable waste and farm slurry can be used to generate methane to produce heat and/or electricity. It is a constant and manageable process with a product that can produce energy for onsite or offsite use. The primary planning considerations relate to:-

- Siting and location;
- Fuel source and the implications of importing material to the proposed site;
- Landscape and visual impact; and
- Proposed management and mitigation measures.

There are three types of digester which relate to the temperature of the process:

1. Psychrophylic (15-25^{0}C) – stable and easy to manage but slow.
2. Mesophylic (35-40^{0}C) – process takes 15 to 20 days, but process robust, simple and relatively cheap.
3. Thermophylic (50-60^{0}C) – 12 to 15 days with higher conversion but more complex and costly.

Mesophylic or thermophylic digesters provide higher yields, and can require less space. The process and plant are flexible enough to meet the needs of farm units, through food processing to municipal organic waste disposal.

Proposals may also require to meet regulations relating to emissions, odour and noise.

2.6 Onshore Wind

Development proposals range from small single turbines to major windfarms subject to S36 of the Electricity Act, which are the responsibility of the Energy Consents and Deployment Unit of the Scottish Government. This is the primary area of renewable

energy proposals in Angus and the planning considerations are strongly influenced by the scale and location of the proposal including:-

- Landscape and visual impact;
- Potential adverse effects on designated natural and built heritage sites, protected species;
- Impact on residential amenity, soils and water bodies; and
- Access

2.7 Offshore Wind

Applications for offshore wind farms are submitted to and processed by Marine Scotland. Angus Council has the opportunity to feed into this process through consultation at all stages and to date input has been made on the proposals at Inchcape, Seagreen Phase 1, 2 and 3, and Neart na Gaoithe. The Council is also actively involved in the development for the landfall and transmission of the energy from Seagreen and Inchcape in Angus.

3. Guidance for Applicants

3.1 The land use planning context

The context for renewable development proposals is summarised below.

Table 1: Land Use Planning Context

The **National Planning Framework 2** (NPF2) • aims to 'realise the potential of Scotland's renewable energy resources and facilitate the generation of power and heat from clean, low carbon sources, including … producing heat and power from renewable sources …' • requires 'landscape and visual impacts … to be important considerations in decision-making on developments' • identifies major infrastructure projects needed to deliver the national strategy, including the electricity grid through Angus. http://www.scotland.gov.uk/Resource/Doc/278232/0083591.pdf;
Scottish Planning Policy (SPP 2010) - planning is about:- • where development should happen; • where it should not; and • how it interacts with its surroundings. This involves promoting and facilitating development while protecting and enhancing the natural and built environment in which we live, work and spend our leisure time. http://www.scotland.gov.uk/Resource/Doc/300760/0093908.pdf
Planning Advice Notes (PANs) provide information and advice on technical planning matters including:- • web based Renewables Advice http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables • PAN 45 Annex 1 Planning for Micro Renewables (2006) http://www.scotland.gov.uk/Publications/2006/10/03093936/0
Dundee and Angus Structure Plan:- makes positive provision for renewable energy generating developments where they are compatible with other environmental and community interests.
Angus Local Plan Review aims to promote:- • renewable energy development and • low or zero carbon emissions in new development. www.angus.gov.uk/localplan/
The **Implementation Guide** aims to:- • clarify and expand policies ER34 : Renewable Energy Development and ER35 : Wind Energy Development: and • support the Council's climate change commitment
Under the **Electricity (Scotland) Act 1989**, Scottish Ministers determine applications for large scale renewable energy (Section 36) and overhead power lines and associated infrastructure (Section 37). Further information on Section 36 and Section 37 consents

procedures can be found at www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/ The established thresholds are as follows:-	
Scottish Ministers	**Local Authorities**
onshore windfarms > 50MW	onshore windfarms < 50MW
	offshore wind farms < 1MW
Wave, tidal and hydroelectric schemes >50MW	Wave, tidal and hydroelectric schemes <50MW
overhead power lines and associated infrastructure	
large oil and gas pipelines	

3.2 Development Plan Context

The statutory development plan provides the basis for assessing development proposals and determining applications including those for renewable energy development. In Angus it comprises:-

- Dundee and Angus Structure Pan 2002 (DASP) - establishes strategic policy, and reflects national planning policy at the time. It makes positive provision for renewable energy generating developments where they are compatible with other environmental and community interests. Environmental Resources Policy 10: Renewable Energy also requires local plans to establish detailed criteria based policy, locational guidance and where appropriate areas of search for individual sources of renewable energy. www.angus.gov.uk/structureplan/

- Angus Local Plan Review 2009 (ALPR) - establishes the detailed policy basis for development management in Angus, including renewable energy development. That part of Angus within the Cairngorms National Park is excluded. www.angus.gov.uk/localplan/

- Cairngorms National Park Local Plan (2010) - applies to the Upper Angus Glens (see Figure 1) and is not covered by this Implementation Guide. http://www.cairngorms.co.uk/park-authority/planning/

The Planning etc. (Scotland) Act 2006 introduces Strategic Development Plans (SDPs) for the four City Regions of Aberdeen, Dundee, Edinburgh and Glasgow and Local Development Plans (LDPs) to replace current structure and local plans. The Strategic Development Plan Authority for the Dundee City Region is a partnership of Angus, Dundee City, Fife and Perth & Kinross Councils. When approved, TAYplan (the Strategic Development Plan) will replace the current approved Structure Plans of the four local authorities. Progress on TAYplan can be viewed at www.tayplan-sdpa.gov.uk

The Development Plan is supportive of renewable energy in principle, and the ALPR establishes criteria against which renewable energy proposals will be assessed. Policy ER34 addresses potential adverse impacts that could arise. Development proposals for wind energy are also considered within the context of ER35 and related text. The full wording of the policies is set out in Appendix 2. These policies provide the basis for the more detailed guidance contained within this Implementation Guide. The ALPR contains a range of other policies against which any development proposal is considered, and where relevant the Implementation Guide will refer to these in the context of renewable energy projects.

Although community owned renewable energy generation is supported in principle where proposals are compatible with development plan policy, it must be made clear that negotiating or securing local community benefit is wholly separate from the planning application process. Angus Council's position is set out in Para 3.86, page 97 of the adopted Angus Local Plan Review. It is however recognised that where renewable energy schemes accord with the development plan there may be opportunity to secure contributions from developers for local community initiatives. However any such negotiations between the community and developers and any local contributions secured are totally separate from the land use planning and planning gain processes and will not be considered as part of any planning application. Such local community benefit initiatives will therefore not fall within the obligations required under Section 75 Planning Agreements and will require to be managed by other means.

Proposals for renewable energy development in that part of Angus within the Cairngorms National Park, will be determined by the Cairngorms National Park Authority (CNPA) within the context of the polices of the Cairngorms National Park Plan. Renewable Energy proposals within Angus that may affect the National Park, or its setting, will be referred to the CNPA for comment, and their views taken into account by Angus Council in the determination of any planning application.

3.3 Applications Checklist

In accordance with the Land Use Planning Context outline above, Table 2: Applications Checklist summarises the supporting information that may be required to accompany a planning application for renewable energy development. This is an aid for applicants, and for detailed information should be read in conjunction with the rest of this Implementation Guide, the Development Plan and other relevant legislation, policy and advice.

Table 2: Applications Checklist

The checklist is designed to identify the supporting information required to determine a planning application for renewable energy development. The information should be proportionate to the proposal, and the checklist indicates the requirements for different technologies and scales of development. It is intended as an aid to applicants, and whilst it aims to be comprehensive there may be site specific considerations or changes to legislation or guidance from the Scottish Government and statutory agencies. Applications will be considered in the context of current guidance.

	Wind Energy Development (Height to blade tip unless otherwise stated)				**Other Renewable Energy Development**
	Turbine height up to 15m	**Turbine height 15 - 50m**	**Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height**	**Projects > 50MW (Section 36 applications)**	
Landscape and Visual Representation	Technical information from the turbine supplier often adequate. Photomontage may be requested to illustrate relationship. Eight figure grid reference for each proposed turbine	Basic level of VIA should include :- • ZTV map covering an area up to 20km (radius) from the turbine; • wireline drawings and/or photomontages from a limited number of key viewpoints: • viewpoints to be agreed with Angus Council, and SNH where appropriate: • design statement may be required in the case of multiple turbines; and • eight figure grid reference for each proposed turbine	Full Landscape and Visual Impact (LVIA) should address the sensitivity, magnitude and significance of landscape and visual impact and include: • ZTV map covering an area up to 35km (radius) from the turbine; • wireline drawings and/or photomontages from key viewpoints; • assessment of landscape sensitivity, magnitude of change and residual impacts. • viewpoints to be agreed with Angus Council, and SNH where appropriate; • design statement identifying design objectives and process; and • eight figure grid reference for each proposed turbine.		VIA or LVIA may be required for larger structures depending on scale, type and location of the proposal.

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	Wind Energy Development (Height to blade tip unless otherwise stated)				Other Renewable Energy Development
	Turbine height up to 15m	**Turbine height 15 - 50m**	**Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height**	**Projects > 50MW (Section 36 applications)**	
		Where proposals are within the ALPR area but may affect the Cairngorms National Park or its setting, applicants are advised to consult the Cairngorms National Park Authority. Applications.			
Cumulative Assessment	A significant constraint to potential wind energy development. The proposals eligible for inclusion in a Cumulative Assessment is dynamic. An appropriate date for baseline data should be agreed with the authority and relevant proposals identified and agreed with Angus Council prior to commencement. Cumulative assessments will normally be required where turbines are >50m to blade tip. The assessment will require to take account of agreed existing/proposed developments over 50m. They may also require to consider agreed existing/proposed smaller turbines where they visually interact with the proposal. Cumulative assessments have not normally been required where turbines are 25-50m to blade tip, but as more turbines under 50m are constructed, a cumulative assessment may be required if turbine density within the area of a ZTV map is deemed to have a potentially unacceptable cumulative impact.				Depending on scale, type and location of the proposal there may be a requirement to assess its impact in conjunction with other existing or proposed development.
		A cumulative ZTV (CZTV) should be produced on a clear and legible 1:50k Ordnance Survey Base plan. The CZTV would typically have a radius of up to 60km, in accordance with SNH guidance. The CZTV should:- 1. include all consents and operational turbines over 50m to blade tip; 2. include extant planning consents and submitted applications which pre-date the submission and which are assessed by the Council to have a realistic expectation of a decision within 12 months; 3. include turbines under 50m (applications at an advanced stage, consents or operational) depending on their scale and location in relation to the application site i.e. visual interaction. This will only apply in specific circumstances;			

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	Wind Energy Development (Height to blade tip unless otherwise stated)				Other Renewable Energy Development
	Turbine height up to 15m	**Turbine height 15 - 50m**	**Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height**	**Projects > 50MW (Section 36 applications)**	
		4. include consented and proposed offshore proposals; 5. other relevant proposals in the public domain; 6. viewpoints for cumulative assessment, selected to provide representative views of all intervisible turbines, not from viewpoints selected to assess the application site. For example, a viewpoint may provide views in succession as defined by SNH (SNH Cumulative Effect of Windfarms (revised 2005)); and 7. Cumulative assessments to address effects in combination; in succession; in sequence and perceived in accordance with SNH Cumulative Effect of Windfarms (revised 2005) http://www.snh.gov.uk/docs/A305440.pdf Following the production of a CZTV, proposed viewpoints should be added and submitted to Angus Council for approval prior to carrying out the assessment. Angus Council does not use file share software. All submissions should be provided in a format which permits high resolution images to be provided. The use of CDs is advised.			
Environmental Impact Assessment (EIA)	An EIA will not generally be required.	Environmental Impact Assessment (EIA) may be required under the terms of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011:- • a Screening Opinion should be sought for turbines over 15m; more that 2 turbines; or located in a 'sensitive area'* to determine whether the development requires EIA under the terms of Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011. taking account of the selection criteria in Schedule 3 of the Regulations as laid reproduced in ANNEX A of Planning Circular The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 http://www.scotland.gov.uk/Publications/2011/06/01084419/10 • scoping for the Environmental Report should be prepared in accordance with ANNEX B of Planning Circular The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011			EIA may be required under the terms of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011

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	Wind Energy Development (Height to blade tip unless otherwise stated)				Other Renewable Energy Development
	Turbine height up to 15m	**Turbine height 15 - 50m**	**Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height**	**Projects > 50MW (Section 36 applications)**	
		• an EIA will require to demonstrate potential impacts, including length and significance of effect and mitigation measures for all components of an application • where EIA is not be required, environmental information may still be required to consider agreed impacts. * Sensitive Areas are defined in the Regulations as :- Sites of Special Scientific Interest; Land subject to Nature Conservation Orders; International Conservation Sites; National Scenic Areas; World Heritage Sites; Scheduled Monuments; and National Parks.			
		Formal screening requests and determination will be publically available. Screening Determinations are valid for 12 months.			
Natural Heritage Designation	Applicants can use SNHi to check protected areas .	Applicants are advised to refer to SNH Small Scale Wind Energy Guidance and to use SNHi to check protected areas within a 20km radius of the proposal. http://www.snh.gov.uk/publications-data-and-research/snhi-information-service/			
	International and National Designation – Supporting information must demonstrate that proposals (including all associated works) will not affect such sites to an unacceptable degree. Where proposals may have a significant effect on European Sites (SAC or SPA), they should be screened in accordance with the Habitats Regulations Directive. A Habitats Regulation Appraisal may be required. Where mitigation measures are proposed these must be shown to be:- • achievable; • agreed with SNH and any organisation responsible for managing the designated site or with responsibility for the maintenance of				

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	the site and the integrity of the reason for its designation; and • subject to planning conditions or a Section 75 agreement as appropriate.
	Other Natural Heritage designations should be accorded appropriate protection and/or mitigation http://www.taysidebiodiversity.co.uk/

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	Wind Energy Development (Height to blade tip unless otherwise stated)				Other Renewable Energy Development
	Turbine height up to 15m	**Turbine height 15- 50m**	**Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height**	**Projects > 50MW (Section 36 applications)**	
Historic Environment	Supporting information should identify historic and archaeological sites affected by the proposal, proportionate with the scale and number of turbines; the effect of the proposal and all associated works on the integrity of a site, its setting; requirements for archaeological survey and recording; and any proposed mitigation measures.				
	Guidance on assessing impacts on historic views has recently been published by English Heritage and may be used to inform the Council's assessment of wind energy developments. http://www.english-heritage.org.uk/content/publications/docs/seeing-history-in-view.pdf				
Noise Assessment	Where a noise assessment is required the methodology and cumulative considerations must be agreed with Angus Council Environmental and Consumer Protection. Failure to agree the methodology or to provide sufficient information may result in the application being recommended for refusal on the basis of lack of information. (See Section 5)				
Peat and soils	Where proposals affect peat soils, applicants should demonstrate carbon savings are calculated in accordance with Scottish Government advice and that SEPA and SNH have been consulted. http://www.scotland.gov.uk/Resource/Doc/229725/0062213.pdf A peat depth survey will be required where appropriate.				
	Development should minimise disruption to soils in accordance with the Scottish Soils Framework http://www.scotland.gov.uk/Resource/Doc/273170/0081576.pdf				
Water Environment	Development proposals should not lead to the deterioration in the condition of any water body, in accordance with the Tay Area Management Plan.				
		Where proposals are within the source catchment area of any private water supply potential impact must be considered and, if necessary, mitigation measures implemented			

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	Supporting information should include a drainage assessment as appropriate.

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<table>
<tr><td></td><td colspan="4">Wind Energy Development
(Height to blade tip unless otherwise stated)</td><td>Other Renewable Energy Development</td></tr>
<tr><td></td><td>Turbine height up to 15m</td><td>Turbine height 15 - 50m</td><td>Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height</td><td>Projects > 50MW (Section 36 applications)</td><td></td></tr>
<tr><td></td><td colspan="5">Identify pollution risk and mitigate through the provision of buffer zones to protect wetland and private water supplies as appropriate</td></tr>
<tr><td>Air Quality</td><td></td><td></td><td></td><td></td><td>Proposals for bio-energy and anaerobic digestion may require an air quality impact assessment</td></tr>
<tr><td>Residential Amenity</td><td colspan="2">Assessment to include properties agreed with Angus Council subject to:-</td><td colspan="2">Assessment to include properties within a 2km radius of the proposed turbine(s) subject to:-</td><td rowspan="2">Amenity to be addressed within the context of Policy S6 and Schedule 1 as appropriate. Other amenity controls will be enforced through the relevant agencies including SEPA and HSE</td></tr>
<tr><td colspan="4">• scale of turbine and blade size;
• existence of buffers including woodland, buildings, landform; and
• location and aspect of primary rooms and garden ground,</td></tr>
<tr><td></td><td colspan="4">Turbines should generally be a minimum of 10 times rotor diameter from sensitive properties* to avoid the potential effects of shadow flicker.

* Sensitive properties include:- residential properties including care homes; educational buildings, hospitals, cemeteries; some visitor facilities and accommodation; and proposed development areas</td><td></td></tr>
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	Wind Energy Development (Height to blade tip unless otherwise stated)				Other Renewable Energy Development
	Turbine height up to 15m	**Turbine height 15 - 50m**	**Turbine height greater than 50m OR groups of 6 or more turbines in excess of 25m height**	**Projects > 50MW (Section 36 applications)**	
Access and Traffic Management	Access likely to be feasible within existing road network Angus Council Roads Division will be consulted.		Access to be agreed with Angus Council Roads Division.	Access arrangements and traffic management plan and suitable route for large vehicles to be agreed with Angus Council Roads Division. Any required road improvements to be implemented prior to commencement of construction.	Access to be agreed with Angus Council Roads Division, including management plan and suitable route for large vehicles where necessary.
	Any new tracks to be included in the planning application, supporting information and decommissioning /reinstatement agreement.				
	Transport Scotland advise that a wind turbine should be located no closer than 1.5 x the Wind Turbine height to the nearside Trunk Road kerb line. For the avoidance of doubt the nearside kerb line is either the kerb of the live carriageway or the nearside heel kerb of the Trunk Road footway if present. Angus Council will apply this principle to all turbine proposals adjacent to a public road, for reasons of road safety.				
Other	Supporting information should include reasons for site selection and evidence of viability				
	Where proposals are within the Cairngorms National Park Area, they will be referred to, and may be called in for determination by, the Cairngorms National Park Authority.				
	Where proposals are located on the coast, applications should demonstrate they have been assessed within the context of the developer/undeveloped coast as defined in the SPP and Angus Local Plan Review and Shoreline Management Plan for Angus. Advice on the sustainable use of the Tay Estuary and adjacent coastal waters can be found in the Management Plan published by the Tay Estuary Forum (http://www.dundee.ac.uk/crsem/TEF/PDFS/Management%20Plan%20Final.pdf)				

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3.4 Additional Guidance for ALPR Policies ER34 and ER35

Sections 3.4 and 3.5 expand on each of the two main policies and the specific criteria and sets out in more detail those matters that will be taken into account in considering and assessing development proposals. Interconnection with other policies and background information sources is also highlighted.

Policy ER34: Renewable Energy Developments
This policy sets the criteria against which all renewable energy proposals will be assessed, and where wind turbines are proposed should be read in conjunction with policy ER35. Other development plan policies will be applied where appropriate.

Policy ER34: Renewable Energy Developments ***Proposals for all forms of renewable energy developments will be supported in principle and will be assessed against the following criteria:-***

In all instances 'renewable energy developments' encompass all works associated with the proposal including formation and extension of, or improvement to, access tracks, areas of hard standing/external storage areas, borrow pits, landscaping and bunding, foundations, sub-stations, equipment cabins and any other related or ancillary works and structures . The following policy guidance applies to all renewable energy proposals as appropriate:-

Criterion (a)
'the siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;'

The choice of apparatus and its siting can significantly affect the appearance/impact of a renewable energy installation. 'Apparatus' includes generating equipment and ancillary structures such as transformer houses, transmission infrastructure, and storage facilities.

Wind and water powered renewable energy schemes, tend to be located within the rural landscape and their design should reflect this. Well sited and designed developments can, at best, enhance their setting or at least minimise potential impacts. Poorly sited or designed development can do the opposite – and may have an adverse impact on amenity for decades to come. Appropriate landscaping and planting can help a building or other appropriately scaled structure to blend into the landscape.

Where development proposals will impact on residential or recreational amenity, the choice of equipment may be of particular importance. Wind turbines for example should be chosen to reflect the scale of the landscape, light and visibility conditions and should respect residential amenity including noise and shadow flicker. Hydro-electric dams should be designed to respect the scale, colours and contours of the surrounding landscape.

It is accepted that wind energy technology is advancing rapidly and that there is a wide range of turbines available to the market. Initial discussions between the Council and developers should however seek to establish some basic characteristics such as proposed number and size of turbines, height (hub and blade tip), blade

number, colour and style although it is recognised that this may be amended as the project feasibility is developed. Similarly where a full planning application is submitted this must include details of all aspects of the proposal. Where a specific proposal has been approved by the Council any alteration to that project must be agreed in writing with the Council prior to implementation.

Other Relevant ALPR policies
Policy S3: Design Quality
Policy S6: Development Principles and Schedule 1: Development Principles
Policy ER10: Light Pollution
Policy ER11: Noise Pollution

Additional information
Tayside Landscape Character Assessment
http://www.snh.org.uk/pubs/detail.asp?id=310

Criterion (b)
there will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;

Landscape and visual impact varies with the location, scale and type of renewable energy scheme proposed. For example wind turbines tend to be in exposed locations, and visible over a long distance; while hydroelectric schemes may be contained within a river valley; and solar panels fitted to an existing property roof tend to have a localised impact. As the extent and degree of landscape and visual impact increases so to does the need to assess potential cumulative issues and mitigation measures. The supporting information and accompanying visual/graphic information should be commensurate with the scale and location of the proposal.

It is likely the small hydro proposals will continue to come forward, and where they can be accommodated without detriment to the local environment and water courses, will be supported. Larger schemes can generate greater impact on water courses, fish, and the surrounding area as the diversion of water is much greater and more evidence of impact and mitigation will be required in order to determine any planning application. . Where river dams and associated buildings are proposed landscaping, contouring and planting can help structures blend into their setting, whilst also promoting biodiversity and habitat creation/enhancement. A range of advice is available for applicants considering hydro schemes including landscape and visual impacts. Consideration of associated infrastructure (pump house, tailrace, access, transmission, pipe routes etc) should be included in supporting information.

All forms of renewable energy development should be considered within their landscape context where applicable, Policy S6: Development Principles and Schedule 1 : Development Principles will form the basis for the assessment of small scale proposals, which have a local impact only. Scottish Natural Heritage has developed a series of Advice Notes on assessing the landscape impact of a range of renewable energy developments on the landscape, and their advice will be sought by the Council as appropriate.

Landscape and Visual Impact of Wind Turbines

Wind turbines are likely to have the greatest landscape and visual impact over the greatest distance and this aspect is addressed in Section 4 Landscape and Visual Assessment of Wind Energy Proposals.

Other Relevant ALPR policies

ER5: Conservation of Landscape Character
ER12: Development Affecting Conservation Areas
ER16: Development Affecting the Setting of a Listed Building
ER18: Archaeological Sites of National Importance
ER19: Archaeological Sites of Local Importance
ER20: Historic Gardens and Designed Landscapes
ER29: Coastal Development

Additional information

Scottish Natural Heritage (SNH) provides a comprehensive range of advice regarding landscape and visual impact on the natural heritage while Historic Scotland, Architecture and Design Scotland (ADS) and the local planning authority can advise on the built environment. Design statements can help applicants preparing development proposals to consider and articulate the processes undertaken in reaching final layout, siting and design and help inform the decision making process.

SNH Policy Statement 02/02 Strategic Locational Guidance for Onshore Windfarms in respect of Natural Heritage (updated 2009).
www.snh.gov.uk/docs/A247182.pdf
Associated Maps –
www.snh.gov.uk/docs/C208971.pdf
www.snh.gov.uk/docs/C208972.pdf
www.snh.gov.uk/docs/C208973.pdf
www.snh.gov.uk/docs/C208974.pdf
www.snh.gov.uk/docs/C208975.pdf

SNH Visual Representation of Windfarms (2006)
www.snh.gov.uk/docs/A305436.pdf

SNH Visual Assessment of Windfarms Best Practice (2002)
www.snh.gov.uk/docs/A305437.pdf

SNH Siting and designing Windfarms in the Landscape (2009)
www.snh.gov.uk/docs/A317537.pdf

Renewable energy technologies and the potential impacts on landscape and nature
http://www.snh.gov.uk/planning-and-development/renewable-energy/

Guidance on Hydro electric Schemes and the Natural Heritage
http://www.snh.gov.uk/docs/C278964.pdf

Aiding the Hydro-scheme development process - web-links to useful information sources
http://www.snh.gov.uk/docs/C252875.pdf

Tayside Landscape Character Assessment
www.snh.org.uk/pubs/detail.asp?id=310

Angus Windfarms – Landscape Capacity and Cumulative Impacts Study (2008)
www.angus.gov.uk/devcontrol/LandscapeCapacityandCumulativeImpactAssessmentFinal.pdf

Historic Scotland - Scottish Historic Environment Policy (SHEP)
www.historic-scotland.gov.uk/index/heritage/policy/shep.htm

Criterion (c)
the development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;

There are a number of sites throughout Angus designated for their built, cultural, biodiversity, and natural heritage qualities. These range in scale from individual listed properties up to extensive areas such as Montrose Basin or that part of Angus designated as part of the Cairngorms National Park. Their value is established, and they are safeguarded for present and future generations, through legislation. The integrity of such designations may be affected by activity beyond site boundaries and even into other authorities. Much will depend on the details of an individual proposal – scale, location and type. In assessing development proposals, priority will be given to the maintenance of the quality of the built and natural heritage. Where appropriate, mitigation measures should be investigated and their efficacy demonstrated to ensure compatibility with protected sites.

Natural heritage and scientific designations are subject to a range of legislation, policy, and guidance. Development proposals must be able to demonstrate that there will be no unacceptable direct or indirect adverse affects on the integrity of designated sites or the reason for their protection. There is a hierarchy of designated sites, habitats and species ranging from international to local significance with levels of protection proportionate to status. Where remediation measures can successfully redress potential adverse impact, these must be agreed with the relevant advisory agency and subject to a planning condition or legal agreement.

There are no international designations within the ALPR area, but there are a number of European sites (SPAs and SCAs) including The River Tay, River South Esk and Firth of Tay SACs and SPAs at Montrose Basin, Kinnordy and Lintrathen Lochs and the Firth of Tay.

There are no local nature conservation sites designated within Angus to guide developers, but where locally important habitat or beauty spots are affected, these should be afforded appropriate protection. Local factors will be assessed as part of the consideration of development proposals and where identified through EIA screening and scoping studies should be addressed by supporting information.

Where a proposal affects a designated site an Environmental Impact Assessment may be required, depending on the scale of the proposal and anticipated impact. Proposals which come within the provisions of the Electricity Act 1989 will require to meet the terms of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000.
www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Guidance/EIA-Guidance

Sites and areas designated for historic and archaeological reasons are also subject to a range of policy, guidance and legislation. No World Heritage Sites have been identified within Angus, and Historic Scotland is responsible for the protection of sites of national and international status. Angus Council is responsible for determining applications for Listed Building Consent (LBC) and the identification of Conservation Areas and their subsequent protection. Protection of the built heritage extends beyond the actual property and curtilage to encompass its character and setting. This includes Historic Gardens and Designed Landscapes; all listed buildings; and scheduled ancient monuments. Historic Scotland and the Council's

Archaeological Service are consulted as appropriate. Where local archaeological sites and areas are known, or suspected, the Council will seek advice on the assessing and recording of any features.

Appropriate Level of Assessment

Proposals of more than two turbines or a hub height more than 15m tall, or and hydroelectric scheme with a capacity of over 0.5MW, fall within Schedule 2 of the Environmental Impact Assessment (Scotland) Regulations 2011. Such applications and those within or affecting:

- Sites of Special Scientific Interest
- Land subject to Nature Conservation Orders
- International Conservation Sites
- National Scenic Areas
- World Heritage Sites
- Scheduled Monuments and their settings
- National Parks.

may require a screening opinion from the planning authority to determine whether a formal EIA of the proposed development is required.

Where appropriate, proposals will be judged in conjunction with the consultation agencies as to whether a formal EIA is required. While only a small proportion of development proposals are likely to require EIA, an EIA is *not* discretionary if significant effects on the environment are likely and should be prepared in accordance with the relevant legislation and guidance listed below.

Where a development is of a scale or in a location where a formal EIA is deemed not necessary, the applicant must submit a planning statement on impact, including any proposed mitigation measures. In the case of wind turbines, the statement should address the constraints identified in the SAS for Onshore Wind Turbines. The level of detail should also reflect the scale and location of the proposal.

Guidance can be obtained from SNH, in their publication Hydroelectric Schemes and the Natural Heritage http://www.snh.gov.uk/docs/C278964.pdf

Other Relevant ALPR policies

Policy ER1: Natura 2000 and Ramsar Sites
Policy ER2: National Nature Reserves and Sites of Special Scientific Interest
Policy ER3: Regional and Local Designations
Policy ER4: Wider Natural Heritage and Biodiversity

Policy and Legislation

Scottish Government
Planning Circular 3 The Town and Country Planning (Environmental Impact Assessment)(Scotland) Regulations (2011)
http://www.scotland.gov.uk/Publications/2011/06/01084419/10

PAN 58 Environmental Impact Assessment (1998)
http://www.scotland.gov.uk/Publications/1999/10/pan58-root/pan58
EIA Screening Checklist - http://www.scotland.gov.uk/Resource/Doc/212607/0117167.pdf
PAN 2/2011 Planning and Archaeology
http://www.scotland.gov.uk/Publications/2011/081041322003/0

Scottish Government – web based Renewables Specific Advice Sheets
http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables

The Electricity Works (Environmental Impact Assessment) (Scotland) Amendment Regulations 2008 (Revised 2009)
http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Guidance/EIA-Amendment-Regs-2008

Town and Country Planning (Scotland) Act 1997 (As Amended)
Environmental Impact Assessment (Scotland) Regulations 2011

EU Birds Directive and Annex1
EU Habitats Directive and Annexes 1 and 2
Habitats/protectedareas/NATURA

Additional information

IEEM
Guidelines for Ecological Impact Assessment in the United Kingdom
http://www.ieem.net/ecia/impact-assess.html

SNH
Handbook of Environmental Assessment (2009 Draft)
http://www.snh.gov.uk/docs/B460796.pdf
SNH Renewable Energy Information page
http://www.snh.gov.uk/planning-and-development/renewable-energy/
Wild Land
http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/
Guidance on Assessing Connectivity with Special Protection Areas (SPAs)
http://www.snh.gov.uk/docs/A675474.pdf
Soils and Natural Heritage
http://www.snh.gov.uk/docs/A327906.pdf

SNH, Perth and Kinross Council, SEPA and Angus Council
River Tay Special Area of Conservation (SAC) – Advicce to Developers
http://www.snh.org.uk/pdfs/publications/designatedareas/River%20Tay%20SAC.pdf

SNH, SEPA and Angus Council
River South Esk Special Area of Conservation (SAC) – Advicce to Developers
http://www.snh.org.uk/pdfs/publications/designatedareas/River%20South%20Esk%20SAC.pdf

Historic Scotland
Scottish Historic Environment Policy
http://www.historic-scotland.gov.uk/index/heritage/policy/shep.htm
Environmental Assessment
http://www.historic-scotland.gov.uk/index/heritage/policy/environmental-assessment.htm
Gardens and Designed Landscapes
http://www.historic-scotland.gov.uk/index/heritage/gardens.htm

Scottish Government
Historic Environment
http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/historic

Natural Environment
http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/natural-heritage

Angus Council
State of the Environment Report
www.angus.gov.uk/sustainability/pdfs/StateofEnvironment2011.pdf

Cairngorms National Park Authority
http://www.cairngorms.co.uk/resource/docs/boardpapers/22072011/CNPA.Paper.4440.Planning%20Committee.Paper.8.-..Appe.pdf

Criterion (d)
no unacceptable environmental effects of transmission lines, within and beyond the site;

Ancillary works required to transmit electricity from the site should form part of any renewable energy development proposal to ensure their inclusion in any EIA. Where deemed necessary by the planning authority, consideration will be given to undergrounding of cables and pipe work.

Most overhead power lines will be determined by Scottish Government under S37 of the Electricity (Scotland) Act 1989.

Criterion (e)
access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent change to the environment and landscape,

Renewable energy projects, by their very nature, may promote sites which have limited or no existing vehicular access. The construction, repair, maintenance and decommissioning will normally require access by heavy and/or long vehicles over the life of the project. In some cases, there may be a continuation of the life of a scheme with consequent renewal, replacement or upgrading in the longer term.

Any project proposal must therefore prepare and submit a route assessment and traffic management plan, which demonstrates:-

- how access is to be achieved;
- selected routes have been assessed and are capable of accommodating traffic generated;
- traffic management over the construction phase; and
- longer term access requirements.

If road improvements are required, these must be approved by Angus Council Roads division, part of Infrastructure Services. Site access should allow all vehicles visiting the site to have space to manoeuvre to ensure safe access and egress.

The formation of new, or upgrading of existing, tracks over open countryside/uplands should be designed to avoid generating run off/surface water flooding and be re-instated on completion of construction, where they will not be regularly in use.

Provision must be made for the re-instatement of any existing and proposed tracks when the site is decommissioned.

Other Relevant ALPR policies
Policy S2: Accessible Development
Policy S3: Design Quality
Policy S4: Environmental Protection

Policy S6: Development Principles and Schedule 1: Development Principles

Additional information
SNH – Constructed Tracks in the Scottish Uplands (2005)
http://www.snh.gov.uk/docs/A308736.pdf

SNH and Forestry Commission Scotland – Floating Roads on Peat
http://www.roadex.org/uploads/publications/Seminars/Scotland/FCE:SNH%20Floating%20Roads%20on%20Peat%20report.pdf

Scottish Renewables, SNH, SEPA and Forestry Commission Scotland – Good Practice During Windfarm Construction
http://www.snh.org.uk/pdfs/strategy/renewables/Good%20practice%20during%20windfarm%20construction.pdf

Angus Council
The Roads Division is part of the Infrastructure Services Department, Angus Council, County Buildings, Market Street, Forfar, Angus, DD8 3LG
Contact: ROADS@angus.gov.uk

Criterion (f)
that there will be no unacceptable impacts on the quantity or quality of groundwater or surface water resources during construction, operation and decommissioning of the energy plant.

Ground and surface water – including coastal waters, water courses, standing water, peat soils, wetlands and ground water – is an important environmental and commercial asset in Angus. Their identification and quality classification has been established through the Water Framework Directive and the Tay Area Management Plan sets the framework for development that affects them. Applicants will require to demonstrate that development proposals should maintain or enhance ground and surface waters features, not cause deterioration. Groundwater wetlands should be incorporated in Phase 1 Habitat surveys and where appropriate include a buffer zone of 100m between features and roads, tracks and trenches, increasing to 250m for borrow pits and foundations.

Water Supply
The protection of drinking water, both public and private supplies, will be a priority. Where a development proposal is deemed to affect a potable supply the applicant will require to demonstrate there are no unacceptable adverse effects, or how these can be mitigated if feasible. This may include the requirement for a buffer zone of 100m between features and roads, tracks and trenches, increasing to 250m for borrow pits and foundations. Any works within these distances should demonstrate (e.g. through a hydrogeological assessment) that impacts on abstractions are acceptable.

Flooding
The SPP www.scotland.gov.uk/Resource/Doc/300760/0093908.pdf establishes a risk framework which provides a basis for planning decisions where there is a potential flood risk. Development proposals located within, or affecting known flood risk areas, will be considered within the context of this framework and referred to SEPA where necessary. Angus Council Roads are the Flood Prevention Authority and advise on flood prevention and flood risk standards for new roads, car parks and footpaths.

SEPA have produced an Indicative River and Coastal Flood Map which can be viewed at www.sepa.org.uk/flooding/flood_map/view_the_map.aspx

Water Quality

The water environment is a potential constraint to renewable energy development, particularly in relation to construction works. Applicants should demonstrate that

- no unacceptable damage to the water environment will result from their development;
- all pollution risks and mitigation measures during construction, operation and decommissioning have been identified;
- developments are designed to avoid engineering activities (such as culverts) in the water environment; and
- project management is in place to mitigate potential adverse impacts during the construction phase.

Peat Soils

Where peat soils are affected by potential renewable energy development applicants should consider:-

- Ground water contamination;
- Damage to peatland habitat, especially on or adjacent to designated sites. Early consultation with SNH and SEPA is advised where a proposed development is likely to affect peatland or mire systems;
- In relation to wind energy proposals Scottish Government advice on calculating carbon savings should be used when preparing applications. Information on this is available at http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/17852-1/CSavings ;
- Measures to minimise soil disturbance during construction, operation and decommissioning to maximise carbon balance savings; and
- Potential for slippage;
- Need for a peat depth survey to demonstrate that the layout and design of the proposal avoids areas of deep peat and minimises disturbance to other areas of peat.; and
- Procedures for any extraction and disposal of peat during construction.

Applicants should consult SNH and SEPA at an early stage where proposed development is likely to affect peatland or mire systems

Other Relevant ALPR policies

Policy ER27: Flood Risk – Consultation
Policy ER28: Flood Risk Assessment
Policy ER25: Water Resource Protection

Policy and Legislation

Scottish Government
Water Framework Directive in Scotland (WFD)
www.scotland.gov.uk/Topics/Environment/Water/15561/WFD
Flood Risk Management (Scotland) Act 2009
www.scotland.gov.uk/Topics/Environment/Water/Flooding/FRMAct
A Policy Statement on Hydropower and Water Environment Protection
www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/17851-1/HydroPolicy

Additional information

Scottish Environment Protection Agency

The Tay Area Management Plan 2009 - 2015
www.sepa.org.uk/water/river_basin_planning/area_advisory_groups/idoc.ashx?docid=442c3ee6-588d-468f-bbd5-97cbc7de9e38&version=-1
Guidance for hydropower development
www.sepa.org.uk/water/hydropower.aspx
Planning Advice
http://www.sepa.org.uk/planning/energy.aspx
Controlled Activities Regulations (CAR); Guidance for Applicants on Supporting Information requirements for Hydropower Applications
http://www.sepa.org.uk/water/idoc.ashx?docid=358677fe-61f7-4fc9-baab-79cb93671387&version=-1
Engineering Activities in the Water Environment
http://www.sepa.org.uk/planning/engineering-water_environments.aspx

Scottish Government
Wind Farms and Carbon Savings on Peatlands
http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/17852-1/CSavings

Angus Council

Environment and Consumer Protection and Roads Division are part of the Infrastructure Services Department, Angus Council, County Buildings, Market Street, Forfar, Angus, DD8 3LG
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Policy ER 35 Wind Energy Development

Onshore wind turbines are the main subject of renewable energy proposals in Angus. The scale, location and impacts of wind energy developments raise a number of specific issues for consideration and Policy ER35 establishes criteria to aid the assessment of such planning applications.

The ALPR addresses additional issues raised by wind energy development. it identifies three geographic areas –Highland (1); Lowland and Hills (2); and Coast (3) - based on the landscape classification that was developed in the Tayside Landscape Character Assessment (1999) www.snh.org.uk/pdfs/publications/review/122.pdf and SNH Policy Statement 02/02 www.snh.gov.uk/docs/A247182.pdf. The broad geographic areas are shown in Figure 1 (see page 39). The ALPR recognises that the open and exposed nature of the Coast and Highland areas are sensitive to potential landscape and visual impact from turbines. The Lowland and Hills area is recognised as of generally lower sensitivity to turbines in terms of visual, landscape and natural heritage interests. However, there may be areas within the Lowland and Hills Area where large turbines would have an unacceptable impact, or where properly sited and designed wind energy development can be accommodated in areas of higher natural heritage, landscape and visual sensitivity.

Policy ER 35: Wind Energy Development: ***Wind energy developments must meet the requirements of Policy ER34 and also demonstrate:-***
(policy criteria a) - g) are set out and discussed below)

Criterion (a)
the reasons for site selection;

Applicants should present their rationale for site selection. Applicants should demonstrate that proposals are in locations where the technology can operate efficiently. Where a consent lapses, that proposal will be deleted from the Council's database of active proposals. Any re-application will be subject to full cumulative assessment in relation to visual, landscape and environmental impact as appropriate.

Applicants should demonstrate that site selection considered all technical, environmental, amenity, visual and landscape impact and mitigation where feasible.

Other Land Uses
Applicants should demonstrate that their selected site is compatible with other existing land uses and economic activities including:-

- tourism - proximity to visitor attractions such as historic properties, visitor centres, hotels, viewpoints and 'beauty spots';
- leisure and recreation (particularly outdoors) – foot and cycle paths, facilities (particularly outdoors) such as golf courses, activity centres;
- forestry – impact of felling for access and turbine clearance;
- quiet or remote places valued for their tranquillity;
- ancient woodland; and
- tourist routes and viewpoints.

Applicants should also demonstrate where site selection can enhance an area, and provide added value. This could include improving access, parking provision, visitor facilities on site such as interpretative facilities and amenities.

Residential Amenity

Applicants must be able to demonstrate that the site was selected to avoid unacceptable impact on the amenity of occupied residential property. The SPP advises a 2km separation distance between areas of search for windfarms over 20MW and the edge of towns and villages, and confirms the development up to this distance is likely to be a prominent feature in open landscapes. When considering potential visual impact of wind energy proposals on residential amenity, Angus Council will use 2km as a guide. Within 2km of residential properties information required will depend on the scale and location of the individual proposal.'

Applicants should be able to demonstrate that factors such as scale, location and topography will allow the development without unacceptable detrimental effect. Views from principal rooms looking towards a proposed turbine, and extent and location of garden ground will be factors in considering potential impact on residential amenity.

Additional Information

SNH
Historic and Ancient Woodlands
www.snh.gov.uk/land-and-sea/managing-the-land/forestry-and-woodlands/history/

Criterion (b)
that no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to disturbance, displacement or collision;

This criterion applies to areas designated under the European Habitats and the European Birds Directives for their significance to birds (Natura 2000 sites), and to the flight paths of protected species; and those protected under the Convention on Wetlands of International Importance (Ramsar sites). As well as these internationally designated sites, there are a number of nationally important sites such as Sites of Special Scientific Interest (SSSIs) and RSPB significant bird habitats (which are adjacent to and support designated sites at Kinnordy Loch and Montrose Basin). The protection afforded to these sites extends beyond their boundaries to allow for foraging, roosting and flight paths.

There is a growing body of experience on the management and design of wind farms to reduce or prevent unacceptable impact on birds which may help in the design and layout of a proposed wind farm. SNH will advise on bird surveys and guidance on assessing the impacts of wind farms on birds is available on their website at
www.snh.gov.uk/planning-and-development/renewable-energy/onshore-wind/

Other Relevant ALPR policies

Policy ER1: Natura 2000 and Ramsar Sites (4)
Policy ER2: National Nature Reserves and Sites of Special Scientific Interest
Policy ER3: Regional and Local Designations
Policy ER4: Wider Natural Heritage and Biodiversity

Policy and legislation

EU Habitats Directive and Annexes 1 and 2
EU Birds Directive and Annex1
Habitats/protectedareas/NATURA

Additional information
The RSPB and SNH have produced a Bird Sensitivity Map. Details can be found at: www.rspb.org.uk/news/details.aspx?id=tcm:9-179628

Criterion (c)
there is no unacceptable detrimental effect on residential amenity, existing land use or road safety by reason of shadow flicker, noise or reflected light;

Shadow Flicker and Reflected Light
Shadow flicker is where the moving shadow flicker appears through a narrow window opening. The occurrence of flicker can be predicted by calculation, and is therefore identifiable and can be addressed. Scottish Government on–line guidance for Onshore Wind Turbines advises that in most cases the problem can be resolved through separation between wind turbines and nearby dwellings (as general rule 10 rotor diameter).

Turbines can also cause flashes of reflected light, which can be visible for some distance. It is possible to ameliorate the flashing but not to eliminate it. Careful choice of blade colour and surface finish can help reduce the effect.

Noise
There are two sources of noise from wind turbines - the mechanical noise from the turbines and the aerodynamic noise from the blades. Mechanical noise can be reduced through engineering design. Good acoustical design and siting of turbines is essential to ensure there is no significant increase in ambient noise levels as they affect the environment and any nearby sensitive property/receptors. Where appropriate planning conditions will be imposed to control any impact to within reasonable levels. The evaluation of noise will be addressed on a site specific basis, given the range of factors to be considered and further detailed guidance is provided in Section 5 : Noise Assessment for Wind Energy Proposals

Other Relevant ALPR policies
Policy ER11: Noise Pollution

Policy and Legislation
Scottish Government – 1/2011 Planning and Noise
http://www.scotland.gov.uk/Publications/2011/02/28153945/0
Scottish Government - web based Renewables Specific Advice Sheets
http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables

Additional Information
Working Group on Noise and Turbines, Final Report 1996 – ETSU-R-97
www.semantise.com/~lewiswindfarms/FOV1-00021BAE/FOV1-00021BD2/1996:00:00%20ETSU-R-97%20-%20Exec%20Summary.pdf?FCItemID=S000C081A

The Influence of Colour on the Aesthetics of Wind Turbine Generators' – ETSU W/14/00533/00/00

Angus Council Environmental and Consumer Protection is part of the Infrastructure Services Department, Angus Council, County Buildings, Market Street, Forfar, ANGUS DD8 3LG
Contact: ENVHEALTH@angus.gov.uk

Further information turbine noise level prediction can also be found in Section 5 : Noise Assessment for Wind Energy Proposals

Criterion (d)
that no wind turbines will interfere with authorised aircraft activity;

Military Aircraft

There are MOD bases, RAF Leuchars in Fife and RM Condor at Arbroath, with flight paths for landing and take-off which affect Angus. Parts of the area are also subject to low fly zones. Barry Buddon Camp is an army training facility, with live firing capacity.

The approach zones for the Air Traffic Control Radar at RAF Leuchars affect areas across south Angus.. The MOD has commented on/objected to a number of wind energy proposals in South Angus on the grounds of interference with radar resulting in false signals being recorded by air traffic controllers, which can threaten aircraft safety. The safety of military personnel and aircraft will be taken into account by Angus Council in considering planning applications.

Where radar interference is identified as a potential constraint and effective mitigation measures have been agreed with the MOD, these must be submitted in writing to Angus Council. Only where a scheme is demonstrated to be deliverable or can be secured through application of a condition, will planning permission be granted

Contact details and further information can be found at:
www.mod.uk/DefenceInternet/MicroSite/DE/WhatWeDo/Operations/ModSafeguarding.htm

Civilian Aircraft

There are two civilian facilities which affect Angus - Dundee Airport and the Gliding Club at Roundyhill, between Glamis and Kirriemuir.

No unofficial safeguarding maps are known to have been lodged with the Council e.g. for local emergency service Air Support Units or a former unlicensed airfield in the vicinity of Montrose.

Applicants must consult NERL Safeguarding, the Civil Aviation Authority (CAA) and the local authority before submitting a planning application. The applicant should provide an analysis of possible impact, and appropriate measures to alleviate any identified adverse effects on broadcast communications and signals. These consultees may advise on aircraft safety, including lighting. Where this is the case their advice will be acted upon by Angus Council.

There is an international civil aviation requirement for all structures of 91.4 metres or more to be charted on aeronautical charts. This is achieved by notifying Defence Geographic Centre prior to the construction/erection of wind turbines and/or anemometer/meteorological masts.

Any structure of 150 metres or more must be lit in accordance with the Air Navigation Order and should be appropriately marked. Smaller structures may also be required to be lit by aviation stakeholders particularly if they fall under Section 47 of the Aviation Act

Contacts:

Civil Aviation Authority	NERL Safeguarding

CAA House 45-59 Kingsway London WC2B 6TE	NATS-CTC Mailbox 23 4000Parkway Solent Business Park Whitely Hampshire PO15 7FL
Dundee Airport Riverside Dundee DD2 1UH	

Policy and Legislation

Scottish Government
Circular 2/2003 Safeguarding of Aerodromes, Technical sites and Military Explosives Storage Areas.
http://www.scotland.gov.uk/Resource/Doc/47021/0026439.pdf

Additional Information

Civil Aviaton Authority
Guidance on CAA Planning Consultation Requirements
http://www.caa.co.uk/docs/33/DAP_GuidanceOnCAAPlanningConsultationRequirements.pdf

CAP 764
CAA Policy and Guidelines on Wind Turbines
http://www.caa.co.uk/docs/33/Cap764.pdf

Criterion (e)
that no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;

Wind turbines have the potential to interfere with electronic communication media, which includes television and radio (which may cause interference, loss of sound or picture and 'ghosting'), and micro wave links (which may be affected by reflection, diffraction or blocking). Operators suggest a minimum distance of 100m between the alignment of the microwave and any turbine to prevent interference. These interference effects can be reduced through changes to turbine siting and discussion with operators will confirm an appropriate distance.

Applicants must consult Ofcom (Office of Communication - which acts as the central point of contact for any television and radio broadcasting, telecommunication and wireless communication issues); the emergency services; utility companies; and the local authority before submitting a planning application.

The applicant should provide details of possible adverse effects, and proposed measures to mitigate adverse effects on broadcast communications and signals.

Applicants should contact:

Ofcom Riverside House 2a Southwark Bridge Road London	Wind Farm Team The Joint Radio Company Limited, Dean Bradley House 52 Horseferry Road

SE1 9HA Further information is available at www.**ofcom**.org.uk/	London SW1P 2AF Telephone: +44 20 7706 5197 Further information on The Joint Radio Company Limited is available at www.jrc.co.uk

Criterion (f)
that the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas;

Although a number of consents have been granted in Angus for wind turbines of around 90m to blade tip, only one has yet been constructed. There are a number of large scale turbines close to the boundary of Angus; in Perth and Kinross (Drumderg 16 x 107m), Dundee (Michelin 2 x 120.5m) and Aberdeenshire (Tullo 8 x 100m). These developments are clearly visible from parts of Angus, but no cross local authority boundary landscape/capacity assessment has been undertaken as those commissioned are normally for and by individual local authorities or refer to a specific proposal. Major landscape features such as the highland boundary fault however can extend across several council areas.

The SAS for Onshore Wind Turbines identifies potential cumulative impact as a significant constraint for wind farms, but as noted previously, there is no cross boundary context. The potential impact changes as each development is constructed and the actual scale and potential impact of a windfarm or large turbine will vary depending on the site, layout and turbines selected. Cumulative effects of wind energy developments are a matter of great significance in determining any application. Assessment of landscape and visual impact is contentious and every effort should be made to provide accurate visual representations and to ensure potential cumulative impact on the natural and built environment is fully addressed.

The assessment of cumulative impact will reflect the operational, consented and planning applications for turbines, as well as the specific site characteristics. As this will be different for each application and over the passage of time, it is increasingly difficult to map areas of constraint imposed by cumulative impact. Each proposal should demonstrate how its particular characteristics relate to other proposals at the assessment stage. Regard should be given to the extensive advice available on assessing and representing potential cumulative visual and landscape impact.

<u>Ecology, Ornithology and Hydrology</u>
There is also potential for the combined effect of wind energy development to increase impact on sensitive habitats and/or protected species to an unacceptable level. Where existing development already affects a protected or vulnerable habitat, applicants must demonstrate subsequent proposals through the combined effect of development, will not cause impacts to be intensified to an unacceptable level. This will be particularly important where sites are designated as of international or national importance, but damage to all vulnerable habitats and species should be avoided. (Natura 2000 sites may require a Habitats Regulation Assessment (HRA) by Angus Council as competent authority)

Cumulative Impact

Cumulative ecological impact should be addressed through a formal EIA or an environmental statement, the terms of which should be agreed with the local authority, and other agencies as appropriate. Where the responsibility lies with the local authority to determine acceptable level of impact or viability of mitigation measures, advice will be sought from relevant agencies.

Where mitigation measures are proposed and agreed, these will be subject to the application of conditions or legal agreement as appropriate. Post operational monitoring of impact on habitat and species may be required and will be subject to the application of conditions or legal agreement as appropriate.

Cumulative landscape and visual assessments should establish search area identifying:-

- any constructed or consented windfarm;
- any undetermined windfarm application;
- any windfarm proposal which has been subject to an EIA scoping request to the relevant authority; and
- any other windfarm proposal that the Planning Authority, and/or SNH, considers relevant for study and which is within the public domain (eg as a result of a public announcement or community meeting).

Installed, consented and proposed offshore windfarms should also be presented on the base plan to enable a decision on whether to include these in the assessment.

The cumulative landscape and visual effect will be those which are additional to an agreed baseline of wind energy developments reflecting the scale of the development under consideration. The search area considered will relate to the height of the proposed turbine and the visual interaction with other turbines within an agreed distance

For larger turbines the study area should extend to a minimum of 35km from the outer margin of the application site. The size of the study area should also be influenced by the locations and ZTVs of other windfarms likely to interact with the new proposal; and by transport routes to be assessed for sequential effects. The study area may not be circular in shape but could be larger in some directions than others. Sequential impacts may need to be assessed for a distance of more than 60km from the proposed windfarm.

For smaller proposals appropriate distances will be agreed with the developer in accordance with SNH guidance

Policy and Legislation
Scottish Government - web based Renewables Specific Advice Sheets
http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables

SNH
Assessing the Cumulaive Impacts of Onshore Wind Energy Developments
http://www.snh.gov.uk/docs/A675503.pdf
Visual Representaion of Windfarms Good Practice Guidance
http://www.snh.gov.uk/docs/A305436.pdf

Criterion (g)

a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed.

The anticipated lifespan of a wind farm/turbine is currently around 25 years. Once established the operational capacity and equipment is likely to be reviewed. Extension of existing consents will be assessed in accordance with legislation and guidance pertaining at that time, and continued use of an existing location may be an appropriate option. Where time of operation is extended, the decommissioning statement and re-instatement plan will also be reviewed, updated to contemporary standards, and extended.

The applicant will be required by planning conditions or legal agreement to ensure acceptable re-instatement standards. A decommissioning statement and reinstatement plan should be submitted detailing removal of all apparatus and associated works; restoration of the site and any after care arrangements; and timescale. It is likely a financial bond will be required by Angus Council to ensure restoration is implemented should the applicant/operator cease to trade. The decommissioning statement should be updated prior to the cessation of energy generation.

Where a site has been inactive for six months, the planning authority will require the instigation of the decommissioning process within the six months of the site being confirmed inactive.

4. Landscape and Visual Assessment of Wind Energy Proposals

The potential landscape and visual impact of wind turbines, both individually and cumulatively is a major factor in the assessment of any planning application.

The Tayside Landscape Character Assessment (TLCA) was prepared by Land Use Consultants in 1999, as part of a series of assessments for Scotland prepared on behalf of SNH and the local authorities. It develops a landscape classification which identifies and describes a range of character areas. It also provides guidance on accommodating development and land use change. Whilst some of this guidance has been superseded, the definition of the landscape character areas and their vulnerability to some types of development remains valid, and should be used in conjunction with the evolving SNH guidance.

The landscape character areas form the basis of The Wind Energy Geographic Areas in the ALPR as follows (Figure 1, page 39):-

- Area 1 Highland - primarily the Angus Glens along and to the north of the Highland Boundary Fault;
- Area 2 Lowland and Hills - mainly rolling farmland and low hills;
- Area 3 Coast - a mix of sand, cliffs and, around Montrose, lowland basin.

The ALPR identifies areas 1 Highland and 3 Coast as having a greater potential sensitivity to the landscape and visual impact of large turbines. This principle is developed in the Landscape Capacity and Cumulative Impacts Study undertaken by Ironside Farrar on behalf of the Council in 2008. This study primarily considered landscape capacity and cumulative impact in Angus at a strategic level in order to assist in the determination of two planning applications for wind turbines and based on the TLCA character area it identifies Landscape Capacity for Windfarms and current windfarm character type.
www.angus.gov.uk/devcontrol/LandscapeCapacityandCumulativeImpactAssessmentFinal.pdf

Area 3 Coast also has specific locational factors such as coastal flooding potentially exacerbated in future by rising sea levels, the protection of the undeveloped coast, shoreline management and the interrelationship with off-shore proposals. Development proposals on the coast will be required to address these issues as appropriate in any applications and supporting information.

The ALPR and TLCA form the basis for the strategic assessment of landscape capacity and potential visual and landscape impact. Applicants will require to establish the parameters for their individual site assessment with the Council taking cognisance of the detailed landscape and visual implications and suitable representations Where proposals are for turbines between 15 and 50m are proposed a basic VIA should be submitted and for turbines over 50m a full LVIA should be undertaken as detailed in Table 2.

Scottish Natural Heritage has developed a series of Advice Notes on the impacts of windfarms on the landscape, and their advice will be sought by the Council as appropriate.

Figure 1 - Wind Energy Development Geographic areas

TCLA Designation		TCLA Designation		TCLA Designation	
1a	Upper Highland Glens	8	Igneous Hills	14a	Coast with sand
1b	Mid Highland Glens	10	Broad Valley Lowland	14b	Coast with cliffs
3	Highland Summits & Plateaux	12	Low Moorland Hills	15	Lowland Basin
5	Highland Foothills	13	Dipslope Farmland		

Map extract from Angus Local Plan Review (adopted Feb 2009)

The 'Landscape Capacity and Cumulative Impacts Study' is a strategic level study providing a context for the consideration of the cumulative effects of existing and potential future windfarm developments. It develops a classification of landscape types in terms of the degree of wind turbine development (Table 3) which is applied in Table 4: Levels of Acceptable Landscape Character Change.

Table 3: Landscape Classification

Landscape	Type	Landscape Character Visual Experience
Landscape with no Windfarms	A landscape type or area in which no windfarms or wind turbines are present and none are clearly visible form neighbouring areas	There would be no discernable effects on visual receptors.
Landscape with Views of Windfarms	A landscape type or area within which, or immediately adjacent, there are no windfarms or wind turbines physically located, but from which windfarms are clearly visible in a separate landscape character area. Character may vary considerably according to proximity and scale of neighbouring windfarm(s).	The experience of a visual receptor would be noticeably affected, but windfarms are a background feature clearly not associated with the landscape in which the receptor is located. Visual effects may vary considerably according to proximity and scale of neighbouring windfarm(s)
Landscape with Occasional Windfarms	A landscape type or area in which windfarms or wind turbines are located or are very 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 turbines and more frequent background views of windfarms or turbines. Some turbines may or may not be perceived as being located in the landscape character area. No overall perception of windfarms being a defining feature of the landscape.
Landscape with Windfarms	A landscape type or area in which a windfarm, windfarms or wind turbines are located and visible to such an extent that they become a defining characteristic 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.
Windfarm Lands	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.

Table 4: Levels of Acceptable Landscape Character Change also incorporates the SNH classification of landscape and visual cumulative effects :-

a) *'in combination - where two or more features are seen together at the same time from the same place, in the same (arc of) view where their visual effects are combined;*

b) *in succession - where two or more features are present in views from the same place (viewpoint) but cannot be seen at the same time, together because they are not in the same arc of view - the observer has to turn to see new sectors of view whereupon the other features unfold in succession;*

c) *in sequence - where two or more features are not present in views from the same place (viewpoint) and cannot, therefore, ever be seen at the same time, even if the observer moved round the arc of view, the observer has to move to another viewpoint to see the second or more of them, so they will then appear in sequence. The frequency of occurrence in the sequence may be highly variable, ranging from frequently sequential when the features keep appearing regularly and with short time lapses between (clearly speed of travel influences this as well as distance between the viewpoints) down to occasionally sequential where there may be long time lapses between appearances, because the observer is moving very slowly and / or the there are large distances between the viewpoints (even if not between the features);*

d) *perceived - where two or more features are present but one or more is never seen by he observer, for example, because they are screened, or the observer is unable or unwilling to attend a viewpoint from where they would be seen. However, the observer is aware that others are there because, for example, they may have read or heard about them or seen signs to them; this is an apprehended or perceived effect but can be strongly felt; it could also, nevertheless, be mistaken because the observer's information or interpretation of it is wrong.' (David Tyldesley for SNH at PLI – Proposed Windfarm, An Suidhe, Inveraray, Argyll. November 2002).*

New large scale proposals close to established wind farm or turbine development in landscape and/or visual terms should consider their relationship with existing turbine type, scale, colour and layout from all directions from which the wind farms or turbines are viewed in combination.

As the number of sites generating energy from wind increase, so does potential for conflict between different scales of development, and between proposed and existing development. Where proposals are submitted, the relative height and style of turbine (e.g. tower construction, number of blades, blade length) should increasingly reflect those already consented to promoted a harmonious development pattern.

The Levels of Acceptable Landscape Character Change established in Table 4 provides guidance on the Councils assessment of the potential impact of wind energy development in Angus.

Additional Information
SNH Cumulative Effect of Windfarms (revised 2005)
http://www.snh.gov.uk/docs/A305440.pdf

Table 4: Levels of Acceptable Landscape Character Change

Within **Development Boundaries** (as defined in the ALPR) it is not possible to define maximum turbine heights. Proposals for turbine development in towns and villages will be considered in the context of the ALPR policies and take account of the following considerations:

- Scale and location
- Landscape setting
- Residential amenity including noise, shadow flicker, visual impact etc
- Historic environment including townscape
- Compatibility with adjacent uses
- Proximity to sensitive receptors such as educational buildings, open space and leisure facilities, hospitals, residential care homes, cemeteries, visitor facilities and accommodation and proposed development areas
- Access
- Design
- Security of equipment/facility
- Ancillary works

Outwith development boundaries, in countryside locations it is considered that there is scope for turbines to be accommodated within the following defined landscape types. The guide heights are extrapolated from sources including the Tayside Landscape Character Assessment, the Landscape Capacity and Cumulative Impacts Study, Reporters findings from planning appeals, responses from statutory consultees and reflect the particular scale and landscape of Angus.

There may be scope for turbines of greater height, where this can be demonstrated by the applicant. This will be strongly influenced by the elevation of the turbine site, the scale of the landscape and proximity of scale features and buildings.

ALPR Zone	Landscape Type (LT) Landscape Units (LU)	Existing Windfarm Character	Acceptable Future Windfarm Character	Guidance (Height to blade tip unless otherwise stated)
1	1a. Upper Highland Glens • Glen Isla • Glen Lethnot • Milton and Upper Tarf Valley	Landscape with no Windfarms & Landscape with Views of Windfarms	Landscape with Views of Windfarms	This LT is of medium scale; predominantly unsettled; with wild/slightly tamed level of naturalness and with narrow corridor views. Accordingly, it is considered to have no scope for turbines other than domestic scale turbines (less than 25m in height).

ALPR Zone	Landscape Type (LT) Landscape Units (LU)	Existing Windfarm Character	Acceptable Future Windfarm Character	Guidance (Height to blade tip unless otherwise stated)
	1b. Mid Highland Glens • Glen Esk • West Water Valley • Glen Clova • Glen Prosen • Glen Isla	Landscape with no Windfarms & Landscape with Views of Windfarms	Landscape with Occasional Windfarms	Due to the small to medium scale of this LT and the corridor nature of views, it is considered to have scope for turbines circa 50m in height.
	3. Highland Summits & Plateaux • Caenlochan Forest/ Glen Doll Forest	Landscape with Views of Windfarms	Landscape with Views of Windfarms	Considered to have no scope for wind turbines.
	5. Highland Foothills • Alyth Foothills • Kirriemuir Foothills • Menmuir Foothills • Edzell Foothills	Landscape with Views of Windfarms	Landscape with Occasional Windfarms	The Highland Foothills provide a dramatic transition between highland and lowland. The contrast between the rolling topography of Strathmore (LT 10) and the foothills is important in defining the character of both LT 10 & 5. Whilst the Foothills appear big next to Strathmore, they are relatively low lying hills. In order to avoid the risk of turbines adversely affecting perceived scale, it is considered that there is scope for turbines less than circa 80m tall located on lower ground only, where they do not adversely affect the setting of landscape features and monuments such as Airlie Monument and the White & Brown Caterthuns.
2	8. Igneous Hills • Sidlaws	Landscape with Views of Windfarms	Landscape with Occasional Windfarms	Considered to have scope for turbines circa 80m in height which do not disrupt the principle ridgelines or adversely affect the setting of important landscape features monuments such as Kinpurney Monument and Auchterhouse hillfort.

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ALPR Zone	Landscape Type (LT) Landscape Units (LU)	Existing Windfarm Character	Acceptable Future Windfarm Character	Guidance (Height to blade tip unless otherwise stated)
	10. Broad Valley Lowland • Strathmore	Landscape with Views of Windfarms	Landscape with Occasional Windfarms	Considered to have scope for turbines circa 80m in height.
	12. Low Moorland Hills • Forfar Hills	Landscape with Views of Windfarms	Landscape with Occasional Windfarms	Considered to have scope for turbines circa 80m in height which do not disrupt the principle ridgelines or adversely affect the setting of important landscape features and monuments such as Balmashanner Monument; and Finavon and Turin hillforts.
	13. Dipslope Farmland • SE Angus Lowland	Landscape with Views of Windfarms	Landscape with Occasional Windfarms	Considered to have scope for turbines circa 80m in height.
3	14a. Coast with Sand • Barry Links • Elliot • Lunan Bay • Montrose	Landscape with Views of Windfarms	Landscape with Views of Windfarms	Due to the often open nature of the Angus coastline and in order to avoid the risk of turbines being visually prominent and therefore adversely affecting the character of the undeveloped coast, it is generally considered there is scope for domestic turbines of circa 25m in height.
	14b. Coast with Cliffs • Carnoustie • Auchmithie • Usan	Landscape with Views of Windfarms	Landscape with Views of Windfarms	
	15. Lowland Basins • Montrose Basin	Landscape with Views of Windfarms	Landscape with Views of Windfarms	

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Figure 2: Scale Buildings in Angus

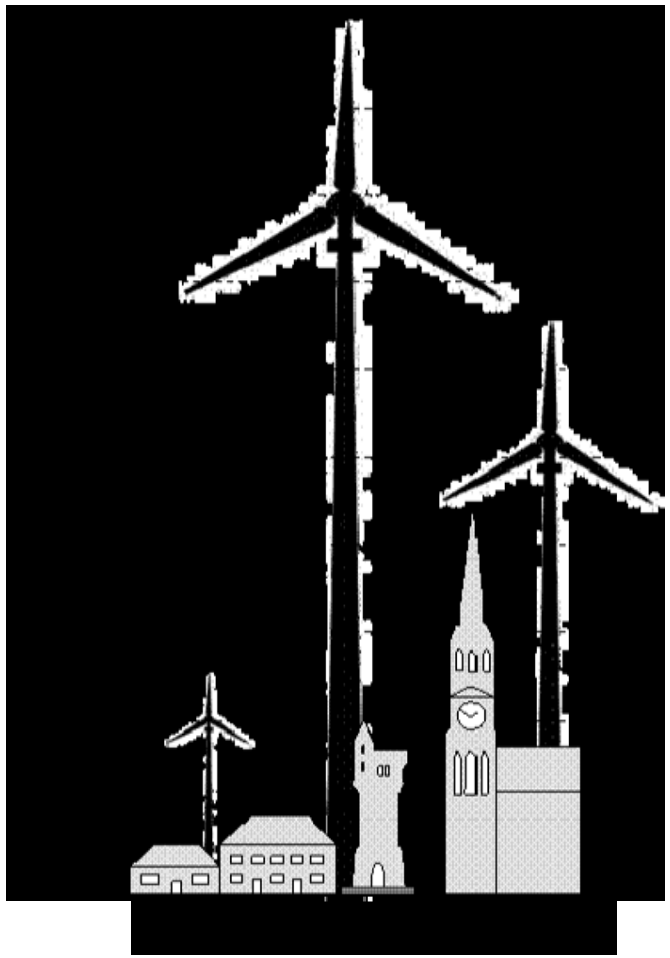
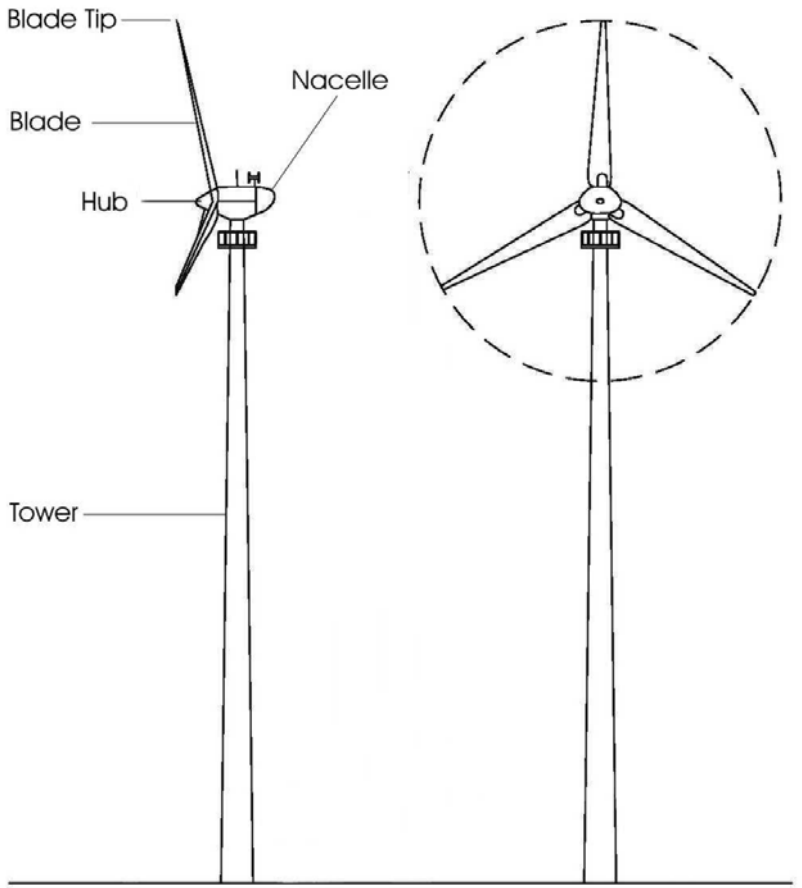


Figure 3: Wind Turbine Components



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5. Noise Assessment for Wind Energy Proposals

Noise from wind turbines can be an important factor in the assessment of wind energy developments. Applicants are advised to contact the Environmental and Consumer protection Service at Angus Council at an early stage to establish an agreed methodology for noise assessment. Initial guidance is outlined below:-

Assessment Criteria

1. Subject to the points below the criteria specified in ETSU-R-97; the assessment and rating of noise from wind farms should be used as appropriate noise assessment criteria.
2. If absolute lower noise limits are to be used then the significance of these in relation to the existing background noise levels should be considered.
3. Amplitude modulation should be considered in terms of the current level of technical knowledge on the subject. Angus Council will consider the use of appropriate Planning Conditions to control AM on a case by case basis.
4. Where it is suggested that any property benefits financially from the scheme and the higher absolute lower limit of 45 dB(A) maybe applied to that property, full details of the financial benefit and how the occupiers of the relevant property will receive that benefit for the life of the development should be clearly stated. A valid financial benefit is considered to be one which relates directly to the power or income generated by the turbine. One-off lump sum payments are unlikely to be considered acceptable because occupiers could change during the life of the development.
5. Where criteria are derived from background noise measurements the additional points below should be taken into account.
6. It is generally considered that the ETSU-R-97 simplified method criteria is not suitable for small wind turbines i.e. those with a rotor diameter of less than 16m. For developments involving small turbines a noise limit of 40 dB LAEQ(10mins) assessed using the BWEA method referred to below is considered appropriate.

Background noise measurements

1. It is recommended that the type of noise meter, microphone and protection kit for each monitoring location is agreed. An appropriate windshield (usually double skinned) is required in order to prevent any wind over the microphone affecting readings.
2. It is recommended that the exact position of the monitoring equipment is agreed not just the general location and photographic evidence of the location is taken. Where monitoring data is to be used for more than one property this should be agreed before hand in order to ensure that sufficient locations are monitored to represent all of the neighbouring properties. It is recommended that a list of properties is drawn up and monitoring positions allocated to each for discussion.
3. Monitoring should be avoided next to running water or trees in leaf (unless the measurement location solely represents a single property and the noise environment is not likely to alter seasonally) or on the noisy side of a building (unless it faces the proposed turbine location)
4. It is recommended that the method for determining periods of heavy rainfall and the measurement period to be excluded due to heavy rain is agreed prior to the commencement of monitoring. Heavy rainfall should be taken to mean periods of more than 4mm per hour.
5. The period of monitoring should be sufficient to obtain a reasonable amount of data at each wind speed from 3-12m/s.Depending upon weather conditions this can take longer than 7 days so this should be considered a minimum only.

6. The method for Simultaneous wind speed measurement should be agreed before hand with Environmental & Consumer protection Service. Derived not measured 10m high wind speeds may need to be used to take account of site specific wind shear.

Turbine noise level prediction

1. Wind turbine noise predictions should follow the methodology used in ISO 9613 and take into account the detailed guidance published in The Institute of Acoustics bulletin Vol 34 no 2 2009.
2. For small wind turbines i.e. those with a rotor diameter of less than 16m the BWEA small wind turbine performance and safety standard, Feb 2008 guidance maybe used as an alternative methodology to predict the separation distance required to comply with the relevant noise criteria.
3. Turbine noise data must be referenced to test reports.
4. Where any type of noise calculator is used a detailed explanation of the formulae used and the data used should be given.
5. The noise level prediction should take into account the cumulative impact of other turbines.

Appendices

APPENDIX 1: Renewable Energy Development in Angus

Renewable Energy provides opportunities to develop locally based sources of power, with minimal impact on the local, national and global environment. It can aid progress towards sustainable development, reduce dependence on energy imports, broaden the energy supply base, and create jobs and investment. The growing number of development enquiries and proposals reflects increasing awareness of renewable energy capacity, financial incentives and technological advances all contributing to renewable energy generation across Angus. The current position is set out below.

Planning Applications and Consents (as at May 2012)
The following Tables will provide the base line for monitoring the Implementation Guide and future renewable energy development within Angus.

Table 1 - Status of Applications for Single Turbines (May 2012)

Year	<25m			25-50m			>50		
	App	Ref	Pen	App	Ref	Pen	App	Ref	Pen
2004	1	1	-	-	-	-	-	-	-
2005	2	-	-	-	-	-	-	-	-
2006	9	-	-	-	-	-	-	-	-
2007	8	-	-	-	-	-	-	-	-
2008	9	-	-	-	-	-	-	-	-
2009	10	1	-	-	-	-	2	-	-
2010	13	2	-	2	-	-	2	-	-
2011	6	1	-	7	1	8	3	3	4
2012	-	-	3	4	1	1	-	-	2
Total	58	5	3	13	2	9	7	3	6

App – planning application approved
Ref – planning application refused
Pen – decision pending

Table 2 - Status of Applications for Multiple Turbines (May 2012)

Year	No of turbines 2			No of turbines 3-6			No of turbines >6		
	App	Ref	Pen	App	Ref	Pen	App	Ref	Pen
2004	-	-	-	-	-	-	1	-	-
2005	-	-	-	-	-	-	-	-	-
2006	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	3	-	-	1	-
2008	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	4	-	-		-
2010	4	-	1	1	-	-	-	-	-
2011	12	1	2	-	-	1	-	-	2
2012	2	-	1	-	-	1	-	-	-
Total	18	1	8	1	7	2	1	1	2

App – planning application approved
Ref – planning application refused
Pen – decision pending

Table 3 – Operating and Consented Onshore Renewable Energy Development in Angus (May 2012)

Generation Method	Location	Capacity (MW*)	Status
Wind Turbines			
Wind farm/cluster - over 50m or 3 x 15m	Ark Hill (8 x 81m turbine)	10.4	Approved
	Scotston Hill, Auchterhouse (1 x 80m turbine)	0.8	Operational
	Former Tealing Airfield (1 x 93.5m turbine)	2.5	Approved
	Cononsyth, Arbroath (1 x 67m turbine)	0.33	Approved
	East Memus (1 x 86.6)	0.8	Approved
	Castleton of Eassie (3 x 25)	0.33	Approved
	Total	**15.16**	
Landfill Gas			
	Lochhead Landfill Site	1.0	Operational
	Total	**1.0**	
Hydro			
Run of River	Rottal Estate, Glen Clova	0.45	Operational
	Glenmarkie, Glen Isla	0.75	Operational
	Clova Farms, Glen Clova	0.18	Approved (CNPA)
	Glamis Sawmill	0.06	Operational
	WWTP, Tannadice, Forfar	0 78	Approved
	Total	**2.12**	
Biomass- commercial			
Fuel Production Unit	Padnaram, By Forfar		Operational
All Operational and/or approved		**18.28**	

Table 4 – Other Renewable Energy Proposals in Angus (November 2011)

Generation Method	Location	Capacity (MW*)	Status
Wind Turbines			
Wind farm/cluster over 50m or 3 x 15m	Nathro Hill (S36)	50+	Scoping
	Carrach	7.2	Application
	Land at Nether Kelly (Corse)	17.5	Application
	Total	**74+**	

Other Energy Related Projects

Transmission Network

SHETL has indicated that once the Beauly-Denny transmission line has been upgraded, the upgrade along the western side of Strathmore will proceed. This will utilise existing towers and renew cables and insulation to increase capacity from 275 to 400KV. Grid access licences are normally subject to this upgrade being implemented.

APPENDIX 2: Development Plan – Renewable Energy Policies

Dundee and Angus Structure Plan Environmental Resources Policy 1: Renewable Energy

Proposals for renewable energy development will be favourably considered where they deliver quantifiable environmental and economic benefits and any significant or cumulative adverse impacts on the natural and historic environment, landscape and local communities can be satisfactorily addressed.

Development proposals will be considered in the context of the wider environmental policies of the Structure Plan. Detailed criteria based policy, locational guidance and, where appropriate, areas of search for individual sources of renewable energy will be established by Local Plans. An Environmental Statement will be required for all large scale proposals or where development is likely to have significant effects on the environment.

Angus Local Plan Review Policy ER34: Renewable Energy Developments

Proposals for all forms of renewable energy developments will be supported in principle and will be assessed against the following criteria:

(a) the siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;
(b) there will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;
(c) the development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;
(d) no unacceptable environmental effects of transmission lines, within and beyond the site; and
(e) access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent change to the environment and landscape, and
(f) that there will be no unacceptable impacts on the quantity or quality of groundwater or surface water resources during construction, operation and decommissioning of the energy plant.

Angus Local Plan Review Policy ER35: Wind Energy Development

Wind energy developments must meet the requirements of Policy ER34 and also demonstrate:

(a) the reasons for site selection;
(b) that no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to disturbance, displacement or collision;
(c) there is no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light;
(d) that no wind turbines will interfere with authorised aircraft activity;
(e) that no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;
(f) that the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas;
(g) a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed.

APPENDIX 3: Other Relevant Development Plan Policies

Dundee and Angus Structure Plan (2002)*
The Structure Plan was approved by Scottish Ministers in October 2002. The document can be viewed and down loaded at http://www.angus.gov.uk/structureplan/
The main policies relevant to energy proposals are listed below:

Environmental Resources Policy 1: Natural Heritage Designations
Environmental Resources Policy 2: The Wider Natural Heritage
Environmental Resources Policy 3: Coastal Development and Protection
Environmental Resources Policy 4: Flooding and Development
Environmental Resources Policy 5: Historic Environment

Angus Local Plan Review (2009)*
The Angus Local Plan was adopted by Angus Council in February 2009. The document can be viewed and downloaded at www.angus.gov.uk/localplan
The main policies that may be relevant to energy proposals are listed below under the document headings:

General Policies
S1: Development Boundaries
S2: Accessible Development
S3: Design Quality
S4: Environmental Protection
S5: Safeguard Areas
S6: Development Principles and Schedule 1 : Development Principles

Building Sustainable Communities
SC19: Rural Employment

Environment and Resources
ER1: Natura 2000 and Ramsar Sites
ER2: National Nature Reserves and Sites of Special Scientific Interest
ER3: Regional and Local Designations
ER4: Wider Natural Heritage and Biodiversity
ER5: Conservation of Landscape Character
ER6: Trees, Woodlands and Hedgerows
ER7: Trees on Development Sites
ER10: Light Pollution
ER12: Development Affecting Conservation Areas
ER16: Development Affecting the Setting of a Listed Building
ER18: Archaeological Sites of National Importance
ER19: Archaeological Sites of Local Importance
ER20: Historic Gardens and Designed Landscapes
ER25: Water Resource Protection
ER27: Flood Risk – Consultation
ER28: Flood Risk Assessment
ER29: Coastal Development
ER30: Agricultural Land

*Hard copies of these documents can also be viewed at Angus Council libraries and ACCESS offices; and at Planning & Transport Reception County Buildings Forfar

APPENDIX 4: Print Version Maps

The print maps are illustrative of detailed information that can be accessed via the web-based version of the Implementation Guide, They are intended to indicate the location and range of International, National and Local designations and other considerations within the ALPR area.

Map 1 ALPR Boundary

Map 2 International Designations

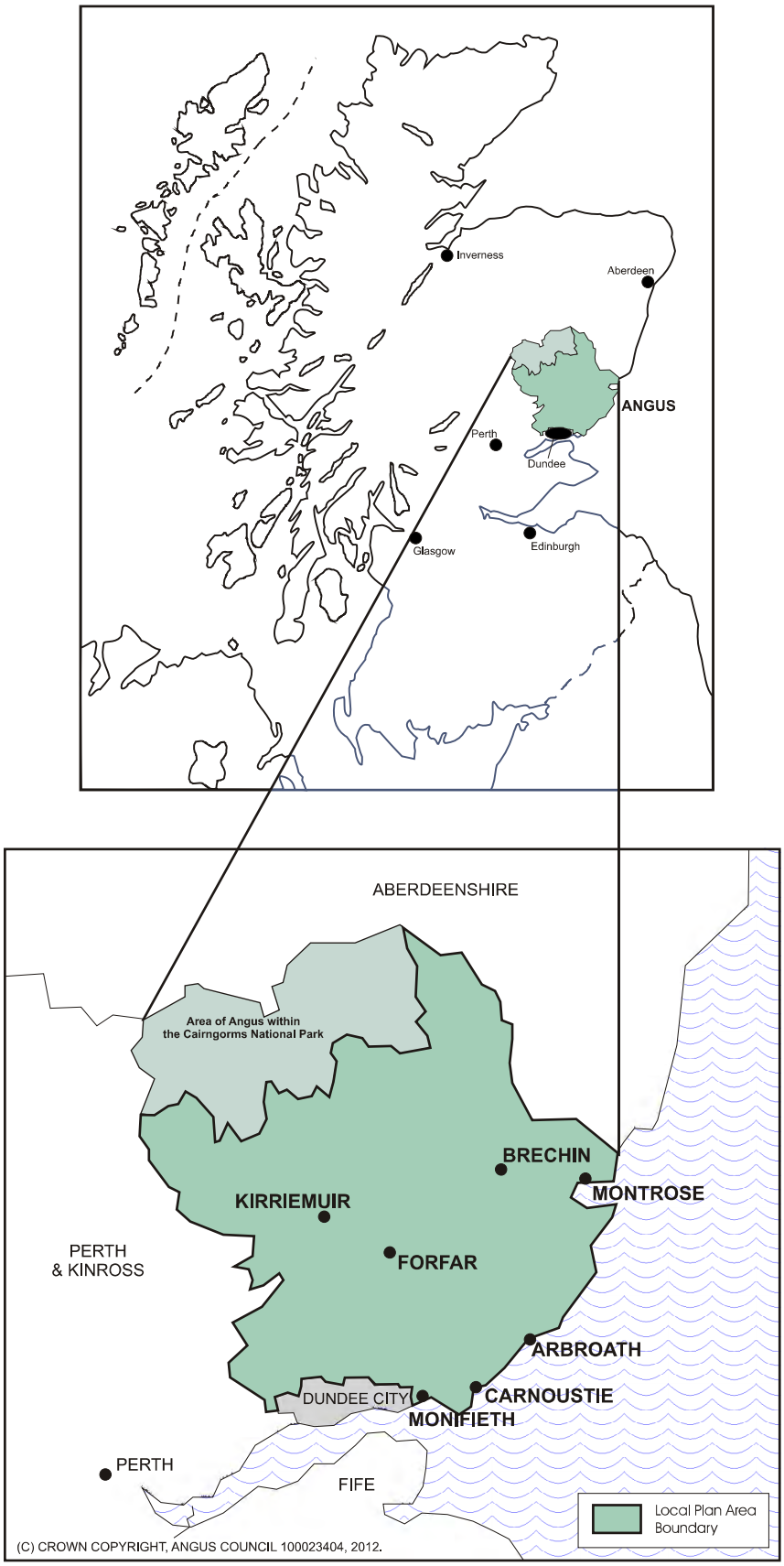
Map 3 National Designations

Map 4 Local Designations

Map 5 Other Considerations

Angus - Location

The National Context



Note: The Angus Local Plan Review excludes that part of northern Angus which lies within the designated boundary of the Cairngorms National Park.

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International Designations

- Angus Council Boundary
- Area of Angus within Cairngorms National Park
- Special Areas of Conservation (SAC)
- RAMSAR sites
- Special Protection Areas (SPA)

0 5 10 20 Kilometers

Angus Council
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Planning & Transport
County Buildings
Market Street
Forfar
DD8 3LG

Map 2 - International Designations

Date Produced: 30/01/2012

Drawn by: CM

Scale: 1:250,000

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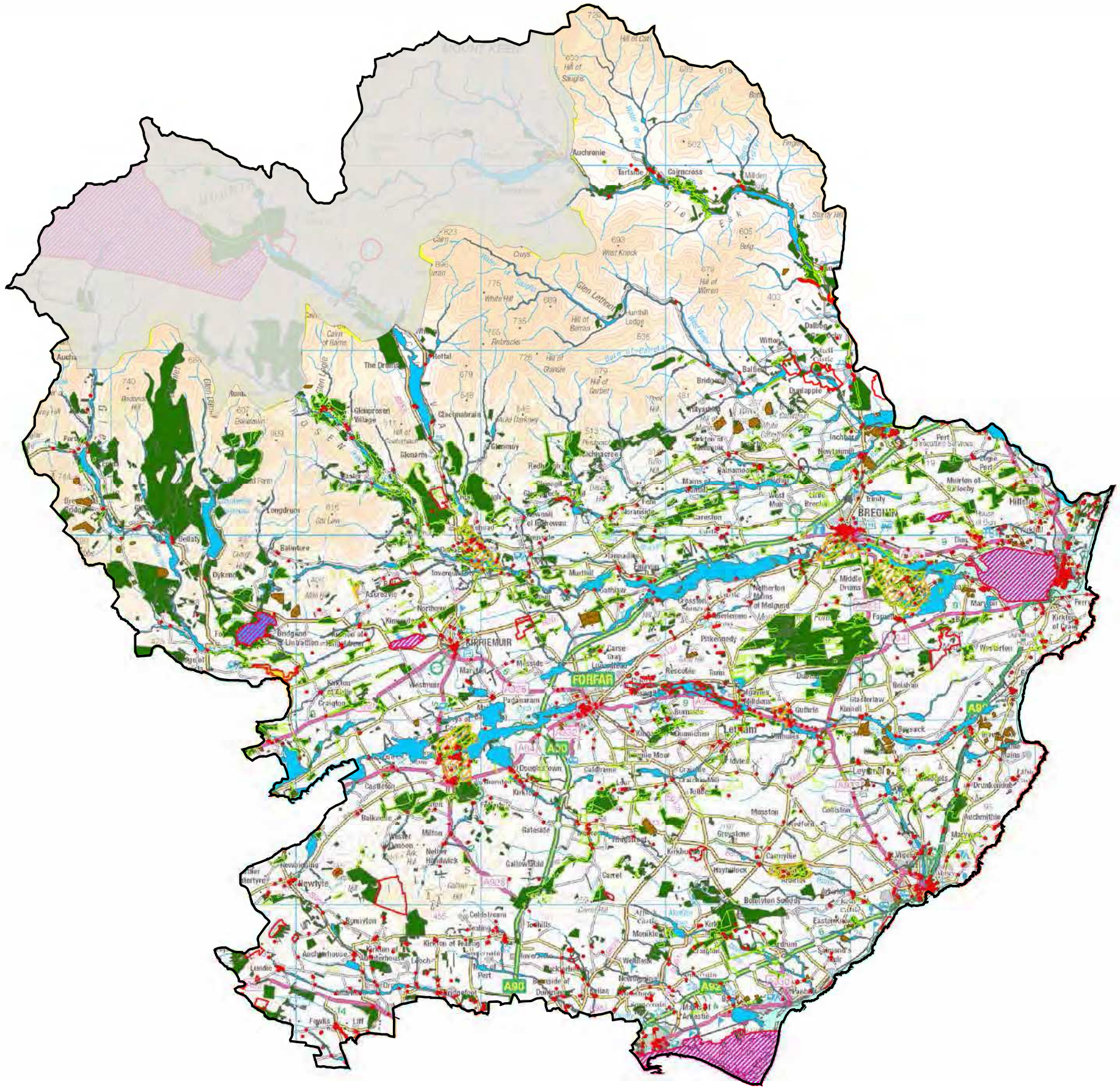

National Designations

- Angus Council Boundary
- Area of Angus within Cairngorms National Park
- RSPB Important Bird Areas
- Historic Scotland Listed Buildings
- Sites of Special Scientific Interest (SSSI)
- Historic Scotland Scheduled Ancient Monuments
- National Nature Reserves (NNR)
- Scotland Ancient Woodland Inventory
- Historic Gardens and Designated Landscapes (HGDL)
- Woodland Map of Scotland
- 200yr SEPA map Coastal Flooding
- 200yr SEPA map Fluvial Flooding

0 5 10 20 Kilometers

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Forfar
DD8 3LG

Map 3 - National Designations

Date Produced: 30/01/2012

Drawn by: CM

Scale: 1:250,000

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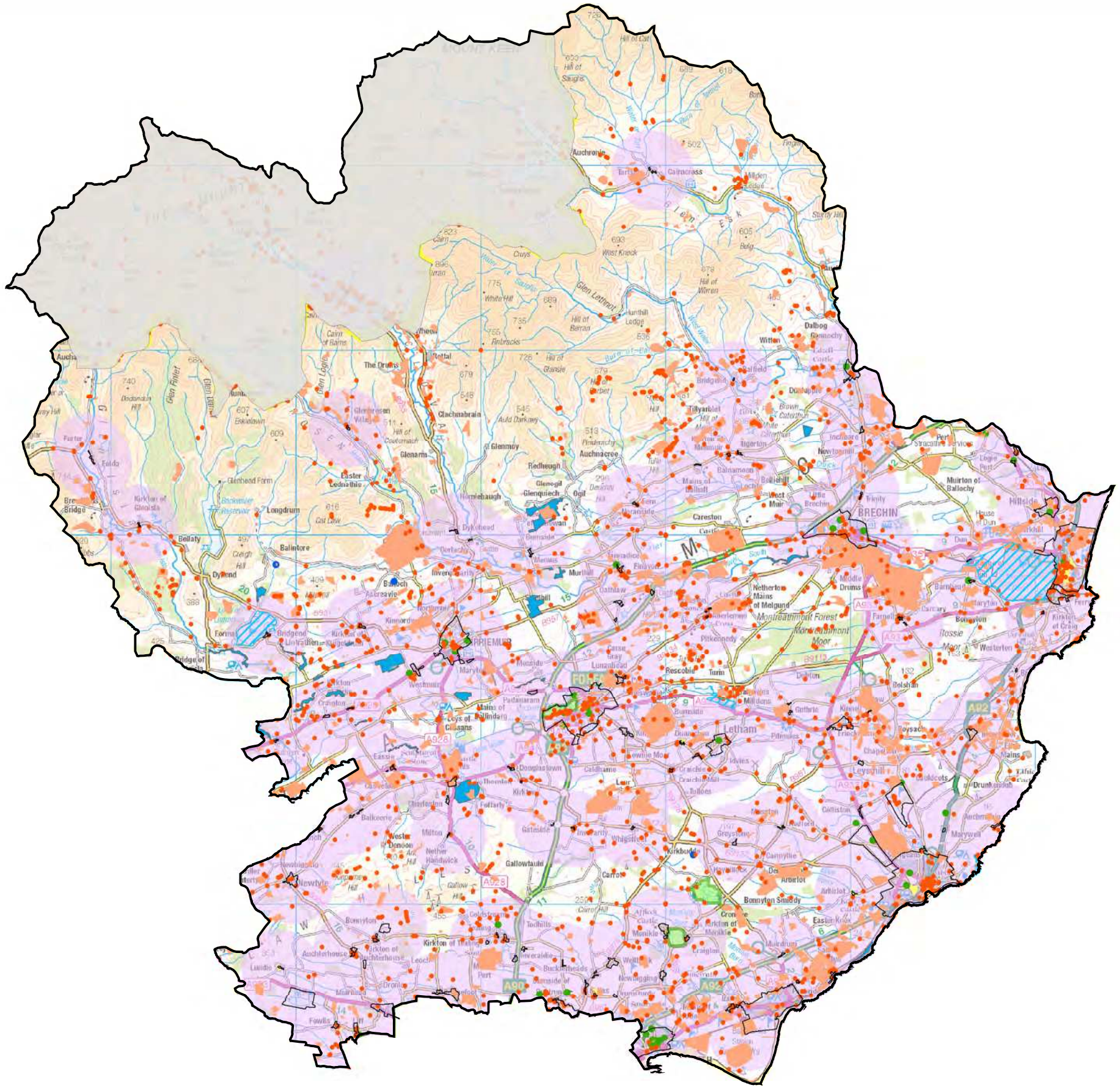

Local Designations

- Angus Council Boundary
- Area of Angus within Cairngorms National Park
- Development Boundaries
- Scottish Wildlife Trust Reserves
- Archaeological Points
- Country Parks
- Archeological Areas
- Angus Wildlife Sites (Points)
- Angus Wildlife Sites (Areas)
- Tree Preservation Orders (Point)
- Tree Preservation Orders (Polygons)
- Conservation Areas
- Local Nature Reserves
- Development Boundaries Plus 2km

0 5 10 20 Kilometers

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Map 4 - Local Designations

Date Produced: 30/01/2012

Drawn by: CM

Scale: 1:250,000

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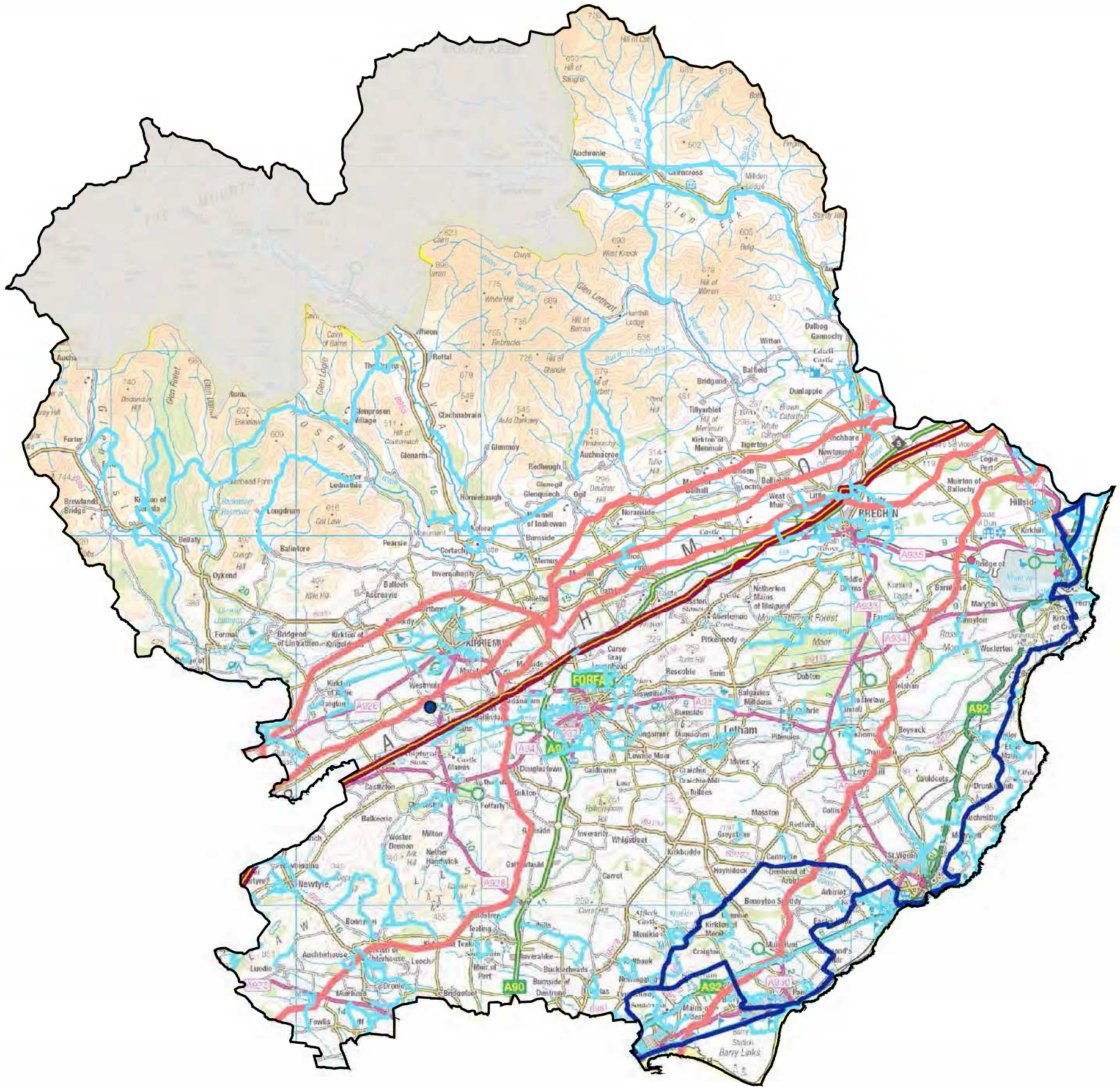

Other Considerations

- Angus Council Boundary
- Area of Angus within Cairngorms National Park
- Private Airfields
- National Cycle Network
- Adopted Core Paths
- Shell Pipeline
- BP Pipeline
- National Grid High Pressure Gas Pipe

0 5 10 20 Kilometers

1144

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Map 5 - Other Considerations

Date Produced: 30/01/2012

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Scale: 1:250,000

N W E S





TAYplan: Scotland's SusTAYnable Region

Strategic Development Plan

2012 - 2032

Approved
June 2012

TAYplan

The Strategic Development Planning Authority for Dundee, Angus, Perth and North Fife

Dundee City Council CHANGING FOR THE FUTURE

Perth & Kinross Council

Angus Council

Fife Council

Scotland's SusTAYnable Region

Strategic Development Plan

2012 - 2032

June 2012

Foreword: A long term plan for Scotland's susTAYnable region.

This Strategic Development Plan is an opportune moment for us to plan for the economic recovery and to shape a better TAYplan region for the future. TAYplan covers Dundee City, Angus, Perth & Kinross (including the newly designated part of the Cairngorm National Park) and North Fife; it excludes the Loch Lomond and Trossachs and the Cairngorm National Parks under the pre-2010 boundaries. This Plan sets out policies for 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.

Despite the global economic situation there is much to be optimistic about. This region has significant potential to support growth in the renewable energy industry, particularly through the growth of Dundee and Montrose ports to support offshore renewable energy. We also have the opportunity to build on the world renowned reputation of the life sciences and digital media sectors. These will be enhanced by the role out of high-speed broadband and increased research cooperation between business and the region's universities and hospitals, particularly with development at The James Hutton Institute and St. Andrews University Science Park.

Our population is growing as people live longer, and, as fewer people leave and more people choose to live and work here. We therefore need to provide enough housing to accommodate them. But we also need to provide better quality homes and neighbourhoods; designed to reduce resource consumption, improve accessibility and meet people's needs and aspirations throughout their lives. This is also important in attracting new businesses and retaining skilled workers.

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Historic and natural assets, such as our dramatic landscapes and the Tay Estuary, will continue to play a strong role in our regional identity. This attractive and diverse region offers a variety of tourist destinations within a network of settlements and a living, working countryside. The region includes St. Andrews, the home of golf, which along with Carnoustie hosts international competitions including the Open, with the Ryder Cup at Gleneagles in 2014. The regeneration of central Dundee and the arrival of the Victoria and Albert Museum from 2014 will make the city a major destination and bring further opportunities to the region. Business activity of all kinds and at all scales will contribute to a stronger regional economy, with more jobs and fewer inequalities.

Our principal settlements will be the focus for good quality development so that people choose to live in places which offer the most opportunities to meet a variety of needs and for people to live and businesses to operate within environmental limits. Quality of place will play a major role in the economic success of the region and people's quality of life. In this Plan we strive for high quality to ensure that all types of development integrate with and complement their surroundings, reduce the need to travel and support a shift from car and road-based freight transport in favour of more sustainable modes and travel behaviour. It also contributes to the quality of habitats and landscapes so that wildlife thrives alongside human activity through interconnected networks of green space and watercourses.

We want to provide future generations with opportunities to improve their lives; what better legacy to leave our children. Therefore the mitigation of and adaptation to climate change, as the single greatest challenge facing humankind, is central to this Plan. We must shift to a low carbon and zero waste economy by using our land and resources more efficiently. Our buildings and landscapes will change as we embrace this. This Plan sets out requirements to ensure that the location, design and layout of development build-in resilience to adapt to climate change and the world after peak oil. It also ensures that new development genuinely reduces the need for its occupants to travel and to consume resources. This will be instrumental in driving up standards for resource consumption in development to contribute to meeting Scottish Government targets to reduce greenhouse gas emissions, energy consumption and waste.

Whether you are a resident, an investor or a visitor this Plan demonstrates the four authorities' commitment to maximising the assets we have and growing our economy in a manner which does not place unacceptable burdens on our planet.

Councillor John Kellas - Chair, TAYplan Joint Committee 2012

Contents

TAYplan the Place – Now (characters of the region, settlement relationships and connections)

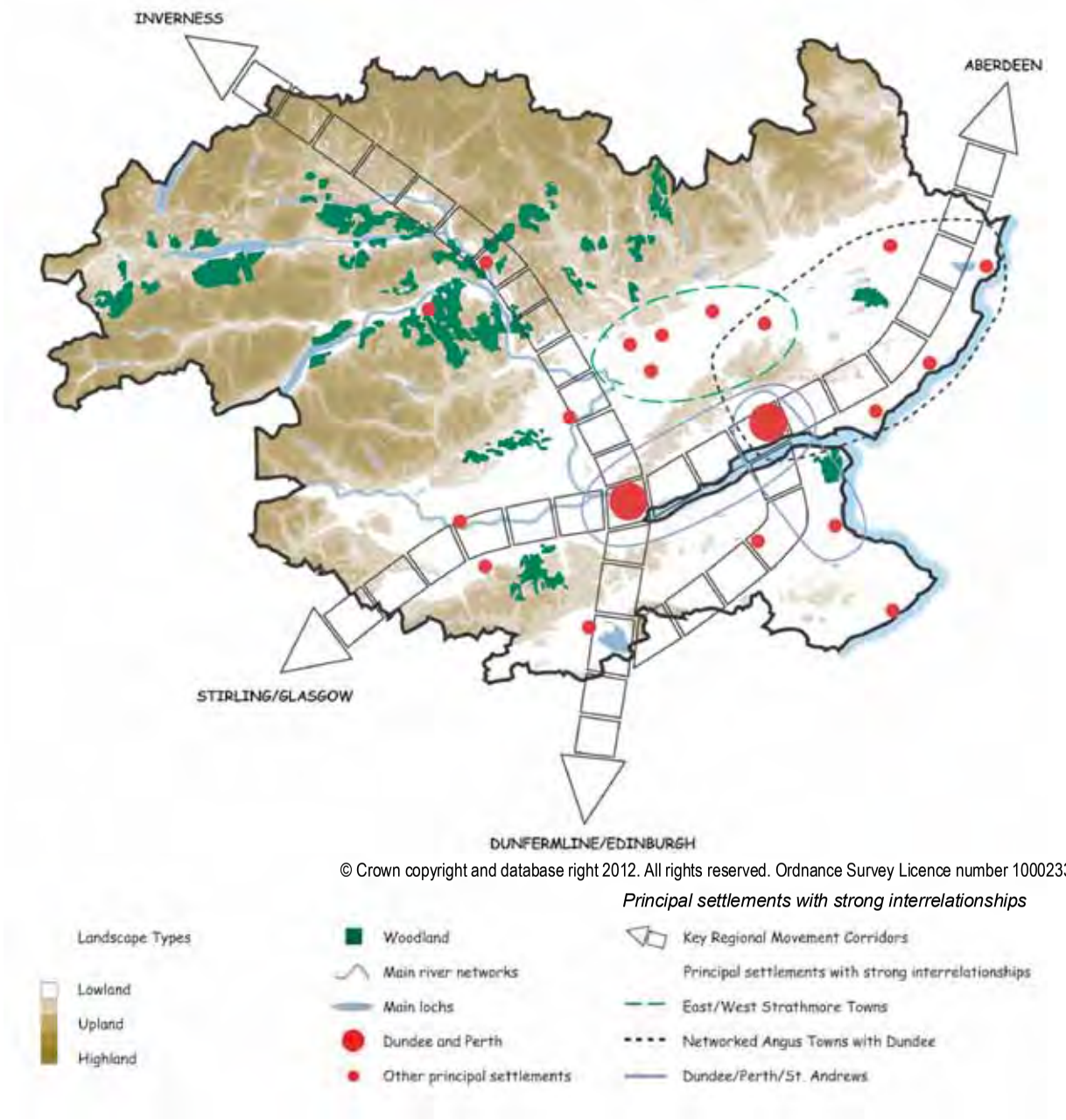
TAYplan is a combination of many diverse and distinctive environments. It is characterised by some of the UK's most attractive and dramatic landscapes and is rich in biodiversity. The map (right) shows the character of the landscape from the mountainous north and west to the coastal plain in the east, and includes major areas of forestry. The majority of the region is drained by the River Tay.

The region is largely countryside but most of its people live in the largest settlements including one third in Dundee and about one sixth in Perth. The region functions as a network of settlements and infrastructure that operate and interact to varying scales of significance. These are characterised by the diverse and differing environments, which form their settings and the places between them.

The economy is diverse from agriculture, forestry and public administration to high tech engineering, life sciences research and development, and computer games production. It is also home to or a major base for several of the leading 100 companies in the Stock Exchange (FTSE 100).

The region is intersected by the main road and rail transport corridors linking Northern Scotland with the Central Belt and the rest of the UK.

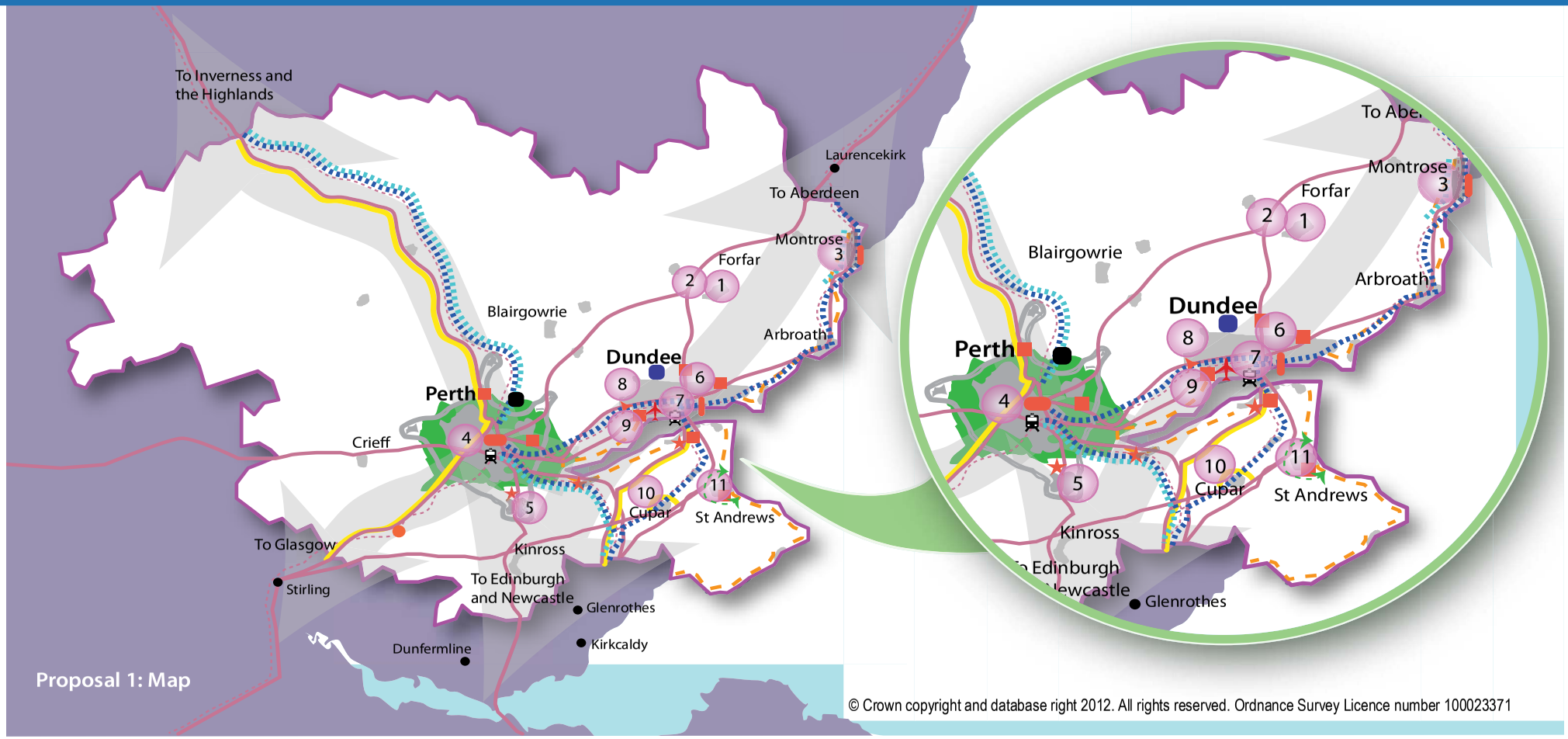
Both the settlements and the land will see changes resulting from a mixture of natural processes, such as flooding and rising sea level impacts of climate change, and, decision taking on development locations, increased forestry planting and agricultural management. Together these changes will influence the landscape, character and resilience to climate change of different parts of the region.



Principal settlements with strong interrelationships

Vision and Objectives: how the region will be in 2032 and what must occur to bring about this change.

Proposals 1: Map – Proposals for how the region will develop over the 20 years between 2012 and 2032



- Existing roads
- Existing railways
- Proposed inter-modal regional rail freight facilities
- Proposed Dundee Airport - expanded services
- Proposed relocation of Invergowrie Railway Station to west Dundee
- Proposed new Rail Station (subject to STAG appraisal **)
- Proposed enhancements of Gleneagles station and access
- Proposed strategic park and ride
- Perth City Centre Transport Enhancements
- Proposed Rail Station upgrades
- Proposed road upgrade or route management
- Proposed electrification of rail network
- Proposed rail enhancement
- Proposed A9/A94 link (route options)
- Proposed A90 upgrade (route options)
- Proposed green belt
- Undeveloped Coast
- Principal settlements

The Strategic Development Areas :

1 - Forfar Regional Agricultural Service Centre
2 - Orchard Bank
3 - Montrose Port
4 - West/North West Perth
5 - Oudenarde
6 - Dundee Linlathen
7 - Dundee Centre and Port
8 - Dundee Western Gateway
9 - James Hutton Institute
10 - Cupar North
11 - St Andrews West and Science Park

*Detail of the major transport proposals can be found in the Action Programme which accompanies the Strategic Development Plan
**STAG: Scottish Transport Appraisal Guidance. Transport Scotland has no commitment towards funding the delivery of stations at these locations.

Location Priorities: Sets out a spatial strategy of where development should and should not go.

This Plan sets out a spatial strategy which says where development should and should not go. It is designed to deliver the many location-related components of sustainable economic development, good quality places and effective resource management described in this Plan's objectives.

It focuses the majority of the region's new development within its principal settlements. These are where most of the region's people, jobs, services and facilities are already located and they offer the best ability to access these by a range of transport modes and to reduce carbon emissions. They also have significant land capacity to accommodate future development.

This Plan is informed by a range of assessments including Strategic Environmental Assessment, Habitats Regulations Appraisal (HRA), Strategic Flood Risk Assessment and an appraisal of transport network capacity.

National infrastructure improvements within this region are vitally important to achieving the Scottish Government's objectives to reduce journey times between the knowledge and business centres of Newcastle, the central belt, Aberdeen and Inverness, whilst maintaining regional and local connectivity and supporting a strong, sustainable regional economy.

This Plan identifies the principal settlements in three tiers reflecting their present and future roles (Policy 1). The focus on principal settlements covers all types of development. However, the most appropriate locations for energy and waste/resource management infrastructure* will also be determined by a series of other considerations (Policy 6). Suitable locations for these and minerals extraction will be identified through Local Development Plans.

This approach complements the shaping of better quality places (Policy 2) to ensure that good quality development is focussed in and makes the most of development locations in principal settlements.

All settlements will play some role in growing the tourism sector of the economy; either as specific destinations of choice; or as bases from which to experience other attractions such as the region's mountains, lochs, coastline and forests e.g. Pitlochry; or attending major events, such as international golfing competitions e.g. St. Andrews.

Prioritising land release within principal settlements ahead of land elsewhere is integral to ensuring that the majority of growth is concentrated there. Reusing previously developed (brownfield)** land and buildings (particularly listed buildings) will play an important role in this by making the most efficient and effective use of land.

Therefore, this Plan advocates that developing land within principal settlements (brownfield or greenfield that is not protected for heritage, environmental or recreation purposes) is preferable to developing land outside of them even where this is brownfield.

The capacity of principal settlements to accommodate growth beyond the Strategic Development Areas (Policy 4) will be considered in more detail by Local Development Plans. There will be no need for any new settlements during the lifetime of this Plan.

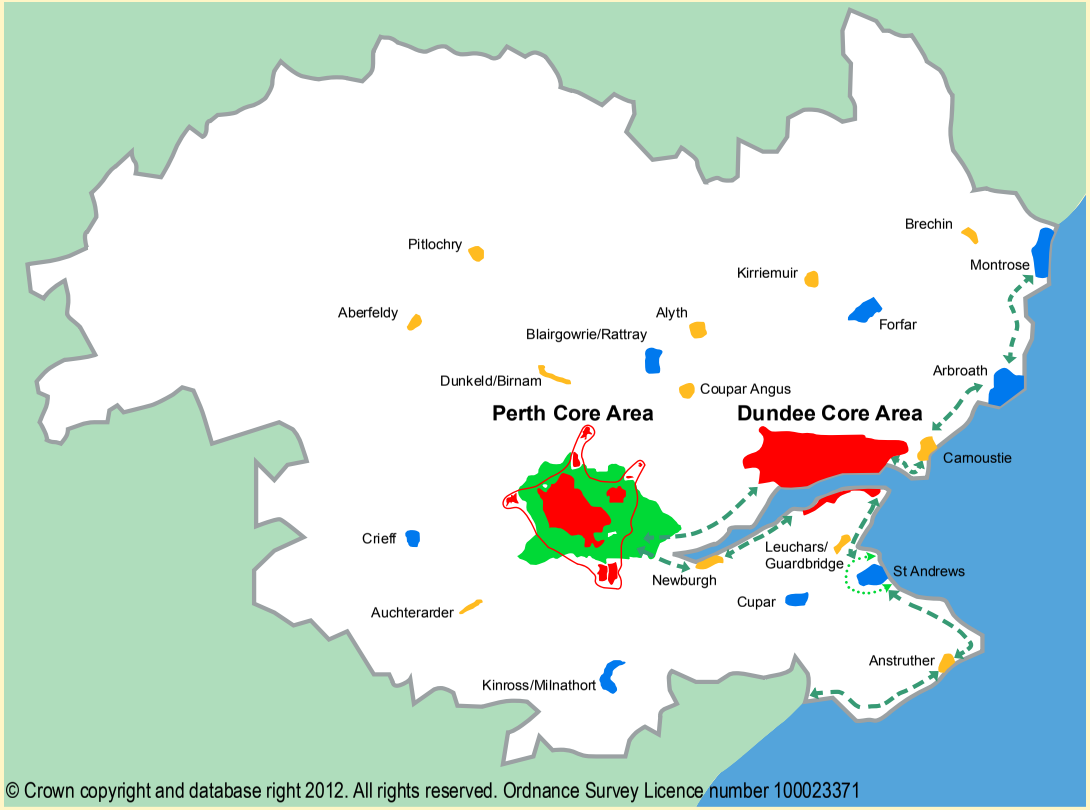
This Plan balances the importance of sustaining rural economies with the need to protect the countryside, by allowing some development in small settlements which are not principal settlements. Implementation of this principle will be set out in Local Development Plans.

**Energy and waste management infrastructure: Infrastructure for heat and power generation and transmission; and, collection, separation, handling, transfer, processing, resource recovery and disposal of waste. This includes recycling plants, anaerobic waste digesters, energy from waste plants, wind turbines, biomass plants, combined heat and power plants, solar power, hydro electric power plants and other facilities.*
***Previously developed land and buildings (brownfield land): land which has previously been developed, including vacant or derelict land, land occupied by redundant or unused building and developed land within the settlement boundary where further intensification of use is considered acceptable.*

Policy 1: Location Priorities

Strategies, plans, programmes and development proposals shall:

A. focus the majority of development in the region's principal settlements as follows:



Tier 1 settlements have the potential to accomodate the majority of the region's additional development over the plan period and make a major contribution to the regions economy.

- **Dundee Core Area:** (Dundee City, Dundee Western gateway, Invergowrie, Monifieth, Tayport/Newport/Wormit, Birkhill/Muirhead) and,
- **Perth Core Area:** (Perth, Scone, Almondbank, Bridge of Earn, Oudenarde, Methven, Stanley, Luncarty, Balbeggie, Perth Airport).

Tier 2 settlements have the potential to make a major contribution to the regional economy but will accomodate a smaller share of the region's additonal development.

Tier 3 settlements have the potential to play an important but more modest role in the regional economy and will accomodate a small share of the region's additional development which is more about sustaining them.

TAYplan area boundary

Perth Core Area

Green belts

Undeveloped Coast

Local Development Plans may also provide for some development in settlements that are not defined as principal settlements where this can be accommodated and supported by the settlement, and in rural areas, if such development genuinely contributes to the objectives of this Plan and meets specific local needs or supports regeneration of the local economy.

B. prioritise land release for all principal settlements using the sequential approach in this Policy; and prioritise within each category, as appropriate, the reuse of previously developed land and buildings (particularly listed buildings).

Sequential Approach

1. **Land within principal settlements.**
2. **Land on the edge of principal settlements.**
3. **Where there is insufficient land or where the nature/scale of land use required to deliver the Plan cannot be accomodated within or on the edge of principal settlements, and where it is consistent with Part A of this policy and with Policy 2, the expansion of other settlements should be considered.**

Shaping better quality places: Requires new development to be fit for place, supporting more sustainable ways of life for people and businesses.

Quality of place within TAYplan is central to the vision and objectives of this Plan. This directly contributes to a better quality of life for the TAYplan region's people and to improving its economic competitiveness as a place.

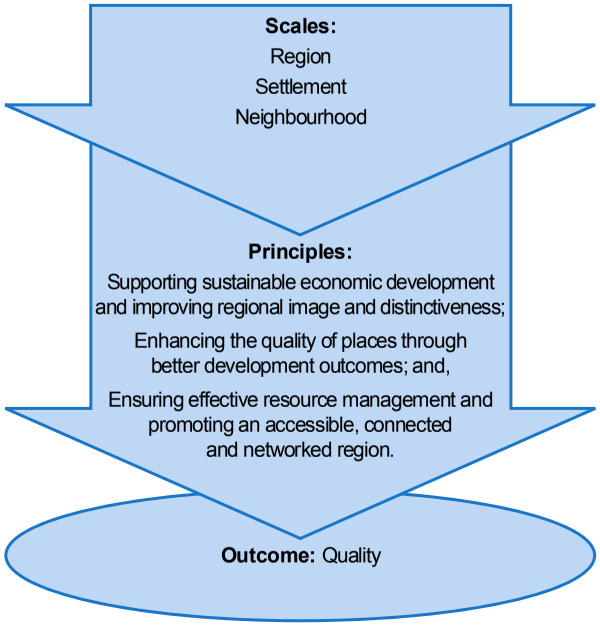
Better quality helps provide for improved resilience through greater adaptability to the risks posed to the residents, economy and environments of the region by climate change. Measures to mitigate and adapt to climate change also help to improve resilience to global peak oil* production; contributing to a more diverse and stronger economy for the TAYplan region that can better weather global changes.

This Plan requires all types of new development within the TAYplan region to be fit for place and be capable of supporting more sustainable ways of life for the people and businesses that use them. The approach set out in Policy 2 requires better quality to be designed-in to all types of development from the outset.

Good quality development properly considers how location, design and layout can reduce the need to consume resources, maximise the contribution towards sustainable economic development and support a better quality of life for people and a better quality of environment.

This is about ensuring new development mitigates against and adapts to climate change and becomes an integral part of its surroundings rather than exclusive from them. It is about how new development adapts to, interacts with and responds by enhancing the existing features, networks and design of TAYplan's many different and distinct places, rather than standardised products which can diminish local character and/or put unacceptable infrastructure and/or environmental burdens upon them. Better location, design and layout also have the potential to increase land values making additional infrastructure more deliverable.

This Plan recognises that different measures to deliver quality, being applied at different scales, contribute individually or collectively to the delivery of this Plan's vision. Policy 2 is therefore built around achieving quality as a direct outcome of the three principles of this Plan's objectives with a recognition that these apply individually and collectively at three scales.



In delivering quality Strategic Development Frameworks** will consider a range of factors to:


1. Highlight constraints and opportunities

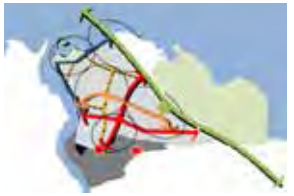

5. Focus civic and community building onto major routes and spaces


2. Identify the opportunities for an integrated network of public transport


6. Promote frontage developments and a range of complementary uses on busy streets


3. Relate opportunities for increased density to public transport accessibility


7. Establish a pattern of local streets and blocks which are clearly contained and enclosed


4. Draw out a heirarchy of connected routes and spaces that link well into transport routes


8. Bring forward guidance (or design codes) on issues such as scale (height and massing) and the public realm

Source: Architecture and Design Scotland using Willie Miller Urban Design 'Inverness City Vision' and Urban Initiatives (image 8).

**Peak Oil: This is the point when the maximum rate of global oil extraction is reached, after which the rate of production declines but continued demand increases price. This is expected in the 2020s or 2030s.*
***Strategic Development Frameworks: Wide area proposals of strategic links, accessibility, and land use principles, and how these relate to the masterplan site. They establish key development parameters through a process of consultation with community, stakeholders and the local authority. Strategic Development Frameworks are used for large masterplan sites and neighbourhoods.*

Policy 2: Shaping better quality places

A. ensure that climate change resilience is built into the natural and built environments through:

i. a presumption against development in areas vulnerable to coastal erosion, flood risk and rising sea levels; including the undeveloped coast. To ensure flood risk is not exacerbated, mitigation and management measures; such as those envisaged by Scottish Planning Policy, should be promoted;

ii. reducing surface runoff including through use of sustainable drainage systems;

iii. protecting and utilising the water and carbon storage capacity of soils, such as peatlands, and woodland/other vegetation; and,

iv. Identifying, retaining and enhancing existing green infrastructure and spaces whilst making the best use of their multiple roles.

B. integrate new development with existing community infrastructure and work with other delivery bodies to integrate, concentrate and co-locate additional new infrastructure to optimise its coverage and capability.

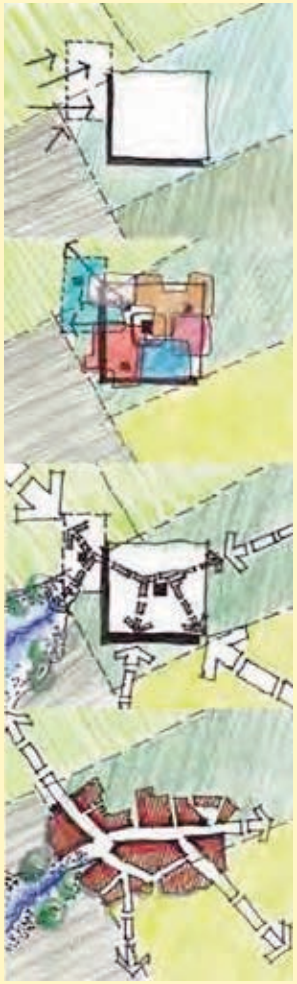
C. ensure the integration of transport and land use to: reduce the need to travel and improve accessibility by foot, cycle and public transport; make the best use of existing infrastructure to achieve a walkable environment combining different land uses with green space; and, support land use and transport development by transport assessments/ appraisals and travel plans where appropriate, including necessary on and offsite infrastructure.

D. ensure that waste management solutions are incorporated into development to allow users/occupants to contribute to the aims of the Scottish Government's Zero Waste Plan.

To deliver better quality development and places which respond to climate change, Local Development Plans, masterplans and development proposals should:

E. ensure that high resource efficiency is incorporated within development through the orientation and design of buildings, the choice of materials and the use of low and zero carbon energy generating technologies to reduce carbon emissions and energy consumption to meet the Scottish Government's standards.

F. ensure that the arrangement, layout, design, density and mix of development and its connections are the result of understanding, incorporating and enhancing present natural and historic assets*, the multiple roles of infrastructure and networks and local design context, and meet the requirements of Scottish Government's Designing Places and Designing Streets and provide additional green infrastructure where necessary.



Outside – In.
Understanding the environmental context of a site, how a site works in its wider location and how that shapes what happens within is essential to integrating new development.

Inside – Out.
Conversely, considering how the site connects from the inside-out and builds on existing features, networks and infrastructure, enhancing these through new development.

Integrate Networks
Making it easy,safe and desirable to walk and cycle within and between neighbourhoods utilising existing green space and water networks and enhance these areas to deliver a better quality of place and life.

Work with the grain of the place
Respecting and working with the grain of a place. This approach will help determine the size, shape and form of development and how it can respond to adaptation to help achieve future-proofing our new communities and facilities.

Natural and historic assets: Landscapes, habitats, wildlife sites and corridors, vegetation, biodiversity, green spaces, geological features, water courses and ancient monuments, archaeological sites and landscape, historic buildings, townscapes, parks, gardens and other designed landscapes, and other features (this includes but is not restricted to designated buildings or areas).

Managing TAYplan's Assets: Safeguarding resources and land with potential to support the sustainable economic growth.

Delivering the vision and objectives of this Plan requires management of land and conservation of resources. This recognises that good quality development and the right type of development in the right places can lead to a series of social, economic and environmental benefits for those areas and the TAYplan region as a whole. This Plan balances these factors with the sometimes competing nature of different land uses.

This Plan safeguards for present and future generations important resources and land with potential to support the economy. It also requires us to ensure that development and growth in the economy occur in a way that does not place unacceptable burdens on environmental capacity and increase the exposure of users or inhabitants to risks. This can be achieved by directing development to specific locations (Policies 1, 4, 5, 6 and 7); ensuring that development is fit for place (Policies 2 and 8); and, that some areas or assets are safeguarded for a specific range of land uses (Policy 3).

This is important to support the growth of emerging sectors of the economy, such as the off-shore renewable energy sector through the protection of the region's ports for port-related uses, particularly Dundee and Montrose Ports. Similarly employment land, particularly in rural areas, can be affected through redevelopment for alternative uses or by alternative uses nearby. This could hinder or even prevent the start up of businesses in the future and/or limit business operations.

The economic recovery of the region and new development will need to be supported by appropriate infrastructure, particularly transport infrastructure. This will also contribute to behavioural change and reducing reliance on the car and on road-based freight. Ensuring that this can be delivered will require land and routes to be protected from prejudicial development. It also requires the public and private sectors to work jointly to deliver infrastructure.

Supporting future food and resource security will require the protection of finite resources like minerals, forestry and prime agricultural land* by management as one consideration in the prioritisation of land release under Policy 1.

Limiting the types of land uses that can occur within green belts at Perth and St. Andrews will contribute to protecting the settings and historic cores of those settlements from inappropriate development and prevent coalescence with neighbouring areas.

It is essential to grow the economy within environmental limits and build-in resilience to climate change, natural processes and increased risk from sea level rise. Identifying environmentally sensitive areas and important natural and historic assets where no or very limited development would be permitted, such as some coastal areas, Natura 2000** sites and other locations, will contribute to this. It will also be important to ensure that plans for managed realignment of coast and other coastal management are devised in liaison with Scottish Natural Heritage and Marine Scotland.

Prime agricultural land: Land classes 1, 2 and 3.1 – these are the most suited to arable agriculture.

***Natura 2000: European-wide designations to protect habitats and species – special protection areas (SPAs), Ramsar sites and special areas of conservation (SACs)*

Policy 3: Managing TAYplan's Assets

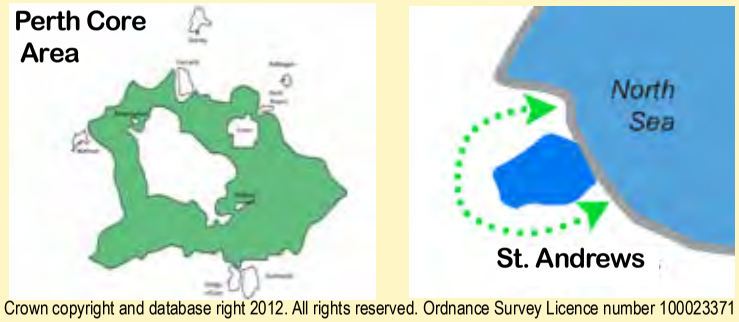
Land should be identified through Local Development Plans to ensure responsible management of TAYplan's assets by:

Employment Land

- identifying and safeguarding at least 5 years supply of employment land within principal settlements to support the growth of the economy and a diverse range of industrial requirements;
- safeguarding areas identified for class 4 office type uses in principal settlements; and,
- further assisting in growing the year-round role of the tourism sector.

Greenbelts

- continuing to designate green belt boundaries at both St. Andrews and Perth to preserve their settings, views and special character including their historic cores; assist in safeguarding the countryside from encroachment; to manage long term planned growth including infrastructure in this Plan's Proposals Map and Strategic Development Areas in Policy 4; and define appropriate forms of development within the green belt based on Scottish Planning Policy;



- using Perth green belt to sustain the identity of Scone, and provide sufficient land for planned development around key villages and settlements.

Natural and Historic Assets*

Understanding and respecting the regional distinctiveness and scenic value of the TAYplan area through:

- ensuring development likely to have a significant effect on a designated or proposed Natura 2000 sites (either alone or in combination with other sites or projects), will be subject to an appropriate assessment. Appropriate mitigation requires to be identified where necessary to ensure there will be no adverse effect on the integrity of Natura 2000 sites in accordance with Scottish Planning Policy;
- safeguarding habitats, sensitive green spaces, forestry, watercourses, wetlands, floodplains (in-line with the water framework directive), carbon sinks, species and wildlife corridors, geodiversity, landscapes, parks, townscapes, archaeology, historic buildings and monuments and allow development where it does not adversely impact upon or preferably enhances these assets; and,
- identifying and safeguarding parts of the undeveloped coastline along the River Tay Estuary and in Angus and North Fife, that are unsuitable for development and set out policies for their management; identifying areas at risk from flooding and sea level rise and develop policies to manage retreat and realignment, as appropriate.

Transport

- safeguarding land at Dundee and Montrose Ports, and other harbours, as appropriate, for port related uses to support freight, economic growth and tourism; and,
- safeguarding land for future infrastructure provision (including routes), identified in the Proposal Map of this Plan or other locations or routes, as appropriate, or which is integral to a Strategic Development Area in Policy 4 of this Plan, or which is essential to support a shift from reliance on the car and road-based freight and support resource management objectives.

Finite Resources

using the location priorities set out in Policy 1 of this Plan to:

- safeguard minerals deposits of economic importance and land for a minimum of 10 years supply of construction aggregates at all times in all market areas; and,
- protect prime agricultural land, new and existing forestry areas, and carbon rich soils (where identified) where the advantages of development do not outweigh the loss of productive land.

**Natural and historic assets: Landscapes, habitats, wildlife sites and corridors, vegetation, biodiversity, green spaces, geological features, water courses and ancient monuments, archaeological sites and landscape, historic buildings, townscapes, parks, gardens and other designed landscapes, and other features (this includes but is not restricted to designated buildings or areas).*

Strategic Development Areas: Identifies strategic development areas that will contribute to the region's economic success.

Scottish Planning Policy requires development plans to identify major locations that will contribute to the economic success of their areas through provision of a range of employment sites for a variety of users.

This Plan supports a stronger economy by identifying national and regional transport infrastructure proposals within the TAYplan region and Strategic Development Areas on the Proposals Map of this Plan. Many are employment, housing or mixed use to reduce the need for car-based travel and encourage walking, cycling and public transport usage. Their scale and nature means that they contribute individually to delivering this Plan. Most, including the transport proposals, have already been allocated in previous plans and strategies or have planning permission. Following further consideration several of these have been considered as strategic and are taken forward in this Plan.

The Strategic Development Areas and the consistency and clarity offered by this Plan demonstrate that this region is 'business ready' and offers a competitive and quality place for people and businesses to be.

The role of the further and higher education sector is central to growing the commercial value of research, particularly in life sciences, food, renewable energy and the games industry. Locations near to the region's universities and their relationships with business have potential benefits through the establishment of a science park at St. Andrews and land for research facilities near The James Hutton Institute at Invergowrie.

The National Renewables Infrastructure Plan* identifies the strong potential to grow the offshore renewable energy sector and its supply chain in this region, particularly around Dundee and Montrose Ports, linked with facilities at Fife Energy Park, Methil. Protecting these for port related uses and improving port access is key to securing their role as major parts of the UK's east coast offshore energy infrastructure.

Forfar has the potential to strengthen its present role as a hub for agricultural services and businesses. As a Regional Agricultural Service Centre it could further support a range of activities and development, both existing and potentially new, across the Forfar area.

Scottish Government and the Regional Transport Strategies (*) (***) have identified transport infrastructure and service priorities. Many, such as those in the West/North West Perth area, are important to the delivery of this Plan in those areas. Although not all projects are worked up or have committed funding and not all sites and routes have been finalised, they have been identified as priorities. Over the long term these proposals are integral to facilitating important development, supporting modal shift**; and, reducing our contribution to climate change.

Some of the Strategic Development Areas will make a major contribution to the housing offer and competitiveness of the region with employment land integrated; such as Dundee Western Gateway, Cupar North, St. Andrews West, West/ North West Perth (West of A9 to Broxden roundabout within the Perth Core Area) and Oudenarde.

The emphasis in St. Andrews will also be to build on the continued economic potential of its international reputation as the home of golf and a tourist destination. More widely in the region the provision and improvement of hotels and visitor attractions will contribute cumulatively to increasing the economic strength of the tourism sector and improving the region's year-round tourism offer.

National targets to increase forestry coverage in Scotland are likely to bring the potential for growth in some sectors of the economy as well as providing carbon sinks.

*Strategic Habitats Regulations Appraisals (HRA) are being undertaken separately for the NRIP, STPR and the RTSs with their associated conclusions and generic mitigation to be taken into account at lower level HRAs.
**Modal Shift: This relates to changing behaviour so that people and business increasingly on walking, cycling and public transport particularly bus, rail and water-born modes, for the movement of passengers and freight.
***Regional Transport Strategies – two covering TAYplan region: Sestran (2008) covering North Fife and Tayside and Central Scotland (Tactran) (2008) covering Angus, Dundee City and Perth & Kinross.

Policy 4: Strategic Development Areas

Local Development Plans should:

A. Identify specific sites for the Strategic Development Areas and allocate land for the uses set out in table 1, below and identified in the Proposals Map of this Plan:

Table 1: Strategic Development Areas

Strategic Development Area	Type and indicative scale of development
Orchard Bank Forfar	25ha of employment land.
Forfar Regional Agricultural Service Centre	Employment land for agricultural services.*
Montrose Port	Employment land for port related land uses.
Dundee, Linlathen	40ha of employment land.
Dundee Centre and Port	Mixed uses including business, commercial, leisure, retail, residential and port related uses.
Dundee Western Gateway	750+ homes and 50ha of employment land.
The James Hutton Institute	5 to 10ha of employment land for food/agricultural research.
West/North West Perth	4,000+ homes and 50ha of employment land.
Oudenarde	1,200+ homes and 34ha of employment land.
Cupar North	1,400 homes, 10ha of employment land and bulky goods retail.
St. Andrews West and Science Park	1,090 homes, 10ha of employment land and 10ha for a science park.

B. Include (or cover in Supplementary Planning Guidance) Strategic Development Frameworks** for Strategic Development Areas***. These should reflect the overall policy requirements of this Plan and from which master plans will be developed, reflecting in particular the Scottish Government's Planning Advice Note (PAN) 83: *Masterplanning* and Architecture and Design Scotland publication Design Review: *Lessons learnt from Masterplanning* (2010). Frameworks shall set out how new sustainable places (as referred to in PAN 83) are to be implemented.

**The Local Development Plan will consider the need for any new sites, together with existing sites. This Proposal further promotes the role of the agricultural service sector in the area but may not require sites.*
***Strategic Development Frameworks: Wide area proposals of strategic links, accessibility, and land use principles, and how these relate to the masterplan site. They establish key development parameters through a process of consultation with community, stakeholders and the local authority. Strategic Development Frameworks are often used for large masterplan sites, urban extensions and districts.*
****With the exception of West/North West Perth the other Strategic Development Areas already have a framework/masterplan in place or are of a scale/nature where one is not required (Orchardbank, Linlathen, Forfar Regional Agricultural Service Centre and The James Hutton Institute).*

Housing: Identifies housing provision at housing market area level to focus most new housing in principal settlements.

The quantity and the quality of all of the region's homes and neighbourhoods contribute to its ambitions and economic competitiveness. Improving quality in new and existing neighbourhoods through Policies 2 and 8 of this Plan can help better meet the varying needs and aspirations of different households throughout life; and support a growing population and investment in our economy.

To reflect the vision, objectives and Policy 1 this Plan focuses most new homes and neighbourhoods in principal settlements. As such the largest shares of additional housing are in Housing Market Areas that include the Dundee and Perth Core Areas.

The TAYplan-wide Housing Need and Demand Assessment identifies the likely need and demand for between 2,050* and 3,590 affordable and market housing solutions per year during the Plan period. This Plan sets out a framework to identify effective housing land to enable the delivery of around 2,170 homes per year across the TAYplan region, including sites already with planning permission. These will contribute to meeting identified need and demand through new build housing, with the remainder being met through a variety of other interventions including those defined in Local Housing Strategies.

Planning for this level of build broadly reflects the changes in the General Register Office Scotland 2006-based projections** but with growth in Dundee City reflecting Policy 1. Significantly higher levels of growth are presently considered undeliverable.

Nobody can predict exactly when presently low build rates will recover, but it is hoped that increases in output will be recorded from at least 2013. The TAYplan-wide Housing Need and Demand Assessment estimates that the recovery in demand would be complete by 2018/19. This Plan will be reviewed by 2017.

Therefore the first twelve years of this Plan emphasise 'being ready' to support the progress of the recovery from the start.
This requires Local Development Plans to identify sites which are effective or capable of becoming effective to meet the housing land requirement up to year 10, maintain a minimum 5 year effective housing land supply and work towards a 7 year supply by 2015*** to support reaching Policy 5 build rates by 2024, or before then if possible. The scale of growth for 2024-32 is likely to be similar. This will be reviewed through the next Plan. From a place shaping perspective the construction sector will need to provide housing that meets the quality requirements and the needs and aspirations of a range of different households, including low cost housing.

This Plan's approach is bold and clear on shaping better quality places (with the neighbourhood as the key unit of delivery), its location emphasis and, on 'being ready' for recovery and growth from 2012. But, it offers important flexibilities:

- In addition to Strategic Development Areas and sites which already have planning permission, Local Development Plans will identify appropriate land to be allocated for housing, often as part of mixed-use development.
- Whilst average annual build rates are identified, these are only averages and the period in which these build rates should be achieved is within and over the 12 years to 2024.
- Local Development Plans shall allocate sufficient land to ensure a generous supply of effective housing sites to provide for the delivery of Proposal 2 and to provide flexibility and choice.
- The critical issue for the quality agenda is to ensure that the housing figures themselves do not hold back good quality development that delivers the objectives of this Plan. Poor quality development which fails to deliver this Plan's objectives shall be refused.
- Local authorities may move housing provision between neighbouring housing markets within their area if the settlement(s) expected to accommodate growth to achieve Policy 1 is/are affected by serious environmental or infrastructure capacity constraints.

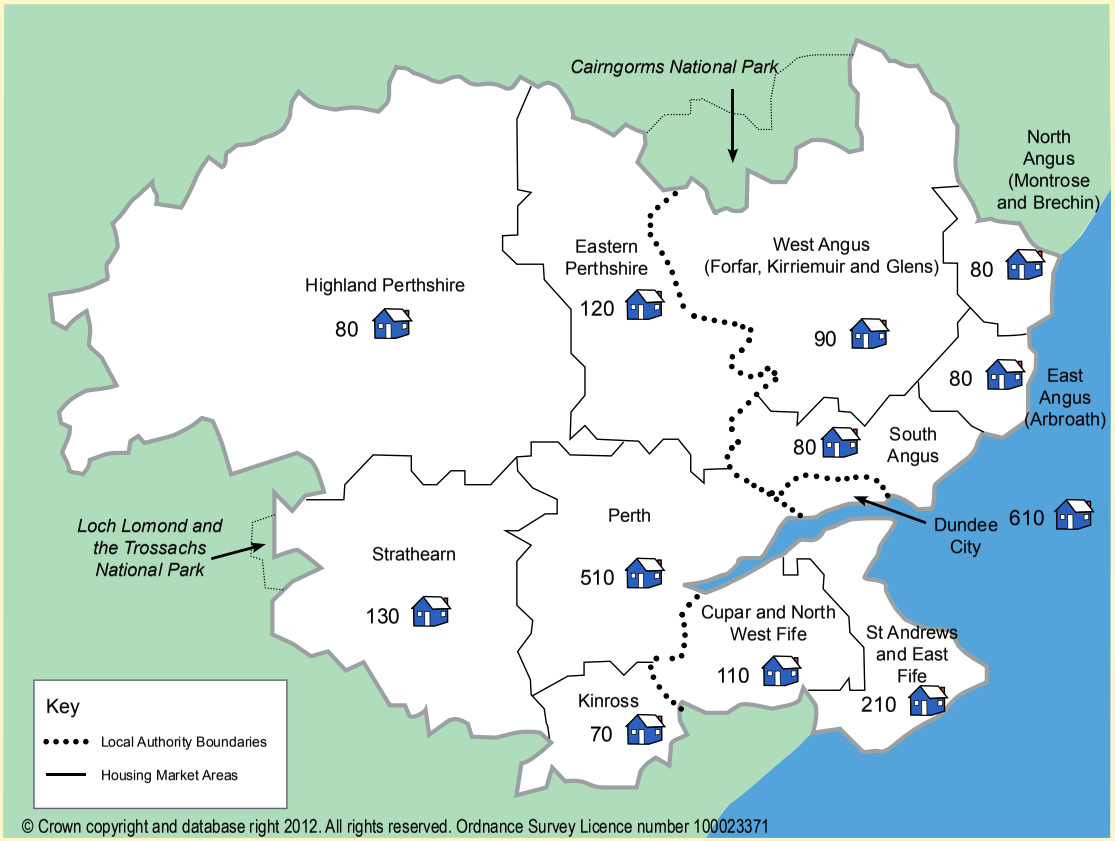
** TAYplan-wide Housing Need and Demand Assessment lower range is from sensitivity analysis based on lower assumptions for each element of the backlog of need for affordable housing for each local authority.*
*** General Register Office Scotland (GROS) Projections: Produced every 2 years, these show population and household changes for the next 25 years assuming a continuation of the most recent five year trends.*
**** By LDPs working towards a 7 year effective land supply by 2015, this will support economic growth by ensuring that housing land supply is more than able to respond to any upturn in the housing market.*

Policy 5: Housing

Local Development Plans shall:

A. Allocate land which is effective or capable of becoming effective to meet the housing land requirement up to year 10 from the predicted date of adoption, ensuring a minimum of 5 years effective land supply at all times, and work towards the provision of a 7 years supply of effective housing land by 2015, to support economic growth. Land should be allocated within each Housing Market Area (Proposal 2) through Local Development Plans to provide an effective and generous supply of land to assist in the delivery of in the order of 26,000 units up to year 2024 across TAYplan. Average annual build rates are illustrated*. In the period 2024 to 2032 in the order of 17,400 units may be required. To assist the delivery of these build rates, Local Development Plans shall allocate sufficient land to ensure a generous supply of effective housing sites and to provide for flexibility and choice.

Proposal 2 – average annual housing market area build rates



- in serious cases of appropriately evidenced environmental or infrastructure capacity constraints, provide for up to 10% of the housing provision for one market area to be shared between one or more neighbouring housing market areas within the same authority taking account of meeting needs in that housing market area.
- ensure that the mix of housing type, size and tenure meets the needs and aspirations of a range of different households throughout their lives, including the provision of an appropriate level of affordable housing based on defined local needs. Local Development Plans (where applicable) will need to set affordable housing requirements for or within each housing market area.

B. have the flexibility to plan for house building rates in Dundee City to exceed the level of annual provision in Proposal 2.

C. ensure there is a presumption against land releases in areas surrounding the Dundee and Perth Core Areas, including the Carse of Gowrie, where it would prejudice the delivery of Strategic Development Areas or regeneration within the core areas or conflict with other parts of this Plan.

**Average build rates are illustrated annually to assist the understanding of what the scale of housing is for communities. These are only averages and the period in which these build rates should be achieved is over the first 12 years of the Plan, not annually. It is anticipated that within the first 12 year period build rates will be lower than the average in the early period and greater in the later period. These figures include Strategic Development Areas and affordable housing.*

Energy and Waste/Resource Management Infrastructure: Ensures that energy and waste/resource management infrastructure are in the most appropriate locations.

This Plan seeks to reduce resource consumption through provision of energy and waste/resource management infrastructure* in order to contribute to Scottish Government ambitions for the mitigation of and adaptation to climate change and to achieve zero waste. It also aims to contribute towards greater regional energy self-sufficiency.

This requires us to use less energy and to generate more power and heat from renewable sources and resource recovery; and, to consider waste from start to finish; becoming better at resource management. This is strongly tied into resource security and living within environmental limits. It also presents opportunities to grow the renewable energy and waste/resource management sector as a whole within the TAYplan region. The issue is no longer about whether such facilities are needed but instead about helping to ensure they are delivered in the most appropriate locations.

Land use planning is only one of the regulatory requirements that energy and waste/resource management operators must consider. This Plan does not provide the locations for energy infrastructure; this role is for Local Development Plans. It sets out a series of locational considerations for all energy and waste/resource management infrastructure as the impacts and operations of these share similar characteristics.

This Plan ensures consistency between Local Development Plans in fulfilling Scottish Planning Policy requirements to define areas of search for renewable energy infrastructure and it applies this to a wide range of energy and waste/resource management infrastructure.

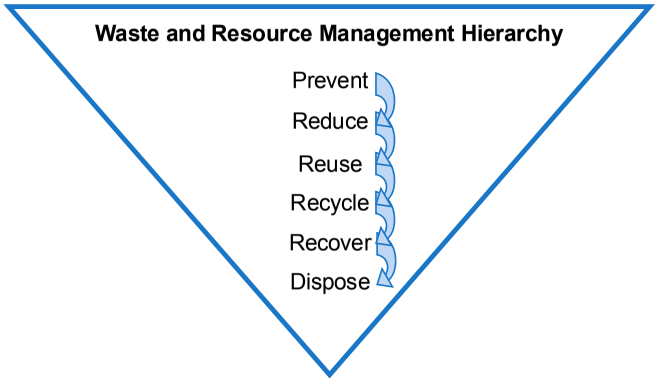
It recognises the different scales – property (eg micro-renewables or individual waste facilities), community (eg district heating and power or local waste facilities) and regional/national (eg national level schemes and waste facilities for wide areas) at which this infrastructure can be provided and both the individual and cumulative contribution that can be made, particularly by community and property scale infrastructure, to Scottish Government objectives for greater decentralisation of heat and energy.

Changes in the law allowing surplus power to be sold back to the national grid and other incentives could stimulate interest from local authorities, businesses, householders, community land trusts and other groups to obtain loans for energy infrastructure to enable development to meet local or individual needs in future. Similarly the price of materials in the global market place may continue to stimulate business interests in resource recovery.

Many of the region's existing waste management facilities have additional capacity or could be expanded in situ, including the strategic scale facilities at Binn Farm near Glenfarg and DERL at Baldovie in Dundee. No requirement for new landfill sites has been identified before 2024 and successful implementation of the Scottish Government's Zero Waste Plan and expansion of other treatment facilities could extend this to and beyond 2032.

This Plan encourages new strategic scale waste/resource management infrastructure to be within or close to the Dundee and Perth Core Areas reflecting the proximity of materials and customers for heat and other products.

Modern waste/resource management infrastructure is designed and regulated to high standards and is similar to other industrial processes. Subject to detailed site specific considerations, waste management facilities can be considered appropriate land uses within industrial and employment sites.



*Energy and waste management infrastructure: Infrastructure for heat and power generation and transmission; and, collection, separation, handling, transfer, processing, resource recovery and disposal of waste. This includes recycling plants, anaerobic waste digesters, energy from waste plants, wind turbines, biomass plants, combined heat and power plants, solar power, hydro electric power plants and similar facilities.

Policy 6: Energy and Waste/Resource Management Infrastructure

To deliver a low/zero carbon future and contribute to meeting Scottish Government energy and waste targets:

A. Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure and for waste/resource management infrastructure or criteria to support this; including, where appropriate, land for process industries (e.g. the co-location/proximity of surplus heat producers with heat users).

B. Beyond community or small scale facilities waste/resource management infrastructure is most likely to be focussed within or close to the Dundee and/or Perth Core Areas (identified in Policy 1).

C. Local Development Plans and development proposals should ensure that all areas of search, allocated sites, routes and decisions on development proposals for energy and waste/resource management infrastructure have been justified, at a minimum, on the basis of these considerations:

- The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;
- Waste/resource management proposals are justified against the Scottish Government's Zero Waste Plan and support the delivery of the waste/resource management hierarchy;
- Proximity of resources (e.g. woodland, wind or waste material); and to users/customers, grid connections and distribution networks for the heat, power or physical materials and waste products, where appropriate;
- Anticipated effects of construction and operation on air quality, emissions, noise, odour, surface and ground water pollution, drainage, waste disposal, radar installations and flight paths, and, of nuisance impacts on off-site properties;
- Sensitivity of landscapes (informed by landscape character assessments and other work), the water environment, biodiversity, geo-diversity, habitats, tourism, recreational access and listed/scheduled buildings and structures;
- Impacts of associated new grid connections and distribution or access infrastructure;
- Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure;
- Impacts upon neighbouring planning authorities (both within and outwith TAYplan); and,
- Consistency with the National Planning Framework and its Action Programme.

Town centres: Sets out a town centres hierarchy to protect and enhance their vitality and viability.

The TAYplan region is home to numerous town centres of different scales and economic significance with a diverse range of activities. It also contains a series of other centres. All centres function as part of a network within which people access services, work or visit and where businesses operate.

The region's town centres are where many businesses, services and facilities are located and are some of the most accessible locations by a range of transport modes. Protecting and enhancing the vitality and viability of all centres, and particularly town centres, directly contribute to providing good quality places and to the region's economic competitiveness. Therefore the mix and quality of town centres and their land uses have a critical role in delivering the vision and objectives of this Plan.

The region is also home to several commercial centres including St. Catherine's Retail Park in Perth, Kingsway East, Gallagher Retail Park and Kingsway West in Dundee and others elsewhere; as well as factory outlets. Generally these specialise in bulky goods such as DIY and furniture, commercial leisure and are often co-located with supermarkets.

Some of the region's larger settlements also contain smaller local centres. Local centres, as defined in Scottish Planning Policy, often provide a mixture of smaller scale convenience and comparison* retail, and, other local services. It is important to protect and enhance their vitality and viability as they provide jobs and services to their immediate localities. This directly contributes to the provision of local services and facilities within communities and reduces the need to travel, particularly in larger settlements. This is a direct contributor to place quality.

To achieve the Scottish Government's aim to protect and enhance town centre vitality and viability this Plan identifies a hierarchy of town centres. The emphasis is also on protecting other service centres (commercial and local centres) for the uses defined in Scottish Planning Policy. This will contribute to protecting and enhancing the vitality and viability of town centres defined in the hierarchy as the focus for comparison retail specifically, but also for some convenience retail, and for the mix of other town centre uses defined in Scottish Planning Policy.

Retail Sequential Approach set out in Scottish Planning Policy (2010)

- town centre,
- edge of town centre,
- other commercial centres identified in the development plan,
- out of centre locations that are or can be made easily accessible by a choice of transport modes.

Comparison retail: non-food items where the shopper will generally compare the price. This includes products such as clothes, shoes, books, music/DVDs, household items, electrical goods and furniture.

Policy 7: Town Centres

Strategies, plans, programmes and development proposals should:

focus comparison retail development within the town and commercial centres specified in this retail hierarchy (table 2 below), with the largest scale of activity in the largest town centres, to protect and enhance their vitality and viability.

- **Local Development Plans should** identify the specific boundaries for each centre identified in table 2 (below) and can identify roles for 'other service centres' beneath the regional hierarchy; including 'commercial centres' for leisure, bulky goods and other retail; and, local centres for convenience and comparison retail, particularly in multi-centre settlements such as Dundee, Perth and Arbroath. They should also support a mix of uses in city and town centres that will encourage their vitality and the diversity of economic and social activity in both the day and the evening.
- **Planning decisions should** be based on the justification of planning proposals combining this hierarchy (in table 2 below), the sequential approach in the Scottish Planning Policy (SPP) and other local considerations as appropriate.

Table 2: Hierarchy of Comparison Retail Centres

Hierarchy of Comparison Retail Centres					
Regional Centre	Dundee City Centre				
Sub-regional Centre	Perth City Centre				
Larger Town Centres	Arbroath	Cupar	Forfar	Montrose	St Andrews
Smaller Town Centres	Aberfeldy Alyth Anstruther	Auchterarder Blairgowrie Brechin	Carnoustie Coupar Angus Crieff	Kirriemuir Kinross Monifieth	Newburgh Pitlochry
Commercial Centres	Gallagher Retail Park	Kingsway East	Kingsway West	St. Catherine's Retail Park (Perth)	

Delivering the Strategic Development Plan: Sets out requirements for developer contributions.

A key role of the planning system is to provide a clear and certain framework for taking planning decisions to foster sustainable economic growth. This Plan is accompanied by an Action Programme, which identifies the key tasks and activities that are needed to ensure successful delivery of the policies and proposals of this Plan.

The planning system will be responsible for the decision making framework; through Local Development Plans, and the decisions themselves. However, other parts of local authorities; public sector agencies and the private sector will be responsible for the delivery of development.

In times of economic recession, the funding of new projects is difficult. This is however a long-term Plan and it is important that developer contributions ensure that the additional burdens placed on infrastructure and services as a result of a development are mitigated by the developer.

This is in addition to delivering high quality development and other requirements e.g. green spaces as set out by other policies in this Plan, and any mitigation to ensure that development proposals will not adversely affect the integrity of a Natura 2000 site.

Achieving the policy aims of this Plan requires Local Development Plans to establish a mechanism(s), which may require new financial models, to ensure that these contributions are achieved and a thorough understanding of infrastructure, service and amenity capacity issues when allocating land for development to implement the strategy. To assist this, particularly in times of an economic downturn, the public sector will have a greater role to play.

This offers certainty to land owners, developers and local authorities about likely developer contributions and the nature of requirements for sites and localities from the outset. The system should then offer operational transparency, consistency and certainty as advocated through Scottish Government Circular 01/2010.

Policy 8: Delivering the Strategic Development Plan

To ensure that quality is designed-in to development and places developer contributions shall be sought for new development:

to mitigate any adverse impact on infrastructure, services and amenities brought about by development including contributions towards schools, affordable housing, transport infrastructure and facilities (including for road, rail, walking, cycling and public transport), and other community facilities in accordance with the Scottish Government Circular 1/2010.

Monitoring Arrangements: How we will monitor the progress of this Plan

Policy	Policy element	Indicator
1A	Settlement concentration	Demographic and migration changes, house prices. Location of all types of new development. Qualitative understanding of decision making.
1B	Land release priorities	
2	Overall	House prices, business rents, land prices and anecdotal evidence
2A	Build in resilience	Development in flood risk locations and protection policies and requirements for SUDS and other measures.
2B	Integrate and co-locate infrastructure	Deployment of planning obligations and anecdotal and qualitative evidence
2C	Integration of transport	Regional Transport Strategy Indicators
2D	Waste management designed-in	Qualitative appraisal of local authority decisions.
2E	Energy efficiency/embedded generation	
2F	Arrangement and layout	Qualitative LDP work
3	Finite resources	Safeguarded land and 10 year aggregates in LDPs. Hectares of prime agricultural land lost.
	Greenbelts and Transport infrastructure	LDP policies and Regional Transport Strategy Indicators
	Natural and Historic Assets	LDP policies, SNH/SEPA objections to approved proposals and Areas at risk
	Employment land	LDP policies and decisions for alternative uses
4	Allocate Strategic Development Areas and produce Strategic Development Framework.	LDP policies
5A	Build rates, HMA shift 10% and affordable housing	Annual build and start rates, outstanding permissions and allocations, urban capacity, LDP policies at housing market area and local authority levels.
5B	Build rates in Dundee	
5C	Dundee and Perth Core Areas	
6A	Identification of areas for energy and waste	LDP policies and anecdotal and qualitative from planning decisions.
6B	Consider criteria as minimum	
7	Retail in hierarchy centres and identification of other commercial and local centres	
8	Seeking developer contributions	

Acknowledgements

Photographs

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-Special thanks to P&A Macdonald/Scottish Natural Heritage for top photograph on page 12.

Diagrams

-Architecture and Design Scotland (Page 10 Strategic Development Framework including Willie Miller 'Inverness City Vision' and Urban Initiatives (image 8) and Policy 2)

Contacts and finding information

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This information is made available in large print or in an alternative format that meets your needs.	
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Urdu	مزید معلومات کے لئے برائے مہربانی 01382 435825 پر فون کریں۔
Polish	po dalszą informację zadzwoń pod numer 01382 435825
Alternative Formats	For further information please contact the issuer of this publication

Hard copies of the Approved Strategic Development Plan (June 2012) and accompanying documents can be viewed in all public libraries within Dundee City, Perth & Kinross, Angus and North Fife; and, in the Council offices below:

In Dundee	Tayside House, Crichton Street, Dundee, DD1 3RB	Enterprise House, 3 Green Market, Dundee, DD1 4QB	Dundee House, North Lindsay Street, Dundee, DD1 1QA	
In Fife	Fife House, North Street, Glenrothes, KY7 5LT	County Buildings, St. Catherine Street, Cupar, KY15 4TA	St Andrews Local Office, Market Street, St Andrews, KY16 9UY	
In Perth and Kinross	Pullar House, Kinnoull Street, Perth, PH1 5GD	Auchterarder Area Office, Aytoun Hall, Auchterarder, PH3 1QD	Blairgowrie Area Office, 46 Leslie Street, Blairgowrie, PH10 6AQ	
	Pitlochry Area Office, 26 Atholl Road, Pitlochry, PH16 5BX	Crieff Area Office, 32 James Square, Crieff, PH7 3EY	Kinross Area Office/Community Campus, Kinross High School, The Muirs, Kinross, KY13 8FQ	
In Angus	County Buildings, Market Street, Forfar, DD8 3LG	Arbroath Access Office, Old Parish Church, Kirk Square, Arbroath, DD11 1DX	Brechin Access Office, 36 Bank Street, Brechin, DD9 6AX	Montrose Access Office, Town House, High Street, Montrose, DD10 8QW
	Carnoustie Access Office, 26 High Street, Carnoustie, DD7 6AP	Forfar Access Office, Castle Street, Forfar, DD8 3AF	Kirriemuir Access Office, 5 Bank Street, Kirriemuir, DD8 4BE	Monifieth Access Office, 81 High Street, Monifieth, DD5 4AA

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TAYplan
The Strategic Development Planning Authority for Dundee, Angus, Perth and North Fife

No 122

Tayside landscape character assessment

Land Use Consultants

1999

Land Use Consultants, Gleniffer House, 21 Woodside Terrace,
Glasgow G3 7XH

Nominated Officer: Anne Lumb, Advisory Services
Report date: 1997
Report to: Scottish Natural Heritage
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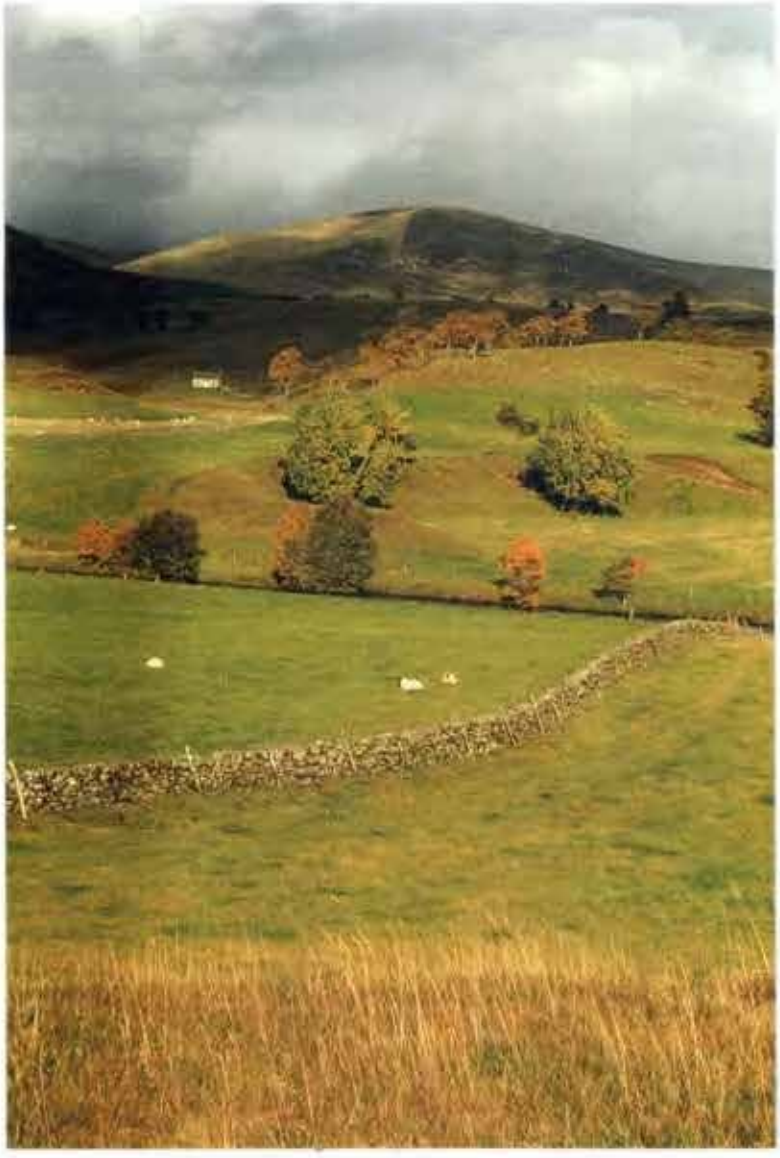
TAYSIDE LANDSCAPE CHARACTER ASSESSMENT



LAND USE CONSULTANTS

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1. INTRODUCTION

ROLE OF THIS REPORT

1.1. Land Use Consultants were commissioned in September 1996 to undertake a landscape character assessment of the Tayside region. The aims of the assessment, as set out in the study brief, are to:

- produce in written and map form a detailed assessment of the landscape character of Tayside;
- provide a tool for Scottish Natural Heritage (SNH) staff to use in their day to day casework, including local planning and development control issues, and in particular to provide guidance on how various types of development or land use changes might best be accommodated within the different landscape character areas identified and their capacity to accommodate these changes;
- provide information about landscape character for use by planning authorities in the preparation and review of their development plans, in the scoping and production of environmental assessments and in the consideration of other applications relating to changes in land use;
- consider the likely and existing pressures and opportunities for landscape change and assess the sensitivity of the landscapes to these changes;
- identify areas of landscape that are or may be under threat and find opportunities for the enhancement of features that contribute to landscape character;
- develop guidelines indicating how differing landscapes may be conserved, enhanced or restructured as appropriate.

1.2. The assessment is to be produced in two phases: These comprise the following:

(i) Phase I: Report of survey;

(ii) Phase II: Planning and management guidance in response to landscape change.

1.3. This document comprises a synthesis of the two phases of the study.

STRUCTURE OF THIS REPORT

1.4. Part I of the report describes the physical and cultural evolution of the Tayside landscape and reviews the principal forces for change which have affected it in the recent past, or which may affect it in the future.

1.5. Part II of the report comprises the landscape classification. For each of 20 distinct landscape types, the report describes the current landscape character and the forces for change that are affecting it and sets out a series of management and planning guidelines which are designed to conserve and enhance the distinctive character of the Tayside landscape.

Part I: Evolution of the Landscape

2. EVOLUTION OF THE LANDSCAPE

PHYSICAL INFLUENCES ON THE LANDSCAPE

2.1. The following chapter outlines the main physical processes which have shaped the landscape of Tayside we see today. The physical influences are discussed under the following categories.

- Solid Geology
- Drift Geology
- Hydrology
- Climate

These four interrelated categories are considered in this report as **processes** which form the resulting topography, soil cover and vegetation. Topography, soil cover and vegetation are thus the resultant **products** of these processes. It is, therefore, the interrelation of process and product which can be taken together to mean physical influences.

2.2. Tayside Region is an extensive area which overlies two of Scotland's major geological units; the Grampian Highlands and the East Central Lowlands of the Midland Valley. These two units are separated by the Highland Boundary Fault, which crosses Scotland from Loch Lomond in the south-west to Stonehaven on the north-east coast.

2.3. This chapter describes the physical influences acting on:

- the lowlands; and
- the Highland area.

2.4. The lowlands comprise that part of the region which lies to the south of the Highland Boundary Fault. The Highlands area is the land north of the Highland Boundary Fault.

2.5. Three maps are of relevance to this section. **Figure 1** shows the solid geology of the region. **Figure 2** shows its landform and drainage patterns, while **Figure 3** provides a generalised picture of Tayside's landcover.

Tayside Lowlands

2.6. South and east of the Highland Boundary Fault, the lowlands form part of a structural rift valley. The valley lies between the two fault lines of the Highland Boundary Fault and the Southern Upland Fault. Both faults were initiated during the period of Caledonian mountain building in early Palaeozoic times. A prolonged period of tectonic uplift was terminated when the centre of a gigantic arch of updomed rocks began to crack along lines of weakness. These fault lines followed the north-east to south-west Caledonian grain. The result was that a large strip of land 80 kilometres wide was lowered to create basins in which Old Red Sandstone Carboniferous and Permian rocks were later deposited. This tectonic instability also caused a great deal of volcanic activity in the area. The two ranges of hills within the lowlands, the Ochils and the Sidlaws, are the result of the north-east lava flows of this time, Stirling being the centre of volcanic activity in the area.

2.7. The lowlands are, therefore, largely comprised of resistant igneous rock overlying softer sedimentary rocks. The igneous rocks were formed by the volcanic activity mentioned previously. The sedimentary rocks are predominantly Lower Old Red Sandstone. These rocks were formed from the deposition of material eroded from the West Highlands and Mounth Highlands to the north, and other detritus. This material was carried south by the powerful rivers of the time. As these rivers crossed what is now the Highland Boundary Fault, their flow would have been checked by the change in gradient where they met the flatter land of the Midland Valley, depositing the material into a large alluvial plain.

2.8. The different rock types of the lowlands - the hard igneous and softer sedimentary - result in markedly different topography. This marked contrast can be seen around Strathearn and Perth. A characteristic of this area is the contrast in form between the hard rock landforms of the igneous Ochils and the soft rock features of Strathallan-Strathearn lowlands. This contrasting topography was shaped by glacial erosion. Ice sheets moving east towards the Firth of Tay truncated the spurs of the Ochil north slopes and pushed lobes of ice into the valley of Gleneagles. The steep sided form of this valley is testament to the resistance of igneous rocks to erosion. The softer sandstones of Strathallan and Strathearn, however, were eroded more easily. The divide between these two valleys was substantially lowered in this way.

2.9. While ice sheets were responsible for significant amounts of erosion within the lowlands, the principal process was that of deposition. This took the form of till (or boulder clay) laid down by moving ice sheets and the spread of fluvio-glacial deposits (kames, eskers and outwash terraces and channels) as the ice sheets melted. Also, at the end of the last Ice Age, sea levels rose, flooding large parts of the Tay estuary and Strathearn, creating the raised shorelines that are visible today, together with the carseland deposits of sedimentary material.

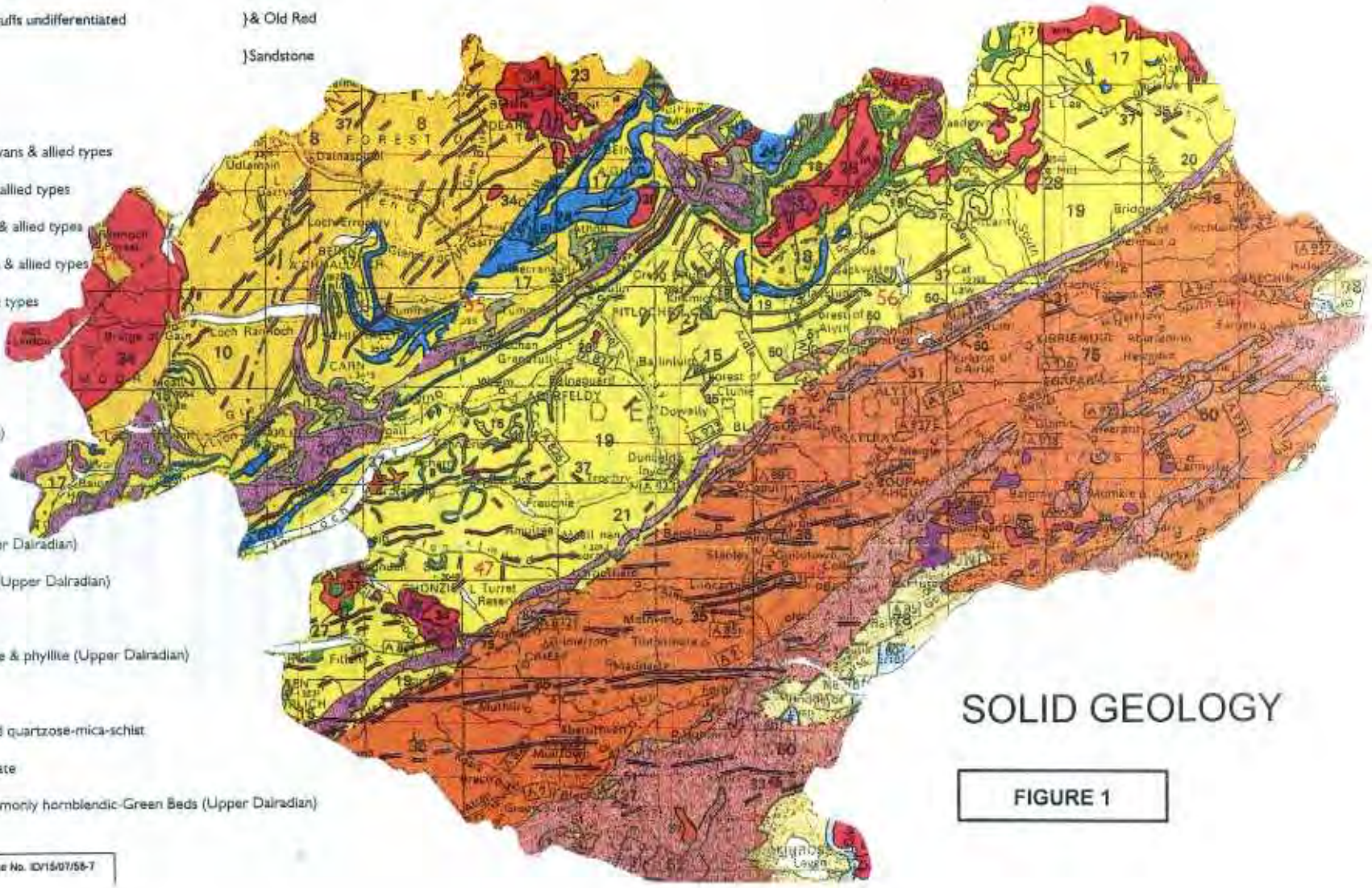
2.10. The western boundary of Tayside in this area crosses the summit of Uamh Beag at 662m. This hill range has survived due to it being of a more resistant composition than the surrounding sandstones. Uamh Beag is composed of Old Red basal conglomerates known as the Dunnottar Group. This group also forms the distinctive foothills which run from Blairgowrie to Edzell, which will be discussed later.

80	Tournaisian & Visean ('Carboniferous Limestone Series')	}Dinantian	}CARBONIFEROUS
78	Upper Old Red Sandstone	}	
77	Middle Old Red Sandstone	}DEVONIAN	
76	Old Red Sandstone	}	
52	Tuff (including ignimbrite)	}	
51	Rhyolite, trachyte & allied types	}Devonian	
50	Andesite &basalitic lavas & tuffs undifferentiated	}& Old Red	
49	Basalt & spilite	}Sandstone	
38	Agglomerate in neck		
37	Rhyolite, trachyte, felsite, elvans & allied types		
36	Porphyrite, lamphrophyre& allied types		
35	Basalt, dolerite, camptonite & allied types		
34	Granite, syenite, granophyre & allied types		
	Diorite & allied intermediate types		
32	Gabbro & allied types		
31	Ultrabasic rock		
28	Limestone (Upper Dalradian)		
24	Limestone		
23	Graphitic schist & slate		
22	Black shale with chert (Upper Dalradian)		
21	Slate, phyllite & mica-schist (Upper Dalradian)		
20	Slate phyllite & mica-schist		
19	Quartz-mica-schist, grit, slate & phyllite (Upper Dalradian)		
18	Quartz-mica schist		
17	Quartzite, grit, interstratified quartzose-mica-schist		
16	Boulder bed and conglomerate		
15	Epidote-chlorite-schist, commonly hornblendic-Green Beds (Upper Dalradian)		

EXTRUSIVE

INTRUSIVE

DALRADIAN



SOLID GEOLOGY

FIGURE 1

2.11. Perth has a strategic location where the Tay breaks through the hard volcanics of the Sidlaws. The city has historically capitalised on its surrounding geological structure. The softness of the water of the Tay, due to the low amount of calcareous mineral, promoted Perth as a centre for bleaching, dyeing and whisky bottling.

2.12. Upstream from Perth, mills connected with cotton, linen and jute industries were established along the Tay, Ericht and Almond valleys. These mills exploited the cataracts and rapids formed where rivers cross the resistant igneous dykes which intrude through the sandstone in these parts.

2.13. The structural history of the tract of land to the south-east of Perth, where the Tay channel widens as it approaches the Firth of Tay, is of note, for it represents the best example in Scotland of a true rift valley. The Ochils and Sidlaws, being of the same rock type, are opposing limbs of an anticline known as the Tay Anticline. The steep north-east facing slopes of the Ochils and the equally steep Braes of Carse, are parallel fault lines along which the highest point of the anticline has been downfaulted. The volcanic rocks were covered by the Upper Old Red Sandstone which now outcrops along the Firth of Tay to Dundee.

2.14. To the north of the Carse of Gowrie, the Sidlaws rise sharply from the flat carse. The Sidlaws are generally lower than the Ochils, reaching around 455 metres. This is due in part to the Ochil-Sidlaw lava flow becoming less thick as it moved further away from its point of origin near Stirling. Because of their base-rich rocks, the soils of the Sidlaws, like those of the Ochils, contain important nutrients such as calcium, phosphorous and potassium. The resultant effect on vegetation is a greater extent of montane grasslands on these hills than is found on the more acidic soils of the granitic Highlands north of the fault.

2.15. Strathmore is a sandstone vale approximately 13 kilometres wide. It corresponds largely to the outcrop of Lower Old Red Sandstone. The fact that this sandstone coincides with an area of lowland is due partly to previous downfaulting along the Highland Boundary Fault. It is also because the softer sandstones are sandwiched between more resistant grits and schists to the north and volcanics to the south, leaving it relatively vulnerable to erosion. Strathmore is, therefore, an example of land formed by 'differential erosion', where denuding processes (including ice sheets) have been able to lower less resistant sedimentary sandstones more effectively than the more resistant metamorphic and igneous rocks, exacerbating the effect of downfaulting.

2.16. Within Old Red Sandstone, however, are some extremely hard formations, such as the Dunnottar Group of Old Red basal conglomerates previously discussed in relation to Uamh Beag (para 2.10). As mentioned, the foothills running north-east from Blairgowrie, including Tullo Hill and the Hill of Alyth, are also comprised of this group. These hills are separated from the Highland Boundary Fault and the Mounth Highlands by a discontinuous linear valley. This valley was also formed by a process of differential erosion. In this case, a narrow outcrop of less resistant Ordovician faulted wedges and Downtonian rocks have been eroded.

2.17. Where the solid geology of the area has had a strong impact on the character of Strathmore, is in the sandstone towns such as Kirriemuir. Here, the town centre is

almost entirely built from red sandstone with slate roofs. This creates a strong local identity.

2.18. The coast of the region is composed of successive cliffs and bays. This pattern results from the alternating igneous and sedimentary rocks within the Old Red Sandstone succession. The cliffs are formed from the harder basalt lavas, igneous dykes and Old Red conglomerates. The lower coasts and bays correspond to the softer areas of sandstone.

2.19. The coastline is generally low with few significant topographic features until Arbroath. North of Arbroath, the presence of igneous basalts and Upper Old Red Sandstone introduces a number of coastal features characteristic of differential erosion by maritime processes. Deil's Heid sea stack and the blow hole of Graylet Pot are two such features. The village of Auchmithie sits atop spectacular conglomeratic cliffs.

2.20. North of Auchmithie, the Ochil-Sidlaw lava group reaches the North Sea. The coastline cuts across the various outcrops resulting in a series of bays and headlands. The headlands of Red Head and those south of Montrose, correspond with igneous outcrops resulting in some spectacular basaltic lava cliffs. In contrast, Lunan Bay corresponds to an outcrop of resistant Lower Old Red Sandstone.

2.21. The main drift geological features of the lowlands are the glacial plains of Strathearn, Strathallan and Strathmore and the post-glacial raised beaches of the Carse of Gowrie and Buddon Ness. The glacial plains and the Carse contain some of the richest farmland in Scotland.

2.22. The Carse of Gowrie, however, has not always been quality agricultural land. Prior to the agricultural improvements and drainage in the 18th century, the Carse was marshy, due to its foundation of uplifted marine clay. The number of names prefixed 'Inch' or island mark the dry areas prior to drainage: Inchture, Inchyra, etc. The Carse of Gowrie, unlike the carse clays of the Forth, never had a cover of peat on its surface. There is, therefore, no history of peat cutting in this area.

2.23. As mentioned previously (para 2.15), it is the drift geology of Strathmore which today dictates the land uses and soil type - a fertile red loam. Strathmore is covered in a thick layer of glacial drift which was produced by several processes.

2.24. The most significant of the processes which produced the widespread bright red drifts, is the movement down the vale of a major ice sheet. Another source of superficial material is the locally restricted south-easterly advances of ice which brought grey ground-moraine and fluvio-glacial outwash from the Mounth Highlands.

2.25. A characteristic drift feature in the Strathmore area is the extensive 'sandur' or plains of outwash at the mouths of most of the Highland Glens, formed as the glaciers retreated into the Highland glens, and meltwater deposited material that had been scoured by the ice. To the south of Blairgowrie the moors, woods and golf course mark the presence of the gravely soils of a sandur.

2.26. Where the ice sheets left extensive sandur plains, or other drift features such as kame and kettle topography, the land use of the fertile straths changes also. Examples can be found in Strathmore, north of Glamis and in Strathallan around the Gleneagles Hotel. In both instances, flat farmland changes to undulating and hummocky well-drained gravely soils. These are often covered with gorse, heather or pine. Some, such as at Gleneagles, are now used as golf courses as they are generally unsuitable for agriculture, being too steep and/or the soils too acidic for any agricultural use other than rough grazing.

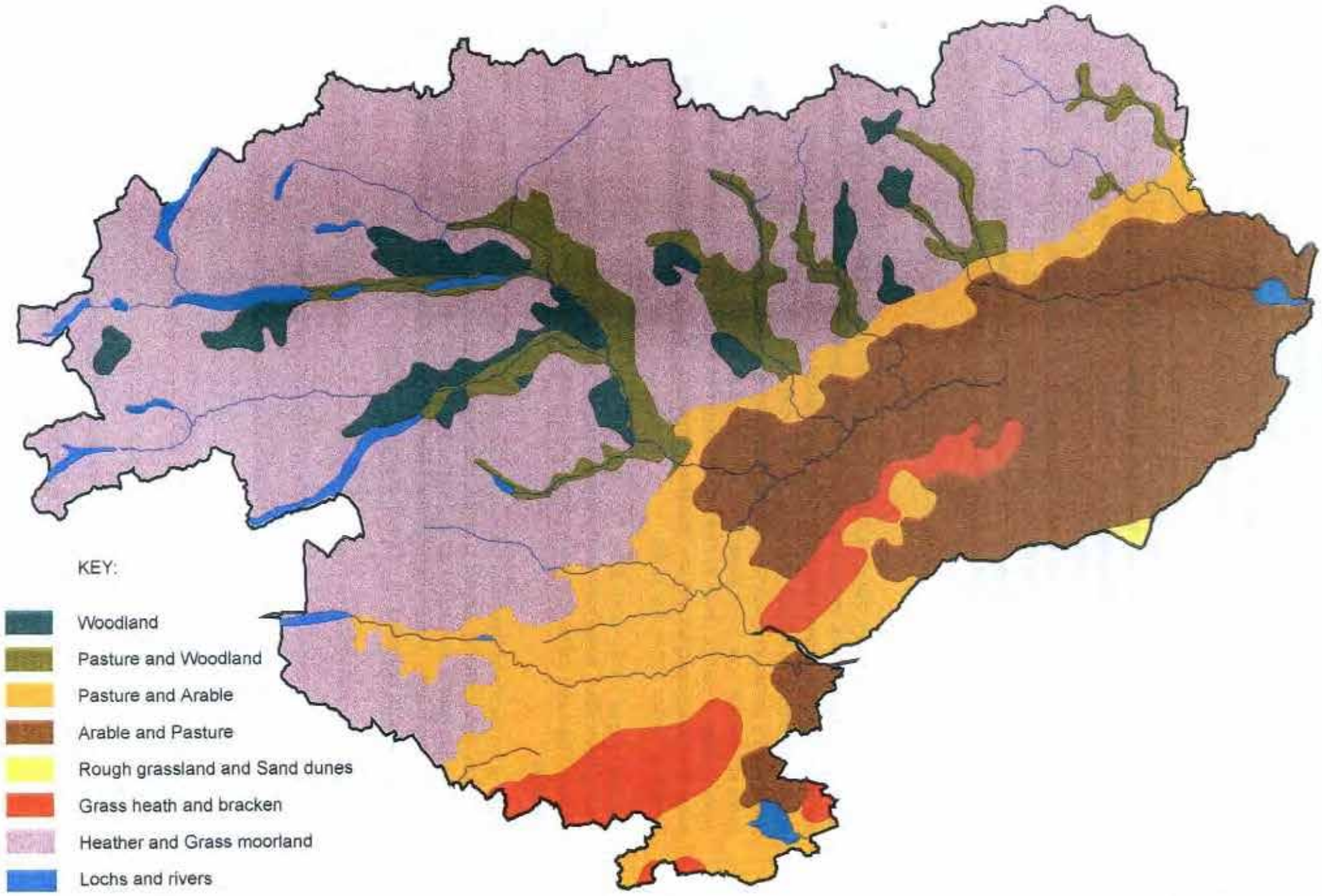
2.27. The hydrology of the lowlands is interesting as it largely ignores the underlying structures. Whilst these structures generally run south-west to north-east, the drainage of the area is predominantly from the west or north-west. The Rivers Tay, Earn and Almond all exhibit this pattern to a greater or lesser degree. This discordant condition is believed to be the result of ancient east flowing rivers continuing their flow over an emerging landmass in which the greatest uplift was in the west. This gentle uplift was accompanied by local warping. As the consequent streams developed upon successively emerging coastal platforms, they continued to extend themselves towards the sea, but always down the steepest slopes. The rivers thus incised themselves across the underlying structural lines. Thus, the drainage of the area used to be accordant with former coastlines, but became gradually more discordant over time.

The Highland areas

2.28. The Highland areas lie to the north-west of the Highland Boundary Fault. They were metamorphosed from sedimentary rocks during the Caledonian Orogeny - the gigantic period of mountain building which took place around 400 to 500 million years ago. Lengthy periods of denudation have reduced these mountains to the stumps seen today.

2.29. Within the region, two main groups of rock outcrop: the Moinian Assemblage and the Dalradian Assemblage. Both run roughly parallel to the Highland Boundary Fault. These two groups differ in age, diversity and composition of constituent rocks. The Moinian Assemblage is the older of the two and occurs in the north-west of the region. This area has yielded to denudation in a largely uniform manner, resulting in featureless plateau lands. The Dalradian Assemblage by contrast is much more diverse in both composition or rocks and thickness of strata. It occurs to the south of the Moinian Assemblage and forms the southern edge of the Highland Boundary Fault. Three significant granite intrusions also occur in the north of the region, at Rannoch Moor, Beinn Dearg and in the Mounth Hills west of Glen Clova.

2.30. The Moinian Assemblage is characterised by uniform landscapes such as at Drumochter and Rannoch Moor, and their blanket bogs. These blanket bogs have formed, unlike lowland raised bogs, independently of ground water. They are more dependent upon high rainfall and atmospheric humidity. The blanket bog has thus become a typical vegetation type or 'climatic' formation in this high rainfall area.



GENERALISED LANDCOVER

FIGURE 3

2.31. Rannoch Moor is one of the best examples of such a peat bog. It is, however, also interesting for its geological significance as a granite outcrop. Despite the fact that granite is an igneous rock often considered resistant to erosion, and that the high Cairngorms are also granite, Rannoch Moor is a low-lying basin. The reason for this apparent paradox is due to the nature of the surrounding rocks, quartzites, quartzose mica schists and the volcanic rocks of Glencoe. All these neighbouring rocks offer greater resistance to denudation than the granite of Rannoch Moor. Once a shallow upland basin had formed, therefore, the ice sheets of the Pleistocene times would have removed the thick accumulations of disintegrating rock for the natural amphitheatre of today.

2.32. East of Rannoch Moor lies the Rannoch/Tummel Valley. This valley can be discussed in relation to two significant geological/hydrological processes characteristic of this Highland area, discordant drainage and radial ice-dispersal.

2.33. Unlike Lochs Ericht, Laidon and Tay, Loch Tummel and Loch Rannoch are not fault-guided. This means, therefore, taken in its entirety, the valley runs contrary to the main underlying geological structure, crossing various rock types. Other examples of this are Loch Errochty and Loch Lyon. Various theories as to how this discordant condition can come about have been suggested. Where perhaps it is most interesting, however, is in its geomorphological manifestations, or the resultant topography it produces. The change along the length of the valley, from wide loch-filled alluvial basins to narrow rock sections, is the result of harder Schiehallion quartzites crossing the valley. A similar condition can be found with river valleys such as the River Garry where it crosses the complex Dalradian formations at Killiecrankie. The Falls of Tummel and the Pass of Killiecrankie are both formed by harder quartzites crossing the river's path.

2.34. Further examples of discordant drainage are found in the eastern part of the region in the Angus Glens. Here, the rivers which occupy Glen Esk, Glen Prosen, Glen Clova and Glen Shee all flow, against the structural grain, south-east towards Strathmore.

2.35. The other main process affecting the Rannoch Tummel Valley is radial ice dispersal. The valley is one of 15 major glacial troughs in the south-west Grampians. The process results from the radial dispersal of ice from Rannoch Moor.

2.36. Where the valley patterns did not accommodate ice dispersal, then glacial 'breaching' occurred, whereby new valleys were created. The Loch Ericht Valley is an example of one such valley.

2.37. The River Tay catchment covers two thirds of the region and is fed by seven other significant rivers including the Earn, Almond, Tummel, Garry and Isla.

2.38. The boundary of the Moinian and Dalradian Assemblages is marked for a substantial length within the region by the Iltay Boundary Slide. The boundary between the two is complicated by overfolding and thrusting as well as being severed by major north-north-east tear faults. Such tear faults often resulted in the formation of belts of shattered rock which have subsequently been denuded due to their weakness. Glen Tilt, the central section of Loch Tay, Loch Ericht and Loch Laidon in Rannoch Moor, are all the result of this faulting process.

2.39. The boundary between the Moinian schists and Dalradian rocks is perhaps most obvious, however, where the River Garry crosses the boundary south of Calvine. The landscape changes abruptly from the open moorland by Drumochter to the wide basin of Atholl. The effect of this change to less resistant calcareous limestone is also apparent in the soils and vegetation, where the extensive Blair Castle Estate is situated amongst large trees and fertile farmland.

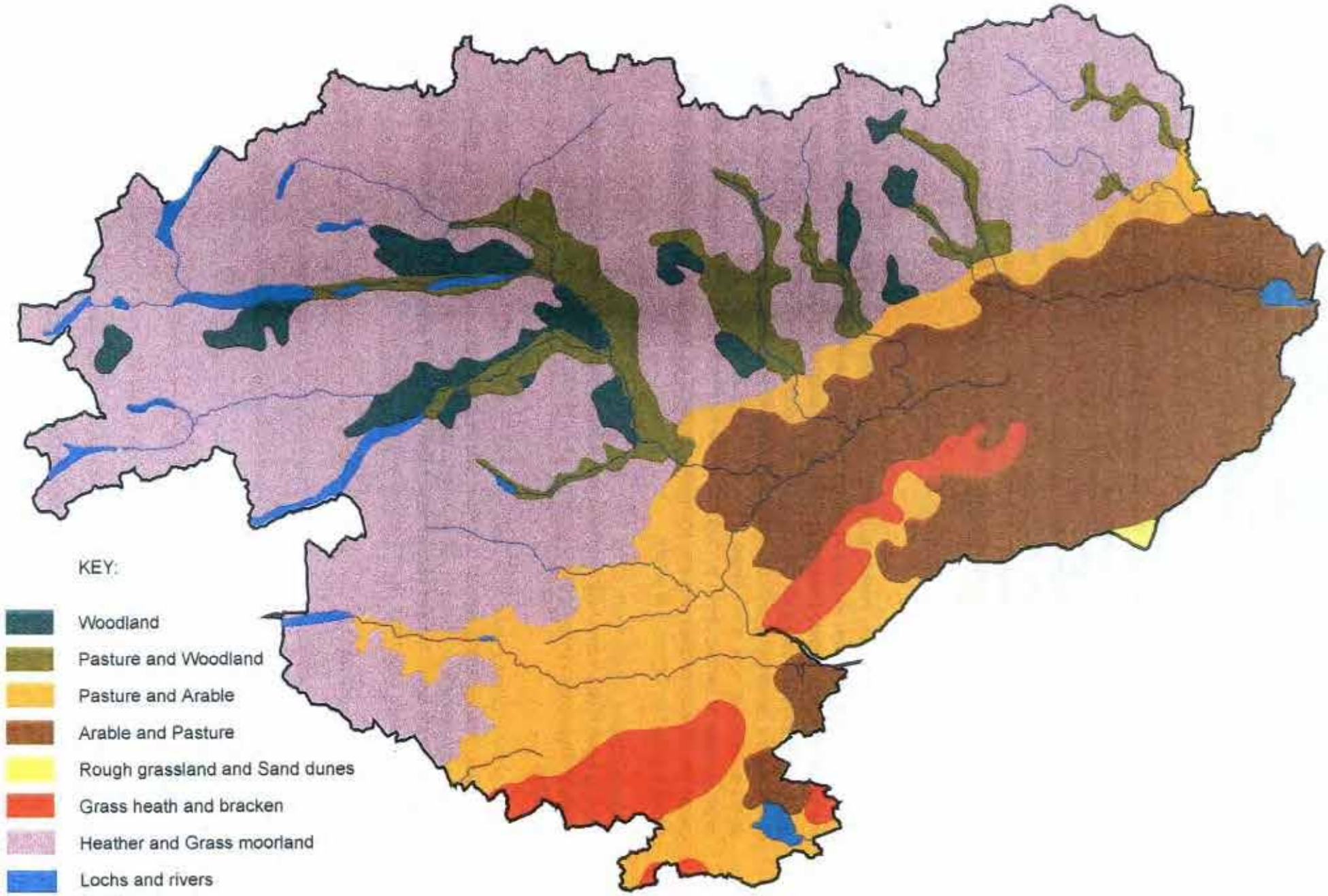
2.40. West of here, the tract of land from Breadalbane to Aberfeldy is dominated by Ben Lawers, Glen Lyon and Loch Tay. This area is considered important as a transitional area between the more heavily glaciated Western Highlands, outwith the region, and the less deeply eroded Eastern Highlands, including the hills above the Angus Glens. This area also represents the eastern extent of the last major ice advance, the Loch Lomond Readvance. The outwash from this last ice-front has been carried into a number of broad, flat terraces. In the area around Fortingall, Kenmore and Aberfeldy, these terraces have had an important impact on land use, providing flat, fertile glacial drift plains suitable for agriculture.

Summary

2.41. The Tayside Region can, therefore, be seen as comprising two broadly distinctive geomorphological areas, separated by the Highland Boundary Fault. The topography of the entire region is largely the product of similar glacial processes acting upon the varying underlying geological structure. To the south of the fault line the broad, flat, fertile straths correspond with the soft areas of sandstone, eroded during glaciation. The fertile soils which now cover these areas are the result of glacial drift deposits and eroded material carried down by rivers from the Highland glens. The flat lands by the coast are raised beaches and are, therefore, covered by marine deposits originating from periods of former higher sea levels.

2.42. The two ranges of hills south of the fault, the Ochils and Sidlaws, are igneous intrusions. Having been tilted, these hills now form south facing dipslopes and north facing scarp slopes. The coast varies from steep cliffs to wide bays and low areas with raised beaches.

2.43. North of the Highland Boundary Fault, generally harder rocks have resulted in higher elevation, despite being subject to similar glacial processes as the south of the region. Much of this area is covered in either moorland or blanket bog, indicating higher rainfall and less fertile soils. Where valleys have been created or enlarged by glaciation, the more fertile soils occurring on drift deposits support agriculture.



GENERALISED LANDCOVER

FIGURE 3

2.44. A broad distinction can be drawn between the eastern and western halves of the Highlands. A more stable climate and lower turnover of ice in the eastern half resulted in less erosion of the Mounth than the more vigorously eroded and, therefore, more rugged western Highlands.

2.45. The hydrology of the region appears to be largely discordant, drainage across the region being generally north-west to south-east, against the grain of underlying structure which runs south-west to north-east. The River Tay catchment covers a large proportion of the region and is fed by seven other significant rivers. In the north-east, the North and South Esk both drain towards Montrose. In the south, the Leven flows east to Fife.

HUMAN INFLUENCES ON THE PHYSICAL LANDSCAPE

2.46. Humans have been present and manipulated the physical landscape in Britain since soon after the retreat of the last Devensian ice sheets around 10,000 years ago. While the greatest changes have occurred within only the last 200 years, the landscape seen today is the product of several millennia of human and animal activity.

Mesolithic Period (7000-4000 BC)

2.47. The earliest, and only good, evidence for human settlement in the Tayside area during the Mesolithic era, barely survives in the form of buried middens of shellfish and flint fragments, thought to date to around 6000 BC. The human societies of this period are thought to have been groups of hunter-gatherers, moving around the land as nomads. This is probably why so little evidence of them remains, for they did not need to build substantial structures to live in, and had no fixed areas of land to defend from others. The middens unearthed at Broughty Ferry in the 19th century, and the Stannergate in Dundee, are further evidence of human settlement in Tayside during the Mesolithic period. Indeed, it is easy to speculate that, despite a lack of evidence, the north side of the Tay Estuary and the wildfowl over-wintering sites in the Montrose basin, would have attracted these early hunters.

Neolithic Period (4000-2500 BC)

2.48. Around 6000 years ago, a society settled in Scotland who farmed the land for the first time. Far more evidence for people of the Neolithic period remains in the region, for they cleared areas of woodland for crops, built houses and enclosures for animals, and had a ritualistic society which has left stone circles and cairns still standing. This was the period when the most impressive stone circles in Scotland, such as Callanish on Lewis, were built, demonstrating fairly sophisticated engineering and organisation.

2.49. Evidence for this society survives as stone circles at Balgarthno by Dundee, Coleallie in Glen Esk, mortuary enclosures such as at Inchtuthil and Strone Hill by Lintrathen, and also tenuously as crop-markings on aerial photographs. During the Neolithic period, the dead were placed in communal chambered cairns and these are numerous over the whole of the region and particularly on valley sides.

Bronze Age (2500-700 BC)

2.50. The transition from the Neolithic period to the Bronze Age was characterised by new and extended forms of settlement, increased agricultural activity, standing stones, some rock carving art, pottery and crude metal working.

2.51. The Bronze Age peoples are thought to have been migrants who crossed the North Sea to Britain from the lands around the mouth of the Rhine. Confusion still exists as to whether they settled peacefully with the Neolithic inhabitants or sought to overpower them. What is clear is that they brought with them the 'magical' knowledge of metal-working. The additional power which such knowledge gave to those who possessed it brought a significant change to the previous communal Neolithic society. The Bronze Age sees the development of a hierarchical societal structure of ruling classes, warrior caste, farming peasantry and slaves. Desire for both the knowledge and materials for metal-working also gave a different form of power: economic. Trading was, therefore, established during the Bronze Age.

2.52. Remains of hut circles and field systems are frequent over the Tayside area. They are most obvious now on what is marginal land, particularly at the edge of the lowlands and highlands, and high on valley sides such as up Glen Isla at Brewlands Bridge and Burn of Kilry, up Glen Shee and on upper reaches of the Tay and Earn Valleys.

2.53. Burial habits in the Bronze Age evolved from using communal chambered cairns such as used in Neolithic times, to individual burial in stone-lined box graves or 'cists'. Also, there was a progression of cremation and burial in small cists rather than the inhumation practised earlier. Again, such sites are numerous over the Tayside area though often known only from aerial photography. Good examples survive at Bell Hillock, Kirriemuir where two urns, a spearhead and jet beads were found inside and on the tops of the Sidlaw Hills.

2.54. Standing stones were a continuing theme during the Bronze Age, though usually not as intricate or extensive systems such as those built by Neolithic peoples, as the habit of ritual monument building was already in decline in late Neolithic times. Frequently, these stones are single such as on the Hill of Kirriemuir, or in pairs or lines, and are found over most of the Tayside area.

Iron Age (700 BC-500AD)

2.55. Several important factors changed the landscape of the region during the Iron Age. Firstly, around the junction with the Bronze Age, there was a period of climatic deterioration which greatly reduced the area of productive land and caused groups to become increasingly warlike and to make fortifications in order to protect their good land from others. Secondly, the availability of iron allowed the construction of more effective tools and weapons which later allowed more felling of trees and renewed agricultural expansion. A third factor leaving an impression on the land was the period of Roman occupation.

2.56. Hill forts, such as the White and Brown Caterthun forts at Menmuir in Angus, are thought to date from around this period, as are a number of Duns such as the Kings Seat fort north-west of Dunkeld, and numerous crannogs on Lochs Earn, Tay and Rannoch.

2.57. An unusual remnant of Iron Age society in Tayside are the brochs. Most brochs in Scotland were constructed between the 2nd century BC and the 2nd century AD, the greatest concentration of them being in the Northern Isles, north and west mainland Scotland. The reason that a small number exist in Tayside, so far and so removed from the centre of activity, is still open to conjecture. One theory relies on the fact that the Tayside brochs appear to date from a period between the Flavian and Antonine Roman incursions into Scotland. They may, therefore, represent the southerly advance of colonists into a land previously depopulated by the Romans. The best example of a Tayside broch is at Laws of Monifieth.

2.58. In the latter part of the Iron Age, a return to unenclosed agricultural settlements such as at Tealing, encouraged construction of a new feature - the souterrain (or 'earth house') - which were used as food stores and litter much of Angus.

Roman Occupation (c.83AD-215AD)

2.59. In 78AD, the Roman governor and general of the province of Britannia, Guaeus Julius Agricola, embarked on a series of campaigns to conquest the remainder of Britain. By 80AD, his armies had reached the Tay. In 82-83AD, Agricola marched into Strathearn and Strathmore. Lines of forts were established between Camelon and Ardoch and further east via Strageath to Bertha, all following the line of a Roman road, still visible today. This second line of forts and signal stations follow the Gask Ridge, a thick igneous dyke running westwards from Perth to Crieff. The importance of Tayside to Roman studies lies in these well-preserved fort lines. These forts comprise one of the largest concentrations of temporary Roman camps in Britain. This indicates Tayside's importance as one of the frontiers of the Roman Empire.

2.60. One further impact the Romans had was to consolidate the previously warring Celtic tribes into a more powerful confederacy - the Picts.

Pictish Period (500AD-1050AD)

2.61. Tayside marks the southern extent of the Pictish kingdom. References are made to the Picts in Roman literature from AD297 onwards, however, it was not until the 6th century that the Pictish kingdom was fully established.

2.62. Pictish culture and art was influenced both by its Celtic ancestry and the contemporary Northumberland styles absorbed during the 7th century through ecclesiastical contacts. Stone carving displaying both influences was flourishing at this time. The 7th century also witnessed the rise of Pictish Christianity. The main proponent of this being Columba. Columba's relics were brought to Dunkeld Cathedral by Kenneth mac Alpin in 850, establishing Dunkeld as the head of all Columban establishments in Scotland.

2.63. Due to its southern location Tayside was also strongly influenced by both religious and political ideas from Northumberland. Indeed, for about 30 years from 658 until the battle of Nechtansmere in 685, southern Pictland was under Northumbrian domination. The battle near Dunnichen, east of Forfar, saw a victory for the Picts and an end to southern domination.

2.64. The political union of Scots and Picts under the kingship of Kenneth mac Alpin in 843, marked the end of Pictland and the creation of Scotland. The ceremonial and symbolic

centre of this new kingdom of Alba was at Scone. At Scone, Kings were inaugurated and the hub of political activity lay.

2.65. The ecclesiastical importance of the region at this time is highlighted by the creation of religious establishments between the 7th and 13th centuries at Brechin, Dunkeld, Glamis and Abernethy. Other important Pictish sites within the region are the cross-slabs at Aberlemno and Cossans, both still in their original positions. A possible function was as territorial markers.

2.66. A special feature of Tayside Pictish monuments is a group of finely executed cross-slabs smaller in size than normal. A good example of such a slab is the Banvie slab now in the McManus Galleries, Dundee.

Medieval Period (1050AD-1600AD)

2.67. The death of Macbeth, killed in battle by Malcolm III in 1057, opened a new chapter in the history of the region which saw the first significant changes to the landscape since the advent of farming. Although the struggle for domination of Scotland continued between the Kings of the Canmore dynasty and the northern descendants of Macbeth, history shows it was the southern kings who proved superior. The last significant battle ended in defeat for Angus, ruler of Moray, at the hands of David I at Stracathro in Strathmore. In order to halt subsequent attacks and extend his power to the previous weak areas north of the Mounth, David I began a conquest of the north.

2.68. Tayside, and subsequently Scotland, became ruled by southern kings with Norman allies. These allies - often land-hungry men - were sent north to create order, assisting the kings in their policies of modernising the country, based on a feudal system. Royal estates were often given as a reward for military service. These new forms of land tenure and lordship formed one of three modernising processes initiated at this time. The other two were the reform of the church and the foundation of burghs.

2.69. Before moving on to discuss the other two, it should be noted that several local families also participated in the colonisation of the north. The Earls of Strathearn and Atholl, both of Celtic descent, were on the one hand reluctant to allow foreign colonisation to disrupt their own sphere of influence, whilst being equally glad to receive new lands on similar terms as those same incomers.

2.70. The reform of the church took several generations, but was part of the same movement as Anglo-Norman colonisation. The gradual appointment of reform-minded clerics thus followed. At the same time as the reform of the church was occurring, new monasteries of the reformed order were being established, Arbroath Abbey being one. In addition to their often dubious religious significance, these monasteries also brought, indirectly, more earthly benefits. The monasteries were seen as centres of alien culture bringing innovative techniques in crafts, trade and most importantly, agriculture. Being substantial landowners, running their estates for profit with surpluses being sold on for cash or traded overseas for luxury goods, their economic importance in the commercial development of Scotland was great.

2.71. The formation of the burghs as privileged trading centres of the time was ultimately a further expansion of royal power. They often served as seats of royal administration.

2.72. During these advances of the 12th and 13th centuries, Tayside was one of the more settled and prosperous regions of the Kingdom north of the Forth. Tayside was home to many of the royal hunting grounds and home to many royal residences and estates. The aristocracy was prospering - evidenced by the shift from building in earth and timber to stone and mortar. The early burghs such as Dundee, Forfar and Montrose were also commercial successes in medieval times.

2.73. The proliferation of castle building in the late medieval period, after the Wars of Independence, was an indication of a return to a more stable society. Despite the defensive form and embellishments of late 15th and early 16th century castles and tower houses, they were built more as a statement of social status, pretensions and wealth rather than for security. Examples of such castles exist at Edzell, Balbengo and Melgund Castle near Aberlemno. A clear distinction existed between people to the north and south of the Highland Boundary Fault. To the north lay the Gaelic speaking Highland clans, with an economy based on cattle. To the south lay the Lowland Scots with an arable farming economy. Though Gaelic has since died out, the distinction is evident in the distribution of Gaelic and anglicised place names.

Post Medieval Period 1600AD-1900AD

2.74. The Reformation of 1560 did not bring about an overnight transformation in society. However, several burghs were early converts to Protestantism. Reformation did, however, bring major changes to the landscape, the most notable change being the destruction of the already declining monasteries. New religious building was limited until the 18th century when increasing prosperity of the land and new confidence of religious men saw them investing in their spiritual future.

2.75. A series of changes transformed the landscape of the Highland glens in the late 18th and 19th centuries. Defeat at Culloden precipitated a change in the way that Highland clans were structured. The major landowners sought to maximise the financial return from their land, and the old crofts were cleared to provide grazing land for sheep and cattle. Crofters, forced off their land, moved to the growing cities, or emigrated, and by the middle of the 19th century the Highland glens had been virtually emptied. The decaying remains of old field systems, and even the sites of abandoned villages, illustrate the scale and severity of the changes that occurred.

2.76. Further changes were brought by the agricultural revolution. In the lowlands, the agricultural revolution brought equally dramatic changes. In areas such as Strathmore large areas of land were improved and enclosed by Act of Parliament. New farmsteads were established, many associated with bothies for the farm labourers. Many of the Angus burghs owed their growing wealth to the markets that were created by the agricultural and industrial revolutions. It was also during this time that many of the large designed landscapes and extravagant houses, such as those at Dunkeld, Blair Atholl, Kinross, Glamis and Taymouth, were constructed. Contrasting with the creation of new policy landscapes was the continued loss of native woodlands as the forests of Scots pine were cleared to provide timber for fuel, construction and boat building. Losses include the Glen Lyon pine woods. New woodlands were established, however, particularly for coppicing.

2.77. The importance of Tayside in the history of early tourism in Scotland in the early 19th century was largely due to both its abundance of the wild scenery currently in 'vogue' at the time and the stamp of approval given to the area by Queen Victoria's visits in the mid-late 19th century. A series of literary tourists, such as Rev. William Gilpin and Thomas Pennant, published accounts of their travels, writing enthusiastically on the 'picturesque' scenery of Highland Tayside.

2.78. Two later boosts to tourism in Tayside, and Scotland as a whole, occurred in the mid-late 19th century with the arrival of the train and the writings of Sir Walter Scott. Perthshire, in particular, became part of the 'Highlands Tour', popularised by Queen Victoria and a number of writers, poets and artists. Towns such as Pitlochry, Aberfeldy and Crieff experienced considerable growth with the development of grand hotels and elegant villas. Many of the lower parts of the glens are characterised by a wealth of Victorian buildings, most of which adopt the local vernacular, but interpret it in a classically 19th century way.

20th century developments

Agriculture/Forestry

2.79. By the 20th century, the native pine and broad-leaved woodland of Tayside had almost entirely vanished, only small remnants existing towards the north and west of the region. Instead, the landscape was one of agriculture in the lowlands and highland valleys, and hill grazing and limited forestry on the hills.

2.80. In 1919, The Forestry Commission was established from the UK's strategic requirements for timber. The Forestry Commission purchased large areas of uplands and estate forests and pursued a policy of maximum timber production from these areas. In the Tayside area, this was most pronounced in the Tay Valley, Glen Prosen and Rannoch-Tummel valley. The policy of maximum production, leading to large-scale afforestation, was later criticised for its lack of amenity and unattractive appearance. Within the past 20 years, the concept of multi-purpose forestry placing greater importance on nature conservation, landscape values and recreation, has been embraced and practised in a more comprehensive approach to forest design. Much of the forestry in Tayside should appear more attractive and diverse by the 21st century.

2.81. In the lowlands, the fertile soils have meant that commercial forestry has been limited. Agricultural landscapes have changed little since the beginning of the century though boundaries have become larger as holdings have become consolidated. In the highlands of Tayside, much of the land has been designated for conservation purposes as Sites of Special Scientific Interest (SSSIs), Environmentally Sensitive Areas (ESAs) or National Scenic Areas (NSAs), and as such has encouraged farmers to use sensitive farming practices and maintain the scenic and ecological values of the landscape.

Construction

2.82. This century has seen massive growth of the main towns such as Dundee, Perth, Crieff, Blairgowrie, Forfar, Arbroath and Montrose. Similarly, the A9 and A90 going to Inverness and Aberdeen respectively, have been expanded and improved and are now Scotland's main roads to the north.

2.83. A high proportion of industry, other than tourism, in Tayside is located in Dundee which is also now the region's largest settlement. For much of the region and especially in the Tay and tributary valleys, tourism is a major economic generator and while there are many established hotels of a high quality, there has been little pressure to build new facilities during recent decades. There has been some development of alternative forms of accommodation such as time-share and log-cabin developments.

3. KEY FEATURES OF THE TAYSIDE LANDSCAPE

INTRODUCTION

3.1. The processes of landscape evolution described earlier, have been responsible for the creation of a wide variety of 'features' which are now integral to the character of the landscape. The scale and diversity of Tayside generates a potentially huge list of noteworthy features of both natural and man-made origin. This chapter seeks to convey how these features contribute to the character of the landscape, by describing key examples and attributes rather than attempting to draw an exhaustive list.

3.2. The features are described under the following broad categories.

- Nature Conservation
- Trees and Woodlands
- Archaeological Features
- Built Heritage
- Seasonal and Climatic Features

3.3. **Figure 4** shows areas designated within Tayside for their natural heritage importance.

NATURE CONSERVATION

3.4. Tayside encompasses coastal, lowland, upland and transitional landscapes which support a diverse range of flora and fauna and provide a wealth of geological and geomorphological interest. These are reflected in the designation of over 150 SSSIs and 4 National Nature Reserves (NNRs) in Tayside. Several of these are designated as Special Areas of Conservation (SACs), reflecting their international importance. A number of these sites also fall within European conservation designations under the Natura 2000 scheme. Whilst these designated sites represent the most valuable and sensitive resources, there are many other areas of special value for wildlife, some of which are recorded as Wildlife Sites by the Scottish Wildlife Trust. The following paragraphs summarise the general distribution of wildlife interests.

Upland/montane habitats

3.5. The mountains of Tayside reach altitudes of over 3,000 feet and support a diversity of upland communities. Calcareous schists of the highest peaks support arctic alpine communities which are rare in Britain. Cliffs and rock platforms harbour lichens and liverworts and many rare montane plants. Flushes, limestone and alkaline fen are also important habitats and are protected under EC regulations. More extensive is the heath and moorland which covers much of the mountain slopes and supports a variety of wildlife, some of which is managed for game. These uplands areas are home to rarer insects, bird and animal life, the most evocative being the golden eagle. Little remains of the high mountain woodlands, although birch, rowan and Caledonian pine are present

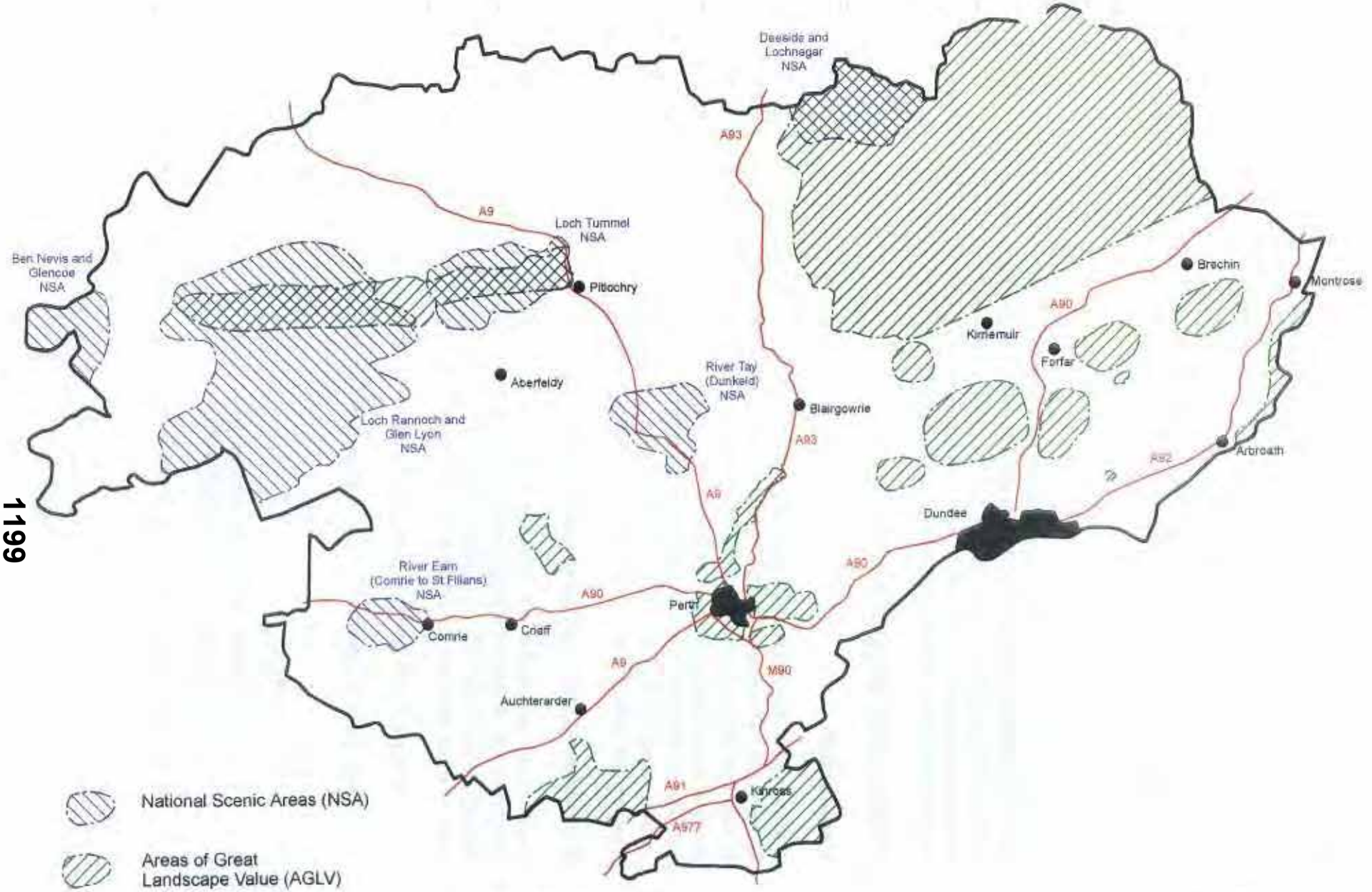
and have a significant local impact. From distant and lower ground, these upland and montane communities create mosaics of muted greens, ochres, browns and oranges, brought to life by the seasonal blooms of alpine flowers, swathes of pink heather, and the autumn russets of ericaceous shrubs, bracken and deer grass.

Valleys, slopes and glens

3.6. The sheltered environments of valleys and glens have supported and protected many of the region's semi-natural woodlands which include slope alder-woods, hazel, ash and elm-woods and oak-woods merging with higher birch woodland. Significant nature conservation values are found in the steeply-sided valleys and gorges where the rich woodlands are frequently called 'dens'. These also contain varied ground flora and often mosses and lichens associated with cliffs and craggy hillsides. On certain more exposed slopes, are woodlands of juniper and Caledonian pine, the most renowned being at Glen Artney and Black Wood of Rannoch respectively. The glaucous colours and uncultivated textures of the semi-natural evergreen woods contrast with the deciduous woods and make them distinctive features. Again, the presence of areas of limestone, wet flushes and alkaline fens create a varied and internationally important range of habitats. The presence of capercaillie in Tayside's pine-woods is also particularly notable due to its striking appearance (when seen) and its curious penetrating mating call.

Lochs, mires and wetlands

3.7. The visual impact of Tayside's largest lochs is undeniable; however, it is the many small lochs, mires and wetlands that hold the majority of natural heritage interest. These waterbodies include high, glacially-carved lochans, lochs, kettle holes, mires, bogs and river corridors which support a range of communities. Basin and raised mires are common (e.g. Gleneagles Mire, Forest of Alyth Mires, Dun Moss, Balshando Bog, Forest Muir), these frequently have fringing carr or fen vegetation and have surrounding areas of wet meadows or woodland. Open water has a diversity of aquatic plants and is internationally important for migrant and breeding wildfowl. Greylag and pinkfooted geese are particularly noteworthy and become significant characteristic features of Tayside's autumn when migrating in formation in their thousands. The Carsebreck and Rhynd Lochs, Drummond Lochs, Loch Leven, the Loch of Kinnordy and the Loch of Lintrathen, are SSSIs of particular interest for both ornithology and botany. Similarly the kettle hole lochs to the east of Dunkeld - Loch of Craiglush, Loch of Lowes, Loch of Butterstone, Loch of Clunie and Loch of Drunellie - are of considerable natural heritage interest.



LANDSCAPE DESIGNATIONS

FIGURE 4

Lowland and mid-altitude features

3.8. Much of the lower, gentler landscapes are grazed or cultivated; however, there are limited areas where local ground conditions or management practice have allowed the development of natural heritage interest. Many of the wetland features described above are characteristic of the lowlands and mid-altitude areas. Grassland and meadow features are equally significant. Tayside has a range of such features: orchid-rich wet flushed meadows (e.g. Cairnleith Moss), orchid-rich dry meadows (e.g. Morenish SSSI), northern hay meadows (e.g. Brerachan Meadows, Weem Meadow) and many other unimproved grasslands. Less extensive are lowland heaths of which Diltry Moss and Methven Moss SSSIs are examples.

Coastal features

3.9. Tayside's coastline, while not dramatic, contains a variety of interest which complements that of its hinterland. This includes saltmarsh, brackish reedswamp, dune systems, low cliffs and links grasslands, and coastal heaths. Associated with these habitats are wildfowl and sea-birds which are essential components of the coastal character. These include eider ducks, waders, kittiwakes, fulmars, puffins and guillemots.

TREES AND WOODLANDS

Introduction

3.10. The trees and woodlands of Tayside play a major part in determining people's perception of the region. There are many strong cultural associations with forests, woods and individual trees and the current mixtures of forests and woodlands have created many areas of scenic value, not least of which is the River Tay (Dunkeld) NSA. Tayside's woodlands have also significant conservation value as mentioned above; however, in consideration of the importance of these features in the character of the landscape, it was deemed appropriate to provide separate descriptions.

Notable specimens and tree collections

3.11. Tayside has arguably the best known individual trees in Scotland due to a combination of their great age, historic and legendary significance and their dendrological value, as well as some of the best conditions for tree growth in Western Europe. The best known trees, many of which are now popular features for visitors, are:

(i) Fortingall churchyard yew tree, believed to be 3,000 years old;

(ii) Birnam oak, a massive remnant of early oakwoods thought to be circa 1,000 years old;

(iii) Niel Gow's oak;

(iv) the beech hedgerow of Meikleour planted in 1746 by the Marquis of Landsdowne and considered to be the tallest hedge in the world;

(v) the Douglas fir at the Hermitage, Dunkeld which is said to Britain's tallest tree;

(vi) the Dunkeld larches, which include the surviving original European larch imports, and Japanese larch imports by the Second and Fourth Dukes of Atholl;

(vii) the stand of grand fir near Dunkeld which are the fastest growing trees in Britain.

In addition, there are many notable individual trees and collections within Tayside's designed landscapes. The huge conifers, the result of 18th and 19th century planting, are particularly important landscape features in many areas, distinguishing 'policies' from great distances. David Douglas, the great Scots plant collector and botanist, came from Scone and many of his early introductions were to Perthshire landowners.

Trees in the countryside

3.12. Tree lines and groups in the countryside make powerful statements in many areas. This is particularly so when viewed across flat and rolling landscapes, where landforms are emphasised and where picturesque silhouettes are possible, for example, in many parts of Strathmore. Beech, oak, lime, sycamore and ash are generally used to form hedgerow tree lines, although beech is predominant. Similar mixes are also characteristic of field corner groups and roadside planting. Riparian trees are also important linear features, often the product of deliberate planting but also of semi-natural origin; these help to define the water course within glens and straths and create attractive subjects for reflections on the water. Hedgerows, typically beech or hawthorn, are locally important where dry-stone walls are absent. These are confined to lowland areas and often associated with areas of deep moraine. These features are commonly the product of historic estate management. Contemporary changes in agriculture and Dutch elm disease have seen the loss of many such features.

Ancient, old and semi-natural woods

3.13. The inventories of Ancient, Old and Semi-Natural Woods for Tayside's districts (Nature Conservancy Council, 1986a, b & c), indicate there to be over 2,300 sites totalling circa 40,000 hectare within the defined categories: Ancient Woodland; Long Established Woodland of Semi-Natural Origin; Long Established Woodland of Plantation Origin; "Roy" woodland sites and "other woods". These woodlands represent under half the total woodland cover in Tayside. They comprise only a small proportion of native woodlands and are mainly introduced conifer plantations (circa 57%), semi-natural woodlands (circa 25%) and mixed/policy woodlands (circa 12%).

3.14. The oldest semi-natural and native woodlands are generally limited to steep and inaccessible areas where they have been afforded protection from early clearance and grazing. The 'dens' woodlands in steeply-sided valleys and gorges are typical of this situation. Alternatively, many old woodlands have survived in accessible areas due to deliberate management for timber products. The extent of birch woodlands is probably far greater than previously recognised due to their ability to spread when grazing pressures are reduced. The main native woodland types remaining in Tayside are:

- acid oakwoods, e.g. Comrie Woods, Cardney Wood;
- oak grading to birch at higher altitude;

- primeval remnants in gorges including ash, wych-elm and hazel, e.g. Pass of Killiecrankie, Den of Airlie, Den of Riechip;
- woods of richer flushed areas including ash, alder and hazel, e.g. Bolfracks Wood, Milton Wood;
- native pinewoods, e.g. Black Wood of Rannoch, Meggernie, Crossbog;
- juniper woods, e.g. Forest of Glenartney;
- lowland native oak woodland remnants, e.g. Methven Woods, Kincardine Castle Wood.

3.15. The more extensive woodlands of long establishment are the product of deliberate planting or management. By the 17th century, the medieval hunting forests (Birnam, Clunie, Dupplin, Forest of Plater) had been largely cleared and the loss of timber was addressed by the estates. Estate woodland planting was accelerated in the 18th century by the combination of designed landscape establishment and the adoption of early commercial forestry ideas initiated by the Dukes of Atholl. The mixed policy woodlands, which are such important features of Tayside straths and glens, are a product of this period. The oldest policies generally contain beech, Scots pine, sycamore, lime, oak, yew, and sweet and horse chestnut. Later planting included more varied conifers including Douglas fir, noble fir, grand fir, hemlock, larch, western red cedar, spruce and occasionally sequoias. These woodlands now provide robust shelter and space-defining belts; they form distinctive visual boundaries and embrace attractive 'comfortable' landscapes.

Forestry and contemporary woodlands

3.16. The most extensive woodlands in Tayside are the commercial forests developed largely by the Forestry Commission since its establishment in 1919, but also by private foresters. The early forests, planted to meet Britain's crisis demand for timber, were often very successfully integrated into the landscape as witnessed by the high quality of the landscape around Dunkeld. Later planting, however, was driven by a greater desire to increase productivity and, as such, were less well-integrated into the landscape as witnessed by the geometric lines in areas such as the Ochils. Current forestry policy encourages multi-use woodlands of high design, amenity and conservation values. Recent forest plantations and rotations have, therefore, sought to create the more sympathetic integration of forests with landform and land uses. Features of modern forests, therefore, include carefully designed margins with appropriate deciduous fringes and 'feathering' into the landforms; open space patterns respecting views, wildlife movements and built heritage features; and recreational facilities associated with forest parks, for example, Tay Forest Park. The historic association of larch with Tayside makes its fairly extensive use seem appropriate. Its deciduous qualities make it a striking feature of the autumn season when it contrasts strongly with adjacent pine, spruce or firs.

Photo: SNH

←
Along the Rivers Tay and Almond the natural weirs formed by bands of harder rock were exploited for water power. Mills can still be seen on the Tay, here at Stanley.

→
The hard rocks have also created sections of narrow gorge. Perhaps the most well known is here at Killiekrankie north of Pitlochry.

←
On smaller rivers and burns, resistant rocks have created dramatic waterfalls such as here at the Falls of Acharn.

→
Native woodlands are an important feature of several glens, here in Glen Esk. A range of initiatives are designed to allow regeneration of these woods.

Photo: SNH

←
The Highland summits and plateaux support a range of upland and sub-alpine habitats. Heather moorland, managed from grouse and deer, dominates large areas, turning the landscape purple in late summer.

FIGURE 5

FEATURES OF THE LANDSCAPE

ARCHAEOLOGICAL FEATURES

3.17. Tayside lacks the renowned concentrations of upstanding archaeological remains found in other parts of Scotland, for example, Kilmartin Glen, Argyll. In part this reflects the intensity of land use, particularly in the fertile lowlands. There is nevertheless, a wealth of interest widely distributed throughout the region, which represents several millennia of cultural activity. Thousands of sites have been recorded including hundreds of Scheduled Ancient Monuments. Recent aerial surveys have also identified significant archaeological potential in areas that had previously received little attention. The majority of archaeological sites are arguably minor features in the landscape due to their small-scale, buried or ruined condition. These are, nevertheless, an important cultural resource which are often representative of wider patterns of human activity or of symbolic/religious meaning which extends across large areas. For this reason, their influence should not be belittled. Conversely, there is a minority of significant archaeological sites and monuments which are distinctive and often enigmatic features in the landscape. These include major earthwork structures, cairns, barrows and upstanding stone monuments. The following paragraphs seek to illustrate by examples the nature of Tayside's archaeological resource.

Burial and ritual monuments

3.18. Ritual and funerary monuments in the form of chambered cairns, cairns, cists, standing stones, stone circles, henges and inscribed stones are found throughout the region, but with concentrations in the valleys, lowlands and mid-altitude slopes, generally where soils were lighter but access to water and communication routes was possible. These monuments represent the more resistant remains of human activity in the second and third millennia BC These ritual and funerary sites were essential foci for the ancient communities who used them for generations. The use of durable stone was, therefore, important, contrasting with the more ephemeral domestic structures of which little trace remains.

3.19. Strathtay and Strathearn have numerous pairs of standing stones which typically include one broad and one narrow stone. In addition, there are significant stone circles and other settings of stones at Croft Moraig near Aberfeldy, Fortingall, Scone, Fowlis Wester, St. Madness and Pittance.

3.20. Cup-marked stones are generally less noticeable, but equally enigmatic. These inscribed outcrops are typically located on valley sides, at strategic vantage points and at the junction of valley routes. Examples discovered within Tayside include Kynballoch/Rattray, Newbigging and Dalladies.

Tayside is famous for its soft fruit. Fields of raspberries and currants create patterns reminiscent of a French vineyard landscape.

Photo: SNH

Potatoes have become an important cash crop within Strathmore. Many farms have developed specialist processing and storage sheds.

Photo: SNH

A range of crops adds interest and variety to the landscape. Here spring daffodils are grown in Strathmore. Later large parts of the valley once again turn yellow as the oil seed rape flowers.

Photo: SNH

Sheep farming remains an important activity in may of the upland parts of the region - here in Glen Isla.

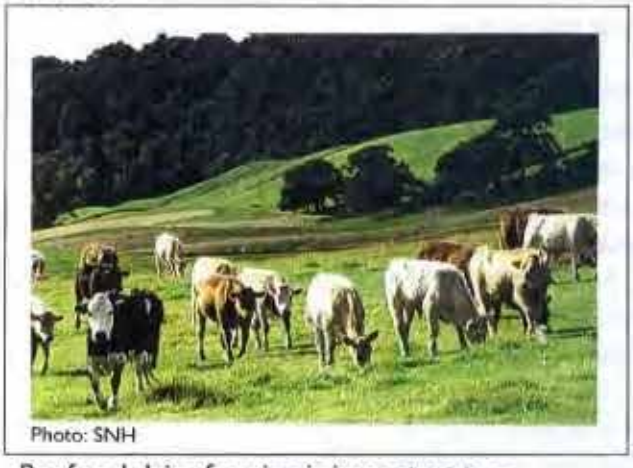


Photo: SNH

Beef and dairy farming is important too, particularly on the rich pastures along the Highland foothills, here near Blairgowrie.

FIGURE 6

FEATURES OF THE LANDSCAPE

3.21. Cairns or barrows are generally the most prominent landscape features from the Stone and Bronze Ages. They include chambered cairns, which allowed repeated use for internment and cairns under which burials were interred in stone cells (cists). These structures were usually constructed from local stone and covered with turf. They are recognisable today as irregular mounds which break the natural contours of hills, low ridges and river terraces. Cairns were frequently associated with other ritual monuments as at Clach na Tiompan, on a terrace of the River Almond, where a large chambered cairn is associated with a setting of standing stones. The Fowlis Wester site also contains a cairn, standing stone and stone circle, and commands views over Strathearn to the Ochils. Another spectacular cairn was discovered at West Mains, Auchterhouse in Angus, a high prominent site which yielded many important discoveries.

Early settlements and fortified sites

3.22. The Iron Age saw the development of a more political society where settlements became more concentrated and conflicts over land resulted in the development of fortifications by tribal groups and communities. Few Bronze Age settlement sites are readily identifiable, although aerial surveys have highlighted patterns of hut circles and field systems from the first millennium BC, as soil marks and crop marks. The Drumturn Burn site is one of the best such examples.

3.23. The more extensive use of stone for domestic and defensive buildings in the Iron Age has left a more resistant legacy. The main archaeological interest relates to souterrains, crannogs and forts from this period.

3.24. Souterrains are stone-built underground galleries used for food storage associated with large timber-built houses, some of which were integral structures. A number of fine examples of souterrains have been discovered in Tayside and particularly in Angus. Notable examples include those at Newton, Barns of Airlie, Tealing and Ardestie in Angus, and Newmill, Bankfoot in Perth and Kinross.

3.25. Crannogs are artificially constructed island residences, built at the edge of lochs with defensible causeway access structures. Many crannog bases are below the water's surface and consequently are illegible to most people. The Oakbank crannog on Loch Tay is perhaps the region's best example of this feature.

3.26. The Iron Age is renowned for its fort building and more extensive use of hilltops and valley ridges for strategic defences. These forts combined extensive earthworks with stone walls and timber structures. Large fortified enclosures were created at the main centres and these remain as significant landscape features. The most spectacular forts are arguably the Brown and White Caterhuns on neighbouring hilltops in the Menmuir foothills. These ring forts enclose areas of 140 x 190m (Brown) and 140 x 60m (White Caterhun), the latter use stone to reinforce its ditches. Other notable forts include Finavon (150 x 36m) which has vitrified stone walls through the use of timber lacing, Barry Hill Fort near Alyth, Abernethy Fort, Queens View Ring Fort and Dundurn Fort. These forts all commanded views over and access to ancient communication routes up the glens and straths, while retaining hospitable positions below the levels of severest mountain landscapes. The foothills of the Mounth Highlands were particularly well-

defended as reflected in the many fortifications in the form of forts, fortlets, linear earthworks. These were superseded by fortifications in later generations.

Roman features

3.27. Tayside represented part of the Roman frontier during Agricola's advances. This resulted in the construction of many military installations as both permanent and temporary outposts. Tayside contains sites of legionary fortresses, forts, fortlets, watch tower and temporary camps; particular concentrations re found in Strathearn and Strathmore as part of the Roman defences for the productive Midland Valley. A legionary fortress was constructed at Inchtuthil, the outline of which is still visible; at Ardoch, north of Braco, is an exceptionally well-preserved site of a turf and timber fort where the square concentric rings of defences are clearly visible. Watch towers were constructed along Roman communication routes, sites on the Gask Ridge and in Sma' Glen are visible as circular earth forms, the remnants of the watch tower bases.

Pictish monuments

3.28. Dark Age monuments are few, reflecting the fact that later settlement obscured Pictish or re-used Pictish remains. A number of Pictish fortified sites have been identified, some of which occupied earlier fortifications. Dundurn Hill Fort has been identified as a Pictish structure. Forts were also constructed at Abernethy and Norman's Law. The main legacy of Pictish settlement is, however, their stone carving and erection of 'cross slabs' throughout the region. These slabs were intricately carved with pictograms and abstract geometric designs. They were located in strategic positions to serve, it is believed, as boundary markers or as ceremonial/commemorative features. Tayside is particularly renowned for its numerous finely executed smaller slabs from the 9th century. Most slabs have been incorporated within local museum collections for protection. Several of these have been substituted with facsimiles in the original position and so preserving them as features in the landscape. Notable cross slabs can still be found at Aberlemno in Strathmore, at Cossans, Dupplin at Forteviot and Comnstone near Monikie.

3.29. Later features which reflect Scandinavian influences are the ornately carved Hogsback tombstones from the 10th and 11th centuries. These are found at Inchcolm, Meigle and Brechin.

BUILT HERITAGE

3.30. The built heritage interest of Tayside is rich and varied. It charts the progression from simple to sophisticated buildings and illustrates changes in style and the use of materials throughout this millennium. The region's geological foundations are expressed in the constituents of its built structures. This forges a strong relationship between buildings and their landscapes which is an essential part of the local landscape character. This vast heritage has, therefore, a significant influence on the character of the region as a whole and of its component areas. The following paragraphs seek to outline the nature of these built heritage features.

Much of the Tayside landscape is historic. Here in Glen Almond the earthworks associated with a Roman signal station are still visible.

Centuries of strife between the Highland and lowland clans are reflected in the proliferation of castles along the Highland Boundary Fault - here at Huntingtower.

The development of landed estates had a profound influence on the landscape. Here an ornate gatehouse marks an entrance to the Atholl Estate.

Photo: SNH

Policy woodlands, often comprising exotic and ornamental tree species often surround and signal the presence of historic houses.

Traditional farm buildings are often sited to maximise shelter, constructed from stone and slate. A typical round horsemill is visible at this Glen Shee farm.

FIGURE 7

FEATURES OF THE LANDSCAPE

Tower houses and fortified residences

3.31. The turbulence of the medieval period in Scotland saw the development of many fortified residences in the form of tower houses. These were initially severe defensive structures, tall and of square plan with few and only small windows. The 16th and 17th centuries saw increasing sophistication as strife diminished. Tower house designs were adapted to become less military and more comfortable as residences. Tayside contains numerous such buildings dating from the 15th century. Their scale and commanding locations and imposing design makes them powerful and romantic features in the landscape. Fine examples include Huntingtower Castle near Perth, Braikie Castle, Loch Leven Castle, Elcho Castle and Edzell Castle. The latter is also notable for its walled parterre garden, one of very few tower house gardens in Scotland. Some of the major estates had smaller tower house outposts to prevent or impede cattle thieves from poorer highland areas. The Angus Glens contain a number of these towers, of which Invermark at the head of Glen Esk, is a striking example. This served as an outpost for Edzell Castle guarding against raids from the north. Other small tower houses of note are Hynd Castle, Ballinshoe Tower and Easter Fordel.

Castles, stately homes and their designed landscapes

3.32. The 17th and 18th centuries saw the consolidation and development of estates. At their centres, castles and country houses were built, improved or replaced by more sophisticated buildings. The influence of Europe and the Renaissance was reflected in the adoption of classical, architectural styling and in layout of grandiose formal landscapes in the early 18th century. Between the 18th and 19th centuries, styles changed in favour of the romantic and picturesque, as reflected in the remodelling of castles, country houses and their landscapes. Scots baronial and gothic styling became favoured and the informal landscape ideas of Capability Brown and William Kent in England were introduced in place of the previous formality.

3.33. Tayside contains innumerable castles and stately homes which illustrate the above changes. Glamis Castle, the seat of the Earl of Strathmore and Kinghorne, is an example of an enlarged and remodelled medieval tower house which now controls an outstanding designed landscape. Kinross House, designed by and for Sir William Bruce in the late 17th century, represents one of the finest Palladian mansions in Scotland. The extensive portfolio of William Adam includes many fine classical mansions, the House of Dun in Angus is one of his most original designs. Blair, the quintessential Scots Baronial Castle, was in fact remodelled by David Bryce from an earlier Georgian mansion, also incorporating parts of an earlier castle. Blair Castle is the centrepiece of another superb designed landscape which is an essential component of Strath Garry. Meggernie Castle in Glen Lyon is a similarly modified tower house which now dominates its isolated setting on the glen floor. Taymouth Castle, formerly the imposing seat of the Marquess of Breadalbane, is a major landmark in the valley floor between Aberfeldy and Kenmore. It commands an extensive designed landscape, punctuated by follies that once extended up both valley sides. The Atholl landscape of Dunkeld House was similarly extensive and has locally influenced the setting of Dunkeld. The list of notable stately homes is too large to address in this report; however, a shortlist of the most prominent (excluding those mentioned above) includes Aberuchill Castle in Strathearn; Balmanno Castle near the Bridge of Earn; Blair Adam near Kelty; Brechin Castle; Camperdown House, Dundee;

Castle Menzies near Weem; Cortachy Castle at the foot of Glen Clova; Drummond Castle near Crieff; Fingask Castle near Rait; Grantully Castle near Ballinluig; Guthrie Castle near Forfar; Kinfauns Castle near Perth; Kinnaird Castle near Brechin; Methven Castle near Perth; Murthly Castle near Dunkeld, Ochtertyre near Crieff; and Scone Palace.

3.34. The above properties all have notable designed landscapes which are listed within the Inventory of Gardens and Designed Landscapes in Scotland (Land Use Consultants, 1987). There is, however, a total of 45 current inventory sites in Tayside, which in themselves represent only a limited, select proportion of the total number. A further 130 sites have been identified by the Garden History Society as being worthy of study or possible inclusion within an extended inventory. These landscapes make major contributions to the scenic diversity and apparent richness of the Tayside landscapes. The grandeur of their buildings, the extent and patterns of their policy woodlands and picturesque qualities of their follies, lodge houses and home farms, are all important features. The influence of the estates can also be seen in the broader landscape where planned settlements have been established and where estate led agricultural improvements have introduced dry-stone walls, hedgerows and tree lines.

Religious buildings

3.35. Medieval Tayside contained numerous monastic houses and two influential cathedrals. The former left a legacy of abbey buildings and ruins of the Cistercian, Tironensian and Augustinian orders. These include the abbeys of Arbroath, Coupar Angus, Scone and Lindores. The Cathedrals of Dunkeld and Brechin are still in use (although partially in ruins) and are important both as landmarks and as ecclesiastical centres. Little remains of earlier religious foundations, the most significant remnants being at Abernethy and Restenneth.

3.36. There are, of course, innumerable post-reformation churches in Tayside. These are generally of Renaissance character; classically restrained and of simple form. Some rural churches have a 'T' plan layout to allow preaching to a 3-sided congregation, whilst avoiding large roof spans. Numerous churches are built on the sites of earlier chapels; these are invariably strategic or prominent sites. Most churches represent the focus of their towns and villages and are frequently the most visible feature of these settlements from the surrounding countryside.

Vernacular buildings

3.37. Tayside's underlying geology is clearly reflected by the distribution of building materials throughout the region. The different qualities of the local stones determine the coloration of individual buildings and towns and the manner in which they were constructed.

3.38. The most striking influence is the division between the Old Red Sandstone of Strathmore and the schists to the north of the Highland Boundary Fault. The Old Red Sandstones provide a range of stone suitable for masonry. These are noticeably red/brown in colour, but vary in line and texture. Coarse-grained pink, brown and deep red stones are all evident in Strathmore, Lower Strathearn and Strathallan. These are generally used as squared and dressed masonry, in contrast to the schistose rocks further north which yield less easily dressed stone and are consequently used more extensively as rubble. Their

predominant colours are light browny-grey, distinguished by the glitter of mica. Small-scale variations reflect the local availability of intrusive rocks, for example, grey and pink granites and dark basalts are distinctive in isolated areas. Available masonry stones are frequently mixed in practical ways, for example, the more readily dressed granites and sandstones are frequently used as quoins, lintels and sills, framing walls of coarser rubble schists or basalt. White render has been introduced in many areas (but particularly in the Highlands). This serves a practical function in the protection of coarse stonework, but is also the result of stylistic trends instigated by certain landlords. The presence of slate bands has also been important as a source of local roofing materials. The use of pantiles around Kinross and more extensively in Fife, has been attributed partially to the local absence of suitable roofing stones. Pantiles were also imported as ballast in ships, exporting coal and iron ore from Fife to the low countries. These local variations in building materials reinforce a sense of place and contribute greatly to the overall character of Tayside's landscapes.

3.39. The oldest surviving domestic buildings in Tayside date generally from the 17th century. Within settlements these are scarce, but easily recognisable as simple single storey cottages of crude rubble construction. In upland areas there are numerous upstanding ruins from this period; the legacy of Highland clearances. The foothills and lower mountain slopes have notable concentrations of such ruins. These generally comprise clusters of small rectangular buildings with associated walled enclosures constructed, on the whole, of dry stone.

3.40. The majority of inhabited vernacular buildings in Tayside date from the 18th and 19th centuries. Robert Naismith (1989) identifies a range of local building characteristics in the region related to geology and cultural influences. Some of the main characteristics are described below.

3.41. Typical buildings in Highland Perthshire and Highland Angus are constructed of schists with the occasional use of granite, whinstone and local sandstones. One and a half storey buildings are most common, frequently with dormers that break the eaves. Elevations are usually symmetrical; the front door and porch framed by windows. Windows are a mixture of 4 and 12 pane sash and cash. The use of horizontal panes is a distinctive feature of the Western Highlands. Squared rubble rybats are typically used around windows and at corners, with random rubble walls sometimes in a contrasting material, for example, whinstone. Projecting eaves are common throughout this area as are timber porches. The 'Breadalbane' estate is renowned for its use of rusticated log porches and other timber ornamentations, together with the use of horizontal panes. The Kenmore area provides the best examples, but these can also be found in neighbouring areas. The more polite Victorian architecture is notable for its timber ornamentation; the barge boards on the buildings of Pitlochry and Birnam are particularly fine examples. White and cream renders or paint are fairly common in this area. This is typically contrasted by the use of dark colours on window margins. Interesting examples of rendered buildings are found on the Glenlyon Estate, where a range of neo-vernacular style buildings were constructed at the end of the 19th century. These include the Balnald Cottages and the Fortingall Hotel. The latter comprises a thatched set piece village, inspired by the arts and crafts movements and designed, in part, by James McLaren of the Charles Rennie Mackintosh school.

Simple Victorian interpretations of the Scots vernacular are found throughout the region - here constructed in grey stone and slate.

A mixture of pink and grey granite blockwork in this Highland farmhouse.

Fortingall is a local curiosity, its thatched cottages reminiscent of a Devonian village. It represents one of a number of estate villages, each with a distinctive and coherent design.

At villages such as Auchmithie, simple working houses were constructed from sandstone and slate, sometimes limewashed.

Hydroelectric power has left its mark in the form of dams, enlarged lochs, pipelines, turbine houses (as here on Loch Rannoch) and pylons.

FIGURE 8

FEATURES OF THE LANDSCAPE

3.42. In the lowland areas, there are notable variations from north-east to south-west. Around Kinross, buildings are generally more formal and larger in scale. They retain the classic proportions so favoured by the Georgian era. They have few dormers and porches and little applied ornamentation. Masonry is typically local sandstone of creamy, grey colours. This is usually regularly coursed, snecked rubble with plain margins and rybats. The main buildings have slate roofs, but the use of pantiles on small buildings is a distinctive characteristic of this part of Tayside.

3.43. The red sandstones of Strathmore have allowed the construction of more highly dressed and tooled buildings, displaying a wide repertoire of masonry skills. There are local variations, however. Dressed coursers are common to South Angus, while further north, red flagstones and rubbles are found. In north-east Angus, the use of Aberdeen bond is distinctive. There are many common aspects to these buildings which include, predominantly, one and a half storeys, pane casement windows and stone slate and Scots blue slate roofs.

3.44. The predominant rural quality of Tayside is emphasised by the small size of most settlements and the large numbers of isolated buildings/small building clusters in the countryside. Farm complexes are key features, many of which are large estate steadings with courtyard layouts. Associated with these complexes are the small circular horse gang mills and lectern style dovecotes. Dry-stone dyke field enclosures are another essential feature of the Tayside landscapes. This legacy of 18th/19th century agricultural improvements, represents an extensive network covering large parts of the lowlands and marking boundaries throughout the mountains. Once again, the local stone is expressed in the differing colours and styles of wall construction.

3.45. Another aspect of estate management was the development of planned settlements. Tayside, and particularly Strathmore, has a concentration of such towns and villages established during the 18th and early 19th centuries. These include Ardler, Alyth, New Scone, Stanley, Spittalfield, Douglastown, Letham and Friockheim. Some of these settlements were developed as centres for the textile industry. Stanley was conceived as a model textile works and village, operating seven large waterwheels. Douglastown in Angus had the first power driven flax mill in Scotland. Milling using water power was widespread throughout Tayside, capitalising on the abundance of swift flowing rivers. Mill buildings (many of which have now been converted) are, therefore, a common legacy of corn milling and textile production, found both within settlements and in more isolated locations. Barry Mill in Angus is a fine working example of a 19th century water powered corn mill.

Communications and engineering structures

3.46. The glens and lowlands of Tayside have been important communication routes for several millennia. Many, but by no means all, of these routes are now traced by roads, farm tracks or footpaths. Several are marked by archaeological sites or ruined castles. The existing road network is the product of development and improvement since the 18th century. Military roads were succeeded by Turnpike roads which were in turn upgraded and supported by the development of railways.

3.47. The military roads developed after the Jacobite rebellions (largely by General Wade) laid down a strategic network of well-constructed roads, with bridge crossings over the main water courses. Most bridge structures were unremarkable stone structures; however, special attention was given to the more important river crossings. The Aberfeldy Bridge designed by William Adam is of particular architectural merit.

3.48. The Turnpike roads provided more extensive metalled routes throughout Scotland and particularly in the lowlands and valleys. These roads were run by 'Turnpike Trusts' who levied charges every six miles. Toll houses controlled movements and charges and are features of this era. Toll houses exist at Dunkeld, Crieff, Killiecrankie and at Marykirk Bridge. Numerous bridges were also constructed to accommodate the new roads. Dunkeld Bridge, designed by Thomas Telford in 1809, is one of the finest in the region. Other road bridges of note include the Bridge of Dun, the Marykirk and Perth Bridges designed by John Smeaton. The 'trust' organisation was reflected by a 'house-style' in the design of milestones, distance plates and directional signs. A number of these features can still be seen at the road sides, for example, Dundee to Perth milestones carry a single letter and distance figure, while Angus roads have large sandstone block milestones.

3.49. The development of the railway lines in Tayside involved some major feats of engineering, both in scale and complexity. Extensive rock cuttings and embankments and many bridges were required. In addition, the railway companies developed many attractive station buildings and associated hotels. The station at Birnam is a particularly good example.

3.50. Latterly, the road network has been enhanced by major engineering projects. This has resulted in new motorways, dual carriageways and associated bridgeworks/earthworks. The major projects include the A9, M90, A90 and A94.

3.51. The last major category of significant engineering features in Tayside is that of hydroelectricity generation. This development, which began in Victorian times, has harnessed the considerable resource of water power, through the construction of huge concrete dams, aqueducts and power stations. The main features are associated with the River Tummel and the River Lyon where they have a locally significant impact.

Towns and village

3.52. Tayside has a distinctive pattern of settlements which reflects both directly and indirectly the physical environment. Within the lowlands there is a clear distinction between inland and coastal settlements. Inland, a series of market towns developed at key crossroads, typically south of the Highland Boundary Fault, but close to the mouths of the Angus Glens. Examples include Brechin, Edzell, Forfar and Blairgowrie. These towns, which are typically nucleated in layout, provided market functions both for the lowland arable economy and the Highland cattle economy. Along the coast, towns and villages grew up around the fishing and shipping trades. Examples include Auchmithie, Arbroath, Dundee, Montrose and Perth. Within the Highland Glens, the location of settlements reflects the strategic importance of bridging points and crossroads. Comrie, Aberfeldy, Bridge of Cally and even Pitlochry, while providing important market functions, are all sited at important bridging points. The latter was amongst a number of towns which saw

considerable expansion during the Victorian era as parts of Tayside were included on Grand Tours of the Highlands.

SEASONAL AND CLIMATIC FEATURES

3.53. The variety of Tayside's landscapes, associated with the combination of highland and lowland terrain, provides a wealth of seasonal interest. The changing tapestry patterns of the arable lowlands is complemented by the more subtle changes of pastures and moorlands. The vibrancy of autumn colours in the woodlands, heaths and bracken is renowned in this region and attracts many visitors. The migrations of wildfowl which fill the autumn skies with awesome formations, are also evocative. The sudden transition from lowland to highland is perhaps most marked in winter, when snow covered peaks form the backcloth to lowlands of green and brown. Locally, the juxtaposition of high and low ground also generates a number of characteristic features: long shadows across the valleys, low mists and the varied distribution of frosts. These seasonal factors and many more are all essential parts of Tayside's character.

landscape. Forestry is the main viable alternative land use, and it is supported by EU and national policies that seek to increase timber production and reduce agricultural surpluses.

Changes in lowland farming

4.5. Lowland farming in the region comprises arable cultivation, beef cattle, sheep and pig rearing, with some soft fruit production. Farm units tend to be large and heavily mechanised, taking advantage of the gentle topography and better soils. In the last 50 years, there have been a number of changes in the nature of agricultural activities and in particular, the components of rotations. Sugar beet, once produced for a local market, is no longer grown, potato production has increased considerably over the last 10 years, while the recently introduced oil seeds are currently expanding. The increased productivity of lowland farms has been supported by the erection of large agricultural buildings: potato, machinery and overwintering sheds. Hedgerows and tree lines have become largely redundant as post-and-wire fences now constitute the main physical boundaries. The incremental loss of mature trees and hedgerows has, therefore, not been compensated by new planting on most farms.

Changes in the landscape: regional trends

4.6. Agricultural policies also seek to achieve more extensive farming systems to reduce agricultural over-production. Since the mid-1980s, the government has sought to make farmers have more regard for the landscape and nature conservation of their land through various schemes and initiatives. The ESA designation for Breadalbane has provided the opportunity for grant funding towards a range of farm conservation works. Under this scheme 'Farm Conservation Plans' are produced by the farmers for ratification by the Scottish Office Agriculture, Environment and Fisheries Department (SOAEFD). These have provided the framework for conserving many important characteristic features such as meadows, dry-stone walls, hedgerows, farm wetlands, etc.

A number of traditional farmbuildings have been converted for alternative uses. This must be undertaken with care (as in the above example) to avoid unnecessary 'suburbanisation' of the countryside.

Incremental changes can add up to substantial change. Here the loss of a hedge, with its trees has opened up the landscape while the incorporation of concrete kerbs has introduced suburban influences to the countryside.

Some estates have managed and replanted field boundary trees, particularly where they form avenues along roads. These create Strathmore's traditionally rich landscape.

Elsewhere, boundary trees have been removed, creating an open, prairie-like landscape in which modern farm buildings are often particularly prominent.

Modern farming techniques sometimes introduce novel landscape features such as these linear bales, wrapped in black plastic.

FIGURE 9

FORCES FOR CHANGE

4.7. The opportunities presented by the ESA designation have, until this year, been limited to the designated area, to the detriment of all excluded areas. This situation may change, however, with the planned introduction of the Countryside Premium Scheme (CPS) which will provide the opportunity for grant funding towards a broad range of countryside conservation works across the region (outside the ESA). It is to be hoped, therefore, that the beneficial effects of this scheme will soon become evident and that it will be a positive force for change in the landscape.

4.8. Farm diversification has not made a significant impact within Tayside, although the development of farm/estate based tourism is locally evident, especially in the upland areas. This is mostly related to caravaning and camping, with some recreational developments typically 'activity holiday' facilities such as 4 x 4 courses, shooting or riding schools. It is conceivable that demands for such facilities may continue, but it is unlikely that this will be a significant force for change in the landscape.

Changes in Agriculture
Summary of Key Landscape Issues

The main landscape changes related to agriculture that need to be addressed in future policies and management strategies are:

- ***how polices and funding can best sustain a viable farming community and at the same time ensure the conservation and enhancement of the landscape;***
- ***how redundant agricultural buildings can best be conserved;***
- ***how important landscape features such as hedges, hedgerow trees and walls should be maintained;***
- ***how best to exploit the change in agricultural policies and to encourage a move to more environmentally sensitive farming practices;***
- ***how best to enhance and restore patterns of agriculture that reflect the landscape character;***
- ***how best to accommodate modern agricultural practices and buildings within the rural landscape.***

General planning and management guidelines

Pastures

- Many of the pastures in the lowlands and more sheltered glens are semi-improved or improved, creating the lush grazing. The improvement of pastures has often been at the expense of wildlife rich grasslands and meadows, except within the ESA where grants are available for the conservation of such features. Whilst improved pastures are characteristic, encouragement through financial assistance to farmers from appropriate bodies to maintain, conserve and enhance herb rich meadows as a feature, should be considered from both a landscape and wildlife point of view. In both cases this would improve diversity in pastoral landscapes. The ESA scheme currently provides opportunities for grant support for such measures. The proposed CPS might do likewise for areas outside the ESA.

Heather moorland

- The mosaic of heather moorland in the landscape as a result of active management through muirburn, creates a distinct and attractive appearance. Such practices help to maintain habitats for ground nesting birds such as grouse and capercaillie, whilst ensuring a good supply of young heather for sheep. This management practice also prevents natural regeneration of woodland and can, therefore, artificially prevent the development of upland woodland/dwarf woodland. There is a need, therefore, to examine how heather moorland management could best meet both sporting/agricultural interests and landscape/wildlife interests through combinations of muirburn, natural regeneration and reduced grazing pressures.

Farm woodlands and trees

- Farm woodlands and trees are important features throughout Tayside, but become key space defining elements in the flatter lowland landscapes. The general decline of these features over the last 50 years provides considerable scope for planting new farm woodlands, and for establishing or repairing tree lines. The Farm Woodland Premium Scheme (FWPS) and the Woodland Grant Scheme (WGS) are useful grant-aid mechanisms for such work, although planting individual trees and tree lines may require alternative means of support such as the CPS. The latter are particularly important in the Broad Valley Lowlands (e.g. of Strathmore, Strathearn and Strathallan) where they determine the main patterns and visual boundaries. The introduction/restoration of hedgerow trees, roadside trees and farm woodland copses and belts should, therefore, be promoted. These should be predominantly broadleaves and used to re-establish the 'lost' fields patterns and to integrate new woodland blocks and intrusive farm developments.

Farm Buildings

- Although farm buildings enjoy permitted development rights in principle, local planning authorities are able to influence the siting, design and materials of new structures through the negotiation procedures. In very flat landscapes, such as by the coast and lowland straths, any vertical developments become very obvious, and if of any considerable breadth, these structures can be visible from considerable distances or can become blocks on the skyline. In small-scale intimate landscapes, large structures can again become very prominent, detracting from the nature of the surrounding landscape. Particular concern is the combined effect of the erection of major new agricultural sheds (often light coloured) in a landscape where the screening effect of woodland is decreasing.

Livestock

- The present livestock densities and lack of fenced woodland are preventing natural woodland regeneration. This is particularly noticeable in many of the Angus glens where semi-natural birch woodlands stand derelict and are unable to regenerate. In the upland areas, the selective grazing habits of sheep have also left the rougher grasses to dominate. Deliberate measures to reduce grazing densities may be worthy of exploration in certain upland areas, where regeneration and enhancement of wildlife values may be desirable without the need for extensive fencing. Generally, however, the current stocking densities appear acceptable in the landscape and fencing to promote regeneration is a most appropriate option. Livestock make a significant contribution to the region's landscape. Current stocking densities and balance between sheep/cattle are acceptable in the landscape, but fencing is required to allow woodland regeneration.

Field boundaries - walls

- Dry-stone walls are a key feature of the agricultural landscape, whose variations in materials and style reflect a local distinctiveness, for example, the difference between schist bouldered walls of the glen and red sandstone walls of the lowlands. The expertise for this craft exists locally, and should be used to maintain the local traditions in wall styles. Mortaring is often seen by farmers as essential to the longevity of the dyke's lifespan, but this can detract from its appearance.

- Wall repair should be further encouraged using local knowledge and craftsmen. Roadside walls and others in prominent locations should, ideally, receive priority treatments. Mortaring should be avoided or applied discreetly.

Field boundaries - hedges

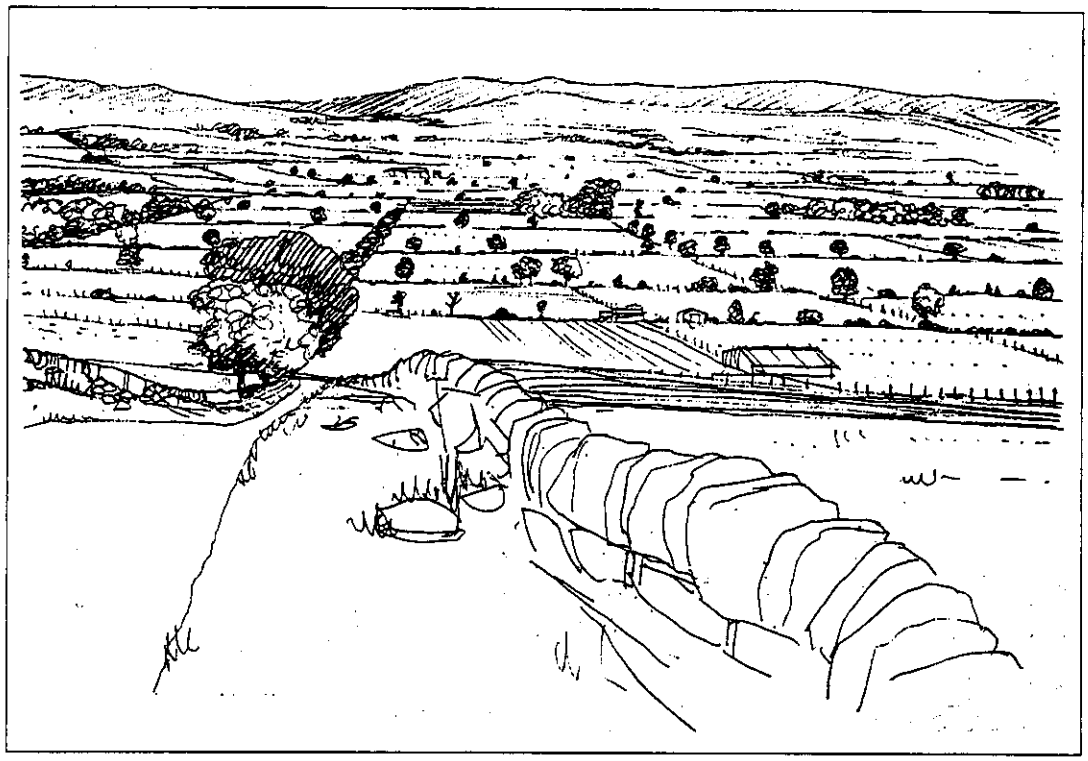
- Hedgerow boundaries are also important in this agricultural landscape, often creating a sense of enclosure and emphasising the contrast between lowlands and uplands. However, loss of hedgerow and replacement by post-and-wire fences has had a significant adverse effect on some of these landscapes. Further hedgerow losses, through field amalgamation or poor maintenance, should be strongly discouraged.

There may also be opportunities for hedgerow recreation or restoration. It is important to refer to the tradition for different materials/species in field boundaries within an area. In arable areas where there may be resistance to hedgerow restoration, in which case efforts should be concentrated along road and other boundaries. Alternatively, measures to compensate for lower yields/differential ripening around field margins should be explored.

Implementation

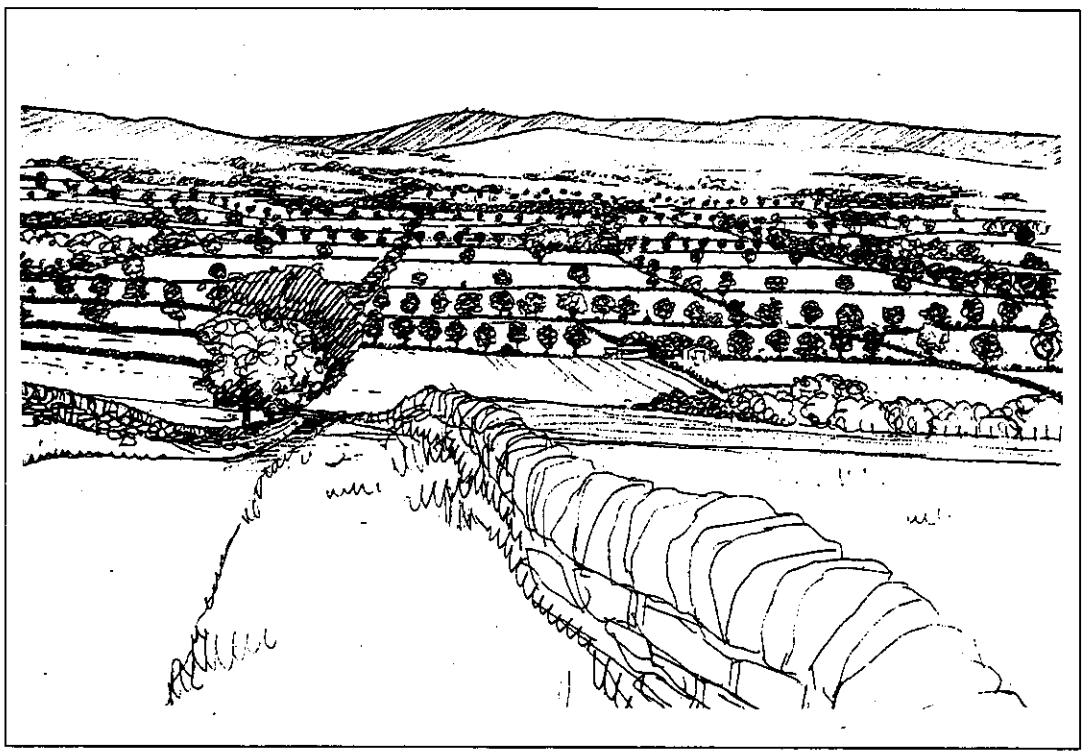
- Agriculture's central role in both shaping and maintaining the landscape means that retaining a healthy and viable farming community is essential. Large parts of the agriculture of the region, particularly in Highland areas, are dependent on subsidy. It is important that the various forms of funding are co-ordinated and complementary and that the environmental effects of policy changes are fully assessed. It is, therefore, important that farmers and landowners are involved in the process of 'countryside management'. Equally, agriculture in many parts of the lowlands is prosperous, creating the economic conditions under which farmers and landowners should be encouraged to manage the legacy of woodland and other features in an appropriate way.

- The sketches on pages 50 and 51 illustrate the possible effects of implementing management options to deal with changes in agricultural practices. Examples are given for two different landscape character types ('Broad Valley Lowlands' and 'Highland Foothills'). These landscape character types are discussed in greater detail in Part II.



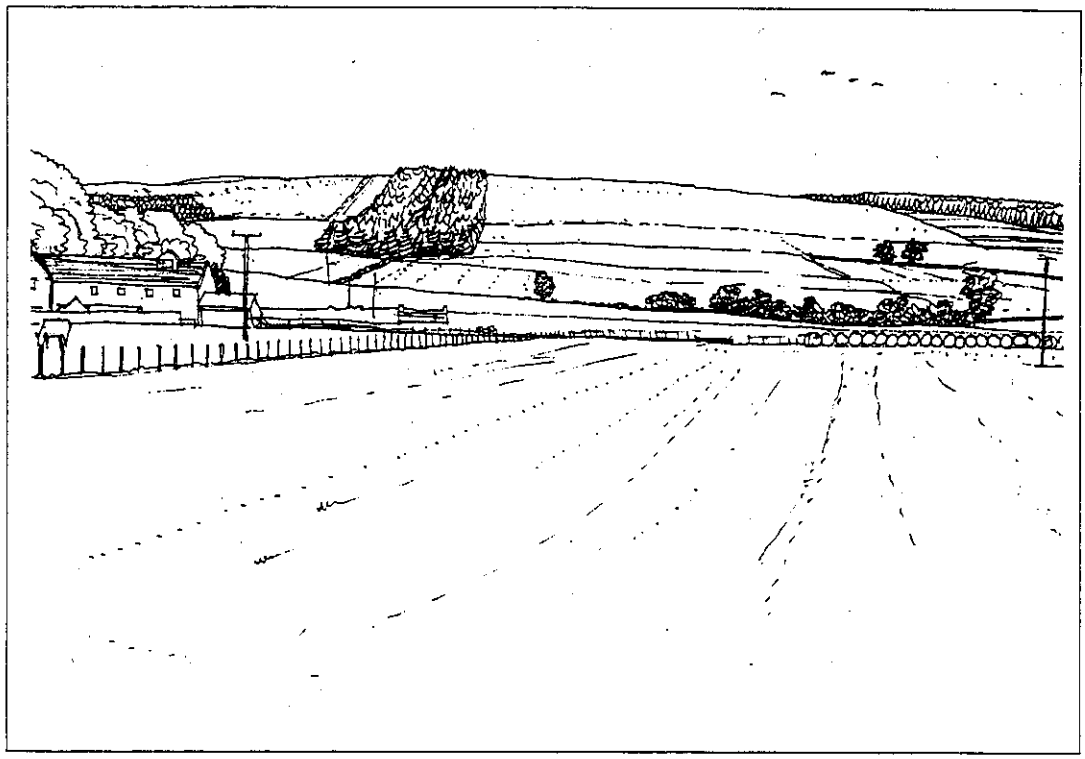
Broad Valley Lowlands

Decline of hedgerows and incremental loss of tree lines is diluting the strong character of these pattern/space-defining elements.



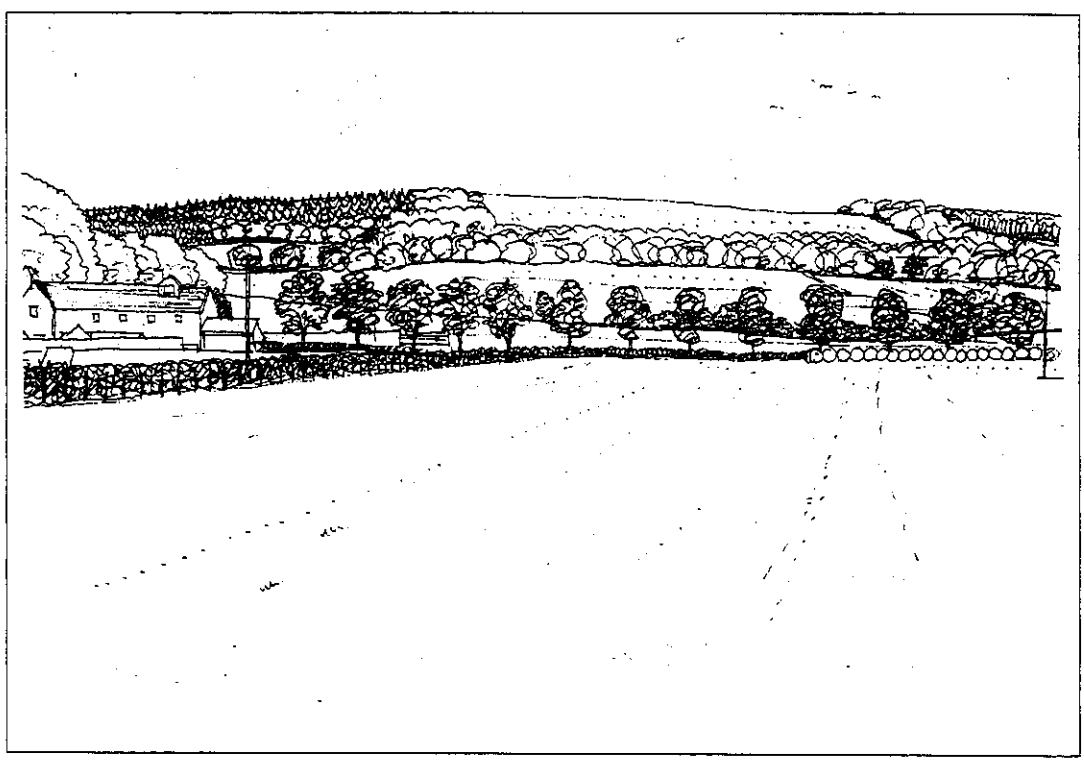
Management Option

Restoration of hedgerows and reinstatement of tree lines, combined with new farm woodland to screen potato sheds, would significantly strengthen and enhance the landscape character.



Highland Foothills

Geometric blocks of forestry and general lack of integration between upland and lowland features.



Management Option

Restoration of hedgerows and field boundaries and reinforcement of access roads by tree lines; extension of farm woodlands and broad-leaf shelterbelts to provide link with conifer plantations.

FORESTRY AND WOODLANDS

Background

4.9. The development and expansion of forests in Tayside is one of the most significant changes in the landscape over the last 75 years.

4.10. The Forestry Commission was established in 1919 with a remit to build up the country's critically depleted strategic reserves of timber. Initially, a target was set for 2 million hectares of productive woodland by the year 2000. After the Second World War, emphasis was increasingly placed on potential socio-economic benefits from forestry: rural employment and import substitution. By the 1960s, demands for rural access led to an increase in the recreational use of state forests and the development of public access and facilities. During the 1980s, the concept of multi-purpose forestry developed which placed greater emphasis on integrating recreation, conservation and landscape objectives into the traditional timber production objective. The latter was fuelled by adverse reactions to early 'blanket' afforestation and by the increasing opportunities afforded by maturing forests.

4.11. Between 1919 and 1980, the Forestry Commission was the main forestry developer. During the 1980s however, private forestry rapidly increased, encouraged by tax relief. This incentive ended in 1988 and resulted in a marked change in private forestry development. The Forestry Commission was restructured in the early 1990s into the Forestry Authority and Forest Enterprise. These encompassed two clear aims: the latter is responsible for state forest management, while the Forestry Authority is responsible for regulating state and private forests.

Changes in forest landscapes

4.12. Tayside has extensive mature forests; some of these originated in the 17th and 18th centuries as estate forests when the area around Dunkeld acted as the Cradle of the Scottish Forestry Renaissance by the "Planting Dukes" of Atholl; others are the products of Forestry Commission and private developments this century. Sitka spruce is the predominant timber species due to its productivity on low quality sites and suitability for timber processing. As a result, some larger upland forests are often lacking in diversity, although larch is widely used and firs are locally distinctive. Future timber harvests will create significant short and long term changes to these forest landscapes. The Forestry Commission's policies towards forest and woodland design have been developed and refined considerably over the last 20 years. Guidance now requires that new forest plans are sympathetic to landform, provide a greater proportion of open space and of broad-leaf/other conifer species. In addition, the design of felling coups is required to add greater age diversity to the forests. All these measures should result in the marked enhancement of many commercial-forest landscapes, in terms of visual amenity, ecological diversity and recreational potential.

4.13. Tayside has currently circa 12% of its area under forest and woodlands and whilst the region has several large forests, it has scope for new woodlands and forests. The Tayside Indicative Forestry Strategy (IFS) provides a framework within which new forestry proposals can be considered and provides guidance to potential forestry

developers (Tayside Regional Council, 1997a). The IFS is based on an assessment of the region's environmental constraints and sensitivities. It identifies forestry planting opportunities in the following categories: Preferred Areas; Potential Areas and Sensitive Areas. This categorisation suggests that interest in forestry development may be targeted in foothill areas and the less dramatic/less sensitive uplands (i.e. Highland Foothills, the Sidlaws and the Ochils). The whole concept of IFS is currently under review at present, though this will also present an opportunity to improve the way IFS may be used.

4.14. New woodlands and forests have considerable potential to enhance the landscape through a combination of measures. They can create new resources, provide timber and shelter and accommodate recreation. Landscape character can benefit through the creation of stronger spatial patterns; the provision of linkages between isolated and currently incongruous woodlands; the integration of conifers with broadleaves and the creation of more scenic and wildlife diversity in the landscape. The above beneficial changes can only be achieved through careful design that responds to the characteristics of the locality. Potential negative changes which should be avoided are:

(i) the loss of visual diversity and opportunities for views due to the creation of imbalance between agriculture and forestry;

(ii) the loss of 'wilderness' or semi-natural landscape in remote upland areas where no commercial forestry currently exists, though the opportunities for expanding the native woodland resource in such areas need to be explored;

(iii) the obscuring of cultural features/patterns in formerly pastoral landscapes, e.g. the loss of dry-stone walls, shielings, upland rigs and ancient communication routes.

4.15. A recent trend has been towards the re-establishment of native woodlands in the upland areas (predominantly Caledonian pine). To date, this has focused on the less productive upland areas where there is less interest in grazing and sporting uses.

Visitor accommodation also includes chalet and log cabin developments. While these have the potential to integrate with the landscape, often they are constructed in geometric lines with little screening or interest.

Photo: SNH

The lochs are popular for a range of activities including fishing, sailing, windsurfing and power boating. There is potential for noisy activities to disturb the otherwise tranquil nature of the lochside landscapes.

Photo: SNH

Past forestry practices resulted in areas of dense, geometric and often single species planting. Current practice means that many existing plantations will be enhanced in the future.

New forestry planting should result in more sympathetic patterns of woodland which emphasise and enhance rather than hide the landscape.

Here in Glen Errochty, deciduous woodland frames pastures and provides a buffer around the conifers.

FIGURE 10

FORCES FOR CHANGE

4.16. The government has renewed its commitment to increasing the national forest cover. There are now more incentives towards planting woodlands on better land on the fringe of uplands and in the lowlands. The productivity of the lowland arable areas is likely, however, to limit the planting of farm woodlands except in pockets of poorer land. This may have the effect of planting wet, rough or steep ground where wildlife interest may be significant. It is likely, therefore, that the main focus for Woodland Grant applications may be the Foothills and Igneous Hills (Ochils and Sidlaws) categorised by the Tayside IFS as 'Preferred Areas', although this will depend on the complex interaction of the government's incentives. These areas are within close proximity of main settlements in the region and are, therefore, highly visible and heavily used for recreation. In addition, they contain a wealth of cultural heritage features which may be affected by forestry proposals. The Igneous Hills have, however, suffered degradation through a range of urban fringe developments and from some unsympathetic forestry schemes; there is, therefore, potential to mitigate some of these detrimental influences through new woodland and forest planting. Much has been achieved already through co-operation by forest managers and interest groups such as the "Friends of the Ochils".

Changes in policy woodlands

4.17. Tayside contains a wealth of designed landscapes, country houses, castles and their estates. These vary in scale and grandeur, but combine to project an image of affluence for the region as a whole. The policy woodlands make important contributions to the local landscape character and in many areas help to integrate newer adjacent forests into the landscape. Many of the policy woodlands originated over 200 years ago and have undergone a combination of rotational replanting and changes in management styles and objectives. Although maintaining the same boundaries, several woodlands have changed from diverse mixtures of broadleaves and conifers to predominantly coniferous plantations. Alternatively, the policy woodlands have suffered from inadequate management and consequently lack the age diversity required to perpetuate their presence. The implications of the above are that the richness of Tayside's landscape may ultimately be prejudiced through the loss of change in character of these important features. There is an increasing interest in preserving the heritage value of these woodlands.

Changes in semi-natural and ancient woodlands

4.18. Pockets of ancient and semi-natural woodland exist throughout the region, adding diversity to local landscapes and wildlife. Many of these most significant areas are protected as SSSIs; however, the register of Ancient and Semi-Natural Woodlands (Nature Conservancy Council, 1986a, b & c) does not take account of woodlands of less than 2 hectares. These small woodlands make valuable contributions to the landscape, but many are not adequately monitored or managed. Designation as an SSSI requires a list of Potentially Damaging Operations to be drawn up, which effectively protects the nature conservation and landscape value of the site. Further to this, the Forestry Commission, through the Forestry Authority, have produced a set of guidelines on the management of semi-natural woodlands (see References). Some of these woodlands remain threatened, or potentially threatened, by grazing pressure, grey squirrel encroachment and general lack of management, though the future outlook for these woods is probably better now than it has been for the last 200 years.

Changes in Forestry and Woodlands: Summary of Key Landscape Issues

The main landscape changes related to forestry and woodlands that need to be addressed in future policies and management strategies are:

- ***how forest dominated landscapes might be enhanced by future rotations by the application of the Forestry Commission's Environmental Guidelines tailored to their individual characteristics (see 4.19.);***
- ***where and how 'wildland' or semi-natural characteristics should be preserved and enhanced;***
- ***ensuring that significant elements of the cultural landscape are recognised in forest plans;***
- ***ensuring that sites of local nature conservation interest are safeguarded and acknowledged in forest and woodland plans;***
- ***ensuring that the scale and types of forest and woodland appropriate to the landscape character are encouraged;***
- ***ensuring that the management of policy woodlands for visual amenity/historic design authenticity is encouraged;***
- ***ensuring that all semi-natural and ancient woodlands are adequately monitored, managed and protected;***
- ***encouraging the expansion of the productive woodland resource base in a way which does not compromise the inherent natural and cultural heritage values of the area.***

Forestry Commission Guidelines

4.19. The Forestry Commission and Forestry Authority produces a range of guidance documents related to many aspects of management and design. These seek to ensure that the social, environmental and economic benefits of forests and woodlands are realised for the community at large. The guidelines include *Forests and Water* (1993), *Forest Landscape Design* (1994), *Lowland Landscape Design* (1992), *Forest Nature Conservation* (1990), *Community Woodland Design* (1991) and *Forest Recreation* (1992). These documents represent not only invaluable guidance information, but are, more importantly, essential components of the regulatory process. Grant and Felling Licence applications must demonstrate (to the Forestry Authority) compliance with these guidelines. The guidelines are, therefore, important tools, the results of which can be recognised in the recent improvements of forest landscapes throughout the UK.

4.20. The Forestry Commission's guidelines are universally applicable, but like any general guidance require to be tailored to the specific circumstances of the site/area in question. The latter part of this report identifies the characteristics of different landscape types and, where appropriate, identifies the key character considerations for forest/woodland design that should be addressed at the time of applying Forestry Commission's guidelines.

General planning and management guidelines

Commercial forestry

- Patterns of open space in new forests should be developed to avoid the lack of open ground that some of the older 'blanket' forests visually and physically implied. This is particularly important in Tayside where mountain recreation is widespread.

- New large-scale forest proposals should identify and acknowledge the cultural heritage values of landscapes by maintaining patterns of open space which allow the historic and ancient landscapes to be interpreted. This would probably require additional research into the ancient and historic landscapes and particularly into the relationships between ancient patterns of movement, settlement, farming practice and ritual or religious behaviour. This is especially required in the Foothills, Lowland Hills and Igneous Hills where concentrations of archaeological sites exist.

- The location and design of new forests should seek to avoid obscuring the denser patterns of stone dykes, and where practicable, should leave the dykes as legible features in open ground without encroaching or using them as plantation boundaries. Opportunities for incorporating dykes within the new patterns of open space should also be pursued. Measures should be undertaken to maintain walls peripheral to forests, where they still fulfil an important visual function, e.g. beside public roads.

- The definition of 'wildland' or semi-natural areas could be used as a planning guide in response to a range of upland development pressures including wind farms, pylons, radio masts and forestry. It is recommended that further studies be undertaken to define appropriate wildland areas. The definition of such areas should involve an assessment of intervisibility which identifies visual boundary lines and peripheral zones of visual influence around wild land areas as a basis for planning policies.

- The open 'wild' character of these areas is partially a product of human land management in which sheep farming plays an important role. Discontinuation or decreases in grazing might allow natural woodland regeneration. This would potentially create a new type of wild landscape which should be considered in similar terms, as regards protection from development.

Upland Fringe

- Woodland and forestry proposals for Upland Fringe areas should seek to integrate lowland woods with upland forests. This should employ transitions from broadleaves to conifers and should provide linkages with existing shelterbelt patterns and riparian woodlands. Generally, broad-leaf lower margins should be introduced and field patterns preserved.

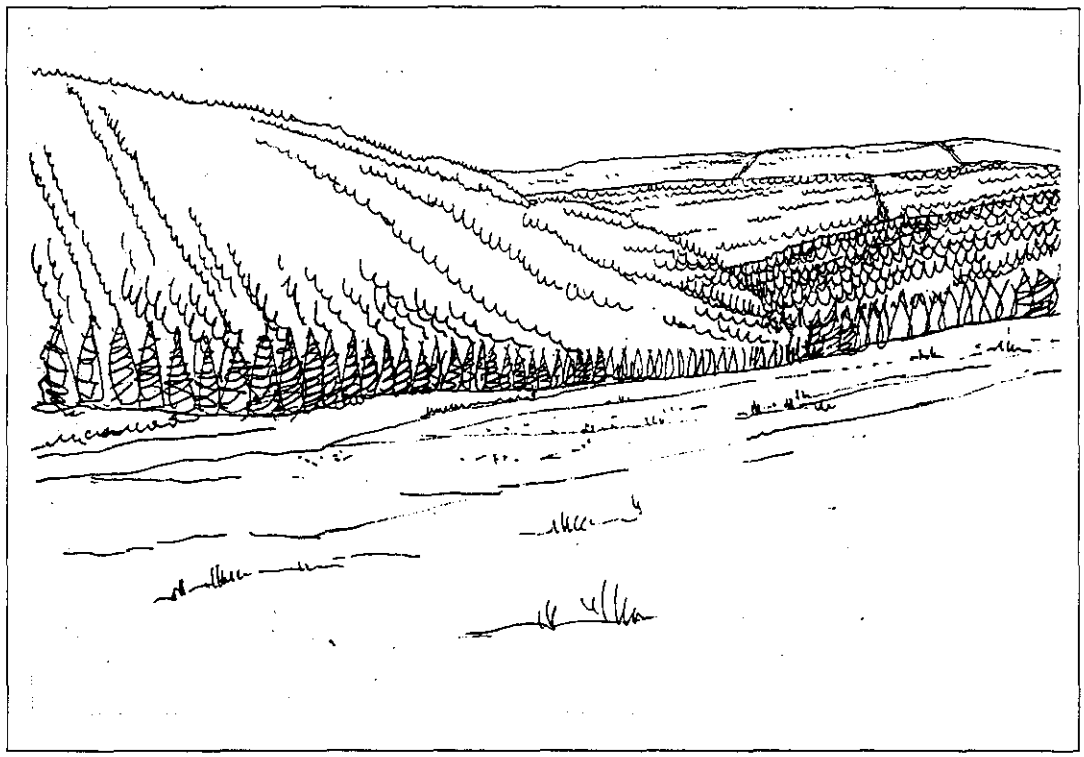
Policy Woodlands

- There is a need to further support the management of historic designed landscapes in both the production of informed management plans and the physical implementation of the works. The special contribution of policy woodlands may be lost if they become managed for solely commercial objectives, though there is already considerable liaison between the Forestry Authority, Scottish Natural Heritage and Historic Scotland to ensure such woods are managed appropriately. The exotic mixes of specimen trees are particularly important characteristics: towering conifers, beech, oak, limes and horse chestnuts are especially significant in Tayside. Policies and grants to support their management and replacement should be promoted.

Semi-Natural and Ancient Woodlands

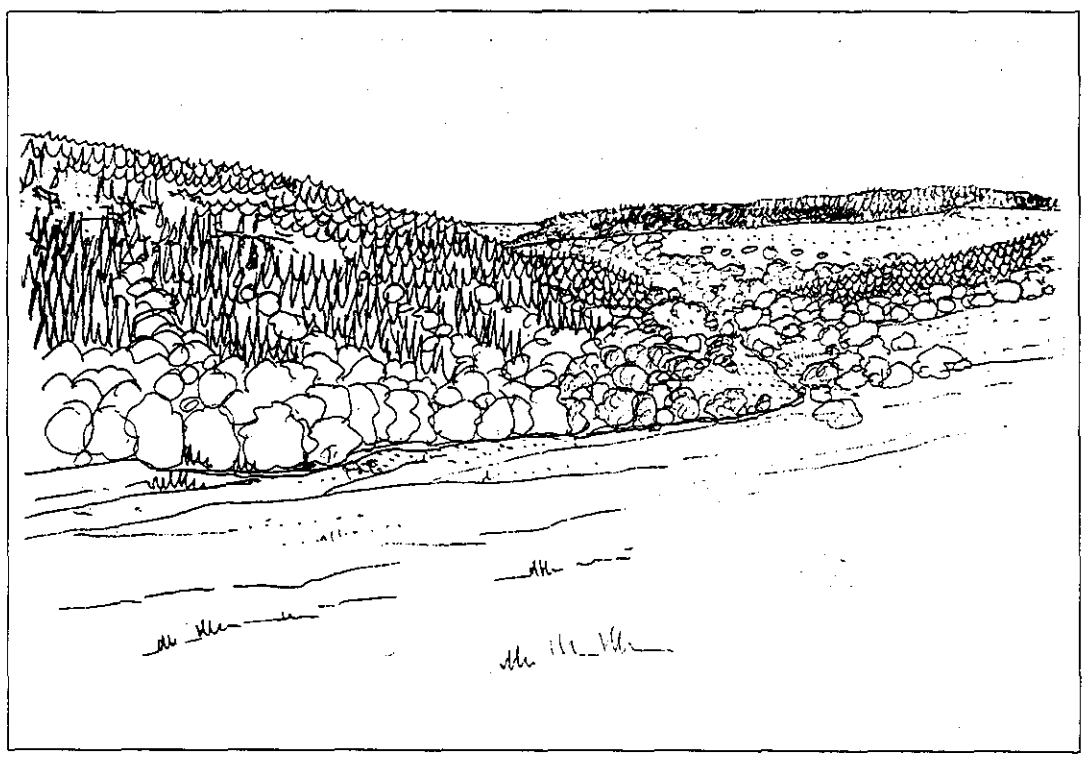
- The protection of these woodlands should be regarded as very important. Semi-natural and ancient woodlands make important contributions to the landscape of Tayside - particularly its glens. Continued support for their protection and management through the Tayside Native Woodlands and other initiatives is essential.

- The sketches on pages 59, 60 and 61 illustrate the possible effects of implementing management options to deal with changes in forestry and woodlands. Examples are given for three different landscape character types ('Igneous Hills', 'Lower Highland Glens' and Mid Highland Glens'). These landscape character types are discussed in greater detail in Part II.



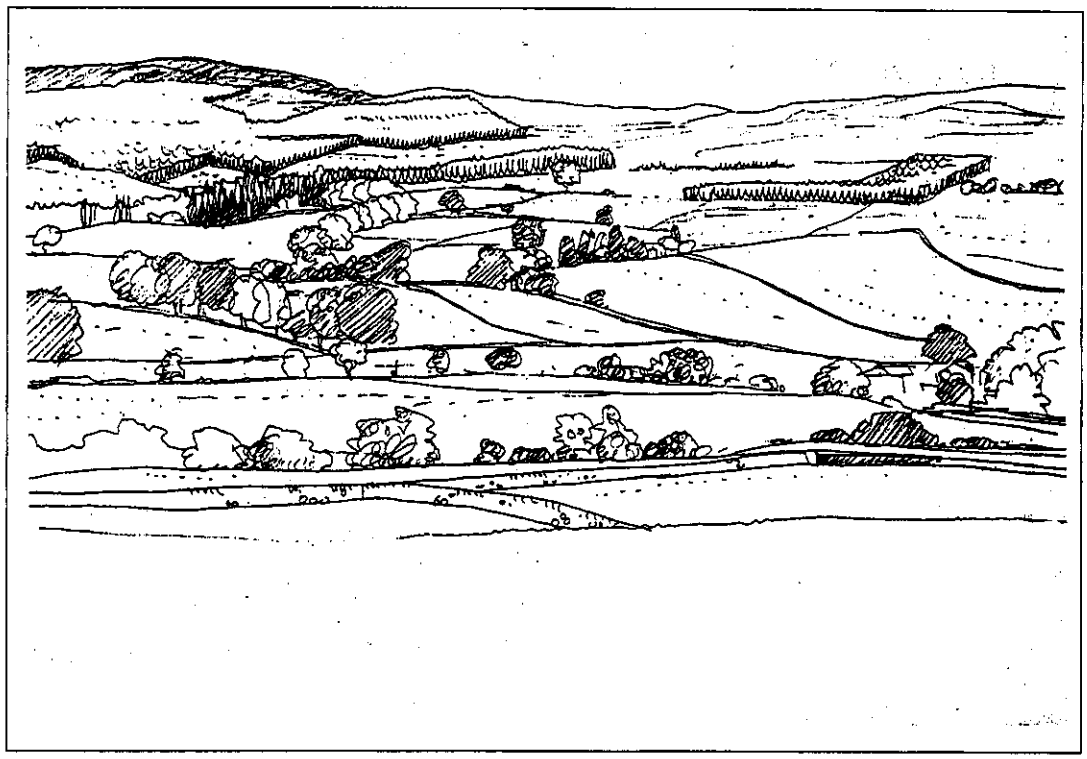
Igneous Hills

Mature 'blanket' forests of Sitka spruce cover parts of these hills, devoid of open space and species variations.



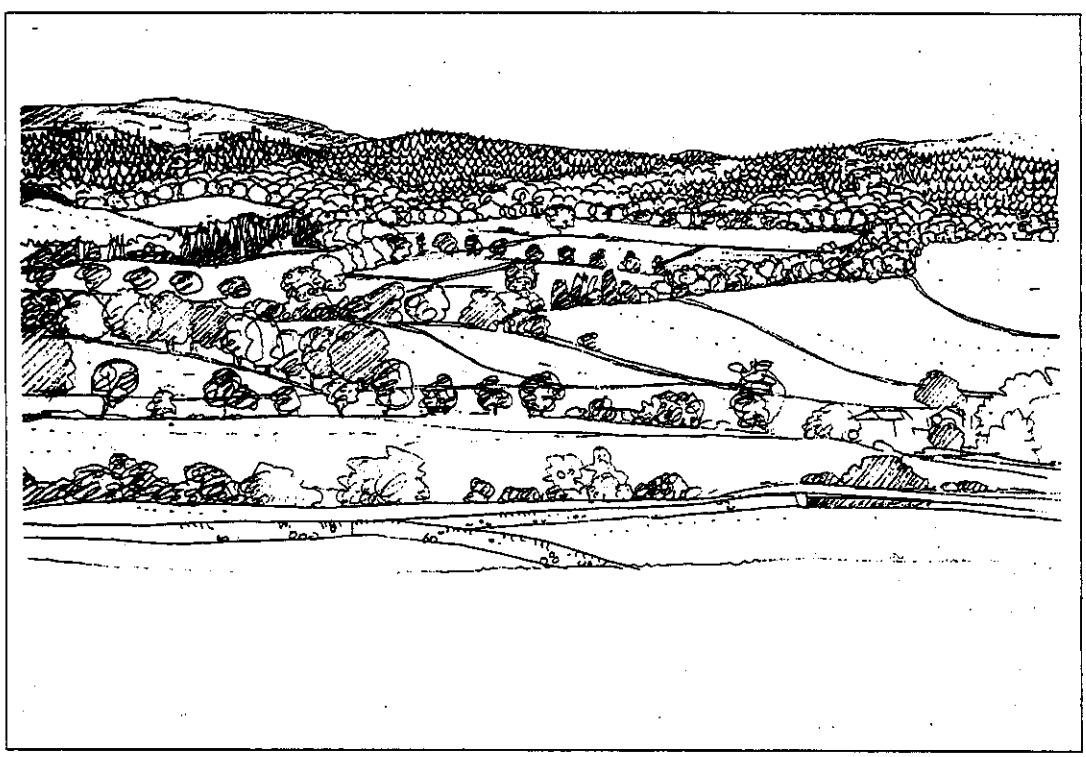
Management Option

Future rotations present opportunities for modifying the existing forests - introducing riparian corridors, large-scale patterns of interlinked open space, broad-leaf planting around low margins and along valleys and large- to medium-scale use of conifer species variations e.g. spruce and larch.



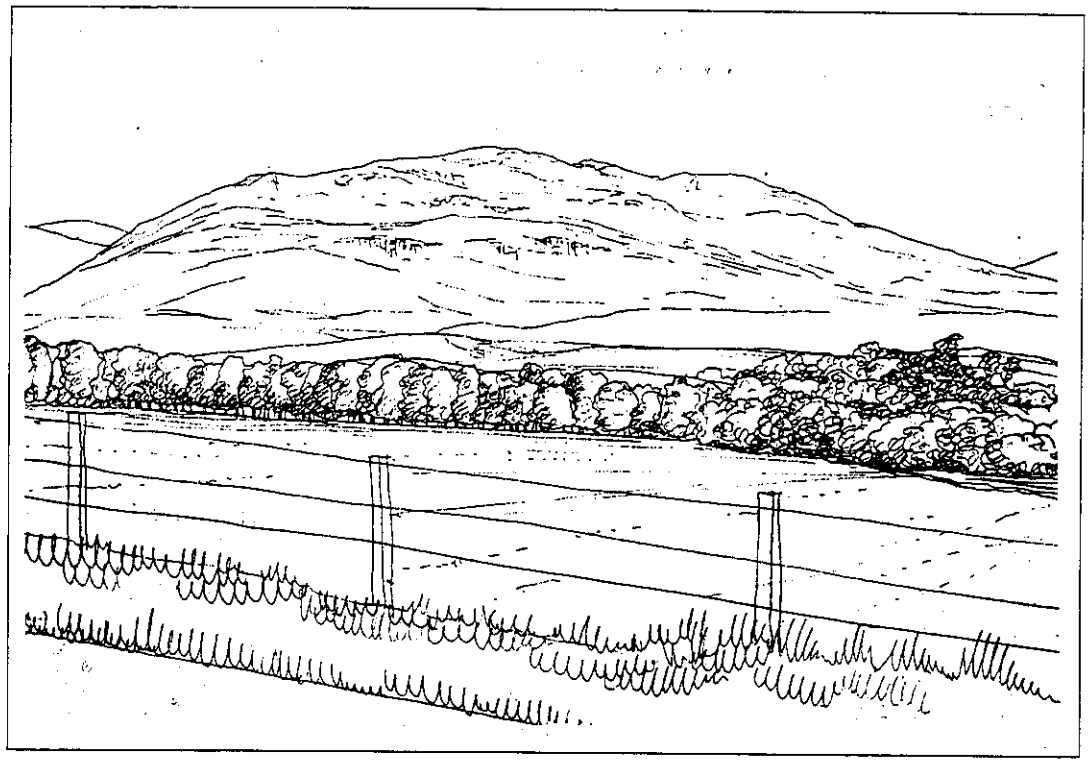
Lower Highland Glens

Lack of integration between conifer plantations and farm woodlands, loss of tree lines and walls.



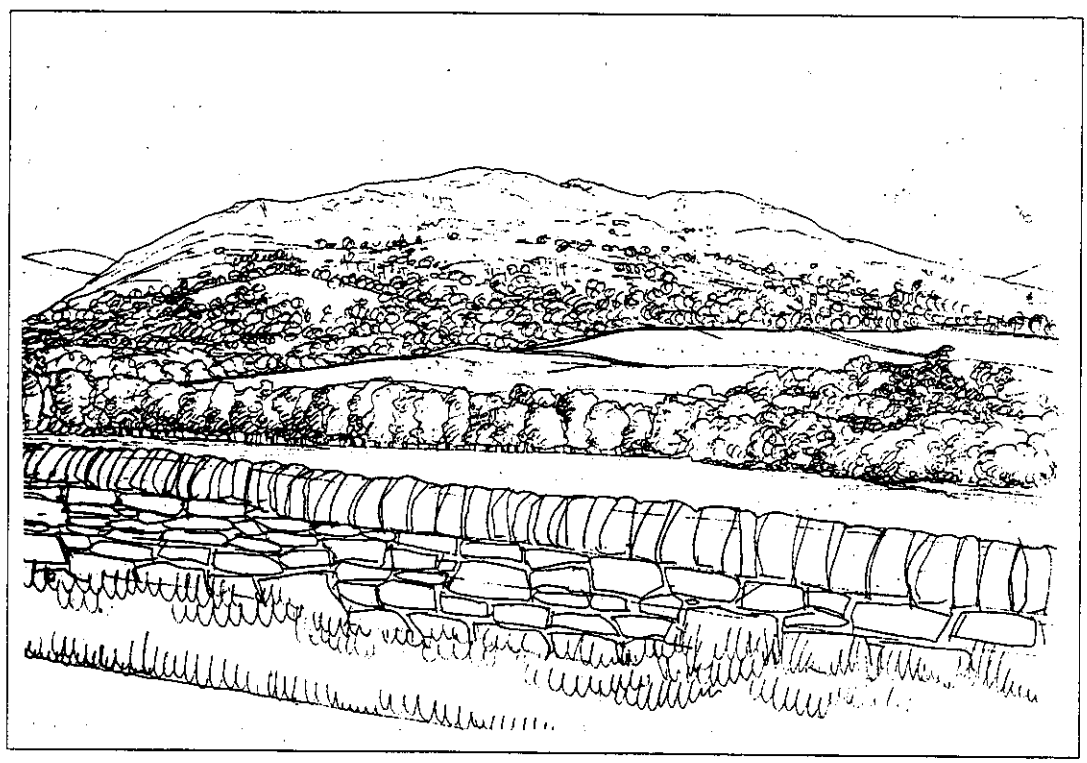
Management Option

Establish new broad-leaf woodland belts connecting with broad-leaf forest margins; restore tree lines, walls and hedges.



Mid Highland Glens

Decline of field boundary walls, loss of pastoral enclosures and prevention of natural woodland regeneration by sheep and deer grazing.



Management Option

Reduction of grazing or increased use of fencing to allow natural regeneration of woodland; restoration of dry-stone dykes and reclamation of old pastures on the glen floor and lower glen sides.

DEVELOPMENT PRESSURES

4.21. Tayside has an enviable reputation for its quality of life. It is consequently an attractive place to live and work and a popular holiday destination. These characteristics are conducive to inward investment and generate demands for a range of development in many parts of the region. This is facilitated by the region's strategic communication routes which allow ease of access along their corridors. The main development issues area as follows:

(i) urban expansion;

(ii) building in the countryside;

(iii) tourism developments;

(iv) minor and major road developments;

(v) wind farms.

These issues are described below.

Urban Expansion

Background

4.22. Over the last 30 years, there has been a steady rise in the demand for development sites within, and in close proximity to, main settlements, which has been accommodated through strategic and local planning on a mixture of brown and greenfield sites.

4.23. Development pressures still exist as a result of high demands for new housing and demands for strategic business developments. Demands which directly affect the landscape include:

(i) demand for greenfield sites on the periphery of existing settlements to allow urban expansion for housing and occasionally business/industrial development;

(ii) demand for greenfield sites adjacent to strategic transport routes and in close proximity to settlements;

(iii) potential development of new villages where the existing settlements lack capacity or are unsuitable for expansion;

(iv) demands for isolated developments in the countryside (discussed below).

4.24. Satisfying the above demands can and does cause significant changes in the character of the landscape within the zone of visual influence of settlements. These changes include:

(i) sub-urbanisation of the countryside through the extended visual influence of new development and the inclusion of 'suburban' design elements in peripheral developments;

(ii) alterations to the physical and visual relationship between town and countryside;

(iii) loss of local distinctiveness through unsympathetic building developments;

(iv) loss of indigenous buildings through their inability to accommodate new uses, the lack of interest in expansion restoration projects or through 'over-conversion' which emasculates the original character.

4.25. These issues to a greater or lesser degree, affect all but the exposed highlands and the remotest glens. The gradual compounding change could transform the everyday experience of the landscape for the resident population and modify the perception of visitors.

Urban Expansion
Summary of Key Landscape Issues

The key landscape related issues to be addressed by planning and management guidelines are as follows:

- ***how a strong indigenous character and identity could be created for all types of new urban development, i.e. to avoid peripheral zones of ubiquitous or characterless developments;***
- ***how new and appropriate relationships might be developed between urban expansion developments and the countryside, i.e. both visual and physical;***
- ***how the limits of urban development might be determined and landscape frameworks developed for the main settlements;***
- ***how the perception of settlements on arrival or from distant viewpoints could be influenced by planning and management to achieve the best and lasting impressions;***
- ***how new housing and other developments sympathetic to the local character, could be encouraged;***
- ***how significant original buildings might be safeguarded from dereliction, demolition or unsympathetic conversion.***

While many of the large towns in Tayside have a limited impact on the wider landscape, sometimes, as in Dundee, the transition from urban to rural is abrupt.

Many smaller settlements have experienced considerable growth, often by the addition of suburban estates and with little attention paid to the uirban/rural interface.

Photo: SNH

Here at Kinnesswood, suburban development has spread up the lower slopes of the Lomond Hills, with a considerable effect on the wider landscape.

In parts of the region, planning policies have allowed development in the countryside, sometimes resulting in isolated groups of suburban houses.

This recently constructed 'kit' house shows that it is possible for new build to reflect traditional designs, materials and features.

FIGURE 11

FORCES FOR CHANGE

Government and Local Authority Planning Guidance

4.26. The Scottish Office has published Planning Advice Notes (PANs) which are relevant to the subjects of urban expansion and building in the countryside. These are PANs 36, 39 and 44, which cover the following subjects:

(i) PAN 36: Siting and design of new housing in the countryside (Scottish Office,1991);

(ii) PAN 39: Farm and forestry buildings (Scottish Office, 1993);

(iii) PAN 44: Fitting new housing development into the landscape (Scottish Office, 1994a).

These address in general terms most of the issues prevalent in the siting and design of domestic (including farm and forestry) buildings and provide guidance suitable for universal application.

4.27. The planning framework for the region is currently adapting following local government reorganisation in April 1996. As comprehensive local plan coverage evolves, there is considerable scope for supplementary planning guidance to address issues such as settlement and building design. There is also substantial potential for the wider use of design briefs which encourage developers to respond to the landscape context, settlement form and vernacular building styles.

General Planning and Management Guidelines

- Ubiquitous imported housing designs applied throughout the UK should be avoided. Designs for new buildings which reflect local characteristics should be promoted and local industries encouraged to produce component parts suited to Tayside's landscapes.

- There is a need to promote new developments of a high architectural quality where they are highly visible, form the urban edge or define the main approaches to towns and villages.

- The potential expansion of settlement should be given defined limits to ensure the overall identity and character is not compromised. Proactive landscape planning should seek to establish landscape frameworks (e.g. new woodlands, shelterbelts, etc.) at potential development sites in order to facilitate the future integration of buildings. Where a landscape framework cannot be established, then the urban design architectural treatment should seek to produce an appropriate urban edge.

- The potential for establishing new villages should be assessed where existing settlements lack capacity for expansion without compromising their sense of place. This would require an environmental appraisal to determine viable sites that are appropriate in landscape terms.

- Design briefs and even 'urban plans' should ideally be prepared by local authorities for large and sensitive sites. This would help to ensure new developments have clear identities and respond to their landscape and townscape context in an appropriate manner.

- PAN guidance does not address the development forms of contemporary business developments that demand large sites and building footprint areas, in particular that of retail warehouses, single storey industrial buildings and certain office/workshop combinations. These are typified by low cost, rapid build forms of construction and are frequently located within close proximity to strategic road corridors, e.g. to the north of Perth. The demand for these types of development may warrant the production of design guidance and its application to potential sites. Proactive guidance may then be useful to potential developers and be a positive influence on future proposals.

Building in the Countryside

Background

4.28. The scenic and accessible nature of much of Tayside encourages interest in development in the countryside. These are predominantly demands for houses, agricultural buildings and tourist accommodation. Whilst the lowlands and more accessible glens and straths are characterised partially by their settled nature, continuing incremental development in the countryside could compromise the rural character and/or scenic quality of the landscape.

Changes in the landscape

4.29. Decades of rural depopulation affecting some of the more remote or less prosperous parts of Tayside, have prompted planning policies which encourage a certain amount of house building in the countryside as a means of supporting the rural economy. The Tayside Structure Plan (Tayside Regional Council, 1997b), for example, states a presumption in favour of small-scale housing development in the countryside, provided that certain environmental and infrastructural criteria are met. Rural Angus Local Plan (Angus District Council, 1991) policies adopt a similar approach, supporting the development of housing within certain rural areas. The results of this policy are evident in areas north of Dundee where a dispersed pattern of isolated modern houses or groups of houses can be seen. Perthshire and Kinross policies are more restrictive, stating a presumption against housing development outside settlements except where certain criteria are satisfied. Perth and Kinross Council's 'Houses in the Countryside' policy (1996) opposes housing in the countryside except where:

(i) the development comprises sympathetic additions to existing building groups;

(ii) houses are required to serve a clearly defined operational need;

(iii) sympathetic replacement of existing houses can be justified;

(iv) the development comprises the restoration of existing building(s);

(v) the development comprises the sympathetic conversion of existing buildings.

4.30. This policy appears to be effective in limiting isolated and intrusive developments throughout Perth and Kinross. Local Plans in Perth and Kinross have, however, identified 'Development Zones' in which there is a presumption in favour of housing development. Particular examples are found on the northern side of Strath Tay to the east (Cluny to Strathtay) and west (Coshieville to Farleyer) of Aberfeldy. Although comparatively limited in geographic extent, these zones do have the potential to result in a semi-dispersed pattern of residential development within these parts of Perth and Kinross. To minimise adverse effects on the character of the landscape, development within these zones should be encouraged to avoid higher slopes, and to favour clustering along roads, echoing the traditional pattern of development. Design guidance will be important so as to avoid particularly prominent and unsympathetically designed buildings. Even the most restrictive planning policies do not guarantee sympathetic architectural solutions. Style, quality and occasionally placement in the landscape, are sometimes unsympathetic and project a suburban image. In general, however, the quality of Tayside's contemporary rural architecture is noticeably better than many other parts of Scotland, this perhaps reflects the success of the planning authorities and a more sympathetic approach on the part of developers. Perth and Kinross's recently published siting and design guidance (Perth & Kinross District Council, 1995) should further assist in this regard.

4.31. Changes in agricultural practice have brought about a range of farm building developments and conversions. Traditional buildings, being unsuited to contemporary needs for machinery or livestock, have become largely redundant. These have been replaced by large barns, potato or overwintering sheds, which dwarf the original buildings and which frequently detract from the farmsteads' composition and relationship with the landscape. This is particularly evident in lowland areas such as Strathmore, where the spread of potato growing has led to the construction of many large sheds for processing and storage. Recent legislation requires a planning application for farm buildings over 365 sq.m. and prior notification for all other buildings. The guidance contained within PAN 39: Farm and Forestry Buildings (Scottish Office 1993), coupled with the above planning controls, should result in farm building being more sympathetically positioned and designed henceforth.

4.32. There is a significant demand for traditional buildings as restoration projects within Tayside. Many of these are redundant farm buildings or isolated dwellings in the countryside. Generally, these restoration projects have significant environmental benefits, however, in some cases, there are associated changes in character. These are typically caused by changes to windows, whitewash treatments, the creation of driveways, gates and elaborate gardens, all of which change the building and its immediate setting.

Buildings in the Countryside:
Summary of Key Landscape Issues

The key landscape issues related to building in the countryside that need to be addressed in future policies and management strategies are:

- ***the capacity of different landscape types to accommodate new isolated developments;***
- ***the importance of sensitive planning policies which are able to balance the needs of the rural economy with the importance of avoiding over-development and 'suburbanisation' of the countryside;***
- ***how the siting and design of new residential buildings should best achieve integration with the different landscapes of Tayside;***
- ***how design guidance might prevent 'suburban' solutions from being applied in the countryside;***
- ***the identification of key design requirements in the restoration of old buildings, to avoid dilution of character;***
- ***how proposals for new farm buildings might be influenced by design guidance and planning policies in order to achieve more sympathetic results.***

General Planning and Management Guidelines

4.33. The following guidelines should be considered in conjunction with PAN guidance 36, 39 and 44 and with the guidelines included under paragraph 4.29.

- Proposals for new building in the countryside should be required to demonstrate an understanding and relationship with the local buildings in terms of scale, layout, materials and colour. While it may not be appropriate to reproduce replicas of historic buildings, modern design should respond creatively to local factors which may include:

  (i) building materials - clear distinction between the use of grey granites and schists in the Highlands and the use of red sandstones in the lowlands. More subtle variations include use of whitewash in some of the Highland glens, the progression from dull reds to brighter reds in sandstones moving from west to east, the use of pantiles in Kinross, and variations in the appearance of stone used in dry-stone dyking;

  (ii) building layouts, which range from simple linear villages (e.g. Auchnamithie on the Angus coast), 'planted' villages on grid layouts (e.g. Ardler in Strathmore), to nucleated settlements (e.g. Kirriemuir). At a micro scale, farmsteads and hamlets often have characteristic layouts which reflect both their function and the need to shelter from prevailing winds;

(iii) building styles which may range from historic vernacular (often solid, low buildings of one storey or with typical dormer windows), the particular design style of estate villages such as Kenmore, Fortingall or Blair Atholl to Victorian interpretation of the local vernacular;

(iv) local pattern of settlement and location which historically would have had much to do with the importance of shelter, defence, communication, markets, access to lowlands and higher ground, patterns of stock keeping including transhumance, land ownership and the legacy of the clearances, quality of agricultural land and religious factors.

- The relationship with soft landscape components and with landforms to achieve shelter and allow views is an important characteristic of Tayside valleys and glens. New developments should seek to achieve similar sympathetic relationships without contrivance or extravagant site alterations.

- New developments should seek to match local building materials (at least in appearance) in order to reinforce local character.

- The peripheral treatment of new building sites should be given careful consideration. Boundary treatments, gateways and edge planting can sometimes be more noticeable than the house. Appropriate detailing is, therefore, essential to avoid the expression of suburban concepts in the countryside, design guidance, and examples of best practice may be the best way of influencing these factors.

- Building on the sites of former buildings could satisfy a number of objectives for siting, integration and relationship to infrastructure, these should be encouraged providing the original building is beyond redemption.

- PAN 39 provides concise guidance on farm and forestry buildings which can be applied to Tayside. There are, however, a number of specific factors that should be considered:

  (i) guidance and planning policies covering the conversion of typical farm buildings could assist in the useful preservation of some of Tayside's fine farm buildings;

  (ii) encouragement for the use of smaller buildings with more diverse roof configurations could achieve more balanced farm units where original buildings are retained beside the new; more diversity in the range of barn 'kits' available would assist in this regard.

- As noted above, Perth and Kinross Council have also produced guidance on the siting and design of buildings in the countryside (Perth & Kinross District Council, 1995).

Tourism

Background

4.34. Tayside is a major holiday destination and tourism is fundamental to the region's economy. Tourism and recreation are activities which are heavily dependent on the character and quality of the Tayside landscape. In common with many other parts of Scotland, most visitors are drawn by the unspoilt nature of the region's environment, often touring, walking or cycling, and visiting castles and other monuments. It is essential, therefore, that the basic resource - the landscape - is conserved and enhanced.

Changes in the Landscape

4.35. Tourist activity is evident throughout Tayside and the region has a broad range of facilities and attractions. These are largely based on existing features or urban centres, but some have been newly developed. The economic benefits of tourism have supported many positive works in the landscape, e.g. building restoration and upkeep of designed landscapes. There is, however, a range of impacts which require control if they are not to have detrimental effects on landscape character.

4.36. The region has a number of established caravan/chalet parks, several of which are prominently positioned beside lochs, in the glen floors and beside main roads. Some of these are poorly integrated with the landscape and have unsympathetic ranks of white caravans or chalets which are visually obtrusive. Particularly obtrusive developments are at Loch Tummel near Queen's View, the south side of Loch Earn, Strath Tay near Kenmore and between Pitlochry and Killiecrankie. It is possible that proposals for additional caravan parks may come forward in the future, both in established areas such as the principal lochs (Tay, Earn, Tummel) and in areas such as the Highland Foothills. There is an opportunity to learn from past experience and to favour sites which have a limited impact on the wider landscape. Off-site screening may be provided both by the natural topography and by surrounding woodland and hedgerow trees. On-site planting can also play an important role, providing boundary screening and helping to break the caravan site into smaller areas. In some areas, notably the southern side of Loch Earn, there has been considerable caravan development over many decades - both in terms of single static caravans and larger sites. No matter how well-designed, additional caravan sites in such areas would further affect their landscape character. Opportunities may arise, however, to improve and enhance existing sites.

4.37. Tayside has a number of timeshare developments, notably at Kenmore, Dunkeld, Rannoch and Aberfeldy. These are permanent developments aimed at a more prestigious market. They employ, therefore, comparatively high quality architectural solutions as befitting the scenic and heritage values of their sites. These constitute a form of development in the countryside, but usually have been closely integrated with existing villages, built features of designed landscapes or with former hotels/country houses, thereby minimising impacts on the broader countryside. Only at Kinloch Rannoch do timeshares, in conjunction with other tourist facilities, give the impression of over-development. Development of existing timeshare complexes is continuing, but it is thought unlikely that there will be pressure for new timeshare developments in the future.

Photo: SNH

Recent decades have seen the rationalisation of agriculture and the construction of many large buildings including grain driers (above) and potato sheds.

While mineral working can have a major impact on the local landscape, existing quarries in Tayside have a more limited effect on the wider countryside.

Major road schemes are difficult to integrate into the wider landscape. There is often scope to use planting to screen the road, and to tie it into the structure of woodland and hedges.

Tourism and recreation, while contributing to the local economy, can have effects on the landscape. This major development was recently opened at Bruar, on the A9.

Photo: SNH

The area is popular for caravans, with a number of large static caravan parks located close to the main lochs. Without suitable screening, these can have a major effect on the landscape.

FIGURE 12

FORCES FOR CHANGE

4.38. Certain towns have developed as tourist centres and 'honeypots' of activity. These have enjoyed the economic benefits, allowing the built fabric to be kept in good order by proprietors and encouraging public agencies to carry out environmental improvements. These centres, e.g. Pitlochry, Dunkeld and Crieff, are the likely focus for new strategic tourist attractions and developments which may change the local character of the town or its surrounding landscape through the need to accommodate the development, associated large car parks and additional motor traffic.

4.39. The major communication routes which run through Tayside (in particular the A9) have generated interest in tourism developments close to the road corridors, at convenient locations close to junctions (e.g. the Macbeth Experience Centre, the Dowally Craft Centre, the House of Bruar). It is possible that there may be continued demands for such isolated developments which may have significant local impacts due to their high visibility from the main road.

4.40. Tourism has supported the restoration of many traditional rural properties for use as holiday homes. This has generally had a very positive effect in the landscape, although the changed function of the property can sometimes be evident in the less well-managed gardens, signage and lack of occupation during the winter months.

4.41. Certain forms of recreation can have implications for the landscape. The Uplands of Tayside are popular destinations for hill-walking, skiing and mountain cycling; activities that can cause erosion at a local level and introduce developments, noise and movement into otherwise 'wild' and remote landscapes. At lower levels, the noise and movement introduced by powered watersports (e.g. Loch Tay) and off-road vehicles, can be intrusive.

4.42. Signage related to tourism facilities can be an intrusive feature of popular holiday areas. Private signs of variable quality, positioned in an ad hoc manner close to roads, can introduce clutter and detract from views. While planning policies do address signage, enforcement of unauthorised signs is not always carried through. Furthermore, the regulation of 'official' brown signs has been relaxed. Taken together, these factors mean that signage clutter is increasing with implications for landscape character, particularly at the local level.

Tourism:
Summary of Key Landscape Issues

- ***the siting and appearance of caravan and chalet parks and the opportunities to enhance established facilities;***
- ***the potential landscape effects of major tourism developments at 'honey pot' towns;***
- ***the need to reconcile different forms of recreation and steer intrusive and noisy activities to suitable locations;***
- ***landscape implications (both beneficial and potentially adverse) of rural diversification and the growth of 'green tourism';***
- ***the need for control of private signs to prevent signage clutter in the landscape;***
- ***landscape implications of growing volumes of visitor traffic - both direct (noise, movement, etc.) and indirect (demand for car parks, road improvements etc.).***

General Planning and Management Guidelines

- Caravan and chalet park developments illustrate how easy it is for such facilities to undermine the character of the landscape. It is important, therefore, that such developments are carefully controlled, and steered to locations where the topography or land cover limits their impact on the wider landscape. The sensitive choice of materials, colours and screen planting can reduce these impacts still further. There is a need to address the landscape impacts of existing park developments.
- The landscape implications of tourism-related traffic should be considered, both in general and in relation to specific development projects. Parking provision, minor and major road provision and signage, all have a landscape impact. Equally important are the effects of noise and vehicle movement in some of the more remote and tranquil parts of the region. Green tourism projects based on cycling, walking or horseriding, or served by public transport, could provide the opportunity to develop less car oriented tourist attractions.
- Without effective and co-ordinated management, even the most benign forms of recreation, such as walking, can result in erosion, landscape damage and conflict with other interests. With the increasing range of rural recreation activities and the growth of particularly noisy activities, the role of management and co-operation becomes even more essential.
- 'Green tourism' may provide scope to develop tourism and recreation activities that respond to an area's local distinctiveness through community involvement and emphasis on landscape conservation.

- A signage policy and guidance for private signs/tourism promotion would help to prevent signage clutter and preserve landscape character.

Road Developments

Background

4.43. Tayside is traversed by several major roads (A9, M90, A85, A90) which generally follow lowland coastal and major glen routes through the region. The trunk roads have been subject to varying scales of road engineering work by the Scottish Office to improve their efficiency and safety. The remainder of the public road network is the responsibility of the local authorities who have a statutory responsibility for its management.

Changes in the landscape

4.44. The A9 is an important strategic road which has been the subject of progressive improvements over the last 30 years. These have involved the construction of considerable lengths of dual carriageway, local widening and realignment of the original road, and considerable major engineering works (bridges, embankments, rock cuts, etc.). These works have locally affected the landscape of Strathallan, Strathearn, the valley of the Tay and Glen Garry.

4.45. The M90 is the other major road in the region providing motorway access from the Forth Bridge to the strategic intersection of main routes at Perth. The M90 is shorter and traverses less dramatic topography. Its corridor, nevertheless, has a significant local impact and the impressive engineering works around Perth (bridges, under/overpasses and sliproads) are dominant features in the landscape.

4.46. Similar works have been undertaken along other strategic routes such as the A90. These have all generated landscape impacts, not only related to the roads, but also in the surrounding areas where borrow pits, local quarry, sand and gravel extraction and temporary works have been required.

4.47. While these strategic improvements have increased traffic efficiency, they have changed both the local landscape character through the scale of construction works and the volumes of traffic generated; they have also affected the way in which motorists perceive the landscape due to the increased speed of traffic and the 'corridor' effect of the major roads. Future improvements, including further dualling of the A9 north of Perth, and the creation of grade separated junctions on the A9 and A90, may increase these effects.

4.48. Changes to minor roads are less noticeable, but the compounded effect can become significant. Local road improvements such as junction improvements and minor realignments can result in the removal of characteristic features such as hedgerows, walls, trees and old signs.

4.49. Improvements to rural roads may be required in the future to facilitate forestry haulage; it is important, therefore, that any such loss of characteristic features is mitigated by reinstatement works.

Road Developments:
Summary of Key Landscape Issues

The key landscape issues related to road developments that require to be addressed by planning policies and strategies are:

- ***how to reduce the impact of existing major roads;***
- ***how the landscape design of new road corridors could reflect and reinforce the character of landscapes traversed;***
- ***how the scenic qualities of certain landscapes might be acknowledged by innovative road engineering which avoids crude cutting and filling;***
- ***how the characteristic features and inherent interest of the minor road network could be preserved and maintained, i.e. hedgerows, verges, tree lines, walls and bridges;***
- ***how roadside services and facilities can best be located and designed.***

General Planning and Management Guidelines

- Design guidance contained within the Design Manual for Roads and Bridges Volumes 10 and 11 (Scottish Office Industry Department, 1993) should be applied, taking due regard for the local landscape characteristics of Tayside.
- The management of existing roads may require a different emphasis if their essential characteristics are to be maintained, e.g. tree avenues, narrow bridges, sinuous alignments. The Scottish Office is currently examining the potential for establishing a rural road hierarchy. This aims to define management types and priorities for rural roads, distinguishing between functional and categories of leisure roads. This would allow the current statutory standards to be waived in favour of a conservation led approach for many rural roads.
- For extensive ongoing road programmes, the landscape treatments for the entire road corridor should be reviewed as a strategic project to ensure that a strong regional character will ultimately be projected and that the subtleties of the local landscape character changes are also acknowledged. On and offsite landscape works should be designed to integrate the road into the broader landscape.
- For areas of designated and perhaps locally appreciated scenic value, there should be an emphasis on high quality sensitive engineering solutions, e.g. bridge design by competition, as at Glencoe.
- The adoption of a rural roads management programme could make positive contributions to the countryside, if all characteristic features of the road corridors were

addressed. Such a programme would require a multi-agency approach if all opportunities for visual amenity, wildlife and recreation were to be realised.

- Approaches and gateways to towns and villages should ideally be announced subtly in the design of roads and their landscape corridors. Roadside treatments such as tree lines, walls and hedgerows, combined with low-key carriageway alterations, may be able to create a gateway effect without the need for a proliferation of warning/speed restriction signs in the landscape. Again, this requires integration and co-operation to ensure that the messages given by the built environment and the road corridor coincide.

- Roadside services and facilities should be located so as to minimise their impact on the wider landscape. Screening, topography and woodland can help in this respect. The design should similarly seek to minimise visual intrusion. There may be opportunities to adopt local building styles and materials. The night-time landscape, in particular the effect of street lighting and vehicle lights, should be considered carefully since the principal route corridors pass through otherwise rural and undeveloped areas.

Wind Farms

Introduction

4.50. There is growing pressure for wind farm development in Tayside. While wind farms are a novel and exciting means of generating 'clean' electricity, many point to potential landscape and other environmental impacts, particularly when they are built in otherwise undeveloped areas. Local planning authorities have a key role to play in balancing the environmental benefits and impacts of wind farm development, and steering such schemes to locations which meet environmental as well as technical criteria.

4.51. Concerns about the effects of acid rain and rising concentrations of atmospheric carbon dioxide (the so-called greenhouse effect) have prompted a move away from fossil fuel power generation and towards alternatives including energy sources such as wind, wave and solar power or biofuel and waste incineration. As is described below, targets for renewable energy power generation have now been set and local authorities are required to facilitate its development. To date, most interest has focused on wind energy, with a number of wind farms (comprising groups of wind turbines) already having been built and many others proposed. However, this interest is tempered by concerns that those areas with the highest wind speeds (thus potentially most suited to wind power generation) also tend to be those areas with the most sensitive landscape (generally upland and coastal areas).

4.52. The National Planning Policy Guideline (NPPG 6) on renewable energy (Scottish Office, 1994b) includes an assessment of the 'realistic longer-term potential for renewable energy developments in Scotland'. This suggests that Tayside has the potential for 149 megawatts (MW) of installed generating capacity from renewable energy sources. Wind power contributes the bulk of this, accounting for a potential 92.5 MW of installed capacity. However, the policy guidelines note that realisation of this potential is likely to

be constrained by the restricted capacity of the electricity transmission system, particularly in areas north of a line drawn between Pitlochry and Dundee. This suggests that in the short- to medium-term, opportunities and pressures may be greatest in the west Highlands, the foothills, western Sidlaws and Ochils. It also suggests that there may be pressure to upgrade the power system elsewhere in the Highlands in the longer term.

Wind farms - the renewable energy context

4.53. NPPG 6 requires local authorities to plan *'positively for renewable energy where this can be achieved in an environmentally acceptable manner'*, and to *'safeguard sites with potential for renewable energy projects'*. It recognises that there is a need to reconcile the siting of renewable energy developments with the protection of important environmental assets within nationally important areas (such as NSAs, ESAs, NHAs and Regional Parks) such schemes should only be permitted where the integrity and underlying objectives are not affected and where adverse effects are outweighed significantly by the national benefits that would result from the development. Turning specifically to wind power, NPPG 6 states that wind turbines should only be permitted where they would *'not be significantly detrimental to areas valued for their landscape character'*.

4.54. NPPG 6 requires planning authorities to define areas of search for renewable energy developments, to safeguard areas considered suitable for renewable energy development and to define areas where, because of environmental and other considerations, such developments are likely to prove difficult to reconcile with other policy considerations. The development of an integrated strategy for renewable energy in Tayside should therefore be regarded as a priority. This should examine the practical potential for each type of renewable energy in greater detail, taking into account the basic resource itself and the technical constraints, along with key environmental, commercial and other planning constraints affecting realisation of the overall potential. The development of a renewable energy strategy, which is reflected in the planning policy framework, will assist in the consideration of proposals for wind turbines or wind farms. By examining and planning for the potential for other forms of renewable energy, the strategy would demonstrate a positive commitment to the overall benefits offered by alternative sources of power. Key sources of renewable energy within the region, in addition to wind, may include:

- small-scale hydro schemes at former mill sites (e.g. along the Tay and Almond, or in lochside locations); by utilising existing infrastructure, wider landscape and ecological effects can be kept to a minimum;
- domestic and agricultural waste (incineration or anaerobic digestion to create biogas); while processing plant would be required, this approach would help reduce the need for landfilling or other forms of disposal;
- biomass (e.g. short rotation coppice) in the lowlands and glens; although a temporary effect, this could have a local influence on landscape character;

- residues from forestry management and timber processing; again, although processing plant would be required, this would be generally small in scale and would make good use of an otherwise wasted resource;
- energy savings achieved by passive solar design, active solar technology and the use of solar cells (photo voltaics).

Most of these alternative forms of renewable energy are relatively small-scale, or require processing and generating plant which differ little from conventional industrial or agricultural developments. This section, therefore, concentrates on issues relating to wind energy. Some of the issues covered are also of relevance to other forms of development, most notably masts, aerials and other tall structures.

4.55. It is notable that the nominal production of over half of Tayside's energy needs from existing large-scale hydro schemes within the region compares with just 2% of energy supplies from renewable sources for the UK as a whole.

4.56. Appendix A to Planning Advisory Note 45: Renewable Energy Technologies provides further information and guidance on wind power developments. The Appendix sets out criteria thresholds to determine whether an environmental assessment is required under the Environmental Assessment (Scotland) Regulations 1988 (as amended in 1994):

- the proposed development is located within or is likely to have significant environmental effects on a sensitive location such as a NSA, SSSI or Natural Heritage Area (NHA);
- the proposed development is located within or is likely to have significant environmental effects on any other area valued for its landscape character;
- the development consists of more than 10 wind generators;
- the total installed capacity of the development exceeds 5MW.

4.57. From this discussion, it is clear that planning authorities have a critical role to play in the development of wind power. The following sections outline the effects of wind farm development providing a framework for assessing the implications for individual landscape types.

Changes in the Landscape

4.58. The development of wind farms is guided by three principal groups of factors. Firstly, there are the technical issues that influence location. These relate primarily to the incidence of the high wind speeds that are required for power generation. As noted above, this requirement tends to favour coastal and upland areas since average wind speeds tend to be significantly higher here than in more sheltered locations. Additional technical factors include the need to link into the National Grid at a suitable location (the grid tends to be least dense in remote areas and the installation of new cables tends to be both expensive and environmentally damaging), the need to avoid electro-magnetic interference and the need to provide road access (suitable for articulated vehicles) to the site in question. Economic factors are closely related to technical factors, further limiting the areas where the costs of development and operation will be outweighed by the revenue accruing from power generation. The third group of factors that should govern

the choice of wind farm sites comprises the likely environmental effects. These may include:

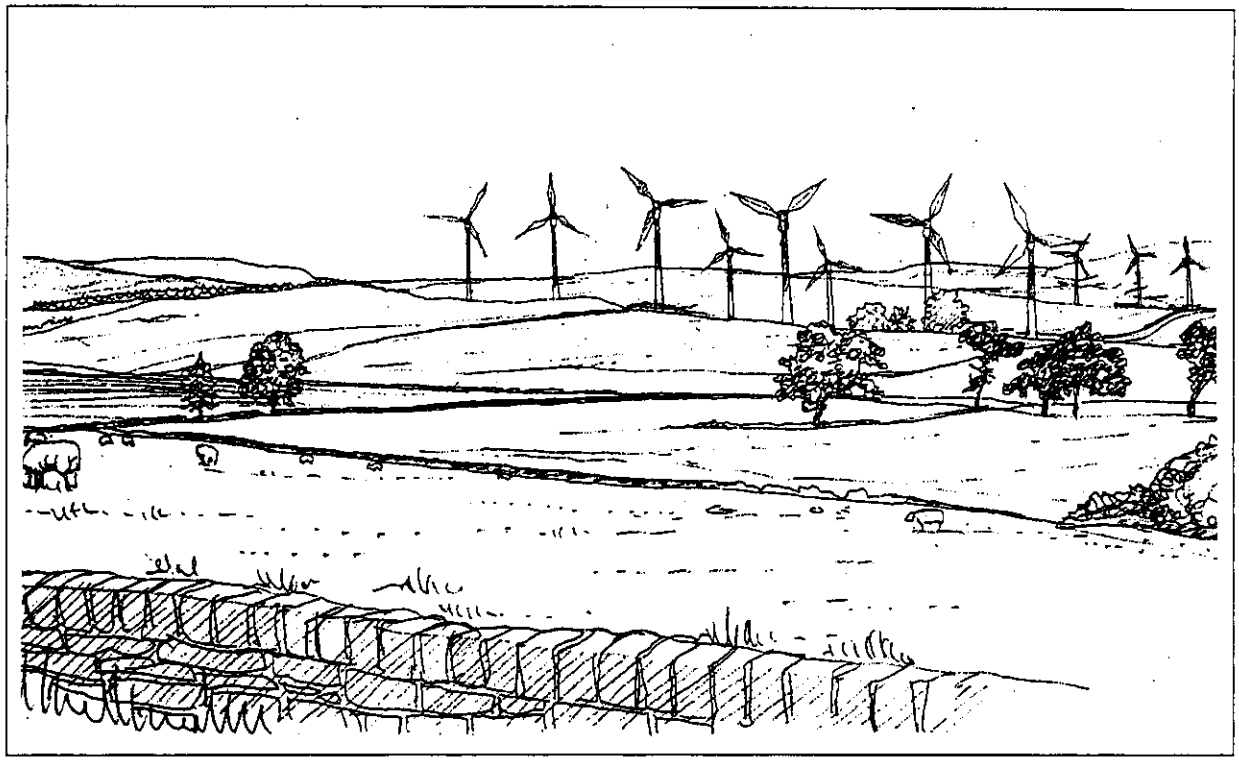
- visual intrusion and effect on landscape character;
- effect on nature conservation;
- noise;
- secondary effects resulting from links to the National Grid or the provision of road access.

4.59. While the last three of these issues are important concerns, this discussion focuses on the implications of wind farm development on visual intrusion and landscape character.

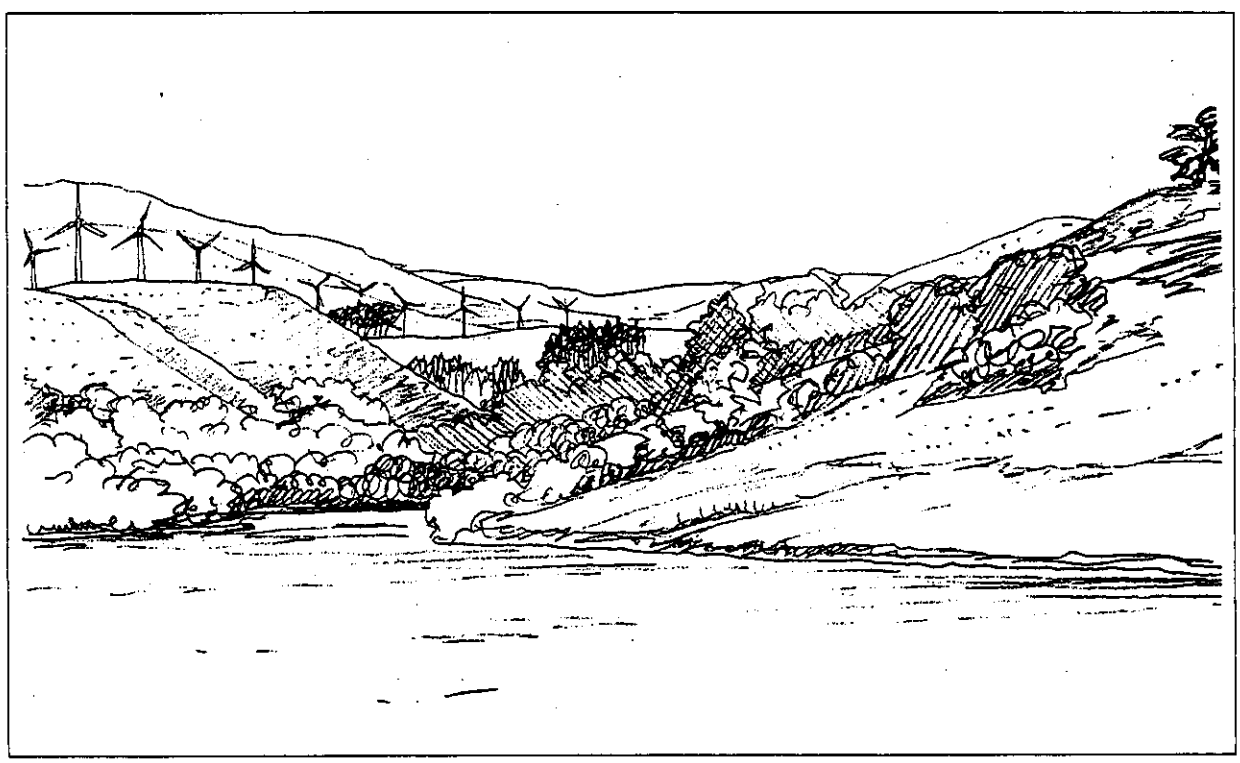
4.60. The landscape impact of wind farms will, in turn, reflect a variety of factors. Most significant, perhaps, is the size of individual turbines (30-35m high with a rotor diameter of 30-35m), their vertical, modern and industrial appearance and the movement that they introduce into the landscape. While in some situations the structures can be almost sculptural, turbines can appear incongruous, particularly in a sparsely developed upland or coastal location. Clearly, the effects increase with the number and density of turbines in any single wind farm development. Associated infrastructure, including buildings and service roads can also be visible features.

4.61. A critical influence on the scale and nature of wind farms' visual impact is the nature of the landscape in which they are developed. Thus, in a large-scale landscape (e.g. an exposed upland area) the visual impact of turbines may be comparatively small, though they will be visible over a considerable area. Conversely, in a small-scale landscape, wind turbines are likely to be particularly obvious, though they are less likely to be visible over a wide area. A further factor is the degree of existing development. Impacts are likely to be greater in unsettled landscapes, and least where the landscape has already been affected by masts, pylons and other structures. A further influence on wind farms' landscape impact is their prominence. Thus, turbines sited on the skyline are likely to be far more noticeable than those located a little further down the hillslope. Topography and landcover may further influence these impacts, providing screening or backclothing for all or part of the wind turbines. It is useful to consider the landscape impacts in terms of the development's viewshed. Where can the wind farm be seen from? Who can see it? How does it appear, against a backdrop or on the skyline? Local residents, farmers, tourists, visitors, and walkers (for example) are all likely to have different perceptions of a given wind farm.

4.62. Since wind farms may be visible over a considerable area, it is important that the impacts on surrounding landscape types and designated areas is taken into account during the consideration of planning applications.



Example A Siting of wind turbines within the Sidlaw Hills using the low ground between ridges to accommodate low level structures and roads without visual intrusion. This example also illustrates how the turbines might be located inside the main watershed/visual horizon, thereby limiting visual impacts to one geographic zone i.e. south of the hill range.



Example B Siting of wind turbines within the more dramatic topography of the Ochil Hills using the high ground to the north for 'backclothing' the turbines. This example also illustrates how the irregular topography could be used to absorb low structures and roads without significant visual effects.

agriculture predominates. There are, however, signs of modern development including the busy A9 corridor where it climbs over the Gask Ridge to the west of Perth, the lines of pylons which fan out from the highland glens carrying power to the lowlands, and a number of telecommunication masts (e.g. on Kirton Hill near Perth) exploiting the hills' proximity to settled lowland. Large areas of the Knaik Hills are reserved for military use.

FORCES FOR CHANGE

5.6.6 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.6.7 **Agriculture.** The transitional nature of the Lowland Hills (like the Highland Foothills) is reflected in the pattern of agriculture with arable on some of the lower slopes giving way to enclosed pastures and eventually, in the case of the more exposed areas, to rough moorland grazing. As in the case of the Highland Foothills, the nature of this transition may vary according to market conditions and the level of support. In particular, it is likely that cereal production has extended uphill from the lowland straths onto parts of the lowland hills such as the Gask Ridge. This does not, however, seriously weaken the contrast between lowland, lowland hills and the highlands.

5.6.8 Many farms in the foothills have constructed modern agricultural buildings such as sheds and barns. These are generally of a smaller scale than those found in the lowland straths.

5.6.9 **Transport.** The Lowland Hills have a network of main and minor roads. These are generally small-scale and fit with the grain of the landscape. The exception is the A9 corridor which crosses the eastern part of the Gask Ridge and the Bankfoot Hills to the north of Perth. Existing coniferous woodland, together with cuttings provide a degree of screening. However there are a number of sections (particularly the length climbing onto the Gask Ridge from Strathearn) which have a much wider landscape impact.

5.6.10 **Development.** Development within the Lowland Hills is very limited, generally comprising little more than a scatter of farmsteads and a few small hamlets. Small, stone settlements such as Fowlis Wester and Findo Gask characterise the lower parts of this landscape type. Along the A9 corridor, particularly to the north of Perth, there has been some more recent residential settlement, in particular expanding villages such as Bankfoot. In others, such as Methven for example, land has been allocated for further housing development. There is scope to accommodate further development in the dissected lower parts of the Bankfoot Hills without major impacts on the wider landscape. The Perth Area Local Plan (Perth and Kinross District Council, 1996) indicates that the possibility of establishing a new village in the vicinity of Moneydie is the subject of early discussions between interested parties. The impact of housing developments in these Lowland Hill areas would have as much to with their layout, scale, variety, materials and vernacular, as with their location within the landscape. Housing developers should be encouraged to adopt layouts and designs which integrate new dwellings into existing

settlements, rather than simply grafting suburban estates onto the edge of villages and hamlets. There may also be some scope for sensitive residential conversions where traditional farm buildings have become redundant.

5.6.11 **Forestry and woodland.** The elevation, soils and prevailing climate of the Lowland Hills makes them well-suited to commercial forestry. This is reflected in the Tayside Indicative Forestry Strategy which categorises much of this landscape type as being 'preferred' or 'potential' areas for new planting. The area already includes a considerable number of coniferous plantations, particularly along the low ridges between Glen Almond and Strathearn. Taking a regional perspective it is evident that the Lowland Hills, like the Highland Foothills, are relatively free from the constraints associated with the most productive agricultural land and the sensitive Highland areas. At a more local level, there is obviously a concern that any additional planting should not be such as to change significantly the landscape character of the hills. Some areas already have about 50% planting, while others (particularly the Knaik Hills and the western part of the Bankfoot Hills) have an open, upland character that could be affected by new planting. Key factors to be considered include:

- scale of new planting relative to the landform and the proportion of unplanted land;
- species composition;
- relationship with existing semi-natural or planted woodland;
- retention of key views within and outwith the foothills;
- size of felling coupes;
- factors such as agricultural viability, nature conservation and historic sensitivities.

5.6.12 These issues are addressed by Forestry Authority woodland design guidance (see section 4.19), and are summarised in the landscape guidelines presented at the end of this section.

5.6.13 There is also a need to address the character of existing plantations, many of which were established many decades ago. A particular concern relates to the hillside shelterbelts to the east of the A822 between Crieff and Glen Almond. Here narrow, geometric strips of woodland run vertically up the hillside, one even crossing the hilltop and descending the other side. While such plantations may provide valuable shelter for stock or game, their landscape impact is high. Consideration should be given to removing them, in due course, and perhaps creating new woodlands elsewhere in compensation. Elsewhere, harvesting and replanting will provide an opportunity to remodel some of the more geometric plantations to create more naturalistic and sensitive woodland forms.

5.6.14 **Tall structures.** The Lowland Hills are comparatively free of tall structures. The principal exceptions are the high voltage electricity transmission lines which cross the area, and the masts that are sited on high ground overlooking Perth (e.g. near Methven and on Kirton Hill). It is possible that there may be pressure for additional masts as telecommunications traffic grows.

5.6.15 At a small scale, wind power has been important in this area for many decades, being harnessed by wind pumps to raise water. With the development of modern wind turbines to generate power, it is possible that this area may come under pressure for wind farm development. Though wind speeds are likely to be significantly lower than in more elevated parts of the Highlands or the Sidlaws/Ochils, it is possible that the lower level of perceived constraint, together with the proximity to the existing electricity distribution network, could favour this area. This would be even more likely if the efficiency of wind turbines continues to improve, thereby making areas with lower wind speeds viable. It is acknowledged that development here could avoid the need to locate turbines in even more sensitive upland areas, or in less sensitive, but more populated areas closer to settlements. It would also mean that, from a distance, and from some directions, turbines would be viewed against a backdrop of higher ground. However, the insensitive development of wind turbines in this area could conflict with the small-scale, historic and deeply rural character of the landscape. It would also weaken and confuse the area's role of providing a transition from the unsettled uplands to the fertile and settled lowland.

LANDSCAPE GUIDELINES

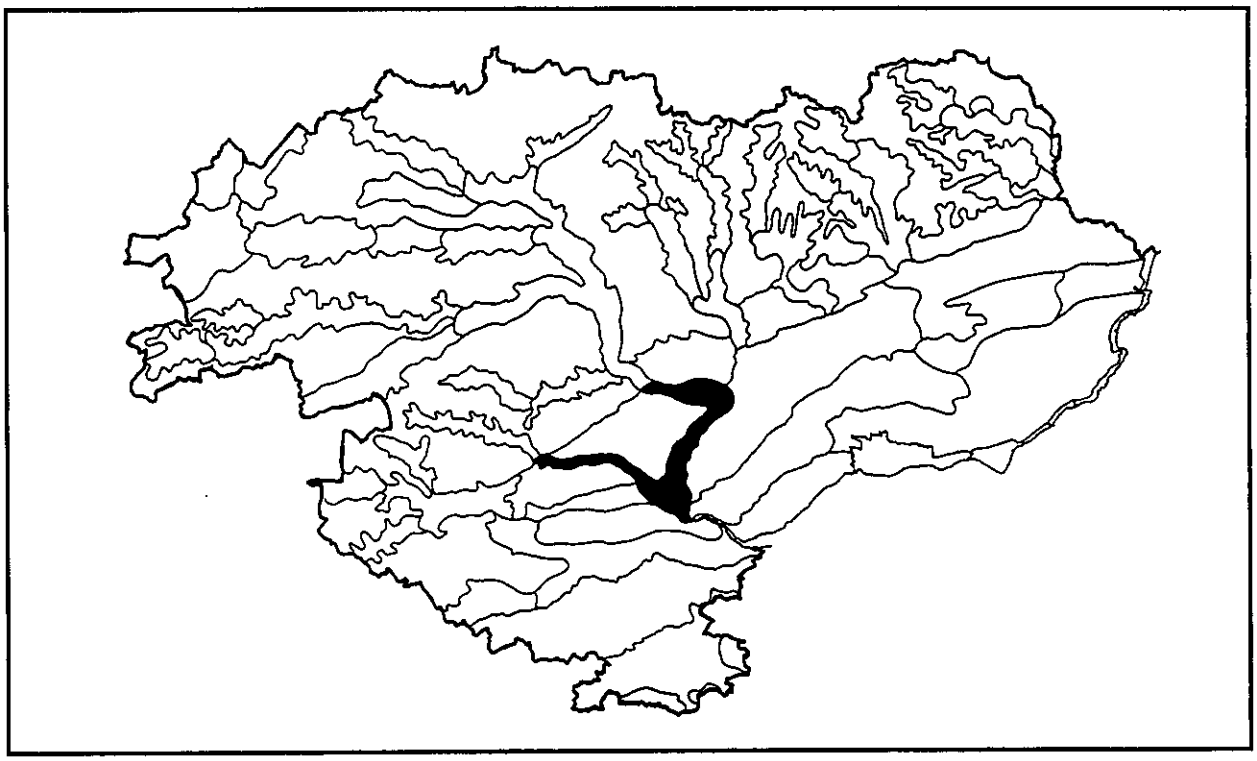
5.6.16 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the small-scale, rural and historic character of the Lowland Hills, recognising their importance in providing a transition zone between the Highlands and the Lowlands.

Agriculture	• Maintain the distinction between lowland cereals and highland grazing areas. • Encourage farmers and landowners to maintain and replant trees and farm woodlands. Species to include oak, maple, beech and ash. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.
Transport	• Where necessary, explore opportunities to provide additional on and off-site screening of major roads. • Where more minor road improvement schemes take place, ensure that hedges, hedgerow trees, gates and other features are re-instated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives. • Develop a road use hierarchy as a basis for management.

Development	• Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements and to protect the rural character of other parts of the lowland glens. • Discourage the simplistic grafting of housing estates onto the edge of settlements. Encourage more imaginative schemes which respond to the existing patterns of layout, structure, massing and scale. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Consider positive ways of addressing the interface between settlements and the surrounding countryside. These could include: - screening; - new buildings which integrate surrounding areas; - key vistas and views; - landmark features; - gateways and approaches. • Where small-scale development is permitted, encourage developers to use local building materials and to adopt local vernacular in respect of density, massing, design, colour and location. Avoid standard or suburban designs and layouts. Assess and adopt existing traditional layouts. Consider the preparation of design guides as supplementary planning guidance. • Encourage the appropriate conversion of redundant farm buildings. Guidance should be provided on the way buildings should be converted (including the provision of drives, gardens etc.) to prevent the suburbanisation of the countryside.
Forestry and woodland	• New planting should conform to the Forestry Authority's design guidelines. In particular, it should respond to the small-scale nature of the landscape, complex topography, the importance of views within and out of the hills, and historic and ecological values. • The broad principles of new woodland could include: - overall planting strategy that emphasises the transitional character of the Lowland Hills; - focus new planting in lower areas, retaining more open, upland character of areas nearer the Highland Boundary Fault; - consider scope for regeneration of native woodlands on higher ground to provide a transition to more heavily wooded areas;

(Forestry and woodland contd.)	- favour a mixture of broad-leaf (oak and ash) and conifer species; - vary the size of planting and felling small coupes to reflect the scale of the local landscape. • With respect to the replanting of existing plantations: - encourage the removal of small, geometric plantations, allowing equal increases in planting in more appropriate locations elsewhere; - encourage the rationalisation of woodland to avoid isolated, small to medium-sized areas of plantation woodland which appear very prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes.
Tall structures	• Assess proposals for aerials, pylons or masts in terms of their visual and landscape impact on the local landscape of the foothills, and the broader landscape of the lowland straths and Highlands. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape. • Encourage the development of a regional strategy for renewable energy, including wind power, in order that the most appropriate types of development and areas come forward.

LOWLAND RIVER CORRIDORS (7)



KEY CHARACTERISTICS

- *well-defined river corridors in broader lowland landscapes*
- *meandering, often incised course through softer sandstones*
- *semi-natural woodland on steeper slopes*
- *rapids, weirs and mills where harder rocks cross the valley*

OBJECTIVE DESCRIPTION		Lowland River Corridors
Physical scale		Narrow corridors up to 3 km wide, containing rivers incised by up to 40 metres; falls and rapids where river crosses bands of harder rocks
Woodland	broad-leaf	Semi-natural woodland on steep incised slopes
	coniferous	A few areas where plantations or policy woodlands extend to the river edge
Agriculture	arable	On higher ground either side of river
	pasture	On higher ground either side of river, on gentler slopes and on a few areas of level floodplain
	fields	Within inner valley, size and shape determined by topography; on higher, level ground, larger and more geometric fields
	field boundaries	Hedges and post-and-wire fences
Settlement pattern		A number of mill settlements sited close to rapids and weirs. Also historic houses and designed landscapes enjoying riverside location
Building materials		Red sandstone
Historic features		Historic houses and designed landscapes, castles and mills
Natural heritage features		Hanging woodlands, rapids
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Small to medium
Enclosure		Semi-enclosed
Variety		Varied
Texture		Textured
Colour		Colourful
Movement		Peaceful
Unity		Unified
'Naturalness'		Undisturbed to tamed

LOCATION

5.7.1 Two Lowland River Corridors stand out as having distinctly different characters from the surrounding landscape. The first is the River Tay corridor between the Highland Boundary fault and the Firth of Tay at Perth. The second, which is of a much smaller scale, is the lower section of Glen Almond from the Highland Boundary fault eastwards to Perth.

PHYSICAL CHARACTERISTICS

5.7.2 Unlike their upper reaches where both rivers are constrained within glens cut through the hard schists and grits, south of the Highland Boundary Fault they flow onto the softer Old Red Sandstones. Here the rivers have been able to meander more freely, though rising land levels following the end of the last Ice Age have resulted in both rivers developing incised channels. Where the more resistant igneous dykes cross the rivers, rapids and cataracts occur.

5.7.3 After crossing the Highland Boundary Fault near Murthly, the Tay swings in a series of broad meanders across a wide, flat floodplain. As it flows south the meanders tighten and the river enters an inner valley up to 40 metres deep. Within this incised channel, there is little or no floodplain and the fertile haughs found upstream are absent. Many of the steep slopes are clothed in deciduous woodland, further increasing the sense of enclosure which cuts the river off from the wider landscape. South of Stormontfield, the Tay valley broadens once more, forming the broad basin with river terraces occupied by Perth and Scone. However, encountering the hard igneous rocks of the Sidlaws, the river has cut a narrow valley, turning eastward to the Carse of Gowrie.

SETTLEMENT AND LAND USE

5.7.4 The River Tay has stimulated several phases of settlement. In prehistoric times, it is likely that the fertile haughs of the river attracted hunter-gatherers and the earliest settlers. However, as with other locations close to gateways into the Highlands, the defensive structures of Roman and subsequent eras have left a more lasting mark on the landscape. The strategic importance of Strath Tay, leading both north and west through the uplands is reflected in the presence of a Roman fort at Inchtuthill south of Spittalfield, and a series of smaller castles such as those near Kinclaven and Stanley. Medieval settlement was focused at Perth, a strategic location in the Tay gap, and at the lowest bridging point. The landscape quality of the river corridor contributed to the later development of landscaped estates associated with historic houses such as Murthly, Meikleour and Scone. The series of rapids that are found along the River Tay stimulated the development of watermills, powering Perthshire's textile industry during the industrial revolution. Mills were constructed at several places, most spectacularly at Stanley. Here the river turns through a tight meander, enclosed within a 40 metre deep gorge. A tunnel was built through the neck of the meander, leading water away from a weir to power mills further downstream.

5.7.5 The River Almond has some striking similarities with the Tay, reflecting its proximity to the Highlands and its common geological structure. Most notable perhaps is the deep, gorge-like valley that the river has cut through the sandstone and glacial deposits.

Although flowing in a meandering course, the river is entrenched within a valley 40 metres deep until it enters the open floodplain of the Tay above Perth. Many of the slopes are too steep to farm and are clothed in broad-leaf woodland. In the upper part of the glen, the river corridor is relatively unsettled, farms and hamlets clustering along roads on more level ground to the north and south. Fields along the northern side of the valley have a dense network of field boundary trees. The site of a Roman Fort at the western end of this part of the glen and the presence of large houses and institutions such as Glenalmond College, echo the pattern of development seen along the Tay. Furthermore, the River Almond also provided a series of mill sites along its lower reaches, where the river cuts through a series of igneous dykes. Here mills and associated houses are perched alongside the river, concealed from the wider landscape.

FORCES FOR CHANGE

5.7.6 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.7.7 **Agriculture.** Agricultural activity within these river corridors is concentrated on higher ground either side of the entrenched river. The network of hedges and hedgerow trees is an essential element of this landscape, extending the texture and variety of the straths up towards the lowland hills. In some areas, however, this structure is in decline with once dense lines of trees becoming gappy and fragmented, and hedges and fences being replaced by 'invisible' post-and-wire fencing. This is noticeable, for example, along the northern side of Glen Almond. Field boundaries on the broad floodplains, where they occur, are often marked by fences, though sometimes boundaries across the valley are marked by shelterbelts or lines of trees.

5.7.8 **Transport.** Main roads have tended to avoid the steep-sided and tortuous river corridors, favouring more level routes elsewhere. Where access to the river corridors is possible, it is usually gained by steep narrow roads which serve mills or riverside farms. The steep, twisting nature of these roads is a characteristic of the area and should be conserved where practical.

5.7.9 **Development.** The proximity of these areas to Perth, and their attractive, sheltered landscape (the Tay valley is designated as an Area of Great Landscape Value) means that there is some pressure for residential settlement. This is particularly the case to the north of Perth where villages such as Luncarty and Stanley lie close to the A9. Over-development in these areas could undermine the quality of the landscape, and development plans for the area seek to steer additional housing towards existing settlements. Almondbank, Luncarty and Stanley all include areas allocated for future residential development. Furthermore, the Perth Area Local Plan (Perth and Kinross District Council, 1996) raised the possibility of a 'new settlement' (termed Almond Valley Village) between Almondbank and Huntingtower on the north-west edge of Perth. This would result in the Perth Urban Area extending into the Almond Valley.

5.7.10 The alignment of the ring road/motorway, and steeply rising ground to the south-west and east broadly defines the physical extent of Perth and contains it within a section of the Tay valley which is relatively concealed within the wider landscape. A somewhat more ambiguous area lies to the north where development has been permitted to the north of the ring road but south of the River Almond. The latter is hidden in woodland, so for people travelling along the A9 there is no obvious physical boundary to the northern part of the town.

5.7.11 Concerns about the potential impact of new residential development reflect the patterns of recent growth. Often this has comprised low density, speculative estates of similar or identical dwellings which are crudely grafted onto the edge of these towns. The stark designs (often lacking any reference to vernacular designs or material) are usually unmitigated by planting, screening or landscaping, while the infrastructure of internal roads, footways, drives etc. appear over-engineered and overly suburban. The impact of additional housing in these river corridor areas would have much to do with their layout, scale, variety, materials and vernacular, as well as their location within the landscape. Housing developers should be encouraged to adopt layouts and designs which integrate new dwellings into existing settlements, rather than simply grafting suburban estates onto the edge of villages and hamlets. There is a role for design guides and imaginative design briefs. There may also be further scope for sensitive residential conversions where traditional farm buildings have become redundant, though this will do little to meet the demand for housing in the area as a whole. Again, guidance on the most appropriate means of conversion will be important.

5.7.12 **Forestry and woodland.** Woodland is an essential component of this landscape type, comprising a combination of semi-natural woodland, commercial forestry, farm woodland and field boundary trees, policy and estate woodland. The characteristic interplay of woodland, farmland and areas of designed landscape is particularly important.

5.7.13 Several areas of river corridor are identified by the Tayside Indicative Forestry Strategy as having potential for new planting. While there may be some scope for additional woodland in these areas, it is important to maintain the overall balance of unplanted and planted areas and to conserve key views into and along the river corridor. It is also important to conserve landscape features such as field systems where these contribute to the grain and texture of the landscape. As elsewhere, there is scope to enhance the appearance of existing plantations as they come forward for harvesting and replanting.

5.7.14 **Tall structures.** With the exception of the lines of pylons that cross Glen Almond at two points, this landscape type is relatively free from tall structures. There is unlikely to be significant pressure for wind turbine construction. However, the effect of any proposals on higher ground which are visible from within the river valleys (for example on the Lowland Hills) should be considered carefully. Development of small-scale hydro schemes at former mill sites could reduce pressure for wind turbine development in the wider area.

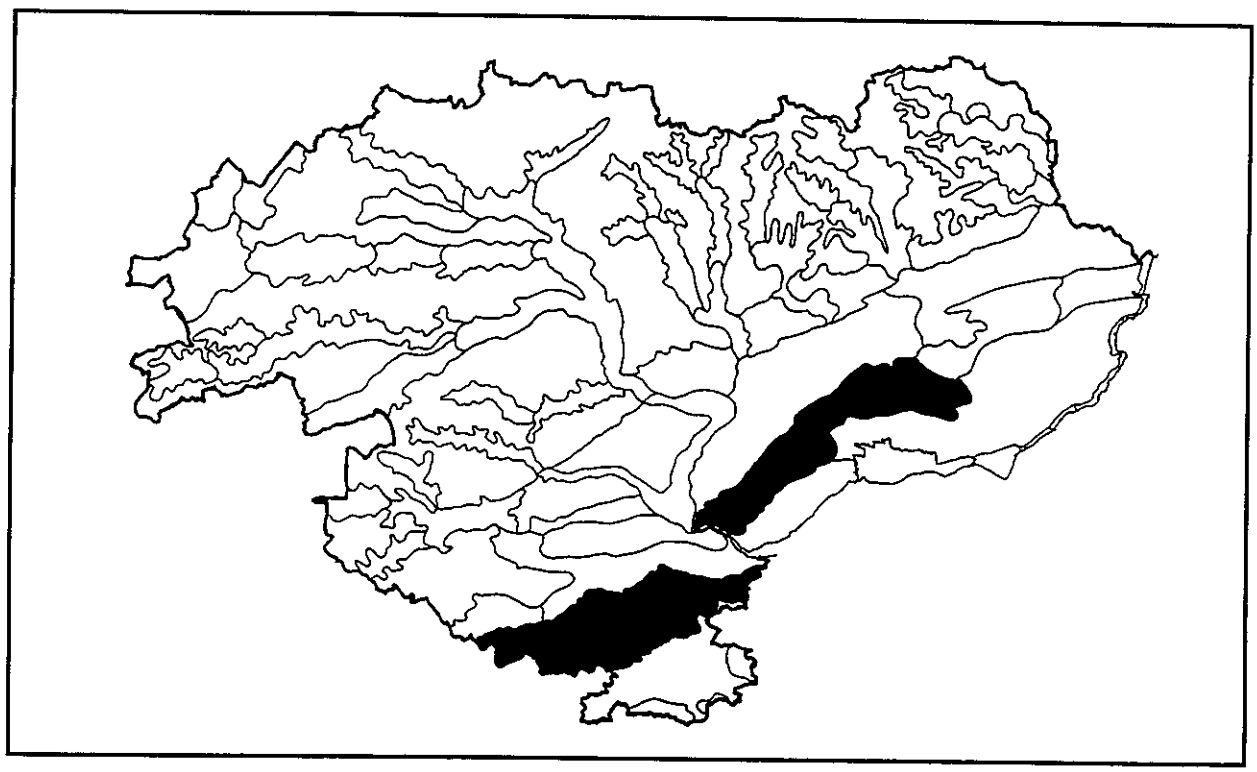
LANDSCAPE GUIDELINES

5.7.15 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristically settled landscape of farmland, woodland and designed landscapes and to ensure that new development is designed to minimise adverse impacts on the landscape.

Agriculture	• Discourage improvements which result in further loss of field boundaries or field boundary trees. • Encourage farmers and landowners to replant trees along field boundaries, initially along roads, but also between fields. Species to include oak, maple, beech and ash. Use incentives to compensate for lower yields where mature trees are retained. • Explore development of market for hardwood from field boundary trees. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.
Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, or features such as concrete kerbing.
Development	• Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements and to protect the rural character of other parts of the lowland glens. • Discourage the simplistic grafting of housing estates onto the edge of settlements. Encourage more imaginative schemes which respond to the existing patterns of layout, structure, massing and scale. Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Consider positive ways of addressing the interface between settlements and the surrounding countryside. These could include: - screening; - new buildings which address surrounding areas; - key vistas and views; - landmark features;

(Development contd)	- gateways and approaches. • Explore the development of Almond Valley Village as a means of addressing the ambiguous pattern of development to the north and north-west of Perth by firming up the distinction between urban and rural and providing clear gateways to the town.
Forestry and woodland	• With respect to the replanting of existing plantations on valley slopes: - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes. • Consider opportunities for new woodland planting in terms of: - the overall balance of woodland and open space; - the relative importance of different areas of existing woodland (e.g. commercial plantation versus policy woodland) and how this would be influenced by an increase in woodland cover; - the importance of key views and features within the landscape; - opportunities for provide screening; - opportunities to link isolated areas of woodland; - agricultural, ecological and historical sensitivities.
Tall structures	• Assess proposals for tall structures in terms of their visual and landscape impact on the local landscape of the river corridors. • Explore the scope for small-scale hydro schemes as an alternative to wind power projects. • Where new power or telephone lines are proposed or required, encourage operators to adopt underground cable solutions.

IGNEOUS HILLS (8)



KEY CHARACTERISTICS

- *the Sidlaw and Ochil hills, comprising hard volcanic rocks*
- *short burns and rivers flowing from short steep glens*
- *a few large glens through the hills*
- *often distinctive scarp and dipslopes*
- *generally open landscapes of almost conical summits dominated by grass moorland*
- *some areas of extensive forestry*
- *many modern influences*

OBJECTIVE DESCRIPTION		Igneous Hills
Physical scale		Ochils up to 600 metres AOD, about 10 km wide and 40 km long; Sidlaws up to 300 metres AOD, about 5 km wide and 30 km long
Woodland	broad-leaf	Very limited, confined to woodland on steep slopes (e.g. along the Braes of the Carse), in more sheltered sections of glen (e.g. Glen Eagles) and along lower level field boundaries
	coniferous	A few isolated pines; more common are extensive areas of coniferous plantation (e.g. in the Ochils south of Dunning and the eastern part of the Sidlaws)
Agriculture	arable	A few areas of arable cultivation on gentler slopes, particularly in the southern and western part of the Sidlaws
	pasture	Pastures common on steeper slopes and on rougher and more exposed areas of hilltop.
	fields	Generally large and regular shaped
	field boundaries	Combination of stone dykes and post-and-wire fences; occasionally marked by isolated Scots pine in upper areas and deciduous species in more sheltered parts
Settlement pattern		Largely unsettled; farms and hamlets concentrated in main glens such as Glen Devon
Building materials		Locally won hard rock and some sandstone
Historic features		Old field systems, burial sites, hill-forts and later castle sites
Natural heritage features		No notable features
Other landscape features		Masts and aerials are already prominent features
SUBJECTIVE DESCRIPTION		
Views		Intermittent
Scale		Medium
Enclosure		Semi-enclosed to open
Variety		Simple
Texture		Smooth
Colour		Muted
Movement		Peaceful
Unity		Interrupted
'Naturalness'		disturbed

LOCATION

5.8.1 To the south and east of the Old Red Sandstone lies a band of hard volcanic rocks. More resistant than the surrounding beds, these rocks survive as the Ochil Hills which run from the boundary with Fife as far as Perth, and the Sidlaw Hills which run from Perth north-east towards Forfar. The Ochils and Sidlaws represent two parts of the same geological structure. Once a broad arch of volcanic rocks would have extended over the area occupied by the lower part of Strathearn and the Firth of Tay. Weakened by compression, the crest of this arch was eroded away, revealing the softer rocks beneath. The resulting landforms comprise a pair of scarp slopes (in the Ochils facing north, in the Sidlaws, south) and a pair of dipslopes (in the Ochils facing south, in the Sidlaws, north).

The Ochils

5.8.2 **Physical characteristics.** The Ochils are the larger of the two hill ranges, rising to over 500 metres and extending up to 12 kilometres in width in places. The hills are drained by a large number of short burns and small rivers, flowing northwards into Strathearn and Strathallan and southwards into the Loch Leven Basin. Most glens are short and steep. The principal exception to this is the pass formed by Glen Eagles to the north and Glen Devon to the south. This corridor was enlarged during the Ice Age when ice sheets in Strathearn pushed into Glen Eagles, lowering the watershed between the two glens by over 200 metres. Ice sheets also had the effect of truncating the Ochils' northern spurs, thereby increasing the drama of the scarp along the southern side of Strathearn and Strathallan.

5.8.3 **Settlement and land use.** Though there are areas of improved pasture and even some cultivation within the more sheltered glens, the land is generally of low fertility (classified as Class 5 or 6) and the bulk of the agricultural land takes the form of unimproved rough grazing. The Ochils also have a considerable amount of coniferous forestry. Along the lower slopes in Strathallan, this generally takes the form of geometric plantations and shelterbelts which are prominent in this open, large-scale landscape. Further west, in Strathearn, the woodland is less formal. However, the most extensive woodlands are located in the heart of the eastern Ochils, particularly on Innerdouny Hill where a large expanse of Sitka spruce covers a series of upper catchments. The effect is to transform the sparse, open landscape of the Ochil summits, and to create a sense of enclosure which is absent elsewhere on the hills. New planting is more sensitive, incorporating broad-leaf fringes and better reflecting the natural flow of the landform. Nevertheless, it will result in a significant change in the upland landscape.

5.8.4 The natural defences provided by the steep slopes overlooking lowland routes are reflected in a large number of hill-forts. There is a particular concentration of such sites along the northern escarpment of the Ochils and along key routes through the hills. Later castles occupy positions lower down the slopes and in the glens themselves. Several of the glens show signs of past prosperity. In Glen Devon the structure of abandoned field boundaries is visible as a series of low grassy banks. More recent settlement is limited to a scatter of farmsteads, concentrated in the less-steep eastern part of the Ochils. Glen Devon now accommodates a range of tourism and recreation facilities while some of the more prominent hilltops are crowned with telecommunications masts.

The Sidlaws

5.8.5 **Physical Characteristics.** The Sidlaws are lower and less extensive than the Ochils. They are most distinct at their southern end where the south-east facing scarp (the Braes of the Carse) rises almost vertically to tower over the Carse of Gowrie, and where the shallower, north-facing dipslope meets the Strath Tay near Scone. Even here the hills are barely 5 kilometres wide. Further north the hills subside, particularly along their south-eastern side, gradually merging into the farmland plateau. From the north, however, the hills continue to present a distinctive profile of smooth rounded hills which contain the views within Strathmore. The lower elevation of the Sidlaws is reflected in more productive agricultural land. While grass and some heather moorland predominate on the upper parts of the hills, it is not uncommon to find arable and improved grassland fields, enclosed by stone dykes, in the more sheltered open basins that occur in the Sidlaws. Such a concentration is found around Milton of Ogilvie, to the south of Glamis. Broad-leaf woodland is limited to steep slopes (such as the southern scarp face) and river valleys.

5.8.6 **Settlement and land use.** Though elevated and often exposed, the landscape of the Sidlaws reflects many hundreds of years of settlement. Many Stone Age hill-forts can be found, exploiting the natural defences provided by the steep hills. Bronze Age burial mounds occupy other key locations on prominent ridges overlooking the lowland. There are few Roman or Pictish remains, but several medieval castles and mottes are located to defend routes through the hills. An example is Pitcur Castle, sited at the mouth of Glen Cott, south of Coupar Angus. Several follies are found through the hills. The most notable of these includes the series of towers built along the top of the south-facing cliffs overlooking the Carse of Gowrie and apparently designed to recreate the landscape of the Rhine Valley in Germany. Another example is the tower on Kinpurney Hill. More recent development has taken the form of coniferous plantations which are less extensive than in the Ochils, and the telecommunication masts which have been built at the summit of a number of hills. A number of existing and disused quarries are found in the Sidlaws, reflecting the value of the hard volcanic rocks that occur there.

FORCES FOR CHANGE

5.8.7 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.8.8 **Agriculture.** Much of the Ochils and Sidlaws are given over to pastoral uses, and in places the land is so poor it supports little more than rough grazing. This pattern of agricultural land use sits comfortably with the Igneous Hills' upland, exposed character and contrasts effectively with more fertile areas of lowland to the north and south. In a few areas better soils and a degree of shelter allow arable cultivation to take place, often at some altitude. It may be appropriate to consider the use of incentive payments to encourage reversion to grassland in some of these areas. As in other areas, the influence of estate ownership is evident in the maintenance of the farming landscape.

The area falling within the Gleneagles Estate can be determined from less well-maintained areas around.

5.8.9 **Transport.** The Ochils and Sidlaws are crossed by a number of minor roads, often bordered by dry-stone dykes. The alignment of many of these roads reflects the gradient of the landform and the presence of glens and passes through the hills. It is important that the small-scale and rural character of these roads is retained. Walls should be conserved and signage and 'improvements' such as widening or kerbing resisted. Similarly, main roads through the hills should be maintained so as to retain their rural character. The eastern part of the Tayside Ochils is cut by the M90 motorway. Despite its scale and nature, the road alignment is relatively sympathetic to the landscape, following a sinuous glen through the hills. However, the movement, noise and pollution associated with moving traffic, together with the presence of over-bridges, cuttings and other structures determine that the motorway has a considerable impact on the local landscape.

5.8.10 **Development.** The elevation and exposure of the Ochils and Sidlaws, and the presence of nearby lowland settlements means that the Igneous Hills are very sparsely settled. The principal exception to this is the gentler southern slopes of the Sidlaws near Dundee. Here there has been a limited amount of building in the open countryside, creating a few lines of south facing suburban houses extending from farmsteads or existing hamlets. This has a suburbanising influence on the Sidlaws' landscape.

5.8.11 **Minerals.** The hard volcanic rocks of the Ochils and Sidlaws are valued for road construction among other uses. However, there are very few operational quarries and only a handful of small-scale disused quarries. Existing quarries are generally well-concealed and do not have a significant impact on the wider landscape. Collace Quarry in the Sidlaws is comparatively well-hidden in the wider landscape, though it has a more local setting on the hill-fort of Dunsinane. Should the number, or scale of quarries increase in response to demand, mineral working could have quite a significant impact on this generally open landscape.

5.8.12 **Forestry and woodland.** Woodland makes an important contribution to the landscape of the Ochils and Sidlaws, clothing many of the steepest slopes and lining some of the more sheltered valleys and glens. However, a number of commercial woodlands, planted in the first half of the 20th century, have had a significant adverse effect on the landscape. Extensive ranks of sitka spruce and Douglas fir cover large areas of the Ochils in particular in an even aged monoculture of conifers. Such plantations have created a uniform, enclosing landscape where before there would have been an open and varied landscape of pastures, burns and small glens. The negative effect of these early plantations has tainted attitudes towards commercial forestry in these areas even though forestry practice has long since moved on. As the existing plantations reach maturity, there will be opportunities to implement a phased programme of felling and replanting which will allow a more varied and 'natural' woodland form to be created, with a much more varied species and age mix, and a higher proportion of open space.

5.8.13 The low fertility of the Igneous Hills, and the suitability of their climate to tree growing means that there is still some interest in establishing new woodlands within the Ochils and Sidlaws. The Tayside Indicative Forestry Strategy suggests that areas to the south

and east of Auchterarder fall into the 'preferred' category for new planting, together with smaller areas in the eastern Sidlaws.

5.8.14 The current policy is to promote multi-purpose woodlands which can, if appropriately located, consolidate and expand existing semi-natural and planted woodland along the glens, which include a proportion of broad-leaves (particularly on lower ground and in more sheltered locations) and native pine woodland (particularly on higher ground). New woodland should also provide the opportunity to create new habitats, and establish new areas for informal recreation.

5.8.15 **Recreation.** The proximity of the Ochils and Sidlaws to a number of centres of population means that there is an opportunity to facilitate countryside and informal recreation, thereby taking the pressure off other more sensitive areas to the north. While some areas of public access already exist, commercial woodlands, reservoirs and even archaeological sites offer potential for recreation and interpretation.

5.8.16 Formal recreation provision within the area is comparatively limited. However, within Glen Devon a number of commercial developments have been established, announcing their presence with large signs. This contrasts with other, less developed parts of the Ochils.

5.8.17 **Tall structures.** The elevation of the Ochils and Sidlaws and their proximity to centres of population makes them technically well-suited as locations for telecommunications masts and aerials. Several of the hilltops are crowned with one or more masts, introducing strong vertical and industrial structures into the upland landscape. The masts are frequently visible over a considerable distance. It is possible that the growth of the telecommunications industry will be reflected in pressure for additional masts and aerials. Operators should be encouraged to develop a strategy that takes into account the landscape implications of masts and which seeks to share masts where this is appropriate and where this can be achieved without increasing the overall level of landscape impact. Additional masts on undeveloped hilltops or ridges should be avoided.

5.8.18 The government's commitment to the stabilisation of carbon dioxide emissions, and the resulting emphasis on developing a market for renewable energy is likely to result in more proposals for wind turbines. At a regional level, suitable sites will be influenced by the presence of adequate wind speeds and proximity to the electricity grid. These operational requirements are likely to favour upland areas fairly close to centres of population. Potential areas therefore include the parts of the Highland Summits and Plateaux within reach of the principal glens, or close to existing hydro schemes, the Highland Foothills, the Ochils and Sidlaws, and other lowland hills. From an environmental perspective, such areas need to be evaluated in terms of the sensitivity of the landscape and its capacity to absorb development. There is a strong argument in favour of steering such schemes away from sensitive upland landscapes and towards areas where human influences are already much more marked. For this reason, it is likely that, wind characteristics permitting, the Sidlaws and Ochils may be the most suitable areas for wind turbine development in Tayside.

LANDSCAPE GUIDELINES

5.8.19 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to restore and enhance the landscape of the Ochils and Sidlaws, addressing the effects of past development and land use and ensuring that future changes do not lead to further deterioration in landscape quality.

Agriculture	• Maintain the distinction between lowland cereals and highland grazing areas. • Encourage farmers and landowners to maintain and replant hedgerow trees. Consolidate areas where native pines have been used in the past. • Encourage the conservation of dry-stone dykes in local stone with an emphasis on roadside walls and others in highly visible areas. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.
Transport	• Where road improvement schemes take place, ensure that hedges and hedgerow trees, together with other features such as milestones, finger posts and gates are reinstated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives.
Development	• Encourage new development to reinforce the existing settlement pattern, focused on market towns and smaller villages outwith this landscape type. Discourage development in the open countryside. • Encourage the appropriate conversion of redundant farm buildings. Guidance should be provided on the way buildings should be converted (including the provision of drives, gardens etc.) to prevent the suburbanisation of the countryside.
Forestry and woodland	• Ensure the current Forestry Authority approach to the restructuring of existing plantations is followed. Replanting should conform to Forestry Authority design guidance and should result in a varied age and species structure, woodland forms which more closely reflect the underlying landform and a greater proportion of open space. • New planting should conform to the Forestry Authority's design guidelines. In particular, it should respond to the small to medium scale nature of the landscape, the importance of views within and out of the hills, and historic and ecological values.

(Forestry and woodland contd.)	• Use a new planting framework to absorb earlier development in the open countryside and other visually intrusive features. • Ideally link new woodlands to lowland shelterbelts, glen woods and farm woodlands, providing broad-leaf lower margins. • Use new woodland planting to enhance the landscape and nature conservation value of the hills. New woodland could link existing plantations and semi-natural woodlands. • New planting should respect historic features, routes and viewlines between them. • The scale and nature of planting should be varied to reflect local differences in topography. In areas of subdued relief (e.g. on the south-eastern side of the Sidlaws), new planting could be used to highlight more subtle variations.
Recreation	• Encourage greater provision of informal recreation within the Ochils and Sidlaws, focus on existing and new woodlands, reservoirs and historic sites. • Encourage providers of formal recreation and tourism facilities to respect the setting of their developments.
Tall structures	• Restrict the development of tall structures to those absolutely essential for operational reasons. • Encourage operators to share masts and sites. • Avoid new masts on undeveloped hilltops and ridges. • Where possible, encourage masts and other tall structures to achieve 'backclothing', particularly for associated infrastructure and buildings so that sky-line features are minimised. • Explore the potential to steer wind farm developments away from exposed and steep ridgelines and summits and from locations where their visual influence would extend both north and south. Consider potential areas with shallow bowls and valleys away from ridges. Maximise the amount of backclothing provided by the natural landform. Consider steering development to areas already affected by masts, roads or forestry. • Assess proposals for aerials, pylons or masts in terms of their visual and landscape impact on the local landscape of the hills and surrounding areas. • New infrastructure (e.g. access roads) should be minimised by locating any new facilities close to existing roads. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact.

(Tall structures contd.)	• Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape. • Encourage the development of a regional strategy for renewable energy, including wind power, in order that the most appropriate types of development and areas come forward.

IGNEOUS HILLS
Coniferous woodland and rounded, open moorland in the Ochils.

LOWLAND RIVER CORRIDOR
The River Tay flows through a narrow wooded valley to the south of Dunkeld.

BROAD VALLEY LOWLAND
The distinctive arable landscape of Strathmore. Remaining hedgerow trees make an important contribution to landscape character.

Photo: SNH

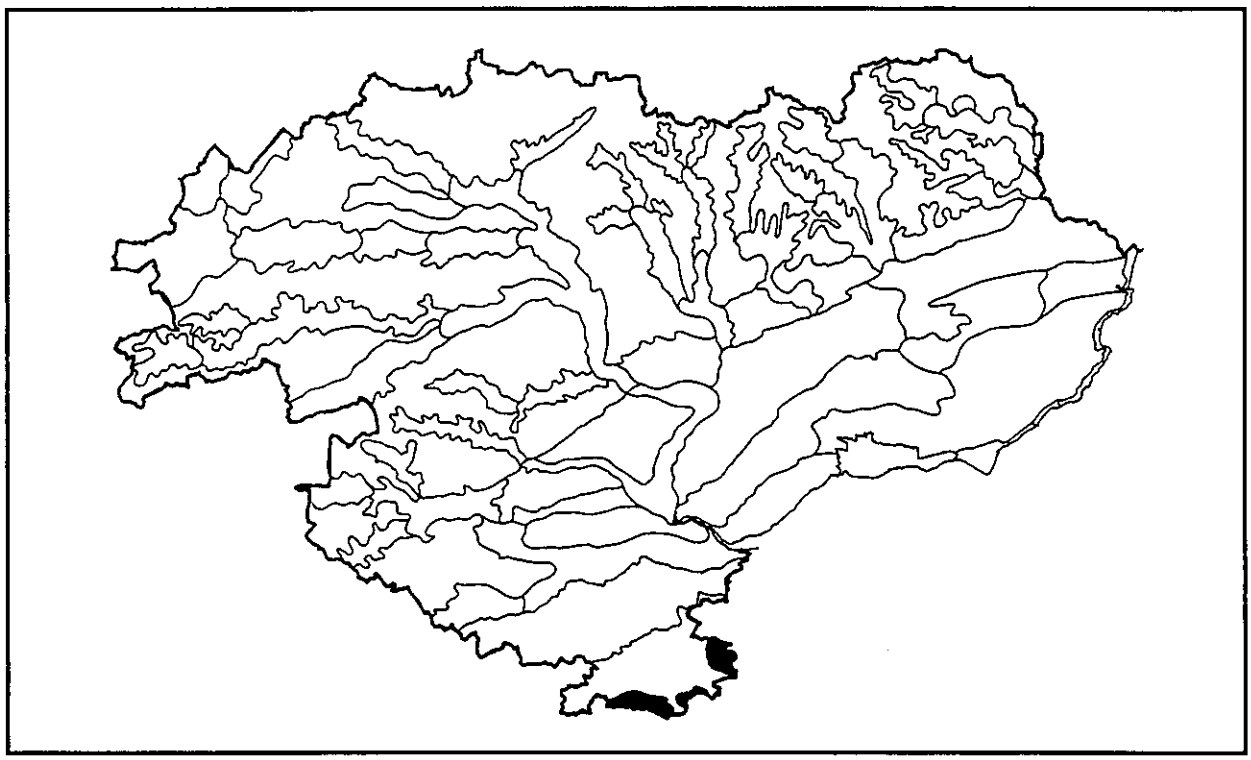
DOLERITE HILLS
The steep western slopes of the Lomond Hills.

FIRTH LOWLANDS
Rich farmlands along the estuarine reaches of the River Tay between Perth and Dundee.

FIGURE 15

LANDSCAPE CHARACTER TYPES

DOLERITE HILLS (9)



KEY CHARACTERISTICS

- *hard quartzite hills enclosing the Loch Leven Basin*
- *steep slopes*
- *predominance of rough grazing*
- *some areas of coniferous forestry*
- *fine views to the north and south*

OBJECTIVE DESCRIPTION		Dolerite Hills
Physical scale		Hills ranging in height from 300m AOD to 450 m AOD
Woodland	broad-leaf	Limited to a small area on the western slopes of Lomond Hills
	coniferous	Extensive plantations (c33% by area)
Agriculture	arable	Absent
	pasture	Rough grazing
	fields	Largely unenclosed
	field boundaries	Stone walls and post-and-wire fences
Settlement pattern		Unsettled
Building materials		Not applicable
Historic features		Forts and castles
Natural heritage features		No notable features
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Panoramic
Scale		Medium to large
Enclosure		Open to exposed
Variety		Simple
Texture		Rough to very rough
Colour		Muted
Movement		Remote
Unity		Unified
'Naturalness'		Restrained

LOCATION

5.9.1 A series of hills rise along the southern boundary of Tayside, enclosing the Loch Leven basin. These are fragments of landscape character areas which extend beyond the region in Fife. The hills divide into three groups, the Lomond Hills to the east, and Benarty Hill and the Cleish Hills to the south.

PHYSICAL CHARACTERISTICS

5.9.2 The Dolerite Hills share a common geology comprising a core of intrusive quartz dolerite overlying carboniferous limestone which, in turn overlies Old Red Sandstone. Bishop Hill (the one Lomond Hill in Tayside) has a steep, west facing scarp slope, rising to 460 metres, and a shallower east facing scarp slope. Only the northern and western slopes of Benarty Hill lie in Tayside. These slopes are also steep, climbing to 350 metres. The Cleish Hills are less steep, but more extensive, forming a rolling line of hills of up to 380 metres along the southern edge of the Loch Leven basin. The north facing slopes are heavily gullied. The hills are dominated by brown forest soils, supporting a combination of rough grazing and coniferous plantation. The latter are most extensive along the Cleish Hills and on the eastern slopes of Bishop Hill.

SETTLEMENT AND LAND USE

5.9.3 Like many other areas of upland in the region, a number of forts are sited among these hills. Later fortifications, such as Cleish Castle are found on the lower slopes. Other signs of human settlement and land use include several small quarries which were worked in the past to obtain hard rock. Relatively accessible to nearby urban populations, these hills provide fine views north and westwards over Loch Leven and southwards towards the Firth of Forth.

FORCES FOR CHANGE

5.9.4 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.9.5 **Agriculture.** The prevailing upland character of these hills means that agricultural activity is dominated by rough grazing with better pastures on the lower slopes. Provided that support mechanisms remain and no significant market changes occur, this activity appears to be relatively stable. Landscape change is therefore unlikely.

5.9.6 **Development.** The Loch Leven Basin is characterised by a series of small villages strung along the roads that encircle the loch. Several of these lie at the foot of the Lomond Hills and comprise little more than groups of stonebuilt houses. The principal exception to this is Kinnesswood which experienced substantial suburban expansion during the 1970s and 1980s. Much of the more recent development occurred on the slopes of the Lomond Hills, resulting in a significant landscape impact. While the local

plan envisages further housing development here, it will be concentrated on the less sensitive lower slopes.

5.9.7 **Minerals.** There is some evidence of small-scale quarrying having taken place in the past, for example in the eastern part of the Cleish Hills. There does not appear to be any prospect of mineral working in the future.

5.9.8 **Forestry and woodland.** Much of the coniferous plantation woodland present in the Dolerite Hills landscape type was established in the 1960s and 70s under very different circumstances and with more narrow objectives than would be considered appropriate today. Modern forestry practices would prevent the geometric, even aged monocultures that are found particularly within the Cleish Hills. Harvesting of this woodland provides an opportunity to review the best locations and designs for replanting. This is considered further within the management guidelines.

5.9.9 **Tall structures.** With the exception of the lower slopes of Benarty Hill, which are currently crossed by a line of electricity pylons, the hills are currently free from tall structures. Masts are found, however, further south in the Cleish Hills, beyond the regional boundary.

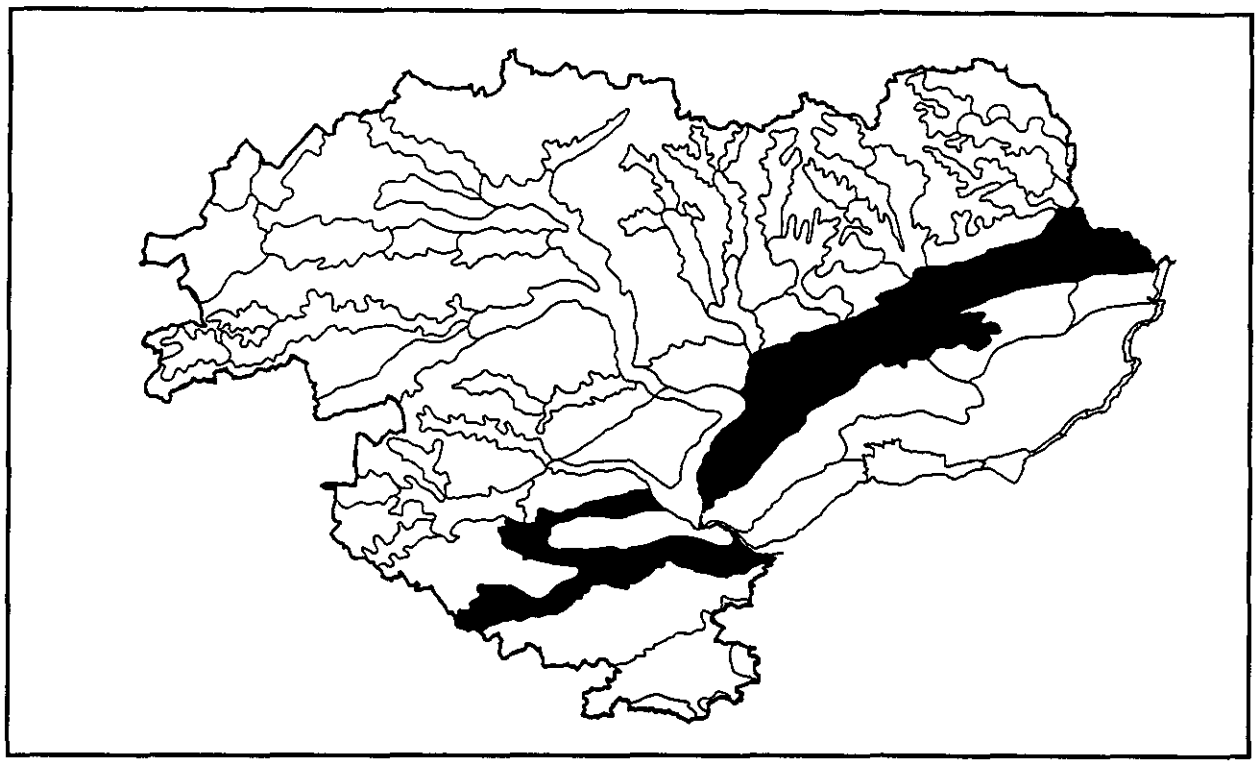
5.9.10 The summits of Benarty Hill and the Lomond Hills are particularly sensitive to structures such as masts, pylons or wind turbines. Not only do they provide the immediate setting to Loch Leven, but they are visible from a considerable distance to the north (e.g. from the Sidlaws) and south (into Fife and even Lothian). The lower, more fragmented Cleish Hills are less sensitive, though any development here would still need to pay regard to the impact on the wider landscape.

LANDSCAPE GUIDELINES

5.9.11 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve and restore the landscape of the bare uplands of the Dolerite Hills, addressing the effects of past development and land use and ensuring that future changes do not lead to further deterioration in landscape quality.

Agriculture	• Maintain the distinction between lowland cereals and highland grazing areas.
Development	• Prevent further uphill expansion of settlements on the lower slopes of the Lomond Hills.
Forestry and woodland	• Ensure the Forestry Authority's approach to the restrictions of single species even-aged blocks is implemented. Implement a phased programme of felling, redesign and replanting of existing plantations to reduce the adverse impact on the environment. Replanting should conform to Forestry Authority design guidance and should result in a varied age and species structure, woodland forms which more closely reflect the underlying landform and a greater proportion of open space: - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes.
Tall structures	• Prevent the development of tall structures on the sensitive Lomond and Benarty Hills. • Assess carefully any proposals for tall structures within the Cleish Hills to determine the visual and landscape impact on the local and wider landscape.

BROAD VALLEY LOWLANDS (10)



KEY CHARACTERISTICS

- *broad straths formed by glacial erosion*
- *undersized, misfit rivers*
- *complex local topography caused by glacial deposition*
- *distinctive red soils and red building stone*
- *influence of large estates, particularly in terms of woodland and policies*
- *dominance of arable and root crops*
- *tree loss weakening landscape character*

OBJECTIVE DESCRIPTION		Broad Valley Lowlands
Physical scale		In the case of Strathmore, up to 10 km wide and 30 km long; Strathallan and Strathearn up to 5 km wide
Woodland	broad-leaf	Extensive broad-leaf woodland limited to inner policy woodland and a few areas of unimproved land
	coniferous	Coniferous plantations on areas of poorer land, especially on valley sides; geometric plantation in Strathallan
Agriculture	arable	Dominant agricultural land uses - cereals, potatoes and oil seed rape
	pasture	Limited
	fields	Medium size, regular, some enlarged; most dating back to parliamentary enclosure
	field boundaries	Characteristically hedges with high density of mature hedgerow trees.; pattern weakened as trees felled. Strathallan fewer hedges and trees
Settlement pattern		Small, often planted, villages, small market/processing towns, and larger market towns
Building materials		Red sandstone
Historic features		Comparatively limited, reflecting intensity of agricultural use
Natural heritage features		Fluvial-glacial landforms. Ecological interest limited to a few unimproved areas
Other landscape features		Large, modern agricultural buildings; dominance of estates and historic houses
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium
Enclosure		Open
Variety		Varied to simple
Texture		Textured to smooth
Colour		Colourful
Movement		Active
Unity		Interrupted
'Naturalness'		Tamed

LOCATION

5.10.1 South of the Highland Boundary Fault lie 5 broad lowland valleys or straths. These share a range of common characteristics which set them apart from other valleys and glens. There are, however, significant variations in landscape character within this type, and these are described below. The five areas of Broad Valley Lowlands are:

- Strathmore;
- Strathearn;
- Strathallan;
- the lower South and North Esk river valleys;
- the Pow Water Valley between the Gask Ridge and Keillour Forest.

PHYSICAL CHARACTERISTICS

5.10.2 These areas share a common geological structure, based on the broad band of Old Red Sandstone that runs south-west to north-east through the heart of Tayside. Bounded by harder schists and grits to the north and lavas and tuffs to the south, and already lowered by downfaulting, this soft rock was easily eroded by the ice sheets which extended across the region during period of glaciation. These created much wider and deeper valleys than the scale of existing rivers might suggest. At the end of the last Ice Age, retreating ice sheets deposited a considerable amount of drift within these valleys, much of which was further modified by meltwater flows below or around the ice. This created the complex local topography of outwash terraces, eskers and dry valleys that occur in many places today. Much of the glacial material was locally derived and have given rise to the distinctive red soils that are visible when fields are ploughed. Brighter reds tend to be found further north and east.

SETTLEMENT AND LAND USE

5.10.3 While surviving standing stones and other monuments point to the prehistoric use of these areas, most of the present landscape has been substantially modified since medieval times. Valleys such as Strathmore had comprised extensive areas of rough grazing, scrub woodland and unproductive wetland. The process of draining and improving the land was begun in the 10th century when groups of monks came to the area. One of the principal centres was Coupar Angus where a major Cistercian Abbey was founded in 1164, and many of the moors and mires were brought into agricultural use over subsequent centuries. The process of improvement entered a new phase with the parliamentary enclosure of the 18th and 19th centuries, creating the structure of rectilinear fields that are evident today. A characteristic of this period of enclosure was the planting of many trees (oak, beech, chestnut and ash) along field boundaries. These would have given shelter and provided a source of building timber and firewood. Up to 200 years later, where they survive these mature (or even over-mature) trees make a critical contribution to the rich character of the Broad Valley Lowlands. The large estates, with their baronial mansions and castles, designed landscapes, pleasure grounds, ornamental woodlands, avenues and policies make an equally important contribution.

5.10.4 The 19th century also saw the rationalisation of estates, including the creation of new villages to accommodate farm workers, and the arrival of the railways. Market towns such as Kirriemuir, Coupar Angus and Forfar experienced growth during this period, reflected in their inner suburbs of Victorian terraces and villas. Agriculture has continued to develop. More and more land has been brought into production. Flood defences have been constructed along rivers, allowing arable cultivation to spread onto the floodplain. The fertility of the soil, allied to favourable climatic conditions have favoured the cultivation of cereals, oil seed rape, soft fruit and potatoes.

VARIATIONS IN LANDSCAPE CHARACTER

5.10.5 It is in Strathmore that the distinctive character of the landscape is most evident. From a distance, the area appears as a very broad, flat-bottomed valley enclosed by the Highland Foothills to the north and the rising sweep of the Sidlaws' north-facing dipslope to the south. Where estate planting survives, for example around Glamis, the strath landscape is rich and textured and particularly colourful during spring and autumn. Where the trees have been lost, it is an open and expansive landscape of rectangular fields punctuated with a scatter of large farmsteads. The landscape of the strath contrasts strongly with neighbouring areas of upland, particularly where the woodland structure has survived.

5.10.6 Strathearn, extending from Crieff eastwards to the Bridge of Earn has a similar structure to Strathmore. To the south it is enclosed by the steep slopes of the Ochils, while to the north the Gask Ridge separates it from the valley of the Pow Water. There are a number of significant differences, however. The first is scale. Strathearn is considerably narrower and less extensive. Furthermore, the River Earn is a more evident feature in the landscape, its broad meanders swinging back and forth across the floodplain. The strath also accommodates a railway and the main A9 dual carriageway. Where the woodland structure is thin, the road and its traffic are very visible. Overall, however, the strath retains a rich, well-wooded agricultural landscape, particularly towards the east.

5.10.7 Strathallan extends from Greenloaning towards Auchterarder. Although the scale is similar to that of Strathearn, the landscape is very much more open, forming a shallow valley between the lowland hills to the north and the smooth, largely unwooded slopes of the Ochils to the south. Arable cultivation predominates and woodland is generally limited to dense, geometric blocks of conifers. In this large-scale, open landscape, this woodland appears sculptural, almost comparable to fields of crops. Along the floor of the strath, the local topography is complex, resulting from extensive fluvio-glacial deposits. Drumlin fields create a landscape of hummocks and small basins. Areas of glacial sands and gravels have been quarried, leaving a network of small lochs.

5.10.8 The Pow Water valley, lies between the Gask Ridge and the lowland hills of the Keillour Forest. It is a shallow, small-scale agricultural valley, with field and woodland patterns similar to those of the larger lowland valleys. Much of the valley floor has been drained to provide pastures and arable land.

5.10.9 The valleys of the Rivers South Esk and North Esk form a broad area of lowland to the south of the Highland Boundary Fault and enclosed to the south by the high ground to the east of Forfar. Although sometimes included within the broad definition of Strathmore to the west, this area drains eastwards and is separated from Strathmore by a low

watershed around Kirriemuir. More significantly, perhaps, this area is distinguished by its smaller scale, higher proportion of woodland (both broad-leaf and coniferous) and by the well-defined river corridors of the two Esks. The rivers are identified by lines of riverside trees, and by inner terraces. They are separated by a low ridge. Like other straths, the valleys are in both pastoral and arable use.

FORCES FOR CHANGE

5.10.10 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.10.11 **Agriculture.** Reflecting the dominance of agriculture within this landscape type, it is changing farming practices which have brought the most significant changes to the areas of Broad Valley Lowlands. The principal agents of change have included:

- intensification of arable production;
- concentration on potato growing;
- introduction of 'new' crops and forms of production.

The landscape effects of these changes are described below.

5.10.12 Over recent decades the national policies, allied to the Common Agricultural Policy (CAP), encouraged the expansion of arable production. This was achieved by greater mechanisation, the more extensive use of inputs such herbicides and fertilisers, and a range of capital improvements designed to maximise the area under cultivation. These improvements included some hedgerow removal to create larger fields. Allied to this was a tendency not to replace the once-dense network of hedgerow trees where they resulted in uneven patterns of cereal growth or ripening as a result of shading or water demand. Field boundary trees are also regarded as a liability as they become over-mature and drop branches or suffer wind blow. New techniques also allowed the more intensive use of land throughout the year with the introduction of a wider range of winter crops.

5.10.13 Although the pattern of change has been uneven within the Broad Valley Lowlands, with some estates deliberately conserving the structure of fields, boundaries and boundary trees, and the emphasis of agricultural policies has shifted towards a stabilisation or reduction in cereal production, in some areas the landscape has been denuded of its tree-cover, creating a prairie-like appearance. This weakens the otherwise rich and textured character of many of these lowland areas and dilutes the contrast between the productive, well-treed lowlands and the harsher highlands. It also renders other landscape features such as roads, traffic and buildings much more visible.

5.10.14 Allied to cereal production has been the expansion of potato growing, particularly within Strathmore. Growth and harvesting of this crop sits easily within the farming landscape. There has, however, been a significant increase in the number and scale of agricultural

buildings as a result. After harvesting, potatoes are typically stored until market conditions favour selling some months later. Many farms in the straths now include a number of very large modern sheds which overtower the older farm buildings and which are often visible over a considerable distance. They are frequently painted white.

5.10.15 Recent decades have also seen a diversification of arable production with the introduction of new crops, principally oil seed rape. The vivid yellow of this crop during flowering creates a very visible and often extensive feature in the landscape. While opinions are mixed about the nature of this impact, it is comparatively short-lived. Other changes in agricultural practice include the move towards free-range stock keeping, particularly of pigs in areas of lighter soils. The animals are typically brought onto cereal fields after harvesting and are allowed to roam within areas delineated by electric fences. While many welcome the more humane treatment of such animals, the landscape impact of over-grazed fields and the scatter of metal pig arcs could be of concern if this practice expands significantly.

5.10.16 **Transport.** Several of the Tayside straths incorporate major roads which enjoy comparatively level routes through the Broad Valley Lowlands. The A9 primary route, which is dual carriageway for much of its length, runs along Strathallan and Strathearn, while the A94 runs through Strathmore. The large scale of the straths means that the impact of these major roads is less than it might otherwise have been. The broad curves and sinuous alignments seem to echo the generous proportions of the landscape. Having said that, the road structures (including embankments, cuttings and overbridges) are clearly impositions upon the lowland agricultural landscape. There appears to have been little attempt to use either roadside or off-site planting to integrate the roads into the broader structure of the landscape.

5.10.17 The noise and movement of traffic using these routes have a major influence on the character of the local landscape in areas adjoining the roads. Such roads also result in an increase in pressure for development, particularly around junctions and where pockets of land are trapped between settlements and the road corridor. The future impact of the roads is likely to increase as traffic grows and there is pressure to upgrade junctions to provide grade separated access.

5.10.18 More minor roads also raise concerns, including:

- the landscape impact of village bypasses (e.g. the A94 at Glamis) both in terms of the road itself and the view of the settlement from the road;
- the failure to re-establish hedges and hedgerow trees where widening schemes have been implemented;
- the increasingly common practice of including concrete kerbing along the edges of minor rural roads, introducing a suburbanising influence into the countryside.

5.10.19 **Development.** Most development within the lowland straths is concentrated within existing settlements. These include historic market towns such as Rattray, Forfar and Brechin, which have grown at the crossroads of important routes and which often provide gateways to upland areas, and a series of smaller agricultural villages, many of which were established in the 18th and 19th centuries following enclosure, agricultural improvement and the arrival of the railways. Many of these settlements are closely

associated with the surrounding landscape, both in terms of the materials that are used (typically red sandstones among older buildings) and their market function. Development outside these settlements is comparatively limited, confined to farmsteads and a scatter of agricultural dwellings.

5.10.20 As noted elsewhere in this report, older settlements make use of local building materials and reflect local building vernacular. More recent developments on the edge of settlements (for example that to the south of Glamis) tend to owe little to local tradition, often comprising low density estates of houses built in a style that can be found throughout the UK. Future decades are likely to see continued demand for residential development, potentially increasing the impact of new development on the landscape. There may be scope to focus new development within some of the 19th century 'planted' villages, many of which never reached their anticipated size. Alternatively, there may be potential to echo the Victorian movement and create a small number of new villages in key locations.

5.10.21 **Minerals.** The lowland straths include substantial deposits of fluvio-glacial material, some of which has been exploited to provide material for building. Sites currently being worked include those to the west of Auchterarder in Strathallan (where a series of lochans have been formed in worked-out areas) and near Kingsmuir, immediately to the east of Forfar. Although such workings inevitably have a local landscape impact, their broader effect is limited. This would change if it proved viable to expand mineral working more broadly.

5.10.22 **Forestry and woodland.** The fertile nature of these lowland areas, and the consequent dominance of agriculture, means that woodland is limited in extent. The exceptions include:

- the rich legacy of hedgerow trees, many of which are up to 200 years old;
- the less fertile Strathallan where geometric plantations of conifers are found;
- the policy woodlands associated with major estates;
- the native birch woodland found on the pockets of unimproved land within the straths.

5.10.23 The issue of hedgerow trees is closely allied to agricultural change and, as such, has been discussed above. However, it is worth noting that even where such trees survive, they are now reaching maturity or are even over-mature. Phased replanting and felling will be required if the stock of trees is not to dwindle further.

5.10.24 As noted above, the large-scale and rectilinear landscape of Strathallan means that it is one of the few parts of Tayside where rigidly geometric conifer plantations do not appear out of place. Policy woodland is an important aspect of a landscape where woodland cover is decreasing. Retention and management should be encouraged. The fragments of native birch woodland should be conserved for their natural heritage value and because of the insight they provide as to the landscape which would have prevailed prior to enclosure.

5.10.25 **Tall structures.** Tall structures such as masts or wind turbines are unlikely to present a significant threat to the landscape within the Broad Valley Lowlands. However, it is possible that further proposals may come forward for developments on higher ground adjoining the valleys. These could have an impact on the character of the straths. It is also possible that proposals for additional power lines may come forward over time, particularly since this would avoid more exposed upland areas and would achieve 'backclothing' of pylons against the hills.

LANDSCAPE GUIDELINES

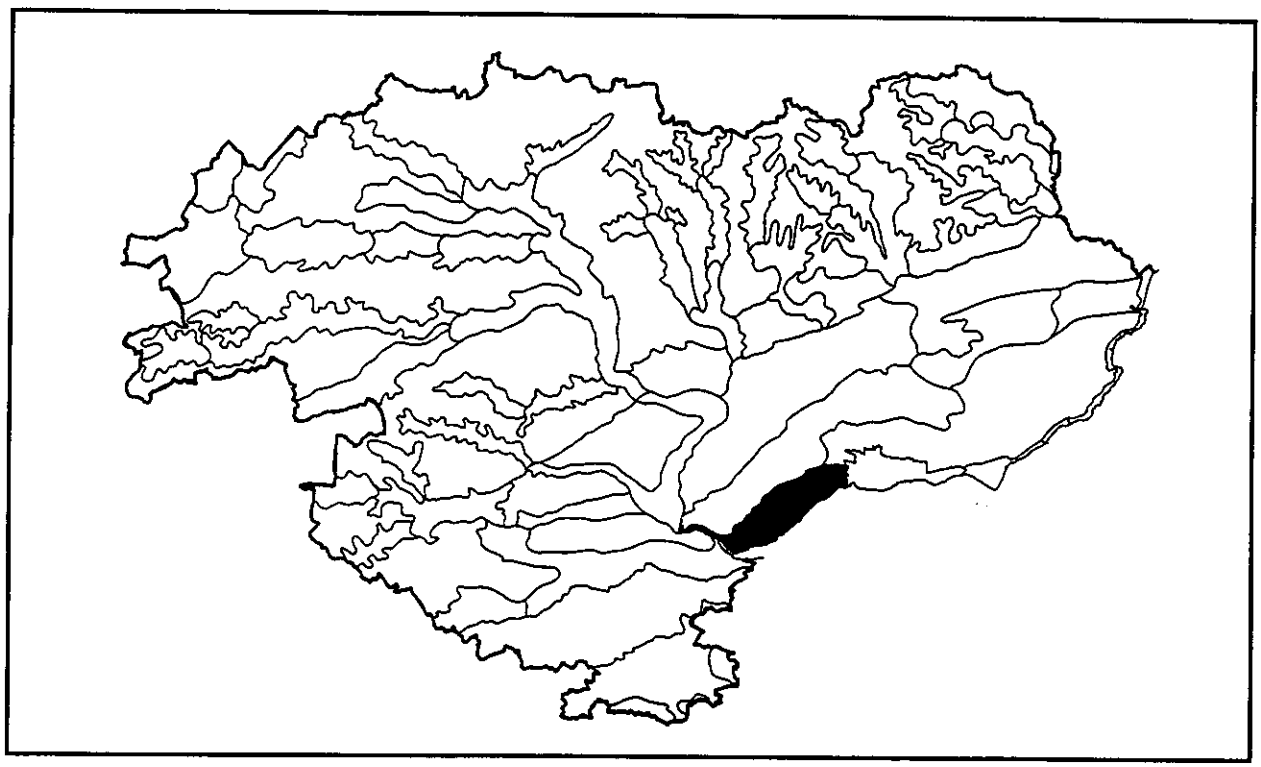
5.10.26 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve and restore the characteristic landscape of hedged fields, hedgerow trees, avenues and policy woodlands. It is important to maintain the contrast between the rich lowland landscapes and the neighbouring areas of harsh upland and enclosed glen.

Agriculture	• discourage improvements which result in further loss of field boundaries or field boundary trees; • encourage farmers and landowners to replant trees along field boundaries, initially along roads, but also between fields; species to include oak, sycamore, beech and ash; use incentives to compensate for lower yields where mature trees are retained; • explore the opportunities to increase woodland cover by creating new woodland belts, particularly where there is a need to screen development; • explore development of market for hardwood from field boundary trees; • discourage over-concentration of oil seed rape and similar crops; • monitor growth of open air pig keeping; • use the agricultural development notification scheme to influence the design, materials, screening and location of new farm buildings; explore the use of planning conditions attached to new buildings to re-establish hedgerow trees.

Transport	• Encourage on-site and off-site planting to better integrate major roads into the landscape and to provide screening of traffic. • Ensure that further proposals for improvements such as dualling or the provision of grade separated junctions are assessed in terms of their wider landscape impact. Where major, unmitigatable impacts exist, explore alternative solutions including traffic management and traffic calming. • Where new bypasses are proposed, consider the severing effect of the road on its setting. Consider also the view of settlements from the new road. • Where road improvement schemes take place, ensure that hedges and hedgerow trees, together with other features such as milestones, finger posts and gates are reinstated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives.
Development	• Encourage new development to reinforce the existing settlement pattern, focused on market towns and smaller villages. • New residential development should respond to the morphology of existing settlements (e.g. nucleated market settlements, grid-iron 19th century new villages). Explore the need and scope for a small number of new villages, echoing those established in the 19th century. • Encourage developers to use local building materials and to adopt local vernacular in respect of density, massing, design, colour and location. While red sandstones predominate, there are local variations which reflect subtle changes in the character of the local geology. Avoid standard designs and layouts. Consider the preparation of design guides as supplementary planning guidance.
Minerals	• Monitor future demand for mineral working. Ensure that any schemes that come forward are restoration-led and are located so as to minimise landscape impacts during operation.
Forestry and woodland	• As a matter of urgency, encourage a phased programme of replanting, managing and, where necessary, felling hedgerow trees, so as to maintain and restore the historic legacy of strath trees. • Maintain, where appropriate, the rectilinear woodland areas in Strathallan. Elsewhere, discourage significant and extensive new afforestation. • Retain and manage surviving pockets of native birch woodland. • Examine the potential to create an integrated pattern of new small woodlands and woodland belts in the most open areas.

Tall structures	• Assess proposals for aerials, masts or wind turbines in terms of their visual and landscape impact on the lowland straths. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape. • Underground cable solutions should be considered in preference to pylon lines across the arable landscape.

FIRTH LOWLANDS (11)



KEY CHARACTERISTICS

- *predominantly flat, fertile area*
- *enclosed by the steep Sidlaws escarpment to the north and bounded by the Firth of Tay to the south*
- *estuarine reed-beds and mudflats*
- *large rectangular fields*
- *decaying structure of hedges and hedgerow trees*
- *well-settled with some urban influences*

OBJECTIVE DESCRIPTION		Firth Lowlands
Physical scale		Relatively flat area bordering Firth of Tay, lying at between about 10 and 50 metres AOD
Woodland	broad-leaf	Trees mainly limited to field boundaries, shelterbelts and policy woodlands; historically an orchard area
	coniferous	Limited to a few areas of policy woodland
Agriculture	arable	Extensive areas of arable land
	pasture	Relatively little pasture land
	fields	Large and rectilinear
	field boundaries	Gappy hedges, post-and-wire fences and wet ditches; decaying structure of hedgerow trees
Settlement pattern		Nucleated settlements on higher ground and a scatter of large farmsteads on tracks leading from principal roads
Building materials		Red sandstone and harder igneous rocks from Sidlaws
Historic features		Castles, historic houses and designed landscapes
Natural heritage features		Reed-beds and mudflats
Other landscape features		Communication corridors, disused airfield etc.
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium
Enclosure		Open
Variety		Simple to varied
Texture		Smooth
Colour		Colourful
Movement		Active
Unity		Fragmented to interrupted
'Naturalness'		Tamed

LOCATION

5.11.1 Along the northern side of the Firth of Tay, between Perth and Dundee lies an area of estuarine lowland known as the Carse of Gowrie. Bounded to the north by the steep escarpment of the Sidlaw Hills, the area forms one of the most fertile parts of Scotland.

PHYSICAL CHARACTERISTICS

5.11.2 The Carse of Gowrie is underlain by Upper Old Red Sandstone and a smaller area of Carboniferous limestone which occurs in the vicinity of Errol. The bedrock, however, is buried beneath a thick capping of superficial deposits, laid down by retreating ice sheets, and by the estuarine and marine deposition. Though the area would once have been subject to frequent tidal flooding, the upward movement of the land mass following the melting of ice sheets means that this no longer occurs. The area averages about 10 metres AOD, rising to a maximum of 50 metres AOD at Errol. The edge of the estuary is often marked by a distinct bank before extensive reed-beds and mudflats are reached. In this flat landscape the sky forms an important part of the landscape and the character can change with the pattern of cloud cover the nature of the light.

SETTLEMENT AND LAND USE

5.11.3 This is a well-settled area, with a number of villages and a scatter of farmsteads and hamlets. Some of the more historic settlements are sited on low hills or slight rises in the otherwise level landscape. A number of castles (e.g. Castle Huntly and Megginch Castle) point to the need to defend the area in the past. The designed landscapes and policies of Castle Huntly and Errol Park also contribute to the landscape. The subdued topography of the area presents no obstacle to communications and roads and railways generally follow straight or geometric lines. Minor roads feed off the main routes at ninety degrees. The area has a history of apple growing with blossoms from surviving orchards characterising the area during the spring. Other past activities include the manufacture of bricks and pipes from local clay at Errol.

5.11.4 The Carse of Gowrie is principally an agricultural area and the landscape is dominated by large, geometric fields. Field boundaries within parcels of land are often absent, the distinction between different fields being marked by drainage ditches or simply by changes in crop. Hedges and hedgerow trees are more common along roads and tracks, though even here many hedges, though trimmed, have become gappy, and lost trees have not been replaced. Historically, the area was an important orchard area but much of this has disappeared though locally important remnants remain. The reed-beds near Errol are one of the largest commercial sources of thatching reeds in the UK.

FORCES FOR CHANGE

5.11.5 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.11.6 **Agriculture.** Farming on the Carse of Gowrie has long been dominated by arable cultivation. Over the years, much of the land has been drained and many fields enlarged to allow the use of modern machinery. Those hedges that remain are often sparse and gappy, with only a few remnants of what would once have been an extensive population of hedgerow trees. The remnant orchard areas, particularly around Errol, contribute a splash of blossom in springtime.

5.11.7 **Transport.** Comprising the only area of flat land linking Perth and Dundee, the area has developed as a transport corridor accommodating the A90(T) - which has been upgraded to dual carriageway standard - and a railway line. The A90, in particular, has a significant impact on this landscape, partly because of the large-scale and unscreened nature of the road itself, and partly because of the large volume of fast-moving traffic moving along it. The further upgrading of the road to include a number of grade separated junctions (Glendoick, Inchmichael and Inchture), while improving safety, is likely to result in increased landscape impacts and may lead to the development of roadside service facilities.

5.11.8 A further detracting feature is the disused airfield to the east of Errol. Options considered for this site include mixed industrial, business and aviation uses and a new settlement expansion for Errol. Out of necessity, these potential uses are being proposed in response to the presence of a derelict site rather than the character of the surrounding landscape. It appears inevitable that the redevelopment of this site will contribute to the increase in urban influences within this landscape type. Even if development is screened from view it is likely to result in traffic generation, altering the character of country roads in the area.

5.11.9 **Development.** The location of this landscape type between Perth and Dundee means that there has been considerable pressure for housing development. While some of this pressure has been accommodated within settlements such as Inchture, Errol and St Madoes, elsewhere it has resulted in a dispersed pattern of development (e.g. around Grange) and the growth of some ribbon developments (e.g. Walnut Grove). As noted above, the disused airfield near Errol is being considered as a potential new settlement location. While this could allow dereliction on the site to be addressed, it would comprise a significant increase in the level of development in this traditionally rural area.

5.11.10 **Forestry and woodland.** Commercial forestry is absent in this productive agricultural area and woodland cover is confined to a declining population of hedgerow trees and shelterbelts and policy woodlands associated with the Errol estate. As noted above, the survival of hedgerow trees and remnant orchards is a particular concern.

5.11.12 **Tall structures.** The area is crossed by two lines of electricity pylons, adding further to the urban influences along the Firth Lowlands.

5.11.13 **Climate change.** Changing sea levels could have an impact on the Firth Lowlands landscape in the medium term. The extent of mudflats and reed-beds could be squeezed as low water levels rise, but productive farmland is protected by tidal defences. In the longer term, there may need to be a choice between expensive flood defences and 'managed retreat'. The latter accepts that the frequency and extent of tidal inundation is likely to increase and modifies land uses accordingly. Within the Firth Lowlands the density of settlement, even on land below 10 metres AOD, and the productivity of the land, are likely to preclude this approach.

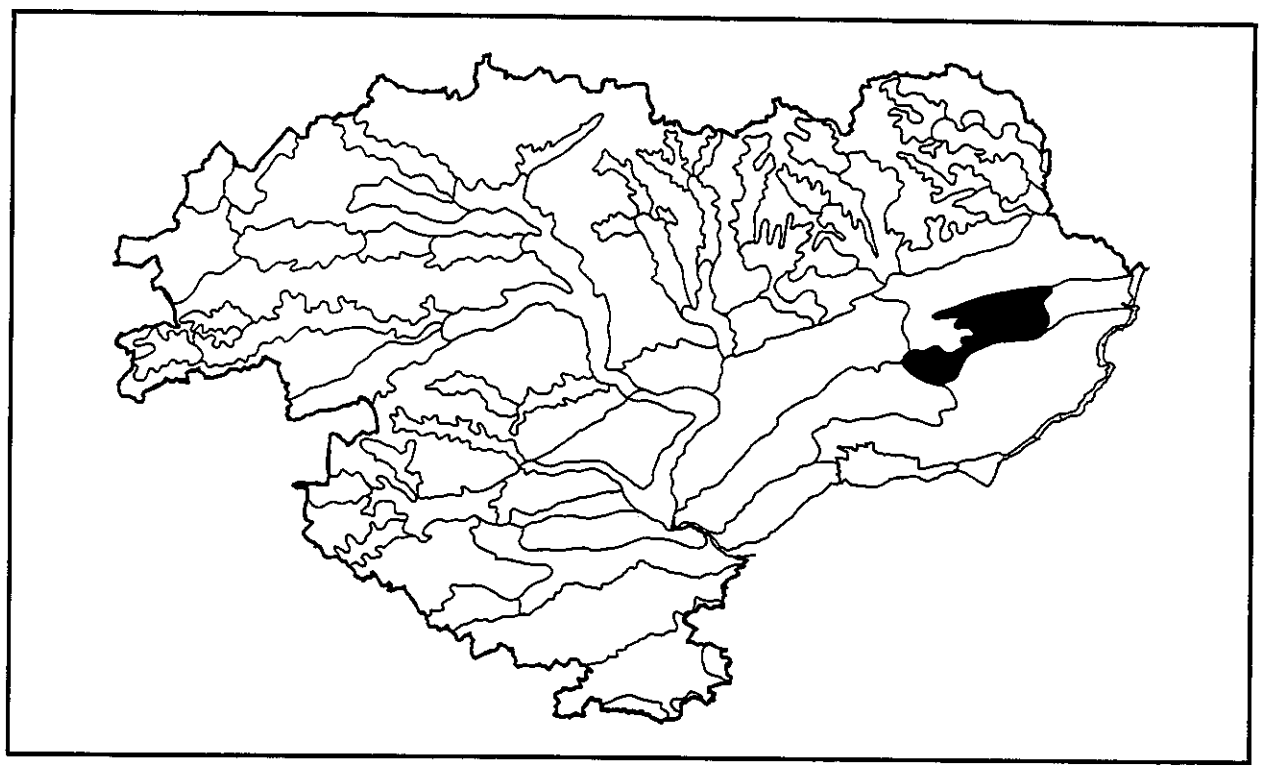
LANDSCAPE GUIDELINES

5.11.14 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve and restore the characteristic landscape of hedged fields, hedgerow trees, avenues and policy woodlands. The rural character of the Firth Lowlands should be restored by addressing inappropriate developments and land uses that have taken place in the past.

Agriculture	• Discourage improvements which result in further loss of field boundaries or field boundary trees. • Encourage farmers and landowners to replant trees along field boundaries, initially along roads, but also between fields. Species to include oak, sycamore, beech and ash. Use incentives to compensate for lower yields where mature trees are retained. • Explore the opportunities to increase woodland cover by creating new woodland belts, particularly where there is a need to screen development. • Encourage the maintenance of the remnant orchards in the Carse for their historic importance and local landscape significance. • Use the agricultural development notification scheme to influence the design, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to re-establish hedgerow trees.

Transport	• Encourage on-site and off-site planting to better integrate major roads into the landscape and to provide screening of traffic. • Ensure that further proposals for the provision of grade separated junctions are assessed in terms of their wider landscape impact. Where major, unmitigatable impacts exist, explore alternative solutions including traffic management and traffic calming. • Where road improvement schemes take place, ensure that hedges and hedgerow trees, together with other features such as milestones, finger posts and gates are reinstated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives.
Development	• Encourage new development to reinforce the existing settlement pattern, focused on market towns and smaller villages. • New residential development should respond to the morphology of existing settlements. Examine how a new settlement could be accommodated within the existing landscape, road network and settlement hierarchy. • Encourage developers to use local building materials and to adopt local vernacular in respect of density, massing, design, colour and location. Avoid standard designs and layouts. Consider the preparation of design guides as supplementary planning guidance.
Forestry and woodland	• Introduce incentives to retain and regenerate the existing orchard remnants. • As a matter of urgency, encourage a phased programme of replanting, managing and, where necessary, felling hedgerow trees, so as to maintain and restore the historic legacy of trees.
Tall structures	• Assess proposals for aerials, masts or wind turbines within and around the Firth Lowlands, in terms of their visual and landscape impact. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape.
Climate change	• Monitor long-term changes in climate so as to anticipate and plan for any implications for the landscape.

LOW MOORLAND HILLS (12)



KEY CHARACTERISTICS

- *eastern outliers of the Sidlaws*
- *combination of low, rounded hills and craggy, ridged upland*
- *moorland character evident in areas of heather and gorse*
- *some areas of extensive woodland*
- *rich historic heritage*
- *scattered modern settlement*

OBJECTIVE DESCRIPTION		Low Moorland Hills
Physical scale		Series of east-west ridge-like hills with sharply defined northern edge and gentler eastern slopes; hills rise to 200 to 250 metres AOD
Woodland	broad-leaf	Very limited
	coniferous	Extensive plantation at Montreathmont Forest
Agriculture	arable	Some arable on gentler and lower eastern slopes
	pasture	Extensive pastures, much of it rough and heathy in character on the upper slopes
	fields	Medium-sized, rectilinear where topography allows
	field boundaries	Hedges with some stone walls and post-and-wire fences
Settlement pattern		Scatter of isolated farmsteads, no villages
Building materials		Red sandstone
Historic features		Hill-forts, Pictish stones
Natural heritage features		No notable features
Other landscape features		Masts and pylons
SUBJECTIVE DESCRIPTION		
Views		Panoramic
Scale		Medium
Enclosure		Open
Variety		Simple
Texture		Rough to very rough
Colour		Muted
Movement		Remote
Unity		Interrupted
'Naturalness'		Restrained

LOCATION

5.12.1 To the east and south of Forfar lie a series of hills, forming low, eastern outliers of the Sidlaws. We refer to these as the Forfar Hills. The hills can be divided into two sub-groups. Firstly there is a series of isolated, rounded hills. These include Dunnichen Hill and Fothringham Hill. Secondly there is the more continuous area of upland centred on Montreathmont Moor, which culminates in sharp ridges overlooking Forfar.

PHYSICAL CHARACTERISTICS

5.12.2 These hills comprise a combination of the more resistant components of the Old Red Sandstone series and areas of volcanic rocks. The resistant sandstone is clearly visible where crags form outcrops on the Hill of Finavon and Turin Hill. Elsewhere, however, the landform is rounded and smooth. Along the southern side of the River South Esk the northern boundary of the resistant lavas is visible as a steep, straight escarpment running west from the coastal cliffs south of Montrose towards Farnell. Rescobie Loch and Balgavies Loch, both of which are of importance for nature conservation, lie in a narrow valley between Turin Hill and Dunnichen Hill. These lochs feed the Lunan Water which flows eastwards to the coast.

SETTLEMENT AND LAND USE

5.12.3 Although lying just 100-150 metres above the surrounding lowland farmland, these hilltops have a very different character, in part reflecting their more recent reclamation and improvement. In agricultural terms, the ridges of the Dunnichen Hill, Hill of Finavon and Turin Hill are categorised as Class 6(2) compared with the surrounding farmland which falls into Classes 3 or even 2. The poorer nature of the eastern part of these hills is reflected in their heathy character (including the survival of gorse and bracken along field boundaries), the existence of large areas of coniferous woodland (other lowland is regarded as being too productive to put into woodland) and the presence of wetland areas. Place names such as Muirton, Muirside, Mostonmuir and Rossie Moor all point to the past or current heathland character.

5.12.4 Settlement on the Low Moorland Hills is limited to a dispersed pattern of farmsteads on the unforested part of Montreathmont Moor. However, there is extensive landscape evidence of earlier phases of human activity. This includes the dramatic Iron Age hill-forts sited on the craggy summits of the Hill of Finavon and Turin Hill. Nearby, at Aberlemno, are some of the finest examples of Pictish sculptured stones and crosses in southern Scotland. Also near Aberlemno stands Melgund Castle, a 16th century, four storey stronghold. The concentration of these sites, spanning two millennia, points to the significance of these hills, marking the divide between the lowland route of Strathmore and the coastal lowlands to the south. Modern encroachments onto these hills are limited to a handful of telecommunications masts. Extensive sand and gravel working takes place at the western foot of Turin Hill, and there were recent proposals to extract igneous rock from Dunnichen Hill. The hilltops provide fine viewpoints looking northwards across the valley lowland to the Highland Foothills and the Highlands themselves.

FORCES FOR CHANGE

5.12.5 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.12.6 **Agriculture.** The poorer nature of the soils of the Low Moorland Hills is reflected in the pattern of agriculture with arable on some of the lower slopes giving way to enclosed pastures and eventually, in the case of the more poorly drained areas, to rough moorland grazing. Historically, it is likely that improvements brought by drainage, reseeding and the application of fertilisers has resulted in a reduction in the extent of rough moorland and an increase in the area of enclosed pasture and arable land. This, allied to the effects of afforestation, means that only fragments of the former landscape survive.

5.12.7 On lower slopes, this landscape type shares the structure of hedgerows and hedgerow trees that is found in the Broad Valley Lowlands and elsewhere. As in these areas, the population of trees is declining as replanting is not undertaken.

5.12.8 Many farms in the foothills have constructed modern agricultural buildings such as sheds and barns. These are generally of a smaller scale than those found in the lowland straths but can have a visual and landscape impact where the screening effect of woodland is absent.

5.12.9 **Transport.** The moorland hills have a network of main and minor roads. Although often very straight, these generally fit with the grain of the landscape. Existing coniferous plantations provide a degree of screening.

5.12.10 **Development.** Development within the Low Moorland Hills is very limited. It has been concentrated instead in lowland settlements such as Forfar, Letham and Friockheim.

5.12.11 **Minerals.** There have been proposals in the past to establish quarries at Dunnichen Hill. The proposals were withdrawn in response to local opposition, but it is possible that modified plans may come forward in the future. If mineral working is permitted it should be subject to the following terms:

- full environmental assessment to address, in particular, issues to do with landscape impact and the cultural environment;
- advance on and off-site planting to provide adequate screening around the site;
- full restoration proposals, re-creating the existing landform, and landscape features such as hedges and woodland.

5.12.12 **Forestry and woodland.** The elevation, soils and prevailing climate of the Low Moorland Hills makes them well-suited to commercial forestry. This is reflected in the Tayside Indicative Forestry Strategy which categorises parts of this landscape type as being 'preferred' or 'potential' areas for new planting. The area already includes an extensive area of plantation woodland at Montreathmont Forest and Moor. Taking a regional

perspective it is evident that these hills are relatively free from the constraints associated with the most productive agricultural land and the sensitive highland areas. Furthermore, the plateau-like summit of the hills means that often it is only the edge of the existing plantation woodland that is seen, concealing its true extent. While there is scope for new planting, this needs to take into account:

- the scale of new planting relative to the landform and the proportion of unplanted land;
- species composition;
- relationship with existing semi-natural or planted woodland;
- retention of key views within and outwith the hills;
- opportunities to conserve or recreate areas of low moorland within the woodland;
- size of felling coupes;
- factors such as agricultural viability, nature conservation and historic sensitivities.

5.12.13 These issues, together with concerns regarding the restocking of existing woods, are addressed by Forestry Authority woodland design guidance, and are summarised in the landscape guidelines presented at the end of this section.

5.12.14 **Tall structures.** The Low Moorland Hills have a number of tall structures, principally a series of masts on Fothringham Hill, Dunnichen Hill, Hill of Finavon and Montreathmont Moor, and the line of electricity pylons running from north of Forfar towards Brechin. There is also pressure for additional masts to serve the cellular telephone industry, particularly along the A90.

5.12.15 With the development of modern wind turbines to generate power, it is possible that this area may come under pressure for wind farm development. Though wind speeds are likely to be significantly lower than in more elevated parts of the Highlands or the Sidlaws/Ochils, it is possible that the lower level of perceived constraint, together with the proximity to the existing electricity distribution network, could favour this area. This would be even more likely if the efficiency of wind turbines continues to improve, thereby making areas with lower wind speeds viable. It would be worth examining the scope for accommodating wind turbines within forested (and serviced) areas such as Montreathmont Forest.

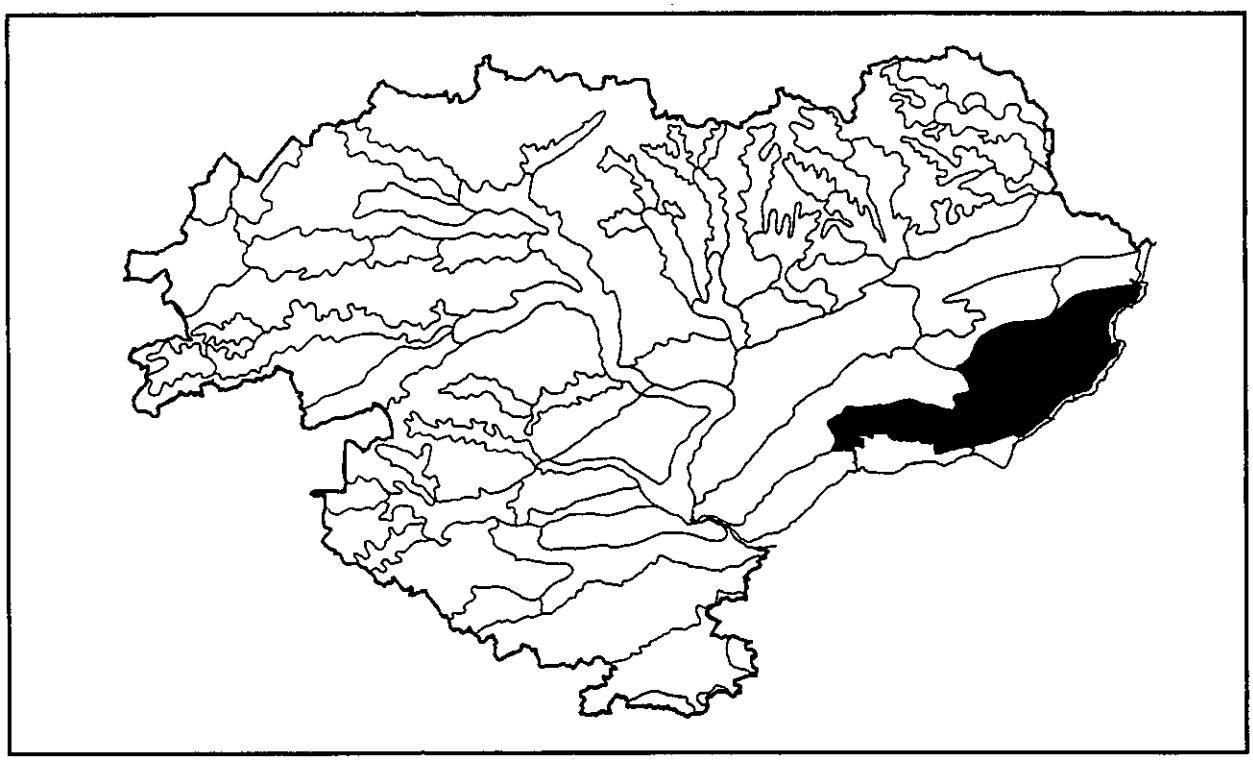
LANDSCAPE GUIDELINES

5.12.16 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the semi-moorland character of these hills, maintaining the contrast with more fertile lower lying areas.

Agriculture	• Encourage farmers and landowners to maintain and replant trees and farm woodlands. Species to include oak, maple, beech and ash. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.
Transport	• Where more minor road improvement schemes take place, ensure that hedges, hedgerow trees, gates and other features are re-instated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives. • Develop a road use hierarchy as a basis for management.
Development	• Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements and to protect the rural character of other parts of the lowland glens. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Encourage the appropriate conversion of redundant farm buildings. Guidance should be provided on the way buildings should be converted (including the provision of drives, gardens etc.) to prevent the suburbanisation of the countryside.
Minerals	• Ensure that proposals for mineral working are subject to thorough environmental assessment and that they are accompanied by full restoration proposals. • Ensure adequate on and off-site screening during the operation of any sites that are granted consent.

Forestry and woodland	• New planting should conform to the Forestry Authority's design guidelines. In particular, it should respond to the small-scale nature of the landscape, complex topography, the importance of views within and out of the hills, and historic and ecological values. • With respect to the replanting of existing plantations: - adopt a more naturalistic appearance, responding to the landform and features such as burns and small valleys; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line;. - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes; - retain open heathy glades within the woodland.
Tall structures	• Assess proposals for aerials, pylons or masts in terms of their visual and landscape impact on the local landscape, including historic sites, and the broader landscape. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape. • Encourage the development of a regional strategy for renewable energy, including wind power, in order that the most appropriate types of development and areas come forward.

DIPSLOPE FARMLAND (13)



KEY CHARACTERISTICS

- *extensive area of land, generally sloping from the north-west to the south-east*
- *dominated by productive agricultural land*
- *low woodland cover, except on large estates and along river corridors*
- *variety of historic sites*
- *dispersed settlement pattern, including some suburban development*
- *limited visual impact of Dundee and Arbroath*

OBJECTIVE DESCRIPTION		Dipslope Farmland
Physical scale		Extensive area of land sloping towards the coast from north-west to south-east; range in height from about 150 metres to 50 metres AOD
Woodland	broad-leaf	Shelterbelts and hedgerow trees
	coniferous	Shelterbelts, policy woodlands and areas of woodland associated with designed landscapes; highly variable cover
Agriculture	arable	Extensive arable production - very fertile land
	pasture	Limited pastureland
	fields	Medium to large, rectilinear
	field boundaries	Many field boundaries absent, others marked by hedges or post-and-wire fences
Settlement pattern		Scatter of hamlets and farmsteads
Building materials		Traditional use of sandstones and harder stone from the Sidlaws
Historic features		Souterrains, castles, mills, historic houses and designed landscapes
Natural heritage features		No notable features
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Intermittent
Scale		Medium
Enclosure		Semi-enclosed to open
Variety		Simple
Texture		Textured to smooth
Colour		Colourful
Movement		Peaceful
Unity		Interrupted
'Naturalness'		Tamed

LOCATION

5.13.1 To the south-east of the Sidlaws and the Forfar Hills lies an extensive area of farmland sloping gently towards the Angus coast.

PHYSICAL CHARACTERISTICS

5.13.2 The area is dominated by Lower Old Red Sandstone, though there are patches of igneous rocks, forming low outliers of the Sidlaws. The area falls from up to 180 metres in the north-west to about 50 metres along the coastal strip. The dipslope blends almost imperceptibly into the southern slopes of the Sidlaws and Montreathmont Hills.

SETTLEMENT AND LAND USE

5.13.3 This is one of the most fertile and productive agricultural areas in Scotland, with much of the land being categorised as Classes 1 or 2. It is not surprising, therefore, that intensive agriculture, based on cereals, is the dominant land use. Fields tend to be large and rectilinear. Woodland cover is low or even absent in some areas, particularly closest to the coast, creating an open, exposed landscape in places. Elsewhere, particularly on some of the larger estates more extensive woodland survives, comprising a mixture of shelterbelts (for example stands of Scots pine or beech) and hedgerow trees. Where these survive, the landscape is enclosed and structured. Often the trees are wind-trimmed and bent slightly away from the coast. Semi-natural woodland is limited to steeper valley sides, for example along the Lunan Water.

5.13.4 Despite the intensive pattern of agriculture, the area has a range of archaeological and historic sites. These include Bronze Age burial sites such as that at Dickmountlaw just to the north of Arbroath, a number of souterrains (for example at Grange of Conon near Redford and in Arbroath), Roman sites such as the camp at Kirkbuddo near Whigstreet, and medieval castles including Braikie Castle and Gardyne castle near Friockheim and Colliston Castle to the south. Designed landscapes are also important in this area. A dense scatter of more recent farmsteads is supplemented by a number of isolated houses, reflecting the proximity to Dundee and Arbroath. Both settlements are, however, relatively well-hidden in this otherwise open landscape. Dundee is screened from the north by a ridgeline running parallel to the Firth of Tay, while Arbroath occupies lowland at the mouth of a shallow valley.

FORCES FOR CHANGE

5.13.5 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.13.6 **Agriculture.** The fertile and productive nature of this area is reflected in the dominance of agriculture, particularly cereal production and the low level of woodland cover. Many fields have been enlarged and the structure of hedges and hedgerow trees, as

elsewhere, is declining. Many farms in the foothills have constructed modern agricultural buildings such as sheds and barns and, while these are generally of a smaller scale than those found in the lowland straths, the reduction in woodland cover means that they are often visible over a considerable distance.

5.13.7 **Transport.** The Dipslope Farmland has a network of main and minor roads. These are generally small-scale and fit with the grain of the landscape. The exception is the A90(T) corridor which runs north from Dundee. The road and its traffic has a considerable landscape and aural impact.

5.13.8 **Development.** The Dipslope Farmland landscape type has few settlements of any size, since most tend to be located along the coast. However, as noted above, the proximity to Dundee and Arbroath is reflected in the number of isolated modern dwellings or groups of dwellings that are found throughout the area. Many of these are associated with existing farm buildings or hamlets. However, designs are usually suburban in character, and their sites chosen to maximise the view rather than minimise landscape impact. Planning policies in Angus have allowed a certain amount of development in the open countryside as a means of stabilising and reversing economic and social decline. A similar policy applied in part of Dundee prior to local government reorganisation in 1996. By way of contrast, the urban edges of Dundee and Arbroath, while abrupt, are comparatively well-screened by the landform and have little impact on the wider landscape.

5.13.9 **Forestry and woodland.** As noted above, woodland cover within this landscape type is limited, comprising small copses (often located on pockets of less productive land), surviving hedgerow trees, and the shelterbelts and policies of estates and designed landscapes. The area is similar to the lowland straths in that the influence of individual estates on woodland management is evident. Some areas retain structural woodland, creating landscape rooms, and providing screening for development in the countryside while others are almost completely open. The importance of restoring tree cover in the latter areas was recognised by the Dundee Rural Areas Local Plan (City of Dundee District Council, 1994) which encouraged woodland planting particularly in the Tealing Area. The Rural Angus Local Plan (Angus District Council, 1991) contained similar policies. Agricultural factors suggest that large-scale afforestation is unlikely to happen in this area.

5.13.10 **Tall structures.** This low-lying area is comparatively free from tall structures with the exception of the electricity transmission lines which serve Dundee and Arbroath. It is possible that there may be pressure for additional masts, particularly in the vicinity of major roads, as telecommunications traffic grows.

LANDSCAPE GUIDELINES

5.13.11 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve and restore the rural character of the Dipslope Farmland landscape type, and to reduce the range of urban influences upon it.

Agriculture	• Discourage improvements which result in further loss of field boundaries or field boundary trees. • Encourage farmers and landowners to replant trees along field boundaries, initially along roads, but also between fields. Species to include oak, sycamore, beech and ash. Use incentives to compensate for lower yields where mature trees are retained. • Explore the opportunities to increase woodland cover by creating new woodland belts, particularly where there is a need to screen development. • Explore development of market for hardwood from field boundary trees. • Discourage over-concentration of oil seed rape and similar crops. • Use the agricultural development notification scheme to influence the design, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to re-establish hedgerow trees.
Transport	• Where necessary, explore opportunities to provide additional on- and off-site screening of major roads. • Where more minor road improvement schemes take place, ensure that hedges, hedgerow trees, gates and other features are re-instated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives. • Develop a road use hierarchy as a basis for management.

Development	• Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements and to protect the rural character of other parts of the lowland glens. • Discourage the simplistic grafting of housing estates onto the edge of settlements. Encourage more imaginative schemes which respond to the existing patterns of layout, structure, massing and scale. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Where small-scale development is permitted, encourage developers to use local building materials and to adopt local vernacular in respect of density, massing, design, colour and location. Avoid standard or suburban designs and layouts. Assess and adopt existing traditional layouts. Consider the preparation of design guides as supplementary planning guidance. • Encourage the appropriate conversion of redundant farm buildings. Guidance should be provided on the way buildings should be converted (including the provision of drives, gardens, etc.) to prevent the suburbanisation of the countryside.
Forestry and woodland	• New planting should help restore field boundary trees and establish woodland belts (see above). • Encourage new woodland where this would help enhance relatively low quality agricultural landscape.
Tall structures	• Assess any proposals for aerials or masts in terms of their visual and landscape impact. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape.

LOW MOORLAND HILLS
Craggy hill tops and ridges near Hill of Finavon above Forfar.

DIPSLOPE FARMLAND
A settled landscape of farmland and small woods.

COAST WITH SAND
The broad sandy beach at Lunan Bay, backed by a complex of sand dunes.

COAST WITH CLIFFS
The former fishing village of Auchmithie perches above the soft red sandstone cliffs.

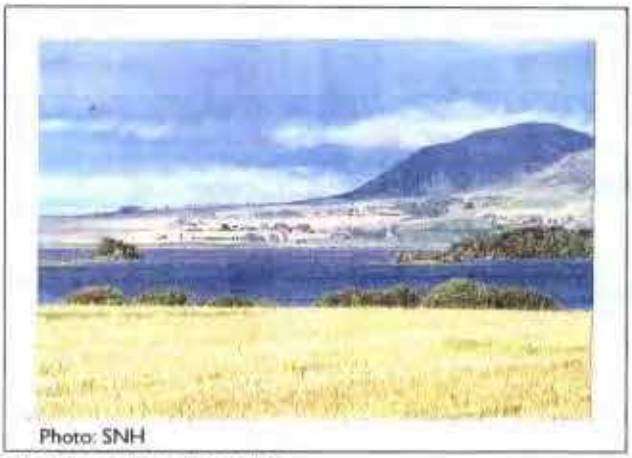


Photo: SNH

LOWLAND BASIN
An open, simple landscape dominated by the expanse of water and surrounding gently sloping farmland.

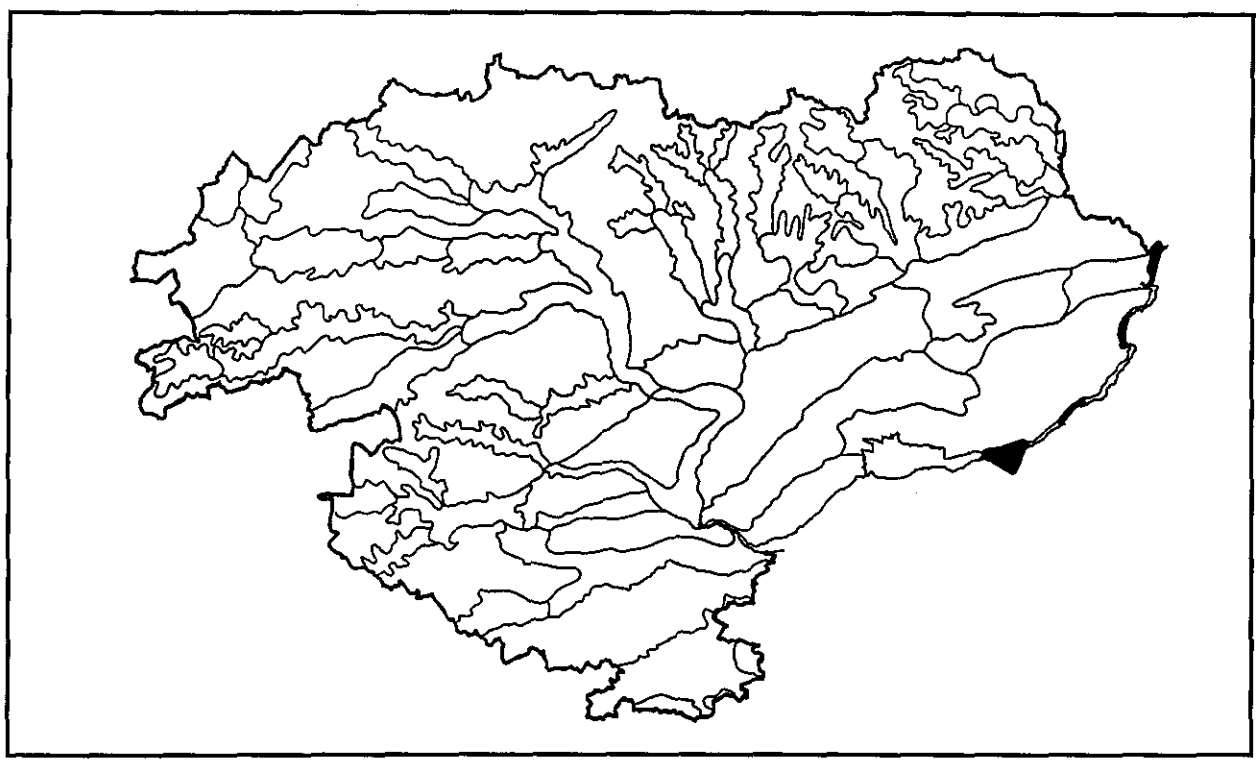
FIGURE 16

LANDSCAPE CHARACTER TYPES

COAST (14)

5.14.1 The combination of distinct physical characteristics and a strong coastal influence on the landscape distinguishes a comparatively narrow band of land along the Angus coast. Here, the sense of exposure, the presence of the sea, the influence of the tides and the expanse of sky create a very different landscape character than that of inland areas. A distinction has been made between the sandy and cliff sections of the coast.

COAST WITH SAND (14A)



KEY CHARACTERISTICS

- *areas of marine alluvium and windblown sand along lower sections of coast*
- *sand dunes inland*
- *ever-changing landscape of shifting sands, erosion and deposition and tidal fluctuation*
- *golf courses*
- *limited settlement*

OBJECTIVE DESCRIPTION		Coast
Physical scale		Low-lying sections of coast ranging from 0 to 5 metres AOD
Woodland	broad-leaf	Confined to hedgerow trees on farmland adjoining the coast
	coniferous	Confined to shelterbelts on farmland adjoining the coast
Agriculture	arable	Along coastal strip
	pasture	On dune slack and along lower sections of river valleys
	fields	Medium and rectilinear where topography allows
	field boundaries	Hedges and walls, supplemented by fences
Settlement pattern		Limited settlement
Building materials		Red sandstone
Historic features		Castles, fishing station
Natural heritage features		Dune systems are of ecological and geological interest
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Distant
Scale		Medium
Enclosure		Exposed
Variety		Simple
Texture		Smooth to rough
Colour		Colourful
Movement		Active
Unity		Unified
'Naturalness'		Undisturbed to tamed

LOCATION

5.14.2 Sections of coast with sand occur between Broughty Ferry and Carnoustie, south of Arbroath, at Lunan Bay and at Montrose.

PHYSICAL CHARACTERISTICS

5.14.3 The origins of these areas differ, falling into two main groups. Firstly, there are sections of coast where blown sand and marine alluvium have created substantial deposits. Particular examples include Barry Links, where a rounded peninsula of sand dunes extends southwards into the Firth of Tay, and the spit of land occupied by Montrose at the mouth of the River South Esk. Secondly, there are sections of coast where rivers such as the Lunan have lowered the level of the land and broad bays are now filled with sand. In both cases, the sandy beach is often backed by sand dunes, some of which are relatively level and are used for grazing.

5.14.4 Several of the links are of ecological and geological importance. Barry Links for example is a designated SSSI, notified because of its range of characteristic plant communities, including some rare species, as well as important mosses, invertebrates and breeding birds. It is regarded as an excellent example of coastal deposition, including the well-developed complex of parabolic dunes. Although there is a golf course on the northern part of the links, much of the area is reserved for military live firing.

SETTLEMENT AND LAND USE

5.14.5 Comparatively little has survived from earlier periods in this ever-changing coastal landscape. Exceptions include Broughty Castle, originally built in the 15th century but refortified in the 19th century, and Red Castle which stands, ruined, above Lunan Bay. Also at Lunan Bay are the remains of an earlier commercial fishing station, including the ruin of an icehouse constructed to store the catch. Today, many of the beaches are popular destinations when the weather is good. A number of golf courses are found among the dunes.

FORCES FOR CHANGE

5.14.6 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.14.7 **Agriculture.** Low intensity grazing can be quite important in maintaining the stability of vegetated parts of the dune systems. Overgrazing could result in the loss of vegetation and an increase in erosion.

5.14.8 **Transport.** Vehicular access to much of this coastal area is limited. Even at Lunan Bay it is limited to a minor farm road which leads to a small and informal car park which has

been created in the lee of the sand dunes. This low level of access is an asset, underlining the low level of development along the coast.

5.14.9 **Development.** There is also very little development on the sections of sandy coast. The principal exceptions are found at Barry Links (which is used for military training and also has a golf course) and the Links of Montrose (also used as a golf course). While these land uses hinder more general access to the coast, they are low-key in nature and do assist in the conservation of the natural heritage.

5.14.10 **Forestry and woodland.** Commercial woodland is absent from this landscape type. However, semi-natural woodland is found along the river valleys that emerge in places such as Lunan Bay and on some of the more stable areas of sand dune.

5.14.11 **Recreation.** While, for most of the year, these beaches and dune systems are deserted, during period of fine weather, particularly at weekends and holiday times, they can attract considerable numbers of people. This can result in erosion around key access points, reducing the overall stability of the dunes. At Lunan Bay, where these pressures are high, boardwalks and other management measures have been implemented to minimise damage.

5.14.12 **Tall structures.** Many of these sections of coast are free from signs of modern development and retain an almost timeless character. The erection of masts in areas visible from these areas (for instance in cliff-top locations) or the development of shore-line or off-shore wind power schemes could have an adverse effect on this character. Any proposals should be assessed carefully in these terms.

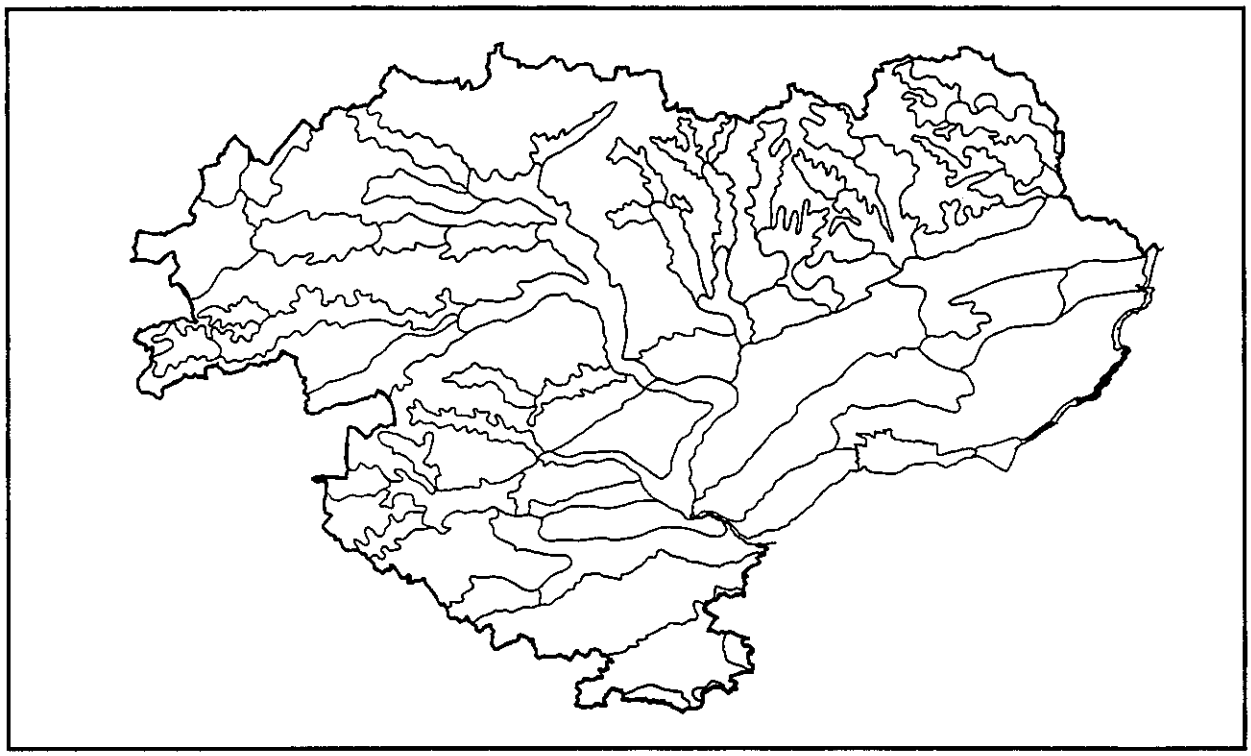
5.14.13 **Climate change.** It is possible that climate change brought about by global warming could result in an increase in storminess and changes in sea levels. Both could have serious implications for the stability and survival of these sections of dune coast. Further monitoring of any changes should be undertaken. If the stability of the coast is threatened, a comprehensive assessment options (including the do-nothing scenario) for managing this change should be undertaken.

LANDSCAPE GUIDELINES

5.14.14 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the natural and, at times, remote character of these sections of coast.

Agriculture	• Encourage the continuation of appropriate levels of grazing on the vegetated dunes and dune slack areas.
Transport	• Maintain the low level and informal character of vehicular access.
Development	• Restrict development in these areas. • Should the military training area at Barry Links become redundant, encourage the restoration of the natural dune landscape rather than disposal for development.
Forestry and woodland	• Discourage planting except within sheltered river valleys. • Facilitate natural colonisation on established dune areas (where this does not conflict with natural heritage interests).
Recreation	• Maintain low level of formal recreational provision. • Monitor erosion and other effects in areas subject to highest pressure, implementing management measures as necessary.
Tall structures	• Assess any proposals for tall structures in terms of their visual and landscape impacts.
Climate change	• Monitor the effects of climate change on the stability of the sandy coast. • Assess any options for coastal management in a comprehensive way (e.g. through a Shoreline Management Plan) reflecting the dynamic and interdependent nature of the processes of erosion and deposition along the coast.

COAST WITH CLIFFS (14B)



KEY CHARACTERISTICS

- *more resistant sandstones and intrusive rocks*
- *cliffs, arches, inlets, bays and rocky reefs*
- *defensive coast with castles*
- *fishing settlements*
- *windswept and exposed*
- *minimal tree cover*
- *productive farming up to cliff edge*

OBJECTIVE DESCRIPTION		Coast with Cliffs
Physical scale		Red sandstone cliffs rising up to 30 metres
Woodland	broad-leaf	Absent except on field boundaries along the coastal strip
	coniferous	Absent except for shelterbelts along the coastal strip
Agriculture	arable	Along coastal strip
	pasture	Absent
	fields	Medium and rectilinear where topography allows
	field boundaries	Hedges and walls, supplemented by fences
Settlement pattern		Fishing villages
Building materials		Red sandstone, often highly weathered
Historic features		Castles, fishing stations
Natural heritage features		Cliffs of ecological and geological interest
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Distant
Scale		Medium
Enclosure		Exposed
Variety		Simple
Texture		Rough to very rough
Colour		Colourful
Movement		Active
Unity		Unified
'Naturalness'		Undisturbed to restrained

LOCATION

5.14.15 Sections of rocky coast with cliffs occur north of Carnoustie, between Arbroath and the southern end of Lunan Bay, and between Lunan Bay and Montrose.

PHYSICAL CHARACTERISTICS

5.14.16 The cliffs fall into two groups, reflecting variations in their geology. To the south, Old Red Sandstones are predominant, forming an indented coastline of dark red cliffs up to 30 metres high. Here the relatively soft rock is eroded into a series of small bays and inlets. Arches and caves reflect the erosive power of the sea. Further north, enclosing Lunan Bay and extending northwards to the southern edge of the Montrose Basin is an area of volcanic lavas and tuffs, of the same origin as the Sidlaws and Ochils. This has created a more resistant coastline of promontories, low cliffs and a rocky shore line.

5.14.17 The rocky coast is also of ecological and geological interest, much of it being designated as SSSIs. The cliffs support a range of important nesting seabirds and overwintering waders including kittiwake, puffin, razorbill, turnstone and purple sandpiper, along with rare grassland and rock-ledge communities. Perched saltmarsh and species-rich grassland also occur along the northern, igneous coastline. Most of this section of coastline provides good exposures of sandstones and lavas, providing considerable potential for the study of the geological structure and origins of the Midland Valley.

SETTLEMENT AND LAND USE

5.14.18 In addition to a number of castles sited about one kilometre inland (e.g. Ethie Castle), several clifftop forts are found along this section of coast. At least six (including Maiden Castle, Castle Rock and Prail Castle) are known to have existed between Arbroath and Lunan Bay. The indented coastline also provided natural harbours for fishing villages. Auchmithie, perched at the top of the sandstone cliffs comprises a cluster of low cottages in the shelter of a shallow bay. Many of the buildings and walls show signs of weathering with the red sandstone sculpted into curious shapes. Stimulated by the arrival of the railways which provided access to markets as far away as Billingsgate in London, many commercial fishing stations developed along the coast. This is exemplified at Usan where, in the 18th and 19th century, the landowner rebuilt the existing villages around salmon fisheries, with the result that one of them is known as 'Fishtown of Usan'. The remains of ice houses and saltpans can still be seen. While these villages are closely related to the surrounding landscape, other more recent settlements such as Carnoustie are not, simply comprising expanded residential suburbs of Dundee.

5.14.19 Despite the exposed, sometimes windswept character of the this coastal landscape, the natural fertility of the soils (much of the area falling into Class 2) means that agriculture dominates inland, with arable fields often running up to the edge of the cliffs. Tree cover is minimal.

FORCES FOR CHANGE

5.14.20 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this

section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.14.21 **Agriculture.** The fertile nature of the soils in this area means that in many places farmland extends right up to the cliff edge. In some places networks of shelterbelts, together with field boundary trees emphasise the exposed coastal location, the trees' branches and canopies are windbent and trimmed. In other areas woodland cover is absent, having declined over decades or having been cleared to allow field enlargement. In the latter case, modern farm buildings can be particularly prominent.

5.14.22 **Transport.** The network of roads, which is often geometric in structure, reflecting the presence of rectangular fields, is complemented by a network of unpaved roads, often contained between high dry-stone dykes, constructed from the local red sandstone. The rough character of these tracks should be retained.

5.14.23 **Development.** Settlement along the sections of cliff coast is concentrated in a number of fishing villages and a scatter of farmsteads. As the fishing industry has declined, some of the villages have declined, or have become remote 'suburban' outposts of Arbroath or Montrose. There is little other development along these sections of coast.

5.14.24 **Forestry and woodland.** Commercial woodland is absent from this landscape type. Woodland is confined to the shelterbelts and field boundaries described above.

5.14.25 **Recreation.** Access to the coast and areas of beach is often difficult and there are comparatively few recreational pressures.

5.14.26 **Tall structures.** Many of these sections of coast are free from signs of modern development and retain an almost timeless character. The erection of masts in cliff-top locations or the development of shore-line or off-shore wind power schemes could have an adverse effect on this character. Any proposals should be assessed carefully in these terms.

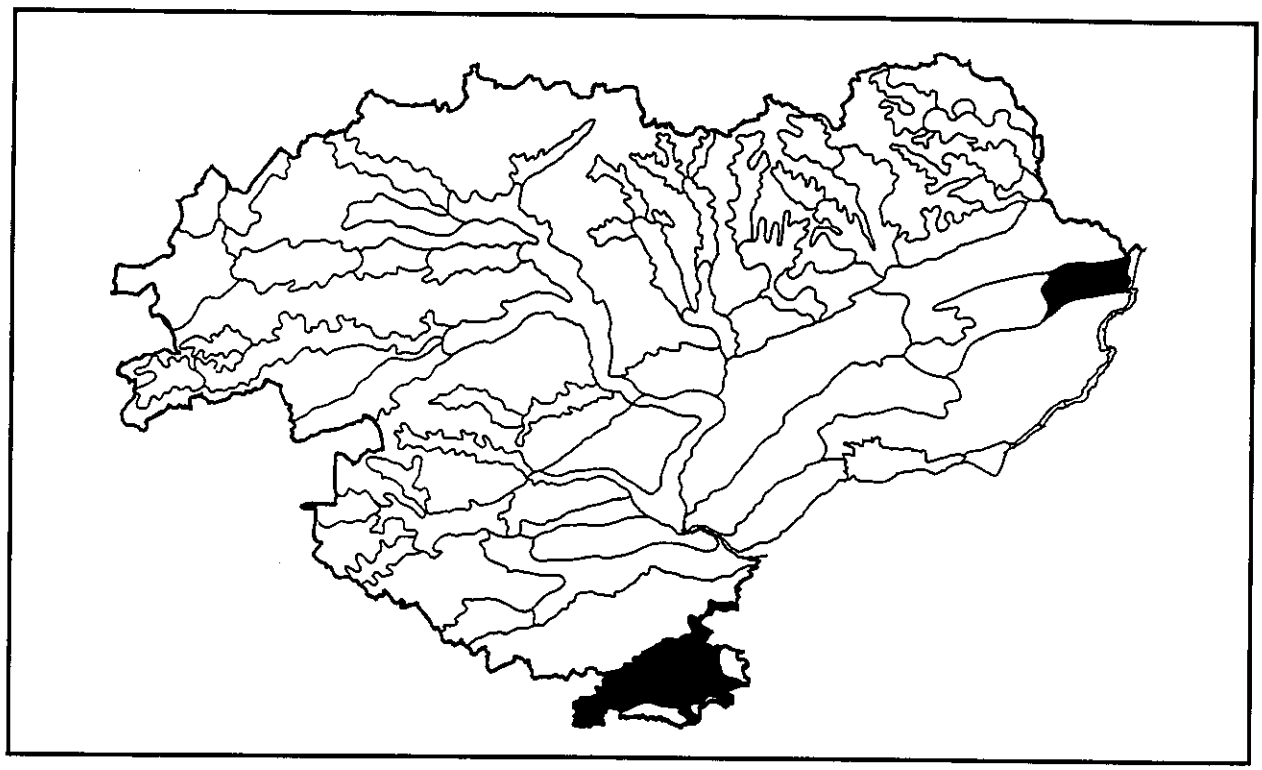
5.14.27 **Climate change.** It is possible that climate change brought about by global warming could result in an increase in storminess and changes in sea levels. Both could have implications for the pattern of erosion and deposition along the cliff coast. The red sandstone is comparatively soft, and increases in erosion could affect natural coastal features and the security of coastal settlements. Monitoring of any changes should be undertaken and if the stability of the coast is threatened, a comprehensive assessment of options (including the do-nothing scenario) for managing this change should be carried out.

LANDSCAPE GUIDELINES

5.14.28 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the natural and, at times, remote character of these sections of coast.

Agriculture	• Encourage the maintenance of shelterbelts and field boundary trees and their restoration where appropriate. • Encourage the maintenance of the network of dry-stone dykes.
Transport	• Maintain the low level and informal character of vehicular access, in particular, conserving the network of unsurfaced roads.
Development	• Focus any residential development within existing coastal settlements. • Ensure that development adopts appropriate designs, materials and scale.
Forestry and woodland	• Discourage extensive planting.
Recreation	• Maintain low level of formal recreational provision.
Tall structures	• Assess any proposals for tall structures in terms of their visual and landscape impact.
Climate change	• Monitor the effects of climate change on the stability of the cliff coast. • Assess any options for coastal management in a comprehensive way reflecting the dynamic and interdependent nature of the processes of erosion and deposition along the coast.

LOWLAND BASINS (15)



KEY CHARACTERISTICS

- *broad basins formed where sandstones have been eroded away leaving harder enclosing rocks*
- *extensive mudflats*
- *rich natural heritage, particularly migratory and wading birds*
- *historic associations*
- *dominance of water, sky and distant shores*

OBJECTIVE DESCRIPTION		Lowland Basins
Physical scale		Loch Leven Basin lies at about 110 metres AOD, rising to about 150 metres in places; the Montrose Basin lies close to sea level, rising to 10 or 20 metres
Woodland	broad-leaf	Semi-natural and plantation woodland around the fringes of the basins, particularly on steeper land
	coniferous	Little coniferous woodland - limited to a small number of shelterbelts
Agriculture	arable	Extensive arable land within Loch Leven basin
	pasture	Some pastures on lower lying and poor land
	fields	Generally large and regular shaped
	field boundaries	Combination of stone walls extending down from surrounding higher ground, and hedges
Settlement pattern		Settlement along roads encircling Loch Leven, concentrated to the west at Kinross and Milnathort; settlement around the Montrose Basin concentrated in Montrose
Building materials		Mixture of sandstone, harder volcanics and, at Kinross, pantiles
Historic features		Kinross House, Loch Leven Castle, millsites and drainage/water management infrastructure
Natural heritage features		Both basins are very rich in nature conservation interest
Other landscape features		Kinross telecommunications installation
SUBJECTIVE DESCRIPTION		
Views		Framed
Scale		Medium
Enclosure		Enclosed
Variety		Simple
Texture		Smooth
Colour		Muted
Movement		Peaceful
Unity		Unified
'Naturalness'		Restrained to natural

LOCATION

5.15.1 Two flooded basins have formed where softer, Upper Old Red Sandstone deposits, enclosed by hard volcanic or carboniferous rocks, have been eroded away. The first of these is occupied by Loch Leven, in the extreme south of Tayside, enclosed by the Lomond and Cleish Hills to the east and south, and by the Ochils to the north. The second of these is the Montrose Basin, a broad tidal estuary cut off from the sea by the spit of land occupied by the town of Montrose, and enclosed by harder volcanic rocks to the north and south.

Loch Leven Basin

5.15.2 **Physical characteristics.** Loch Leven was formed at the end of the last Ice Age as retreating icesheets, which had scoured a hollow between the Lomonds, Cleish Hills and the Ochils, deposited a mass of sand and gravel, impounding a shallow loch surrounded by extensive areas of marsh and wetland. In the first half of the 19th century, the level of the loch was lowered by 1.5 metres in order to ensure a steady supply of water to mills along the River Leven and to increase the amount of rentable farmland. Surrounding areas of marsh were drained and improved to provide the basis of the landscape that we see today. Inland, a shallow basin extends towards the Crook of Devon, drained by a network of minor burns. Downstream, the River Leven has been canalised in a straight channel and the surrounding floodplain drained by a network of ditches. Water levels in the loch fluctuate, revealing extensive mudflats during the late summer and early autumn. The overall impression is of a very broad, shallow basin within which, particularly at the eastern end, water and sky, together with the enclosing hills are the dominant landscape elements.

5.15.3 Despite the changes brought by the lowering of water levels and the drainage of the marshes, Loch Leven retains a rich ecology. It is particularly important for birds, accommodating thousands of ducks, migratory geese, swans and waders. The loch's fish stocks have been exploited for over 650 years, the brown trout being particularly well-known. Mammals around the loch include otters, roe deer and foxes. The area has a range of natural and planted woodland with Scots pine growing in the drier areas and birch, willow and alder in wetter areas. The loch is designated as an SSSI and an NNR.

5.15.4 **Settlement and land use.** Historically Loch Leven has been a focus for human settlement and land use. The earliest signs of settlement included a crannog which was destroyed during the 19th century. Loch Leven has a number of other historic sites including Kinross House, Loch Leven Castle on Castle Island and the Priory on St Serf's Island. Several villages and hamlets grew around the fringes of the loch, their industries of weaving, paper making and fishing reliant on the supply of water. The largest of these settlements, particularly Kinross, Milnathort and Kinnesswood have expanded over the last century, the latter pushing up the slopes of the Lomond Hills.

Montrose Basin

5.15.5 Physical characteristics: The Montrose Basin is a large, rounded estuarine basin formed near the mouth of the River South Esk. Unlike Loch Leven, the basin is tidal, revealing extensive mudflats at low tide. An area of low-lying, drained farmland extends inland,

while the basin is separated from the sea by the town of Montrose, located on a low peninsula spit of land less than two kilometres wide. There have been attempts to drain the basin to provide farmland in the past, the most notable effort leaving Dronner's Dyke which is revealed at low tide. Like the Loch Leven Basin, this area is shallow and open. The expanse of mudflats, water, distant shores and sky all shape the character of the surrounding landscape.

5.15.6 The Montrose Basin also has a rich natural heritage. Its mudflats provide important feeding grounds for birds, supporting internationally important numbers of geese, wigeon and redshank and nationally important numbers of eider, oystercatcher, knot and mute swan. A number of salt-loving plants, including rare grasses, occur on the mudflats. The variety of saline, brackish and freshwater marshes have a great variety of plant communities. The area is also of geological importance.

5.15.7 **Settlement and land use.** Outwith the physically constrained town of Montrose, settlement is limited to a scatter of farmsteads, generally located on slightly higher ground along the A934 and A935 to the south and north of the basin. The western end of this landscape unit is occupied by Kinnaird Park with its deer park and extensive estate woodlands. A number of historic mills are sites along the non-tidal section of the River South Esk, above the Bridge of Dun. Some land has been reclaimed at the inland edge of the basin. There is also a series of raised beaches which demonstrate the series of sea level changes that occurred during the later stages of the last Ice Age and in the post-glacial period.

FORCES FOR CHANGE

5.15.8 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.15.9 **Agriculture.** Both basins include considerable areas of arable and grazing land around the fringes of the waterbodies. This is generally of a semi-open character, enclosed by hedges. There appear to be few pressures acting upon agriculture in these areas.

5.15.10 **Transport.** Both basins are encircled by roads, several of them of A road status. In addition, the M90 passes close to the western side of Loch Leven and, at Montrose, a new inner relief road has been constructed along the north-eastern side of the basin. These roads means that there is often a considerable amount of traffic movement and noise in these otherwise tranquil locations.

5.15.11 **Development.** Historically, both the Loch Leven and Montrose Basins have been a focus for settlement. In the case of Loch Leven, a number of suburban settlements have developed around the loch principally at Kinross, Milnathort and Kinnesswood (the latter is discussed in relation to the Dolerite Hills landscape type, above). Some of the more recent development at Kinross is particularly prominent in the landscape as a result of the building materials that have been employed (white walls and orange pantiles - reflecting

the styles more commonly found in Fife to the south) and the lack of screening around the urban edge. Development at Montrose has been concentrated on the constrained spit of land occupied by the town itself. Expansion has occurred northwards, away from the basin.

5.15.12 **Forestry and woodland.** Commercial woodland is absent from this landscape type. However, semi-natural woodland is found around the edges of the waterbodies.

5.15.13 **Recreation.** The natural heritage importance of the Lowland Basins is reflected in the presence of interpretation facilities. Otherwise, access and recreation is limited.

5.15.14 **Tall structures.** The Loch Leven Basin includes a ball-like radio installation west of the Kinross junction on the M90. Although visible from a number of areas it is not an unduly prominent feature. More serious would be the development of tall structures on the hills that enclose the basins. This is discussed elsewhere, but could have a significant impact on the landscape character and quality of the basins.

5.15.15 **Climate change.** It is possible that climate change brought by global warming could result in an increase in storminess and changes in sea levels. Both could have serious implications for the future of the Montrose Basin in particular. Rising sea levels could result in the inundation of areas of surrounding farmland, or the erection of tidal defences which would result in a decrease in the extent of exposed mudflats and inevitable implications for birds. Monitoring, and an integrated strategy to manage any changes are therefore essential.

LANDSCAPE GUIDELINES

5.15.16 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the natural and at times remote character of these sections of coast.

Transport	• Explore opportunities to provide more on- and off-site screening to reduce the visual and aural impacts of principal roads.
Development	• Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements and to protect the area's tranquil character. • Discourage the simplistic grafting of housing estates onto the edge of settlements. Encourage more imaginative schemes which respond to the existing patterns of layout, structure, massing and scale. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles.

(Development contd.)	• Consider positive ways of addressing the interface between settlements and the surrounding countryside. These could include: - screening; - new buildings which address surrounding areas; - key vistas and views; - landmark features; - gateways and approaches.
Forestry and woodland	• Encourage appropriate woodland planting where this can contribute to positive land management to reduce eutrophication at Loch Leven. • Encourage management of hedges and semi-natural woodland.
Recreation	• Maintain low level of formal recreational provision.
Tall structures	• Assess any proposals for tall structures in terms of their visual and landscape impact.
Climate change	• Monitor the effects of climate change and assess any options for flood defence in a comprehensive and balanced way.

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Appendices

APPENDIX A

HISTORICAL ASSESSMENT

The Study Brief required the study to incorporate historic aspects of the landscape into the assessment and for a short statement to be prepared describing how this had been achieved. A comprehensive historic landscape assessment would require a substantial input to the study from archaeologists and historians in order to translate the mass of detailed historic information (for instance that contained in Sites and Monuments Records) into broader historic landscape types. Having undertaken similar studies elsewhere in the country, it was recognised that such an analysis lay outwith the scope of the present study. However, it was agreed with the Study Steering Group to draw upon existing information sources to provide as full a picture of historical influences on the modern landscape as possible.

This report has, therefore, sought to integrate consideration of the historic landscape throughout the report. Rather than limiting discussion to a self-contained chapter at the beginning of the report, the report has deliberately described those historical features which are characteristic of the region, or parts of it, and which make an important contribution to the landscape. At the same time, there is an analysis of the pattern of historic sites and landscapes found within each of the landscape character types, including a brief description with examples in the written descriptions in Chapter 5. This complements similar information on geology, natural heritage and modern development. It is believed that this approach has worked well in Tayside where the sharp topographical contrasts have had a profound influence on historic patterns of settlement, land use, farming, communication and even clan warfare.

APPENDIX B

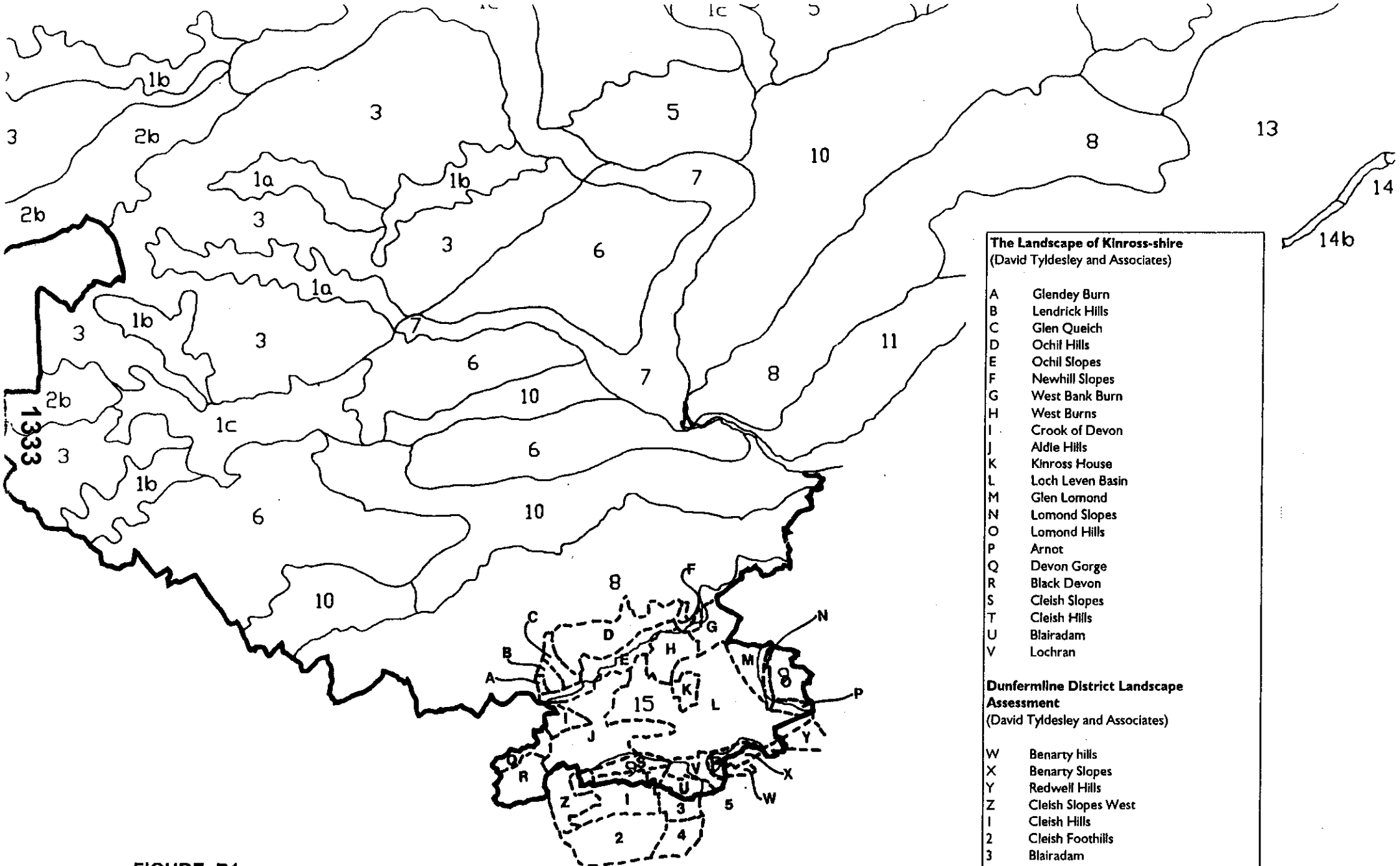
OTHER LANDSCAPE ASSESSMENTS

The Study Brief for the Tayside Landscape Assessment Project required the project team to review a range of other landscape assessments covering parts of the study area, or surrounding areas. It stated that 'the consultants will need to ... ensure consistency in their classification of landscape character areas and types'. Accordingly, the principal landscape assessments were reviewed and the following conclusions drawn.

Figure B1 shows the landscape classifications of **Kinross-shire** and **Dunfermline** prepared by David Tyldesley and Associates (1995) overlaid on the landscape classification produced during the Tayside Landscape Assessment. It is evident that the Kinross-shire and Dunfermline assessments were undertaken at a much finer scale, representing district or local level landscape assessments as opposed to a regional scale assessment. There is broad correspondence between the different levels of assessment.

Figure B2 shows the classification produced by the Turnbull Jeffrey Partnership as part of the **Cairngorms Landscape Assessment** (1996). In contrast to the Kinross-shire and Dunfermline assessments, it is evident that this study adopted a larger scale approach than the Tayside Landscape Assessment, incorporating highland glens and intervening hill ranges in single landscape types for example. There is less correspondence between Cairngorm and Tayside landscape assessments.

Figure B3 shows the landscape classifications of the **Central Region Landscape Assessment** (ASH, 1999) and the **Loch Lomond and the Trossachs Landscape Assessment** (TJP, unpublished report to SNH). It is evident that these studies adopted a scale of assessment similar to that of the Tayside Landscape Assessment. Furthermore, many of the landscape character areas identified during the Tayside study, are continued across the regional boundary into Central Region and the Trossachs area.



The Landscape of Kinross-shire
(David Tyldesley and Associates)

A	Glendey Burn
B	Lendrick Hills
C	Glen Queich
D	Ochil Hills
E	Ochil Slopes
F	Newhill Slopes
G	West Bank Burn
H	West Burns
I	Crook of Devon
J	Aldie Hills
K	Kinross House
L	Loch Leven Basin
M	Glen Lomond
N	Lomond Slopes
O	Lomond Hills
P	Arnot
Q	Devon Gorge
R	Black Devon
S	Cleish Slopes
T	Cleish Hills
U	Blairadam
V	Lochran

Dunfermline District Landscape Assessment
(David Tyldesley and Associates)

W	Benarty hills
X	Benarty Slopes
Y	Redwell Hills
Z	Cleish Slopes West
I	Cleish Hills
2	Cleish Foothills
3	Blairadam
4	Loch Fitty
5	Lowland Hills and Valleys

FIGURE B1

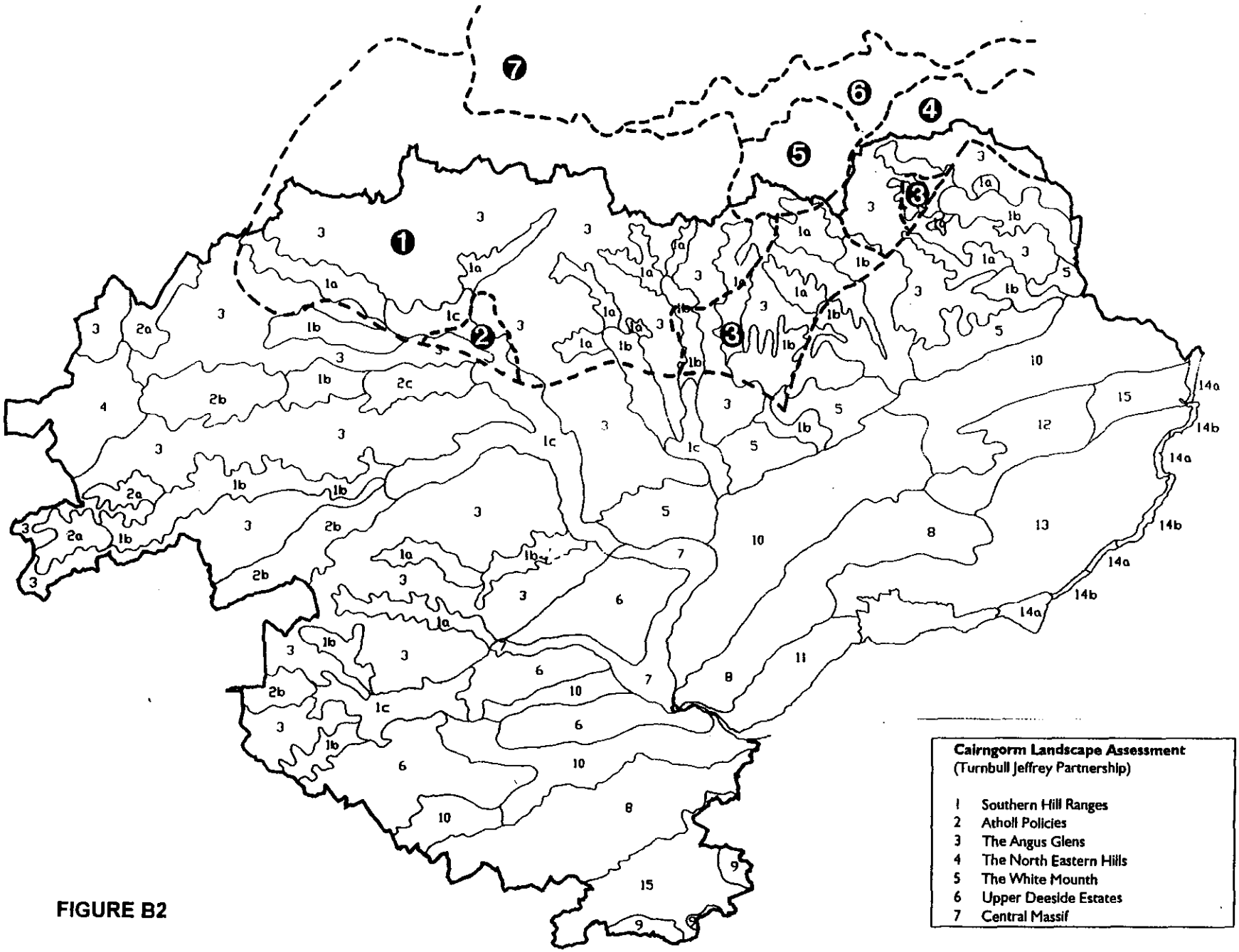

Cairngorm Landscape Assessment
(Turnbull Jeffrey Partnership)
1 Southern Hill Ranges
2 Atholl Policies
3 The Angus Glens
4 The North Eastern Hills
5 The White Mounth
6 Upper Deeside Estates
7 Central Massif

FIGURE B2

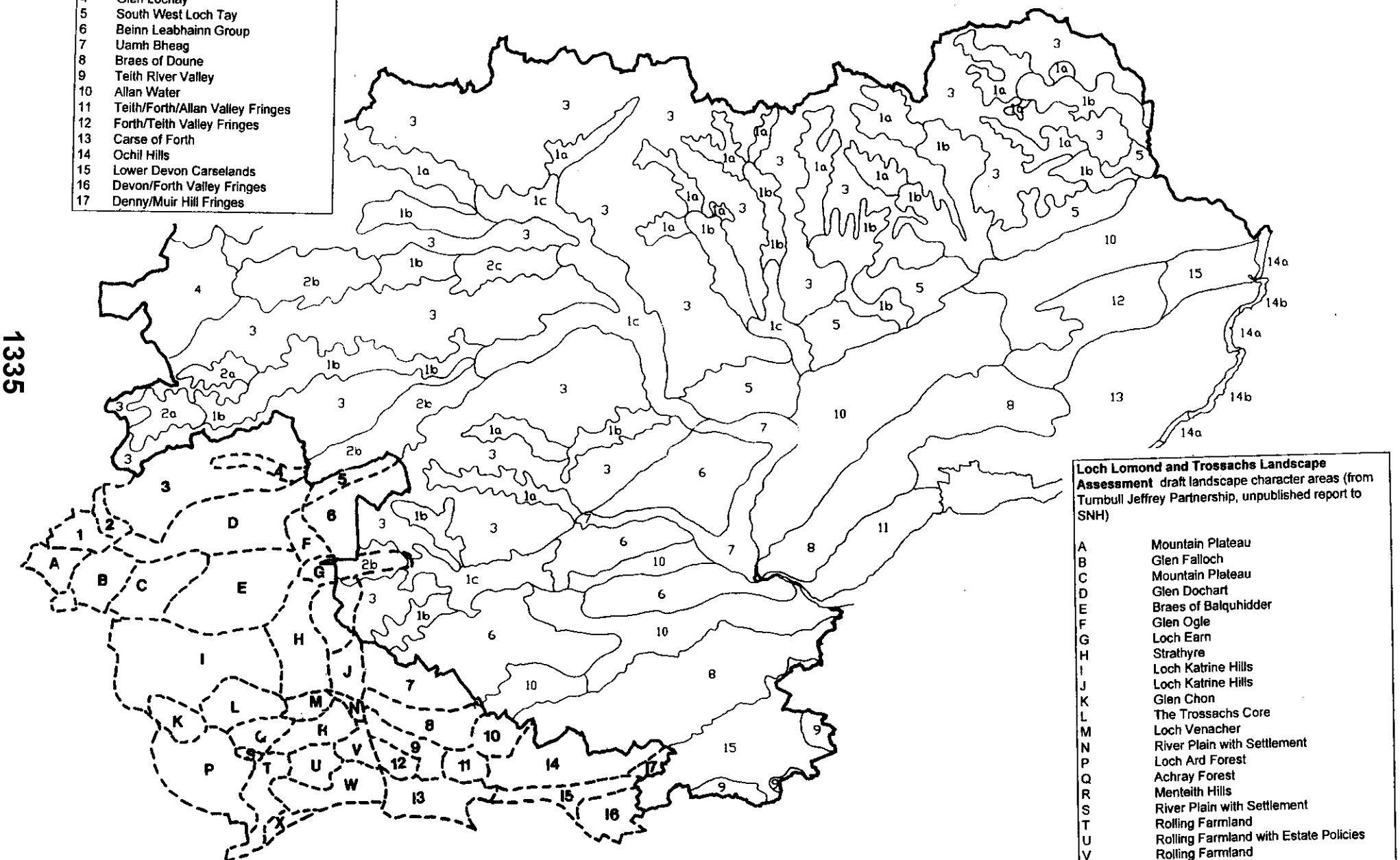

Central Region Landscape Assessment (ASH) - relevant landscape character areas
1 Ben Lui Group
2 Strath Fillan
3 Glen Lochay Group
4 Glen Lochay
5 South West Loch Tay
6 Beinn Leabhainn Group
7 Uamh Bheag
8 Braes of Doune
9 Teith River Valley
10 Allan Water
11 Teith/Forth/Allan Valley Fringes
12 Forth/Teith Valley Fringes
13 Carse of Forth
14 Ochil Hills
15 Lower Devon Carselands
16 Devon/Forth Valley Fringes
17 Denny/Muir Hill Fringes
Loch Lomond and Trossachs Landscape Assessment draft landscape character areas (from Turnbull Jeffrey Partnership, unpublished report to SNH)
A Mountain Plateau
B Glen Falloch
C Mountain Plateau
D Glen Dochart
E Braes of Balquhidder
F Glen Ogle
G Loch Earn
H Strathyre
I Loch Katrine Hills
J Loch Katrine Hills
K Glen Chon
L The Trossachs Core
M Loch Venacher
N River Plain with Settlement
P Loch Ard Forest
Q Achray Forest
R Menteith Hills
S River Plain with Settlement
T Rolling Farmland
U Rolling Farmland with Estate Policies
V Rolling Farmland
W The Carse of Forth

FIGURE B3

APPENDIX C

WIND POWER GUIDANCE

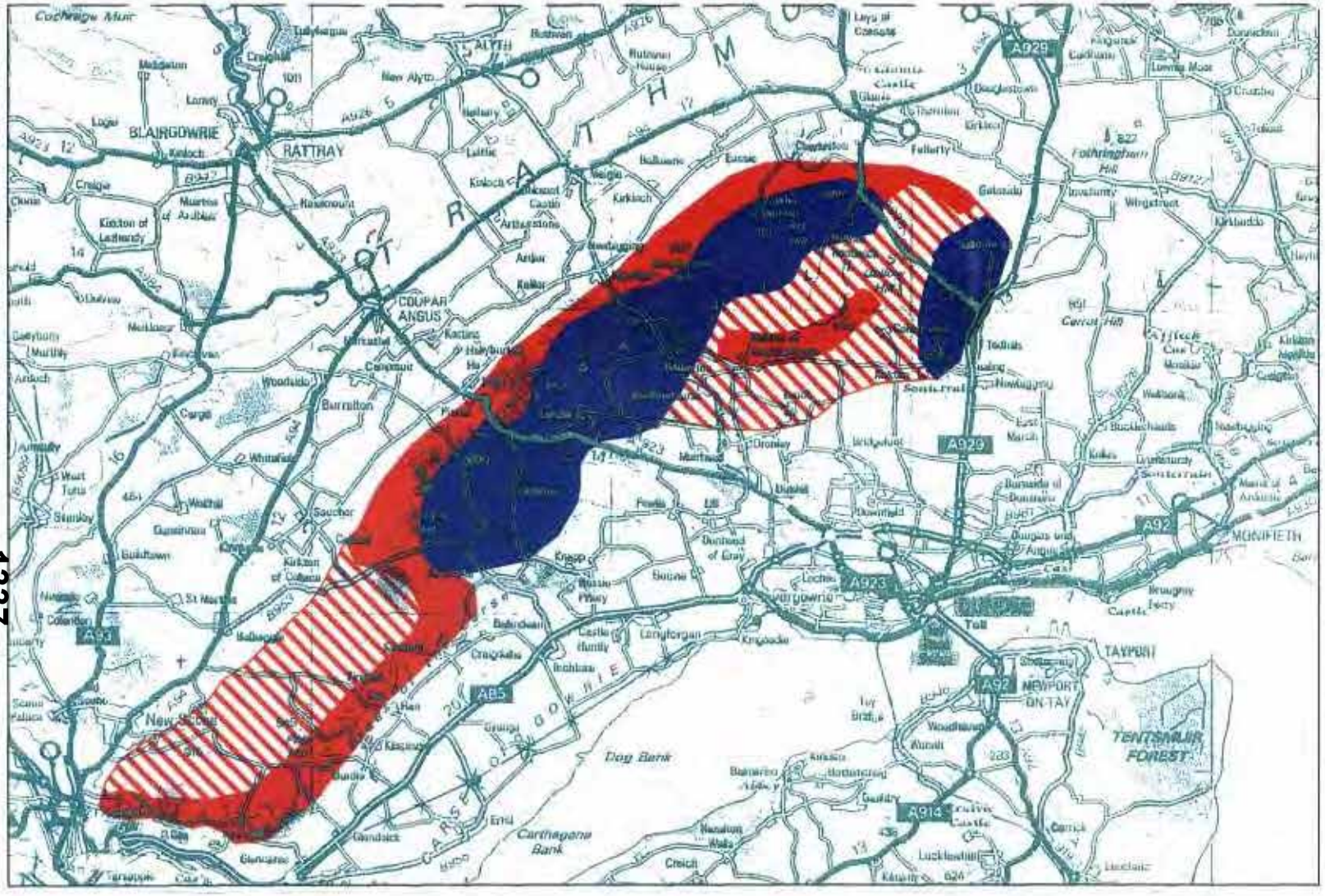
Chapter 4 of this report deals in some detail with the issue of wind power and the possible landscape effects associated with the development of wind farms.

It was recognised that pressure for wind farm development may occur in the Highland Summits and Plateaux areas, in the Highland Foothills and within the Ochils and Sidlaws. The relative merits and constraints associated with each of these landscape types are discussed in some detail in Chapter 4. The approach to planning and assessing such proposals is also outlined.

It was agreed that it would be helpful to provide indicative guidance for one area to illustrate more clearly the broad sensitivities and principals which should be respected in bringing forward proposals for wind farms. The Sidlaws were selected as a suitable area.

Figure C1 provides guidance on the siting of wind turbines within the Sidlaws. It should be emphasised that this guidance is indicative only, and has been prepared on the basis of a regional scale landscape assessment. Much more detailed landscape assessment and landscape impact appraisal would be required to confirm the suitability of these areas in relation to specific planning proposals. Furthermore, it should be emphasised that no areas are entirely free from landscape constraints and that decisions should be made in the light of a regional renewable energy strategy, and in the context of a range of other factors (including technical and operational factors). The indicative wind farm strategy does not necessarily represent the views of Scottish Natural Heritage.

Figure C1 identifies areas of lowest constraint, medium constraint and highest constraint. The most prominent ridgelines and areas visible from both the Firth of Tay and Strathmore fall into the first category. The areas of lowest constraint include the shallow bowls lying to the south of the main Sidlaws ridge and are, in places, associated with existing development such as road corridors.



TAYSIDE REGION

LANDSCAPE CHARACTER ASSESSMENT

FIGURE C1

WIND FARM LOCATION ANALYSIS

= Areas of lowest constraint for windfarm development

= Areas of medium constraint for windfarm development

= Areas of highest constraint for windfarm development

Scale:
0km 10 km

APPENDIX D

LANDSCAPE PLANNING AND MANAGEMENT SUMMARY MATRIX

Issue	Management Approach	Upper Highland Glens	Middle Highland Glens	Lower Highland Glens	Upper Highland Glens with Lochs	Middle Highland Glens with Lochs	Lower Highland Glens with Lochs	Highland Summits and Plateaux	Plateau Moor	Highland Foothills	Lowland Hills
Agriculture	Conserve field boundaries	★	★	★	★	★	★			★	★
	Replant boundary trees			★		★	★			★	★
	New woodland belts			★						★	★
	Discourage agricultural improvement	★	★		★	★		★	★		
	Discourage over concentration of oil seed rape			★							
	Design of new buildings		★	★		★	★			★	★
	Retain agriculture						★	★			
	Maintain upland/lowland distinction		★			★				★	★
	Conserve traditional buildings		★	★		★	★			★	★
Transport	Minimise upgrading of roads	★	★	★	★	★	★	★	★	★	★
	Mitigate impact of new roads	★	★	★	★	★	★			★	★
	Restore roadside features									★	★
	Mitigate impact of existing roads			★							★
Development	Discourage development	★			★			★	★		
	Steer development to existing centres		★	★		★	★			★	★
	Encourage use of vernacular		★	★		★	★			★	★
	Improve urban edge			★			★				★
Forestry	Discourage new plantations	★			★			★	★		
	Explore potential for new plantations			★			★			★	★
	Improve existing conifers	★	★	★	★	★	★	★	★	★	★
	Favour native woodlands	★	★	★	★	★	★	★	★		

Recreation	Focus activity at existing centres	★			★	★	★				
	Low-key provision	★	★		★	★		★	★		
	Restrict additional caravan parks					★	★				
	Mitigate existing caravan parks					★	★				
	Influence design of facilities			★			★				
	Monitor visitor pressures	★				★	★	★			
Tall structures	Discourage	★	★		★	★		★	★		
	Encourage sharing of facilities		★	★		★	★			★	★
	Potential for sensitive wind farms									★	★
Climate change	Monitor and plan										
Minerals	Restoration issues										
	Ensure screening										

Issue	Management Approach	Lowland River Corridor	Igneous Hills	Dolerite Hills	Broad Valley Lowlands	Firth Lowlands	Low Moorland Hills	Dipslope Farmland	Coast with Sand	Coast with Cliffs	Lowland Basins
Agriculture	Conserve field boundaries	★	★		★	★	★	★		★	★
	Replant boundary trees	★	★		★	★	★	★		★	★
	New woodland belts				★	★		★		★	
	Discourage agricultural improvement										
	Discourage over concentration of oil seed rape				★			★			
	Design of new buildings	★	★		★	★	★	★			
	Retain agriculture										
	Maintain upland/lowland distinction		★	★							
	Conserve traditional buildings	★	★		★	★		★		★	
Transport	Minimise upgrading of roads	★	★	★	★	★	★	★	★	★	★
	Mitigate impact of new roads				★	★					
	Restore roadside features		★		★	★	★	★			
	Mitigate impact of existing roads				★	★		★			
Development	Discourage development								★		
	Steer development to existing centres	★	★	★	★	★	★	★		★	★
	Encourage use of vernacular	★	★	★	★	★	★	★		★	★
	Improve urban edge	★		★	★	★		★			★
Forestry	Discourage new plantations			★					★	★	★
	Explore potential for new plantations	★	★		★		★				
	Improve existing conifers	★	★	★			★				
	Favour native woodlands	★	★	★	★						★

Recreation	Focus activity at existing centres										
	Low-key provision		★						★	★	★
	Restrict additional caravan parks										
	Mitigate existing caravan parks										
	Influence design of facilities										
	Monitor visitor pressures								★		
Tall structures	Discourage			★					★	★	
	Encourage sharing of facilities	★	★		★	★	★	★			★
	Potential for sensitive wind farms		★				★				
Climate change	Monitor and plan					★			★	★	★
Minerals	Restoration issues				★		★				
	Ensure screening				★		★				

FIGURE 17

1a Upper Highland Glens
1b Mid Highland Glens
1c Lower Highland Glens
2a Upper Highland Glens with Lochs
2b Mid Highland Glens with Lochs
2c Lower Highland Glens with Lochs
3 Highland Summits and Plateaux
4 Plateau Moor
5 Highland Foothills
6 Lowland Hills
7 Lowland River Corridors
8 Igneous Hills
9 Dolerite Hills
10 Broad Valley Lowlands
11 Firth Lowlands
12 Low Moorland Hills
13 Dipslope Farmland
14a Coast with Sand
14b Coast with Cliffs
15 Lowland Basins

TAYSIDE REGION

LANDSCAPE CHARACTER ASSESSMENT

LANDSCAPE CLASSIFICATION

KEY:
- Tayside Region
- Regional Character Area Boundaries
- Landscape Type Boundaries

Scale: 0 kms 5 10 15

Wind Farms
Summary of Key Landscape Issues

- ***interest in wind power is likely to increase over the next few years; can the environmental benefits of this renewable energy generation be balanced with the need to protect other aspects of the environment?***
- ***wind turbines are often visible features in the landscape, in part reflecting their size, modern and industrial design, vertical orientation and the movement of their blades; how can they best be incorporated into the landscape ?***
- ***given the common coincidence between areas of high scenic value and areas with the highest average winds, how can the planning system balance the need to select prominent sites with the need to protect the most sensitive landscapes?***
- ***how can natural topography and land cover be exploited to screen and backcloth wind farms?***
- ***are some landscape types better suited to wind farm development than others?***

General for Planning and Management Considerations

4.63. In accordance with the approach recommended by NPPG 6 it is considered that the local authorities should take a proactive role in defining areas with potential for wind farm development and those areas where such development cannot be reconciled with other policy objectives. Although factors such as noise, safety, proximity to National Grid connections and communications may influence this analysis, it is the effect on landscape, and upon nationally protected landscapes, which are likely to be most significant in defining these areas. The analysis of landscape types provides broad guidance on the acceptability of wind farm development in different areas. However, it would be simplistic, and probably misleading, to calculate the actual scope for wind farm development on this basis since many more local factors are likely to be significant in defining suitable sites within areas of search. Some of these factors are considered below and the importance of environmental assessment in the design process is outlined.

4.64. The following locations are likely to be particularly sensitive to wind farm development:

- extensive upland areas where development is sparse and views extensive;
- areas designated for their landscape or nature conservation value;
- small-scale landscapes;
- skyline sites;
- sparsely developed areas;

- prominent locations where the development can be seen by large numbers of people (e.g. residents, travellers or visitors).

4.65. Taken together, these factors apply to much of the region. The challenge, therefore, is to determine the extent to which these issues can be addressed during the design and implementation of schemes. If this is not possible, an alternative approach may be necessary.

Environmental Assessment

4.66. The process of environmental assessment should be used to influence the design of wind farm development. In particular, the assessment process should:

- examine alternative sites;
- examine the scope for alternative site layouts; there may be scope to reduce the visual impact of a scheme, for instance by removing turbines from the skyline, without making it unviable;
- the impact on the character of the surrounding landscape, taking account of those landscape types from which the development would be seen;
- the impact on sites designated for their landscape or nature conservation value;
- the scope for on-site or off-site mitigation, including the use of additional planting;
- impacts during construction and decommissioning.

Design

4.67. It is important that wind farm developments respond to the character of the surrounding landscape. As a general rule, flat or open landscapes should be avoided since here views will be long and the turbines will often be visible against the sky. More undulating landforms are likely to provide better screening. Wherever possible, skyline locations should be avoided in favour of sites where the natural land form provides a backdrop against which the wind farm would be seen. Existing land cover (particularly woodland or forestry) may accentuate the screening provided by the landform.

4.68. Locations within coniferous plantations may have the potential to reduce a number of the environmental impacts noted above for the following reasons:

- woodland would provide screening for turbines, particularly when viewed from nearby; associated buildings would be concealed from view;
- to some extent, coniferous forests already present a modified upland landscape; this offers scope for the siting of wind turbines and may help to ease the pressure on open landscapes;
- infrastructure such as forest and access roads usually already exists in these areas.

4.69. However, the option of steering wind farm development to forest locations requires technical assessment. It is recognised that commercial forestry activities usually avoid the most exposed areas. Account should also be taken of the forestry harvesting and management plans in order to ensure that the benefits of woodland screening are sustained.

Regional Overview

4.70. Detailed information on average wind speeds is not available for Tayside. However, taking into account the basic need for high and reliable average wind speeds, it is likely that suitable areas are likely to include:

- highland summits and plateaux;
- transitional hills along the Highland Boundary Fault;
- the Sidlaws and Ochils;
- lowland hills such as the Gask Ridge and Montreathmont Moor.

4.71. As noted above, technical constraints, principally the need for proximity to a suitable part of the electricity distribution network, means that large parts of the Highland, particularly to the east of Glen Garry/Strath Tay, are unlikely to be viable.

4.72. Other parts of the Highlands are likely to be very sensitive to wind turbine development as a consequent of their extremely open 'wilderness' character and extensive views. Any structures would be very visible in this otherwise undeveloped landscape. Even where large parts of the upland have been modified by commercial forestry, any turbines would still be visible over a considerable distance and from many of the principal peaks and viewpoints. This would undermine its wild, upland character. Set against this is the fact that many parts of the Highlands are remote, and comparatively few people would be exposed to the turbines. Overall, however, given the sensitive nature of this landscape, there is a very high level of constraint affecting the development of wind farms in the Highlands. However, should the technical constraints associated with this area be reduced, the Highlands could come under considerable pressure for wind farm development. If this should happen, the areas of highest environmental constraint should be identified as a means of steering wind farms to the most suitable locations. Factors to consider might include:

- the importance of avoiding areas of high nature conservation importance;
- the need to avoid areas of high plateau where turbines would be visible for many tens of miles;
- the need to avoid areas of high recreation value, particularly those used by walkers and climbers;
- the scope for backclothing provided by locations on shoulders and shelves of upland.

4.73. As the term suggests, the transitional foothills along the Highland Boundary Fault form a transition zone from the uplands to the lowlands. This is reflected in landform, land use, vegetation and settlement. West of Strath Tay the landform is often open and rounded. To the east it is more fragmented and smaller scale. Although wind speeds would be lower than in the Highlands, it is probable that these areas would still be viable, particularly since they are relatively close to parts of the electricity distribution network. Wind farm development in these areas would have the advantage that turbines could be set against a backdrop of the Highland mountains. However, the erection of modern

prominent structures could undermine these areas' role in marking the transition from unsettled uplands to settled lowlands. There is generally a high level of constraint in these areas, but that there may be limited opportunities where view-sheds associated with developments are relatively contained. There may also be opportunities to the north of Glen Almond, particularly where the A9 corridor has brought a measure of development. Schemes here would need to be carefully designed and assessed.

4.74. The Sidlaws and Ochils are close to the principal centres of population and, over the years, have accommodated a considerable amount of development including masts, pylons, roads, plantations and reservoirs. While the overall aim should be to reduce the impact of these past developments, the different character and quality of these areas suggests that they may be better for wind farm development. The suitability of areas will vary considerably within the hills, and it is inevitable that some degree of landscape impact will result. However, it is possible that the balance between benefits and impacts is easier to find in the Sidlaws and, to a lesser extent the Ochils, than in more sensitive landscapes. The principles of development should include:

- avoid skyline locations, particularly where this results in extensive areas of visual influence on either side of the hill range;
- favour shallows bowls on the dipslopes;
- examine the potential of areas already affected by major roads, masts or forestry;
- take into account any constraints associated with telecommunications infrastructure;
- employ environmental assessment during the design stage

4.75. An indicative map, illustrating the sensitivities of the landscape for wind farm development in the Sidlaws, is contained in **Appendix C.** It should be noted that this has been prepared on the basis of a regional scale landscape assessment and that much more detailed assessment would be required in the event of a proposal coming forward in this area.

4.76. Lowland hills such as the Montreathmont Moor near Forfar may hold potential for wind farm development. Given the concentration of commercial woodland in some of these areas, it may be worth exploring whether wind farms and forestry are compatible.

CLIMATE CHANGE

4.77. There has been considerable debate about the phenomenon of climate change which may result from higher concentration of carbon dioxide and other 'greenhouse' gases in the atmosphere. Potential effects include rising temperatures, rising sea levels as ice caps melt, and a decrease in climatic stability resulting in more frequent episodes of storminess or drought. It is too early to draw firm conclusions about the scale and nature of these changes in relation to the landscape of Tayside. Possible scenarios include:

- rising sea levels creating pressures along the cliff and sand coastline, and along the Tay estuary;
- changing temperatures and rainfall patterns with implications for upland vegetation, woodland, etc.;
- changing patterns of snow-lie, with implications for skiing and other forms of recreation;
- increased incidence of drought with implications for agriculture and soil stability.

4.78. Many of these scenarios are of a major scale and, should they become reality, little could be done but modify patterns of activity, management and planning. In situations such as the Firth of Tay, however, we face a choice. We could either respond to rising sea levels by raising sea defences (thereby protecting farmland and other property, but squeezing the ecologically important intertidal zone), or we could accept the changes and institute a programme of managed retreat of the coastline.

4.79. Although the effects of climate change could affect most landscape types in some way, consideration of the issue in subsequent chapters has been limited to situations where management responses to such change would have serious implications for the landscape.

Part II:Landscape Classification and Management Guidelines

5. LANDSCAPE CLASSIFICATION

INTRODUCTION

5.0.1 In this section of the report the landscape character of the Tayside Region is examined. In examining the principal influences on landscape character, and identifying the combinations of features or qualities which are critical in defining that character, a basis for future landscape planning and management is established.

SUMMARY METHODOLOGY

5.0.2 In analysing and describing the Tayside landscape, the approach recommended in the document '*Landscape Assessment: Principles and Practice*' published by the Countryside Commission for Scotland (Land Use Consultants, 1991) was broadly followed. The guidance issued by the Countryside Commission in their document '*Landscape Assessment Guidance*' (Countryside Commission, 1993) was also taken into account. The method comprised three principal stages.

(i) **Desk Study** wherein a range of information on geology, landform, land use, land cover and settlement are mapped and analysed to identify draft landscape character types and draft landscape character units which group together areas with similar attributes. The desk study stage of the assessment also included a review of other descriptions of the landscape and consultation with relevant parties.

(ii) **Field Survey** when the draft landscape types and units are tested on the ground and the character of the landscape recorded, using both written description and photographs.

(iii) **Analysis and reporting** when the desk and survey information are brought together to produce definitive descriptions of each landscape character type.

Subjective Assessment of Character

5.0.3 Landscape assessment uses a combination of objective appraisal (which records the presence or absence of particular features such as hedges or buildings) and subjective appraisal during field survey and subsequent analysis. The latter is designed to record the observer's perception of the landscape. The character of the landscape is described under a series of headings, which are explained below and are used to describe each of the landscape types in the rest of the report.

Views	Views are influenced by topographical and landcover factors. They may be **distant** where there is a large expanse of uniform foreground (e.g. heather moorland) and the focal point (e.g. mountain summits) are at some distance. Views may be **framed** where there are strong vertical and horizontal elements, such as woodland or steeply rising slopes either side of a bay. Views may be **intermittent** where the view is interrupted by landform features such as drumlins or woodland cover in the foreground or mid-ground. Views are **panoramic** where expansive, long distance views can be gained for a third or more of the field of view. Views are described as being **corridor** where they are linear in nature, for example within a valley or along a woodland ride.
Scale	Here the overall scale of the landscape must be assessed once the factors that define it have been assessed. These factors include the degree of enclosure by landform or woodland and the main positions from which the landscape is viewed. Scale increases with elevation and distance. The scale may range between **intimate** (perhaps in the vicinity of a waterfall or burn in a secluded hollow), through **small** (where a network of small fields might give the landscape a fine grain), **medium** (where the principal elements are of some size but do not overwhelm the observer) to **large** where the scale of the landscape is such as to make the observer feel dwarfed. It is not possible to place hard and fast rules on the dimensions which fall into each category.
Enclosure	Where elements are so arranged that they enclose space, this has an effect on the overall composition so that the space and mass become as one. It is also closely related to scale, due to the interaction of the height of enclosing elements and the distance between them. Enclosure may be defined as **confined** within a very small-scale landscape (e.g. within a ravine, or a clearing in dense woodland), **enclosed** where views are restricted to the immediate context (e.g., within a small to medium-sized valley), **semi-open** where the containment of the landscape is less and views to surrounding areas are more exposed (e.g.. within a shallow valley), **open** where there is little physical containment, but where features such as hedgerows, boundary trees or wall provide some sense of shelter, to **exposed** where there is no shelter and the observer feels exposed to the surrounding landscape and the weather.
Variety	This reflects the number and diversity of landscape features. On the one hand, a **complex** landscape will have very many elements (e.g. woods, fields, field boundaries, waterbodies, hills and hillocks, buildings and structures). On the other hand, a **simple** landscape will contain just one or two elements, such as heather moorland or outcrops of rock.

Texture	This varies according to scale of assessment but may be influenced by the underlying landform, the pattern of landcover and land use including size of fields, nature of boundaries and types of crop. For example, open chalk grassland may be described as **smooth**, an agricultural landscape of fields, hedges and hedgerow trees may be described as **textured**, a craggy area of heather moorland might be described as **rough** while an upland corrie or a section of cliff coast might be described as being **very rough**.
Colour	This simply records the contribution of colour in the landscape. In winter, a moorland landscape of heather and bog might be described as being **monochrome**, an area of unimproved pasture might be **muted**, an area of birch woodland **colourful** in spring and even **garish** in autumn. The assessment should take into account changes brought by different seasons and in different weather conditions.
Movement	Movement within the landscape may take a number of forms, reflecting levels of activity and land use, the physical movement of vehicles or people, or natural flows of the tides and falling water. This movement may be **remote** where it occurs on the fringes of the landscape, **vacant** where it is slight or absent altogether, **peaceful** where movement is in harmony with the character of the landscape or **active** where the movement stands out as an element in its own right.
Unity	The repetition of similar elements, balance and proportion, scale and enclosure all contribute to the sense of unity. The degree to which elements fit within their landscape context also contributes to the degree of unity. A major road through an otherwise unified landscape could result in a high degree of disunity. Degrees of unity include **unified** where the landscape shows common patterns of elements, management and use, **interrupted** where the otherwise unified landscape has been modified by moderately discordant elements such as insensitive residential development, **fragmented** where changes such as new transport infrastructure, or the decline of traditional forms of management mean that only some areas retain the historic character; or **chaotic** where unrelated landscape elements destroy any pre-existing character but fail to create a unified new landscape.
Naturalness	Naturalness reflects the apparent extent to which human activity has modified the landscape. It is usually used to describe common perceptions of the landscape. In other words, areas of semi-natural or managed landscape such as heather moorland are often described as **undisturbed**, while enclosed areas of glens may be described as **restrained** and lowland farmland described as **tamed**. Areas adversely affected by activities such as mineral working might be described as **disturbed**.

Scale of Assessment

5.0.4 It should be noted that landscape assessment can be undertaken at many different levels and that landscape types may be defined at very different scales. Whereas, at a regional scale, it may be appropriate to identify the principal Highland Glens, and to draw broad distinctions between upper, mid and lower glens, based on combinations of typical characteristics, a more detailed assessment might differentiate between river corridor, floodplain, and the lower, middle and upper valley slopes for each section of glen. It is important that assessments undertaken at a regional level are not applied at a locally specific level. The converse also applies.

ASSESSMENT HIERARCHY

5.0.5 This approach enabled the landscape to be described in a hierarchical framework which established the pattern of variation in the landscape. This framework is based upon the identification and description of Regional Character Areas. Landscape Types and Landscape Units (or Local Landscape Areas) are defined as follows:

(i) **Regional Character Areas** are recognisable as distinct landscape regions at a broad scale, based upon general characteristics such as landform, geology, soils, land use, ecological associations, historical associations and urban and industrial activity. The principal regional character areas are described later in this section.

(ii) **Landscape Types** are tracts of countryside which have a unity of character due to particular combinations of landform, landcover and a consistent and distinct pattern of constituent elements.

Differences in landscape character reflect both physical and historical or cultural influences including geology, drainage, landform, landcover and land use. Each of these landscape types has a distinct and relatively homogeneous character. There are, of course, subtle differences within each of the landscape types, some of which are referred to in the descriptions. It should be noted that the descriptions of landscape types are generalised and that the boundaries between types often indicate transitions rather than marked changes on the ground. This is particularly the case in lowland areas where changes in relief (often a major direct or indirect influence on landscape character) tend to be more subtle. The bulk of the analysis and description for this study related to landscape types. However, there is also reference, where appropriate, to landscape units (described in point (iii) below). Landscape types are usually given generic names reflecting their key characteristics (e.g. Upper Highland Glen). A given landscape type may occur in more than one regional character area, though one would expect regional factors to influence its character;

(iii) **Landscape Units** are discrete geographic areas of relatively uniform character, which fall within particular landscape types. In one regional character area, the same landscape type may occur in a number of different landscape units.

LANDSCAPE CLASSIFICATION

5.0.6 The following table sets out the hierarchy of regional character areas, landscape types and landscape units.

Table 5.1: Tayside Landscape Character Assessment: Landscape Classification

Landscape Type	Regional Character Area	Landscape Units
1 HIGHLAND GLENS		
1a) Upper Highland Glens	Mounth Highlands	Glen Mark
		Glen Lee
		Glen Effock
		West Water Valley
		Glen Clova
		Glen Prosen
		Glen Isla
		Glen Shee
		Glen Beag
		Glen Fearnach
		Glen Brerachan
		Glen Tilt
	West Highlands	Glen Garry
		Glen Quaich
		Glen Almond
1b) Mid Highland Glens	Mounth Highlands	Glen Esk
		West Water Valley
		Glen Clova
		Glen Prosen
		Glen Isla
		Glen Shee
		Strathardle
	West Highlands	Glen Errochty
		Dun Alastair

Landscape Type	Regional Character Area	Landscape Units
1b) Mid Highland Glens (continued)		Strathbraan
		Glen Lyon
		Glen Artney
1c) Lower Highland Glens	Mounth Highlands	Glen Shee
	West Highlands	Strath Tay
		Upper Strathearn
2 HIGHLAND GLENS WITH LOCHS 2a) Upper Highland Glens with Lochs	West Highlands	Loch Ericht
		Loch Daimh
		Loch Lyon
2b) Mid Highland Glens with Lochs	West Highlands	Loch Rannoch
		Loch Tay
		Loch Earn
2c) Lower Highland Glens with Lochs	West Highlands	Loch Tummel
3 HIGHLAND SUMMITS AND PLATEAUX	West Highlands	Ben Vorlich and the Forest of Glenartney
		Ben Chonzie/Sròn Mhór/Meall nam Fuaran and Craigvinean Forest
		Ben Lawers and Beinn Heasgarnich Group
		Carn Gorm/Schiehallion Group
		Meall Tairneachan Group
		Talla Bheith and Craiganour Forest

Landscape Type	Regional Character Area	Landscape Units
3 HIGHLAND SUMMITS AND PLATEAUX (continued)	Mounth Highlands	Forest of Atholl
		Forest of Clunie
		Forest of Alyth
		Caenlochan Forest/Glen Doll Forest
		Muckle Cairn/Hill of Glansie/Hill of Wirren
		Hills of Saughs/Mount Battock
4 PLATEAU MOOR	West Highlands	Rannoch Moor
5 HIGHLAND FOOTHILLS	Mounth Highlands	Clunie Foothills
		Alyth Foothills
		Kirriemuir Foothills
		Menmuir Foothills
		Edzell Foothills
6 LOWLAND HILLS	Tayside Lowlands	Gask Ridge
		Keillour Ridge
		Logie Almond/ Bankfoot Plateau
7 LOWLAND RIVER CORRIDOR	Tayside Lowlands	Strath Tay
		Glen Almond
8 IGNEOUS HILLS	Tayside Lowlands	Sidlaws
		Ochils
9 DOLERITE HILLS	Tayside Lowlands	Lomond Hills
		Benarty Hill
		Cleish Hills

Landscape Type	Regional Character Area	Landscape Units
10 BROAD, VALLEY LOWLAND	Tayside Lowlands	Strathmore
		Strathearn
		Strathallan
11 FIRTH LOWLANDS		Braes of Gowrie
12 LOW MOORLAND HILLS	Tayside Lowlands	Forfar Hills
13 DIPSLOPE FARMLAND	Tayside Lowlands	SE Angus lowland
14 COAST		
14a) Coast with Sand	Tayside Lowlands	Barry Links
		Elliot
		Lunan Bay
		Montrose
14b) Coast with Cliffs	Tayside Lowlands	Carnoustie
		Auchmithie
		Usan
15 LOWLAND BASINS	Tayside Lowlands	Loch Leven Basin
		Montrose Basin

REGIONAL CHARACTER AREAS

5.0.7 As noted above, regional character areas are recognisable as distinct landscape regions at a national scale as result of the distinctive combinations of geology, landform, drainage, landcover, historical and ecological influences and settlement. Chapter 3 of this report demonstrated the key influence of geology within Tayside. The Highland Fault runs south-west to north-east across the region, marking a rapid transition from the Highlands, to the north-west, and lowlands to the south-east. This physiographic division has had a fundamental influence on landscape character reflected in contrasting patterns of landcover, land use, communication and culture.

5.0.8 The area to the north and west of the Highland Fault, often described simply as the Grampian Mountains, may be further divided, reflecting important differences between the Highlands to the west and east of Glen Garry and Drumochter. To the west lies the central mountain ridge that extends northwards from Ben Lomond to Ben Hope in

Sutherland. To the east lies the mountain chain extending from Drumochter eastwards along the southern side of the Dee valley, diminishing in size as it approaches the North Sea near Aberdeen. Historically, this area of highland has been referred to as the Mounth.

5.0.9 These three regional character areas - the Tayside Lowlands, the West Highlands and the Mounth - are described in the following paragraphs.

Tayside Lowlands

5.0.10 This regional character area covers all of the south-eastern part of the Tayside region. Its geology is dominated by a combination of Old Red Sandstone and volcanic lavas and tuffs. The former rocks are comparatively soft and were subject to erosion during periods of glaciation creating the lowland valleys of Strathmore, Strathearn and Strathallan, and the Firth of Tay, together with the distinctive basin of Loch Leven. The harder lavas and tuffs were more resistant to erosion, resulting in their survival as the Ochil and Sidlaw Hills. Although rising to 500 metres in places, these hills attain neither the scale nor the appearance of upland areas to the north of the Highland Boundary Fault. At a local level, glacial deposition, modified by fluvial and marine erosion, has an important influence on landform, land use and character throughout much of this regional character area. Eskers, kames, kettle holes and dry meltwater channels occur throughout the area.

5.0.11 The Tayside Lowlands are among the most fertile areas in Scotland, with much of the land falling into Land Capability Classes 2 and 3(1), meaning that it is suited to a wide range of crops including cereals, ley grassland and root crops such as potatoes. Consequently, much of the area is in intensive agricultural use and many of towns and villages provide markets for farm produce or provide processing, machinery or distribution services to farming enterprises. Extensive woodland is rare in this area, reflecting the importance of land for agriculture. Exceptions include the less fertile and more exposed areas on higher ground.

5.0.12 The Tayside Lowlands also share a distinctive history of settlement. The area represents the northern fringe of Roman occupation, and, as reflected in the pattern of place names, formed the boundary between the more anglicised parts of Scotland to the south, and Celtic areas to the north and west. Furthermore, the productivity of the area, its relative proximity to Stirling and Edinburgh, and its location at the junction of key communication routes (the Edinburgh to Inverness road and the Glasgow to Aberdeen road) are reflected in the large number of wealthy landed estates. The formal and informal woodland, together with the associated structure of field boundary trees has a significant influence on the character of the area. The contrast between the richness of the Tayside Lowlands and the poorness of neighbouring Highland areas generated considerable conflict over the centuries as bands of cattle thieves from the Highland glens plundered the lowland. The density of hill-forts, medieval castles and fortified manor houses reflects this turbulent history.

The West Highlands

5.0.13 The West Highlands form the north-western part of Tayside, bounded to the south by the Highland Boundary Fault between Glen Artney and Strath Tay near Dunkeld, and to the east by Drumochter-Glen Garry- Strath Tummel and Strath Tay. Geologically, the area

has a structure similar to the Mounth Highlands to the east, dominated by the grits and schists of the Dalradian and Moine groups and outcrops of limestone. However, the pattern of faulting and ice movements have contributed to different patterns of glacial and fluvial erosion, and a different landscape has resulted. Glens tend to follow west to east fault lines, and are larger than the Angus Glens to the east. Several of the West Highland glens contain large lochs. Furthermore, the higher rates of precipitation in the western part of the region, caused a more rapid accumulation and movement of ice during periods of glaciation, resulting in the mountains gaining a sharper, craggier relief. The area was also more heavily dissected prior to the Ice Age and this was accentuated by glaciation.

5.0.14 Historically, settlement was influenced by the concentration of cultivable land within the principal glens, and by the existence of three major communication routes through the West Highlands towards the Atlantic coast. The first of these routes enters the Highlands at Comrie passes along the northern side of Loch Earn through Lochearnhead to Glen Ogle and beyond. The second route follows the Tay westwards to Aberfeldy and along Loch Tay. The third climbs past Loch Tummel and passes through Kinloch Rannoch to Rannoch Moor. The landscape is further influenced by the parklands and policy planting associated with the large houses and estates that occupy the lower sections of several glens. Examples include Blair Castle, Dunkeld House and Taymouth Castle. Large parts of the valley sides are clothed in coniferous woodland, while the expanses of highland between are under heather or grass shrub heath.

The Mounth Highlands

5.0.15 As noted above, the Mounth Highlands form a mountainous ridge extending eastwards from the West Highlands. The mountains form the north-eastern part of Tayside running from Drumochter-Glen Garry-Strath Tummel-Strath Tay eastwards to the Forest of Birse. The southern edge of the area is defined by the Highland Boundary Fault between Strath Tay near Dunkeld to Edzell in the east. Although dominated by the grits and schists of the Dalradian and Moine groups, there are also significant areas of granite (for example Ben Dearg) and areas of limestone. The landform has been substantially modified by glaciation, creating distinctive glaciated valleys and resulting in deposition of moraines within the glens. The lower accumulation of snow and ice in the drier Mounth, together with the preglacial landform, are reflected in the mountains having a more rounded and less craggy relief than those to the west. Along the Highland Fault the incidence of a range of different rock types, including volcanic lavas and tuffs, are reflected in the dissected pattern of hills and intervening glens which form the Highland foothills.

5.0.16 In contrast to the West Highlands, the glens along the southern side of the Mounth run from north-west to south-east, reflecting the natural fall of the land from the watershed. The glens tend to be smaller in scale, and shorter, with few providing modern routes through towards the Dee valley. Historically, however, many of the glens would have formed communication routes through the Mounth. The proliferation of castles and fortified houses at strategic points within the glens and at their mouths, reflected the need to control the movement of people and stock. Following the Highland Clearances, much of the Mounth was given over to deer hunting, a use indicated by the word 'forest' in the names of many of the upland areas. Commercial forestry has developed as an important

land use in the middle and lower parts of the glens. The uplands themselves remain as expanses of dwarf heather moorland.

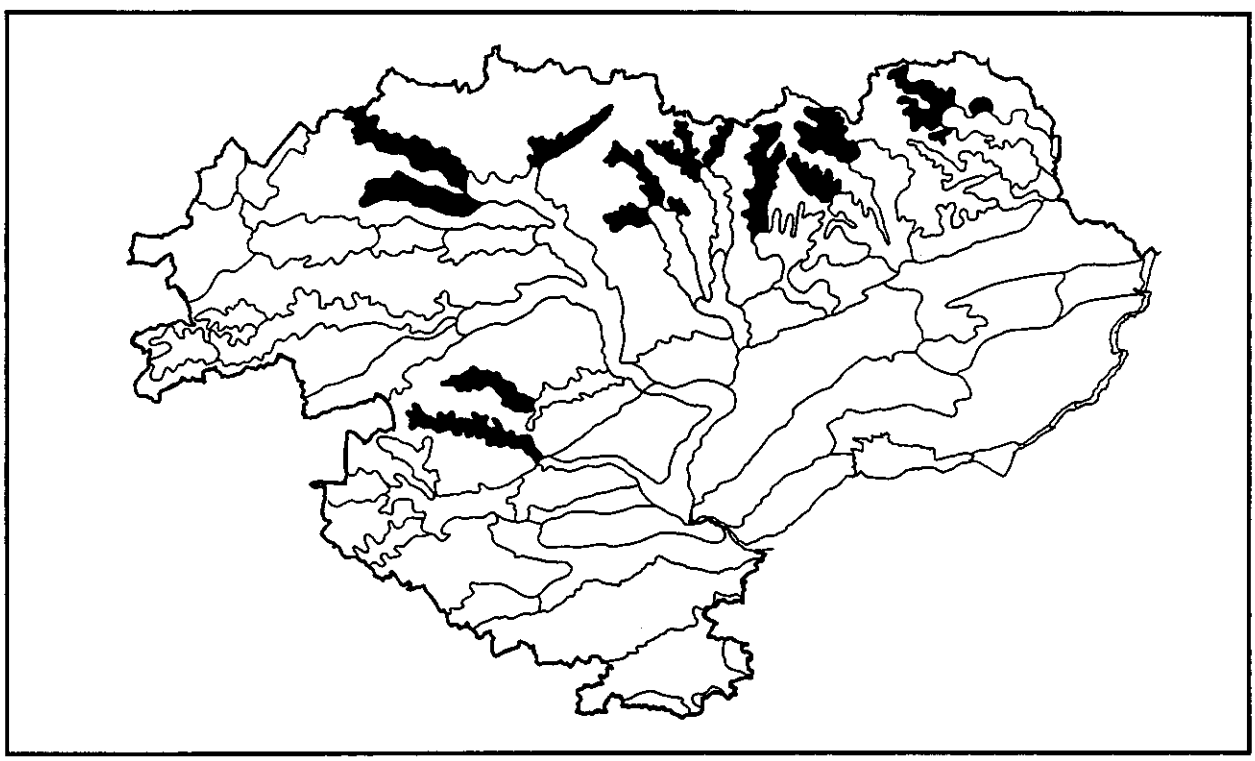
LANDSCAPE TYPE DESCRIPTIONS

5.0.17 The following sections of the report provide generalised descriptions of each of the landscape types identified by the landscape assessment. Reference is also made to the landscape units where these types occur. Where appropriate the variations in landscape character brought about by different regional character areas are described.

HIGHLAND GLENS (1)

5.1.1 Within that part of Tayside to the north of the Highland Boundary Fault, glens formed by the combination of glacial and river erosion provide one of the principal structural elements in the landscape. They also provide the focus for most human activity. In undertaking the landscape assessment, a distinction has been made between the upper, mid and lower sections of the glens. These are described below. It should be noted that those glens containing large lochs are described as a separate landscape type.

UPPER HIGHLAND GLENS (1A)



KEY CHARACTERISTICS

- *uppermost sections of principal Highland glens*
- *narrow*
- *dominated by the scale and proximity of enclosing mountains*
- *classic glaciated landforms and features*
- *sparse settlement and woodland cover*
- *upland, remote character*
- *in some areas the character has been weakened by recent development*

OBJECTIVE DESCRIPTION		Upper Highland Glens
Physical scale		1.5 kilometres wide at valley crest Valley floor 200-250 metres AOD Valley sides rise to 600-900 metres AOD
Woodland	broad-leaf	Virtually absent
	coniferous	Geometric plantations on valley floor and mid slopes, more natural shapes on upper slopes
Agriculture	arable	Absent
	pasture	Rough grazing on valley floor and slopes
	fields	Little or no enclosure
	field boundaries	Where they occur either dry-stone walls or post-and-wire fences
Settlement pattern		Predominantly unsettled. Scatter of isolated farms, lodges and cottages.
Building materials		Schists and granites with slate
Historic features		Castles, old routeways
Natural heritage features		Upland vegetation
Other landscape features		Rock outcrops, glacial features, hydro schemes
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium
Enclosure		Enclosed
Variety		Simple
Texture		Rough to very rough
Colour		Muted to monochrome
Movement		Remote
Unity		Unified/interrupted
'Naturalness'		Wild/slightly tamed

LOCATION

5.1.2 This landscape type comprises the uppermost sections of the most significant Highland Glens. They are distinct from the mid and lower sections of the valleys by their narrowness, the height and dominance of neighbouring mountains, the sparsity of settlement and the lack of enclosed or improved pastures on either the lower slopes or the valley floor. Within the Mounth Highlands, this landscape type occurs in Glen Mark, Glen Lee and Glen Effock (at the head of Glen Esk), the valley of the West Water, Glen Clova, Glen Prosen, Glen Isla, Glen Shee and Glen Beag (at the head of Glen Shee) and Glen Tilt. Within the West Highland mountains, it occurs at Drumochter Pass, and in Glens Quaich and Almond. In addition, there are many smaller glens within the Highlands which exhibit these characteristics, but equally form part of the upland landscape. These have not been identified separately.

PHYSICAL CHARACTERISTICS

5.1.3 While the glens in the West Highlands pass through Dalradian and Moinian grits and schists, within the Mounth the upper glens encounter a variety of different rock types including granites, limestones, quartzite and intrusive diorite. While these have local influences on topography (for instance forming the crags and scree slopes around Glen Doll, designated as an SSSI), it is glaciation that has had the most profound effect on this landscape type. Classic glaciated valley profiles, hanging valleys, corries and misfit rivers are all evident in these upper glens.

5.1.4 The upper glens are of comparatively small scale. With little or no floodplain, the valley sides rise steeply so that the glen as a whole is little more than 1 to 1.5 kilometres wide at the crest of enclosing hills. While valley floors are typically between 200 and 250 metres AOD, the enclosing mountains rise to between 600 and 900 metres. In the east, these summits are generally rounded. In the west they are craggier and more clearly defined. In both areas it is the mountains and the upland character that extends throughout the glen, that shapes perceptions and appreciation of the landscape.

5.1.5 These areas of upper glen are often of nature conservation importance, supporting a combination of moorland and lowland plant communities and fauna. The Dalradian limestone underlying Glen Tilt makes this of particular significance, supporting diverse calcareous and montane plant communities, and rare breeding birds. It is also of geological significance.

SETTLEMENT AND LAND USE

5.1.6 It is likely that, even before the Highland Clearances, the harsh environment of these upper glens would have discouraged settlement. However, many of the glens formed important routes through the highlands, particularly in the Mounth and, as a result, defensive castles (often northern outposts of larger castles or estates located in lower parts of the glen) were sited at strategic locations to control movements from the north. A good example is Invermark Castle, sited at the head of Glen Esk where three side valleys come together. A number of the old trackways through the Mounth survive as bridleways. In later centuries, these remote upland glens became popular for deer hunting and a significant number of large lodges were established.

5.1.7 Few areas of native woodland are found in the upper sections of the Highland Glens. More common are the areas of coniferous woodland established during this century by the Forestry Commission or major landowners. Within the Mounth, large plantations are found in the upper parts of Glen Clova and Glen Prosen. While conifer woods do not look out of place where they adopt 'natural' or organic shapes on the valley sides, the planting is less satisfactory where geometric shapes are imposed on the natural curves of the glaciated landform, or where plantations are established on the valley floor. The coniferous woodland around Glen Doll provides a range of examples. It is recognised that since these plantations were established, the Forestry Commission's approach to planting has changed substantially; however, as is inevitable in forestry, previous approaches endure over long periods.

5.1.8 The upper glens are at the same time accessible and remote. Roads along most of the glens provide access into the heart of the Highlands. Although sheltered within the confines of the valley, the dominance of the mountains and the undifferentiated nature of the vegetation across the glen give the landscape a distinctly upland character. Light and weather conditions can quickly reinforce this impression.

FORCES FOR CHANGE

5.1.9 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development. Although these areas have seen considerable change over past centuries as native woodland was cleared and the population removed, the upland glens retain a wild, untouched character. With little in the way of tree cover, views can be extensive within the glen and any development can intrude on this character.

5.1.10 **Transport.** For the most part, the Upper Highland Glens either have no roads at all or are served by minor roads, often ending in cul de sacs. Although visible in the open landscape, these roads tend to sit relatively easily in the landscape, following natural contours along the floor of the glen. It is important that the diminutive and low-key appearance of these roads is maintained and that minor improvements and signage do not compound to give an overly 'urban' effect. The principal exceptions to the above pattern are found in Glen Garry, where the A9 crosses the Drumochter Pass and Glen Beag (north of Glen Shee) where the valley is occupied by the A93. The A9 is a nationally important route which carries a substantial volume of heavy traffic. In the case of the A93, the two lane road is very visible at it climbs up towards the Cairnwell. In its lower sections the road follows the natural landform. Further up, comparatively recent improvements have created a road with a more even gradient, running up the hillside on a distinctive shelf. The remains of the old 'military road' are visible in the glen below. A programme of improvements along the A93 from Blairgowrie to the Cairnwell is planned. This is likely to increase the prominence of the road, particularly in its more exposed, upper sections. The effect of these roads, their traffic, and the development they have

stimulated, demonstrates how easily the remote character of the Upper Glens can be changed.

5.1.11. **Development.** A lack of settlement is an important feature of these Upper Glens. For the most part, development is limited to a scatter of lonely cottages and lodges. Again, the exception to this is Glen Beag where comparatively good road access, possibly allied to the proximity to the Spittal of Glenshee and the ski area, has stimulated the recent development of a number of isolated houses. The houses stand prominently in the open glen and contribute to a weakening of its seemingly harsh upland character.

5.1.12. **Forestry and woodland**. As noted above, the Upper Highland Glens include several areas of coniferous woodland. In most cases, the plantations have been established to supply commercial timber. In others, the aim has been to provide shelter for game or livestock. The scale and form of the woodland varies accordingly. Commercial plantations tend to be larger in scale, occupying areas of the valley floor and the valley sides. Shelter plantations are smaller and often geometric in appearance. Perhaps the greatest range of plantation types may be found in Glen Clova/Doll where visually intrusive plantations on the valley floor, and in the form of small coverts, sit alongside more naturalistic forms on the valley sides. It is probably true to say that much of the commercial woodland that can be found in the Upper Highland Glens, if established today, would be planted very differently, if at all. Harvesting of this woodland provides an opportunity to review the best locations and designs for replanting. This is considered further within the management guidelines.

5.1.13 It is probable that, without management to favour deer and grouse, native woodland would regenerate on many of the valley slopes. This would form a transition from sparse birch and pine woods, through dwarf woodland to the open vegetation of the highland summits and plateaux.

5.1.14 **Recreation.** Many of the Upper Highland Glens are remote and seldom visited except by a comparatively small number of walkers and climbers. There are two principal exceptions to this rule - Glen Doll at the head of Glen Clova, and Glen Beag. Glen Doll is a popular walking and climbing centre with a Youth Hostel, car park, toilets, campsite and picnic site and a mountain rescue post. The facilities have been designed and implemented in a comparatively low-key way, focusing on the re-use of Glen Doll Lodge. While it would be sensible to accommodate any further growth in walking/climbing within Glen Doll, rather than encouraging wider use of the other, quieter, glens, the scale of development should not be allowed to undermine the essential character of this upland area.

5.1.15 At the head of Glen Beag lies the Cairnwell and the Glen Shee ski area. Although all the ski-runs are concentrated to the north of the Tayside boundary, some of the chairlifts can be seen on the ski-line from some way down the glen. Future expansion of the ski area may bring pressure to provide new runs on the southern side of the mountain watershed, bringing them into Tayside for the first time. The provision of new parking and uplift facilities could substantially modify the local landscape around the Devil's Elbow area. While, from a landscape point of view, it would be preferable to concentrate activity to the north, and to prevent the development spilling south to affect Glen Beag, the existing developed character of the glen (relative to other Upper Highland Glens), and the topographic screening provided by the turn in the glen, may reduce the significance of

the impact. However, due to the sensitivity of the highland landscape, and the possibility that elements of the scheme would be visible over a considerable distance within this open landscape, a full visual impact assessment should be undertaken at the design stage.

5.1.16 **Tall structures.** The Upper Highland Glens are largely free from tall structures such as pylons and masts. An exception, mentioned previously, is the pylons associated with the lifts at the Glen Shee ski area. This landscape type would be very sensitive to any proposals for tall structures, be they pylons, masts or wind turbines, and be they within the glen itself or visible from within it. Such structures would undermine the wild, seemingly undeveloped character of the landscape.

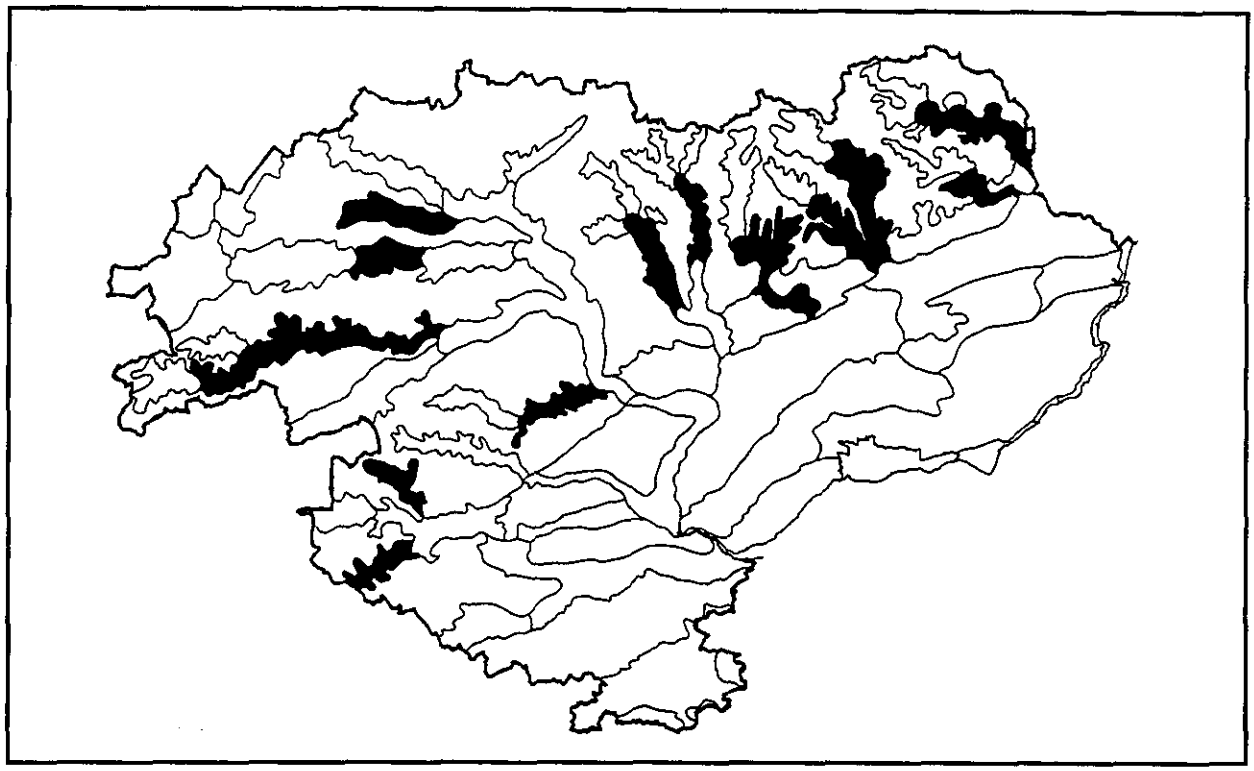
LANDSCAPE GUIDELINES

5.1.17 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristic upland landscape with its open, predominantly unsettled moorland vegetation and to maintain the contrast with the more settled lowland sections of the glens.

Agriculture	• Encourage the conservation of dry-stone dykes in local stone with an emphasis on roadside walls and others in highly visible areas.
Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, road paint or features such as concrete kerbing.
Development	• Discourage development in the Upper Highland Glens. • Where development is permitted, ensure that buildings are located so as to minimise their impact on the landscape (utilising any natural screening provided by the landform) and that they adopt vernacular styles, building materials and colours.
Forestry and woodland	• Encourage good landscape design and appropriate scale for any new woodland areas. • Encourage the removal of small, geometric plantations, allowing equal increases in planting in more appropriate locations elsewhere. • Support the removal of poorly designed plantations on the floor of glens.

(Forestry and Woodland contd.)	• With respect to the replanting of existing plantations on valley slopes: - encourage the rationalisation of woodland to avoid isolated, small- to medium-sized areas of plantation woodland which appear very prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes. • Explore opportunities to modify management practices to allow the regeneration of native woodlands on some valley slopes, to create the 'natural' transition from valley woodland, through dwarf alpine woodland to the vegetation of the highland summits and plateaux.
Recreation	• Focus recreation activities at existing centres. • Maintain low-key level of provision. • Ensure that proposals for expansion of facilities are subject to rigorous visual impact assessment adopting, for example, the approach set out in the guidance published by the Landscape Institute and the Institute of Environmental Assessment (1995). • Expansion of ski-facilities into this landscape type should only be permitted if it is clear that: - the visual and landscape impact is limited; - there is no scope to accommodate expansion to the north; - the economic need for the scheme is demonstrated. • Indirect effects including traffic and the proliferation of related facilities (ski-hire shops) should also be taken into account.
Tall structures	• Discourage proposals for aerials, masts or wind turbines because of their likely impact on the harsh, undeveloped character of the Upper Highland Glens. • Ensure that any proposals are subject to rigorous landscape impact assessment. • Where new power or telephone lines are proposed or required, ensure that operators adopt underground cable solutions.

MID HIGHLAND GLENS (1B)



KEY CHARACTERISTICS

- *middle sections of the principal Highland Glens*
- *concentration of agricultural activity on narrow, but distinct valley floor*
- *predominance of rough grazing, bracken, heather moorland on valley slopes*
- *rapids, gorges and waterfalls where bands of harder rocks occur*
- *glacial and post glacial features including morainic deposition*
- *native birch and oak woodland*
- *moderately settled*
- *proliferation of forts and castles*
- *substantial areas of commercial coniferous forestry*

OBJECTIVE DESCRIPTION		Mid Highland Glens
Physical scale		0.5 to 1 kilometre wide floodplain Valley floor 100-200 metres AOD Valley sides rise to 300-600 metres AOD Gorges and falls where harder rocks cross the glen
Woodland	broad-leaf	Native birch and oak woodland on steeper and poorer ground
	coniferous	Substantial areas of plantation
Agriculture	arable	Almost entirely absent
	pasture	Improved pasture on valley floor, rough pasture on lower/mid slopes
	fields	Small, irregular, reflecting landform
	field boundaries	Dry-stone dykes and post-and-wire fences
Settlement pattern		Scatter of farmsteads and small villages, located to avoid flooding and to maximise shelter/sunlight.
Building materials		Schists and granite with slates
Historic features		Castles, old farmsteads
Natural heritage features		Native woodlands, gorge vegetation
Other landscape features		Waterfalls, glacial deposition features
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium to small
Enclosure		Enclosed
Variety		Varied
Texture		Textured to rough
Colour		Colourful
Movement		Peaceful
Unity		Unified
'Naturalness'		Restrained

LOCATION

5.1.18 This landscape type comprises the middle sections of the most significant Highland Glens. These sections of glen are distinguished by the concentration of agricultural activity on the narrow valley floor, and the predominance of rough grazing, bracken and heather moorland on the valley slopes. Within the Mounth Highlands, this landscape type occurs in Glen Esk, the valley of the West Water, Glen Clova, Glen Prosen, Glen Isla, Glen Shee, Strathardle and Glen Tilt. Within the West Highland Mountains, it occurs at Glen Errochty, Dun Alastair (between Lochs Rannoch and Tummel), Strathbraan, Glen Lyon and Glen Artney.

PHYSICAL CHARACTERISTICS

5.1.19 While the Mid Glens pass through Dalradian and Moinian grits and schists, they also encounter a variety of different rock types including granites, limestones, quartzite and intrusive diorite. Where bands of harder rock cross the glen the valley often narrows to a gorge and the river tumbles over a series of waterfalls. One of the best examples of this is found at Linn in Glen Isla, a narrow gorge 120 feet in depth. In just a short distance, the river descends some 80 feet. A similar gorge is found above Fortingall as the River Lyon descends to join the Tay. However, as with the upper glens, it is glaciation that has had the most profound effect on this landscape type. Classic glaciated valley profiles, hanging valleys, corries and misfit rivers are all evident in these sections of glens. Equally significant, particularly at the local scale, are the glacial deposits found along the valley sides and across the valley floor. Formed as the retreating glaciers dropped their load of scoured rock and soil, and modified by temporary meltwater channels, these deposits often create a hummocky landscape of drumlins and eskers. Misfit rivers meandering across the floodplains cut through the deposits, creating incised meanders.

5.1.20 While the surrounding mountains still have an influence on the mid sections of the glens, they are more open than their upper sections. There is now a well-defined valley floor ranging between 0.5 and 1 kilometres in width. In places, the river has cut a steep-sided inner valley, often cutting down into the glacial deposits (sometimes in response to the general uplift of the Highlands following the melting of glaciers and icesheets). Valley floors are typically between 100 and 200 metres AOD and the enclosing valley slopes rise more gently to between 300 and 600 metres. As before, these summits are generally rounded in the east and craggier and more clearly defined in the west. Within the West Highlands, the northern valley slopes (effectively dipslopes) tend to be gentler than those to the south (eroded escarpments).

5.1.21 Many of the Mid Glens are ecologically important, containing stands of native oak and birch woodland on steeper valley slopes and on poorer land on the valley floor. Much of this is semi-natural and long-established, and active management to exclude grazing is required to encourage regeneration. In places (e.g. near Gallin in Glen Lyon) sparse remnants of Caledonian pine woodland survive. More extensive are the native birchwoods that are found within Glens Prosen and Esk. Much of this is now over-mature and is not regenerating due to high levels of grazing. In addition, policy woodland is found in Glen Clova. Within the deeper gorges the cool, damp and shady conditions favour mosses, liverworts and some rare higher plants and invertebrate species. The upper valley slopes generally comprise a mosaic of heather moorland and grassland

which, together with rock outcrops and scree slopes, creates a textured and varied landcover.

SETTLEMENT AND LAND USE

5.1.22 The mid sections of the glens are more settled than the upland sections. Stone farmsteads, often whitewashed with slate roofs, are sited in the lee of spurs or small hillocks, or are associated with small farm woodlands. Solitary cottages are found throughout the Mid Glens. Fields are generally enclosed within networks of stone dykes, supplemented by post-and-wire fencing. Abandoned enclosures on the valley slopes are surrounded by crumbling walls and have been invaded by bracken and rough grassland. Improved pasture, ley grassland even arable crops are found on flatter fields and along the floor of the glen. Within the West Highland glens, settlement and farmland is often concentrated on the northern side of the valley, benefiting from a southern aspect and gentler slopes. Periods of clan warfare are once again reflected in a proliferation of castles and forts. Near Cashlie there are the remains of the ancient forts of Glen Lyon, while further down the glen, Meggernie Castle stands as an important hunting lodge. Modern development is scarce, limited to a handful of hydroelectric schemes and their associated pylons.

5.1.23 In addition to the semi-natural birch and oak woodland which makes a significant contribution to the landscape character, a substantial amount of commercial woodland is found within the Mid Glens. In many cases coniferous species have been mixed, integrated with surrounding broad-leaf woodland and designed to fit with the natural flow of the landscape. A good example is found along the southern slopes of Glen Errochty where larch, sitka and other species are mixed, creating a more natural, mottled appearance, and where broadleaves along field boundaries and burns push up into the plantations. These woodlands do need to be seen in the wider context however. Even in Glen Errochty there is an imbalance created by the concentration of woodland on the southern slopes and the retention of pastures and open moorland on the northern slopes. Older plantations are generally less well-integrated into the landscape, often comprising geometric blocks apparently unrelated to landform. Within some of the larger valleys, such as Glen Lyon, the presence of estates is signalled by policy woodlands and by the regular lines of trees along field boundaries.

5.1.24 These sections of the West Highlands and Mounth glens provide a transition between the upper and lower parts of the valleys. The presence of the mountains is still the dominant influence on landscape character and it is only on the narrow valley floor that agriculture has been able to bring the land into productive use. Despite the size of the mountains, the narrowness of the glens means that these are relatively small-scale landscapes. Settlement has generally taken the form of a scatter of buildings constructed from local materials. More substantial development, such as pylons, are very evident.

FORCES FOR CHANGE

5.1.25 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis

provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.1.26 **Agriculture.** As described above, most agricultural activity in the Mid Highland Glens is concentrated on the valley floor. In a few places the level ground created by valley terraces or morainic deposits also provides suitable land. For the most part, however, the valley sides are dominated by rough grazing, grading into craggy heather or grass moorland. Pastures dominate, with a variety of livestock grazed on the floor of the glen. In a few places, typically on higher, better drained and sunnier land along the northern side of the glen, root crops or other vegetables are grown. Where this occurs, the bright green leaves of the crop, or the brown of the tilled soil, contrasts with the more subdued browns and greens in other parts of the glen. In other places, the quality of pasture in the glens has been improved by the provision of drainage, reseeding and the application of fertilisers. Again, this creates an intensity of green which appears out of place in this semi-upland landscape.

5.1.27 **Transport.** For the most part, the middle parts of the highland glens are served by minor roads. These generally sit easily in the landscape, following natural contours along the floor of the glen, winding their way between drumlins and marking the boundary between the rough valley sides and the grazed floor of the glen. As in the upper glens, it is important that the diminutive and low-key appearance of these roads is maintained and that minor improvements and signage do not compound to give an overly 'urban' effect. Several glens, notably Glen Shee, Strathardle and Strathraan, contain main roads, bringing with them larger volumes of traffic and a greater amount of development.

5.1.28 **Development.** With significantly more farmsteads, cottages and houses than the upper highland glens, this landscape type is still comparatively sparsely settled. As noted above, older buildings tend to be sited so as to maximise shelter and sunlight. More recent buildings seem to be located more with access to the road in mind. Shelter and (to a degree) screening is often provided by conifers planted around the boundary of the property. In an otherwise open landscape, the screening itself draws attention to the building. While older buildings often share a vernacular of stone walls (sometimes whitewashed) and slate roofs, newer buildings adopt more ubiquitous designs and materials which hinder their integration into the landscape still further. A more effective approach would be to encourage new development to consolidate existing villages, hamlets or even groups of farm buildings, adopting designs which respond to their setting. There may also be some scope for the sensitive conversion of traditional farm buildings.

5.1.29 **Forestry and woodland.** The Mid Highland Glens exhibit a pattern of commercial forestry that is similar to that of the upper parts of the glens. Commercial plantations tend to be large in scale, occupying areas of the valley sides. Shelter plantations and coverts are smaller and often geometric in appearance. Many of the plantations were established following very different planting principles to those employed today. In places this has resulted in geometric blocks of even-aged, single-species woodland which appear as impositions upon the natural form of the landscape. Harvesting of this woodland provides an opportunity to review the best locations and designs for replanting. This is considered further within the management guidelines. It is also true to say, however, that well-designed commercial woodland in the middle parts of the highland glens is significantly less intrusive than in the upper sections. In part this reflects the

larger scale and more open character of the landscape (wider glens with lower hills) and the greater extent of human settlement and land use. There may be additional scope for commercial woodland in these glens, particularly in the lower, more wooded, sections.

5.1.30 The Mid Highland Glens are also characterised by areas of native birch woodland, concentrated particularly on steeper valley slopes and on less productive areas of drumlins. The birch woods have had a varied history with periods of regeneration and expansion (typically during wartime periods when grazing declined), followed by decline and even dereliction. Many of the woods that survive today are in a very poor condition, overmature and unable to regenerate due to the level of grazing within or around them. There is an urgent need to facilitate the regeneration of these woodlands, an aim which is being pursued by the Tayside Native Woodlands Initiative.

5.1.31 Moving beyond the survival of these woods, there is an opportunity to allow their expansion and growth through the glens and up the valley slopes so as to re-create the more natural patterns of woodland that would have characterised the glens before intensive management for deer and grouse dominated. Better management of the birch woodland could result in the creation of a marketable crop of high quality timber.

5.1.32 **Recreation.** Other than fairly low-key, informal recreation, there are few pressures within these middle sections of glen.

5.1.33 **Tall structures.** The Mid Highland Glens are largely free from tall structures such as pylons and masts. Although better able to absorb development than the simpler and smaller upper glens, this landscape type would be quite sensitive to any proposals for tall structures, be they pylons, masts or wind turbines, either within the glen itself or visible from within it.

LANDSCAPE GUIDELINES

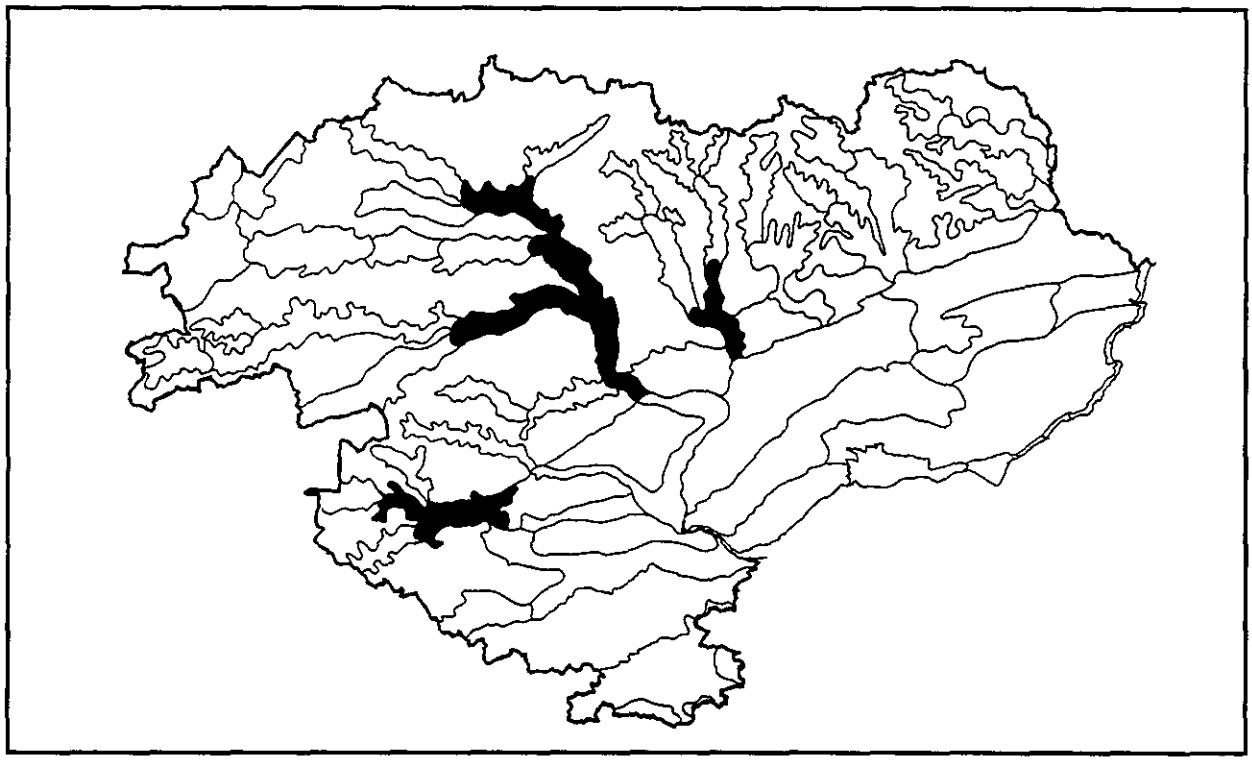
5.1.34 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristically lightly settled landscape with agriculture on the valley floor enclosed by moorland-covered valley slopes. These areas provide a transition from the simple landscape of the upper glens to the richer lower sections - this role should be respected.

Agriculture	• Discourage further improvement of pastures and expansion of cultivation within the Mid Glens. • Encourage the conservation of dry-stone dykes in local stone with an emphasis on roadside walls and others in highly visible areas. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.

Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, road paint or features such as concrete kerbing.
Development	• Discourage isolated developments in the open landscape. • Where development is permitted, encourage construction to consolidate existing villages, hamlets or groups of farm buildings, and favour sheltered locations. • Do not rely on screening where the screening itself becomes a prominent landscape feature. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles.
Forestry and woodland	• Support the removal of poorly designed plantations where they occur on the floor of glens. • With respect to the replanting of existing plantations on valley slopes: - encourage the rationalisation of woodland to avoid isolated, small to medium sized areas of plantation woodland which appear very prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes. • Manage grazing levels in and around birch woodland to allow regeneration and expansion. • Explore opportunities to modify management practices to allow the regeneration of native woodlands on some valley slopes, to create the 'natural' transition from valley woodland, through dwarf alpine woodland to the vegetation of the highland summits and plateaux.
Recreation	• Maintain low level of formal provision for recreation.

Tall structures	• Discourage proposals for aerials, masts or wind turbines because of their likely impact. • Ensure that any proposals are subject to thorough landscape impact assessment. • Where new power or telephone lines are proposed or required, encourage operators to adopt underground cable solutions.

LOWER HIGHLAND GLENS (1C)



KEY CHARACTERISTICS

- *lower sections of the principal Highland glens*
- *comparatively large-scale landscapes*
- *combinations of upland and lowland attributes*
- *broad floodplains, often with meandering rivers, interspersed with narrower, gorge-like sections where harder rocks cross the glens*
- *the most settled parts of the glens*
- *farmland on valley floor and slopes*
- *substantial and varied woodland cover*
- *influence of large estates, castles and Victorian development*

OBJECTIVE DESCRIPTION		Lower Highland Glens
Physical scale		0.5 to 1 kilometre wide floodplain Valley floor 50-200 metres AOD Valley sides rise to 500 metres AOD Gorges and falls where harder rocks cross glen.
Woodland	broad-leaf	Extensive: comprising semi-natural woodland on steeper slopes and managed estate woodland
	coniferous	Extensive: on valley sides and associated with estates
Agriculture	arable	Lower/mid valley sides and drained valley floor
	pasture	Valley floor and upper slopes
	fields	Large and rectilinear on valley floor, medium and rectilinear on gentler valley slopes
	field boundaries	Shelterbelts and post-and-wire fences on floodplain, hedges, trees and walls on valley slopes
Settlement pattern		Well settled with villages and large estates, some planted villages
Building materials		Transitional - granite, schist, slate and some sandstone
Historic features		Castles, lodges and estate features
Natural heritage features		Native woodlands, gorge vegetation
Other landscape features		Waterfalls, glacial deposition features
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium to large
Enclosure		Enclosed to semi-enclosed
Variety		Varied
Texture		Textured
Colour		Colourful
Movement		Peaceful
Unity		Unified
'Naturalness'		Managed

LOCATION

5.1.35 This landscape type comprises the lower sections of the most significant Highland Glens. These sections of glen are distinguished by their comparatively large scale, and the particular combination of upland and lowland attributes. Most of the glens within the Mounth Highlands change rapidly from upper and mid glen to the lowland and foothills, so this landscape type only occurs in Strathardle. Within the West Highland mountains, however, it occurs in Glen Garry around Blair Atholl, joining with the Strath Tummel and Strath Tay between Aberfeldy and Dunkeld.

PHYSICAL CHARACTERISTICS

5.1.36 The Lower Glens share the same geological structure as other parts of the highlands in Tayside. The area is dominated by Dalradian and Moinian grits and schists but there are also significant outcrops of other rocks. A broad band of Atholl limestone runs north-eastwards from the western end of Loch Tummel, across Glen Garry at Blair Atholl towards Beinn A'Ghlo. These softer rocks account for the broadening of the valley in the vicinity of Blair Atholl. The limestone is quarried on the western side of the glen. A little to the south, the glen is crossed by bands of harder quartzite rocks, this time resulting in the narrowing of the valley to form a dramatic gorge with waterfalls at Killiecrankie. While glaciation has had a significant effect on these Lower Glens, the valleys lack many of the classic features found higher up. Rivers tend to be larger, either meandering across broad, often level floodplains or flowing through narrow, incised channels. The valley floor lies typically at between 50 and 200 metres AOD, while the neighbouring hills rise to about 500 metres AOD. Where floodplains occur, they are generally about a kilometre wide.

SETTLEMENT AND LAND USE

5.1.37 These are the most settled parts of the Highland Glens. Historically, they provided important communication routes through the Highlands. Traces of General Wade's Military Road can be found in many of the glens (e.g. Glen Garry and Strath Tay at Aberfeldy where he constructed a grand bridge over the river) while the railway and A9 and A93 routes follow the same corridors. Other significant bridging points include the Bridge of Cally, Dunkeld and Tummel Bridge. As with the upper sections of the glens, the strife between highlanders and lowlanders, and the need to control movement through the glens resulted in the construction of many castles and fortified manor houses. Perhaps the best example is Blair Castle at Blair Atholl which is believed to date back as far as 1269. The clan warring reached its height during the 17th century at the Battle of Killiecrankie.

5.1.38 However, perhaps the most significant phase of settlement occurred during the 18th and 19th centuries as a result of growing wealth and the accessibility brought by railways. The dramatic nature of the landscape within the Lower Glens, particularly where they narrowed to enclose gorges and waterfalls, was favoured by followers of the picturesque and sublime. Historic estates such as Blair Castle and Craighall were remodelled to emphasise and accentuate the natural landscape. The creation of extensive parkland, including large areas of woodland on many of the steeper valley slopes contributes much to the landscape that we see today. New estate villages such as Blair Atholl were built to a uniform style and layout. Smaller estates with their own distinctive landscape and

architecture (e.g. Findynate and Derulich) were also created in Strathtay. In the 19th century the Tay Valley became known as 'little Switzerland' and attracted many visitors and travellers, resulting, in turn, in the growth of towns such as Pitlochry and Dunkeld. Visits by writers, poets, artists and members of the Royal Family underline the popularity of the area among the Victorians. Twentieth century development has continued this pattern of settlement, accelerated by the upgrading of the A9.

5.1.39 In contrast to the upper parts of the glens, these valleys include large areas of relatively fertile farmland. It is most productive on the floodplain alluvium but also extends much further up the valley slopes. The influence of large estates is often visible in the form of lines of hedgerow trees (e.g. along lower Strathardle) giving the valley a well-wooded and structured appearance. Within the Tay Valley, however, farmland is concentrated on the valley floor in large fields, often divided only by post-and-wire fences. Above Aberfeldy the floodplain is structured by bands of woodland running across the valley. Between these, fields are divided by wire fences.

5.1.40 Woodland is a vital element of the Lower Highland Glens landscape type. Broad-leaf woodlands, some ancient and semi-natural, clothe many of the steeper hill slopes, surround some of the lodges and estate houses, and trace the course of rivers along the glens. Coniferous woodland such as the larch plantations around Blair Atholl, or the woods on the crags around Dunkeld, further emphasise the landform and contribute to the sense of enclosure within the glens. With the bare summits which rise beyond, these coniferous plantations help create a dramatic upland atmosphere in a relatively lowland area. The combination of this woodland and the pattern of large estates, Victorian settlements and productive farmland gives this landscape type a rich yet dramatic character which contrasts both with the harsher upland areas, and with the more open lowland areas to the south.

FORCES FOR CHANGE

5.1.41 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.1.42 **Agriculture.** While agricultural activity in the Lower Highland Glens is concentrated on the valley floor, there are also many areas where pastures and even arable fields extend up the more shallow valley slopes. The network of walls, hedges and hedgerow trees is an essential element of this landscape, underlining its relationship with lowland areas, and adding texture and variety to the landscape of the glens. However, in some areas, this structure is in decline with once dense lines of trees becoming gappy and fragmented, and hedges and fences being replaced by 'invisible' post-and-wire fencing. Field boundaries on the broad floodplains, where they occur, are often marked by fences, though sometimes boundaries across the valley are marked by shelterbelts or lines of trees.

5.1.43 **Transport.** A number of Lower Highland Glens have provided important communication routes for centuries and today accommodate roads such as the A93 in Glen Shee, the A827 through the middle part of Strath Tay and, most significantly, the A9 through Glen Garry and the lower part of Strath Tay. For the most part, these roads and their traffic are relatively well-absorbed by the often well-wooded landscape of the Lower Glens. However, the A9, which has been improved as dual carriageway or high quality single carriageway along much of its length, is a much more prominent feature with its rock cuttings, embankments and overbridges. At points such as Killicrankie, the present road is considerably higher up the side of the glen than previous routes, meaning that the road structure is more visible, and the traffic moving along it has a much wider impact.

5.1.44 A little more subjective, perhaps, is the effect that a fast road has on a traveller's perception of the landscape. Parts of Strathtay around Blair Atholl and Dunkeld, for example, were remodelled during the 19th century to create a sublime landscape in which key vistas and the experience of travelling slowly through the landscape would have been particularly important. Today many people pass through at high speed, their attention focused within a narrow road corridor.

5.1.45 **Development.** Facilitated by better communication, more suitable land and access to the lowlands, this part of the Highlands has traditionally accommodated the greatest amount of settlement. Old market and bridging settlements such as Comrie, Aberfeldy and Pitlochry expanded during the 19th century as the area was opened up by the railways, and again during the 20th century as motoring brought the area within commuting distance of Perth. Generally, the growth of these towns has respected their original form. Pitlochry and Crieff for example have expanded up the valley slopes. In the case of Pitlochry, the historic linear settlement, represented by the main street, has expanded eastwards into the gentle bowl created by a tributary of the Tay. Twentieth century suburban development had its precedents in the form of grand Victorian hotels which were established with commanding views high on the hillside. This pattern of expansion is preferable to growth onto the Tay floodplain, or along the edges of the valley. Nevertheless, the elevation of much of the development means that it is more visible than it might otherwise have been.

5.1.46 At Comrie, which historically comprised two settlements, one each side of the bridge over the River Earn, recent growth has been concentrated on the Dalginross side. More recent development, however, has sometimes comprised low density, speculative estates of similar or identical dwellings which are crudely grafted onto the edge of these towns. The stark designs (often lacking any reference to vernacular designs or material) are usually unmitigated by planting, screening or landscaping, while the infrastructure of internal roads, footways, drives etc. appears over-engineered and overly suburban in this rural area. The growth of smaller settlements has been more limited, retaining the impression of a settled, rural landscape with a scattering of farmsteads and hamlets.

5.1.47 **Forestry and woodland**. Woodland is an essential component of this landscape type, comprising a combination of semi-natural woodland, commercial forestry, farm woodland and field boundary trees, policy and estate woodland. The characteristic interplay of woodland, farmland and areas of designed landscape is particularly important.

5.1.48 Several areas of Lower Glen are identified by the Tayside Indicative Forestry Strategy as having potential for new planting (Tayside Regional Council, 1997a). While there is

scope for additional woodland in these areas, it is important to maintain the overall balance of unplanted and planted areas and to conserve key views. It is also important to conserve landscape features such as field systems where these contribute to the grain and texture of the landscape. As elsewhere, there is scope to enhance the appearance of existing plantations as they come forward for harvesting and replanting.

5.1.49 **Recreation.** The high landscape quality, allied to the area's accessibility and the presence of a number of towns, means that tourism and recreation are important activities in the Lower Highland Glens, making important contributions to the area's economy. Generally, this development pressure has been steered towards existing settlements with, for example, the expansion of tourism facilities at Pitlochry. There are a handful of exceptions to this, the most notable being a major tourism facility at Bruar, north of Blair Atholl. Opinions about this particular scheme are mixed since, although its design attempts to reflect Scottish Baronial influences, the accompanying signage, car parking etc. indicates the presence of a more modern development. Furthermore, located close to the point where the southbound traveller leaves the sparse, dramatic landscape of the upper glen and enters the rich landscape of the lower glen, the new development reduces the positive visual impact of Blair Castle, a few kilometres to the east.

5.1.50 **Tall structures.** The Lower Highland Glens are subject to a range of pressures for tall structures such as pylons and masts, reflecting the more settled nature of these areas, and their suitability as routes for electricity transmission cables. Particular concerns relate to the provision of mobile communication infrastructure along routes such as the A9 which can result in the proliferation of telecommunications masts.

5.1.51 Within this landscape type there is unlikely to be significant pressure for wind turbine construction. However, the effect of proposals on higher ground which are visible from within the glens (particularly some of the more historic areas of designed landscape) should be considered carefully.

LANDSCAPE GUIDELINES

5.1.52 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristically settled landscape of farmland, woodland and designed landscapes.

Agriculture	• Encourage the conservation of dry-stone dykes in local stone with an emphasis on roadside walls and others in highly visible areas. • Discourage improvements which result in further loss of field boundaries or field boundary trees. • Encourage farmers and landowners to replant trees along field boundaries, initially along roads, but also between fields. Species to include oak, maple, beech and ash. Use incentives to compensate for lower yields where mature trees are retained.

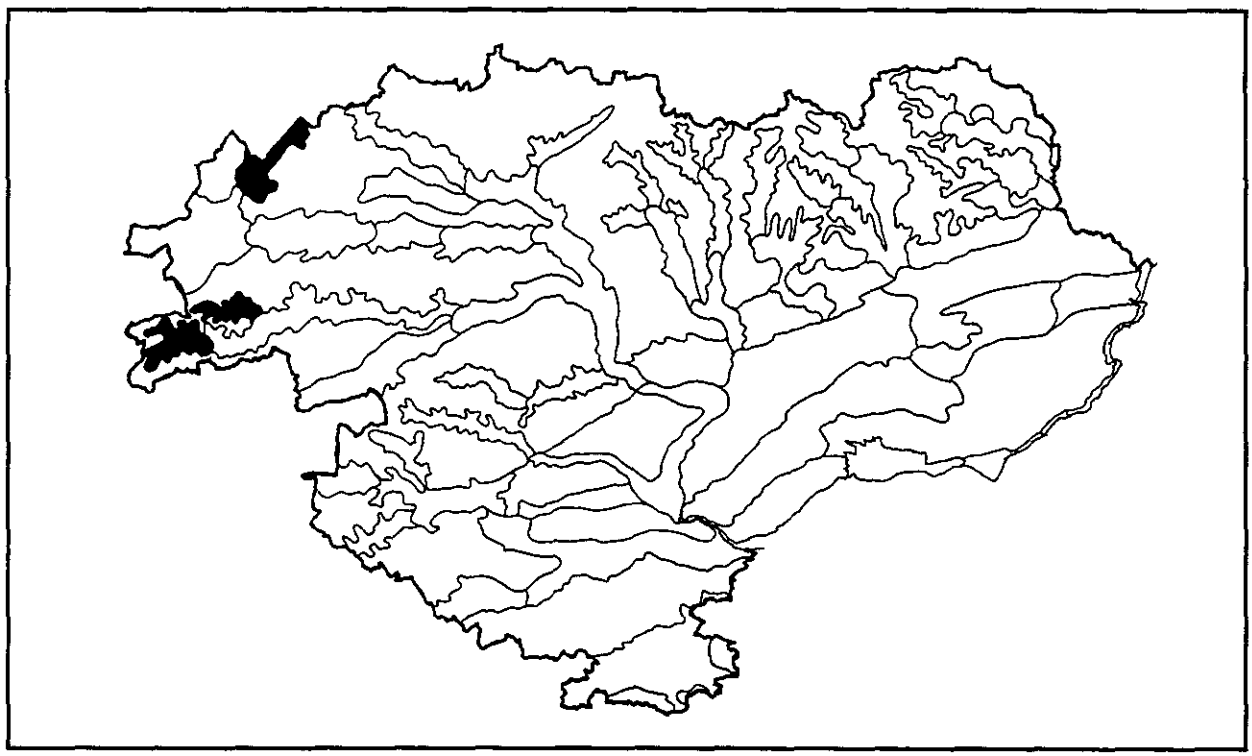
	• Explore the opportunities to increase woodland cover by creating new woodland belts, particularly where there is a need to screen development. • Explore development of market for hardwood from field boundary trees. • Discourage over-concentration of oil seed rape and similar crops. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.
Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, or features such as concrete kerbing. • Explore opportunities for additional on- and off-site screening to reduce the impact of existing sections of improved road.
Development	• Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements and to protect the rural character of other parts of the Lower Highland Glens. • Discourage the simplistic grafting of housing estates onto the edge of settlements. Encourage more imaginative schemes which respond to the existing patterns of layout, structure, massing and scale. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Consider positive ways of addressing the interface between settlements and the surrounding countryside. These could include: - screening; - new buildings which address surrounding areas; - key vistas and views; - landmark features; - gateways and approaches.
Forestry and woodland	• With respect to the replanting of existing plantations on valley slopes: - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen;

(Forestry and woodland contd.)	- discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes. • Consider opportunities for new woodland planting in terms of: - the overall balance of woodland and open space; - the relative importance of different areas of existing woodland (e.g. commercial plantation versus policy woodland) and how this would be influenced by an increase in woodland cover; - the importance of key views and features within the landscape; - opportunities for provide screening within the Lower Glens; - opportunities to link isolated areas of woodland.
Recreation	• Concentrate tourist facilities within existing settlements. • Influence the design and provision of associated signage. • Influence the design of new tourism facilities, particularly where it is permitted in previously undeveloped areas. While modern and innovative design may be appropriate, it should respect local building styles, scales, materials and locations. Features such as signage and car parking should be designed to minimise the impact on the local and wider landscape.
Tall structures	• Assess proposals for aerials, pylons or masts in terms of their visual and landscape impact on the local landscape of the hills and surrounding areas. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Ensure that any proposals are subject to thorough landscape impact assessment. • Where new power or telephone lines are proposed or required, encourage operators to adopt underground cable solutions.

HIGHLAND GLENS WITH LOCHS (2)

5.2.1 Lochs are an important feature of many Highland Glens. In undertaking the landscape assessment the influence of such lochs upon landscape character was considered carefully. In some cases (for example Loch Lee at the head of Glen Esk) the lochs are sufficiently small as to have a relatively minor effect on the overall appearance of the landscape. In others, the presence of the loch (most obviously in the cases of the largest lochs such as Loch Rannoch, Loch Tummel and Loch Tay) has a very significant influence on character. The latter cases justified inclusion as a landscape type in their own right. Again, the landscape classification draws a distinction between the upper, mid and lower sections of the glens.

UPPER HIGHLAND GLENS WITH LOCHS (2A)



KEY CHARACTERISTICS

- *geological and physical structure similar to Upper Highland Glens*
- *visual dominance of lochs, enlarged to provide hydroelectric power*
- *the expanse of water, changing its appearance according to the weather, adds to the sense of exposure, remoteness and desolation*

OBJECTIVE DESCRIPTION		Upper Highland Glens with Lochs
Physical scale		1.5 kilometres wide at valley crest Loch surface at 300-450 metres AOD Valley sides rise to 600-900 metres AOD
Woodland	broad-leaf	Virtually absent
	coniferous	Geometric plantations on mid slopes, more natural shapes on upper slopes
Agriculture	arable	Absent
	pasture	Rough grazing on valley slopes
	fields	No enclosure
	field boundaries	Not applicable
Settlement pattern		Predominantly unsettled; hydroelectric infrastructure (dams, turbine houses, pylons etc.)
Building materials		Not applicable
Historic features		Old routeways
Natural heritage features		Upland vegetation
Other landscape features		Rock outcrops, glacial features, hydro schemes
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium
Enclosure		Enclosed
Variety		Simple
Texture		Rough to very rough
Colour		Muted to monochrome
Movement		Remote
Unity		Unified/interrupted
'Naturalness'		Wild/slightly tamed

LOCATION

5.2.2 A number of the upper glens within the West Highlands contain lochs. Where these lochs are of a sufficient size, they have a significant influence on the landscape character of these upper glens. Examples of the Upper Highland Glens with Lochs landscape type include Loch Errochty, Loch Daimh, Loch Lyon and Loch Ericht.

PHYSICAL CHARACTERISTICS

5.2.3 The geological and physical structure of the Upper Highland Glens with Lochs is very similar to that described above in relation to Upper Highland Glens. The geology is dominated by grits and schists of the Dalradian and Moinian groups and the landscape has been highly modified by glacial erosion, creating typically glaciated valley cross sections, hanging valleys and corries. The lochs have been created where the ice sheets overdeepened the glens or where morainic material deposited during their retreat impounded water within the valley. Each of the lochs has been modified by the addition of dams, thereby increasing the available head of water for hydroelectric power generation.

5.2.4 The expanse of water, often disturbed by wind and rain, adds to the sense of exposure, remoteness and desolation experienced within these upper glens. Even the engineering structures associated with power generation are dwarfed by the scale and sweep of the enclosing mountains. The landscape is dominated by low moorland vegetation, with woodland limited to sheltered side glens or a handful of geometric coniferous plantations. In fine weather these glens form part of the dramatic upland landscape. In poor light or inclement weather, the atmosphere is less hospitable and can even seem threatening.

FORCES FOR CHANGE

5.2.5 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development. Although these areas have seen considerable change over past centuries as any native woodland was cleared and the population removed, the upland glens retain a wild, untouched character. With little in the way of tree cover, views can be extensive within the glen and any development can intrude on this character.

5.2.6 **Transport.** For the most part, the Upper Highland Glens with Lochs either have no roads at all or are served by minor roads, often ending in cul de sacs. Although visible in the open landscape, these roads tend to sit relatively easily in the landscape, following natural contours along the floor of the glen. It is important that the diminutive and low-key appearance of these roads is maintained and that minor improvements and signage do not compound to give an overly 'urban' effect.

5.2.7 **Development.** A lack of settlement is an important feature of these upper glens. For the most part, development is limited to a scatter of lonely cottages and lodges.

5.2.8 **Forestry and woodland.** The Upper Highland Glens with Lochs include areas of coniferous woodland, though these tend to be more limited than in those glens without lochs. In most cases, the plantations have been established to supply commercial timber while in others, the aim has been to provide shelter for game or livestock. The scale and form of the woodland varies accordingly. Commercial plantations tend to be larger in scale while shelter plantations are smaller and often geometric in appearance. Harvesting this woodland will provide an opportunity to review the best locations and designs for replanting. This considered further within the management guidelines.

5.2.9 It is probable that, without management to favour deer and grouse, native woodland would regenerate on many of the valley slopes. This would form a transition from sparse birch and pine woods, through dwarf woodland to the open vegetation of the highland summits and plateaux.

5.2.10 **Recreation.** Many of the Upper Highland Glens with Lochs are remote and seldom visited except by a comparatively small number of walkers and climbers.

5.2.11 **Tall structures.** The Upper Highland Glens with Lochs are comparatively free from tall structures. The exception occurs where power lines serve the hydro installations located adjoining the dams that impound the lochs. This landscape type would be sensitive to proposals for further tall structures, be they pylons, masts or wind turbines, either within the glen itself or visible from within it.

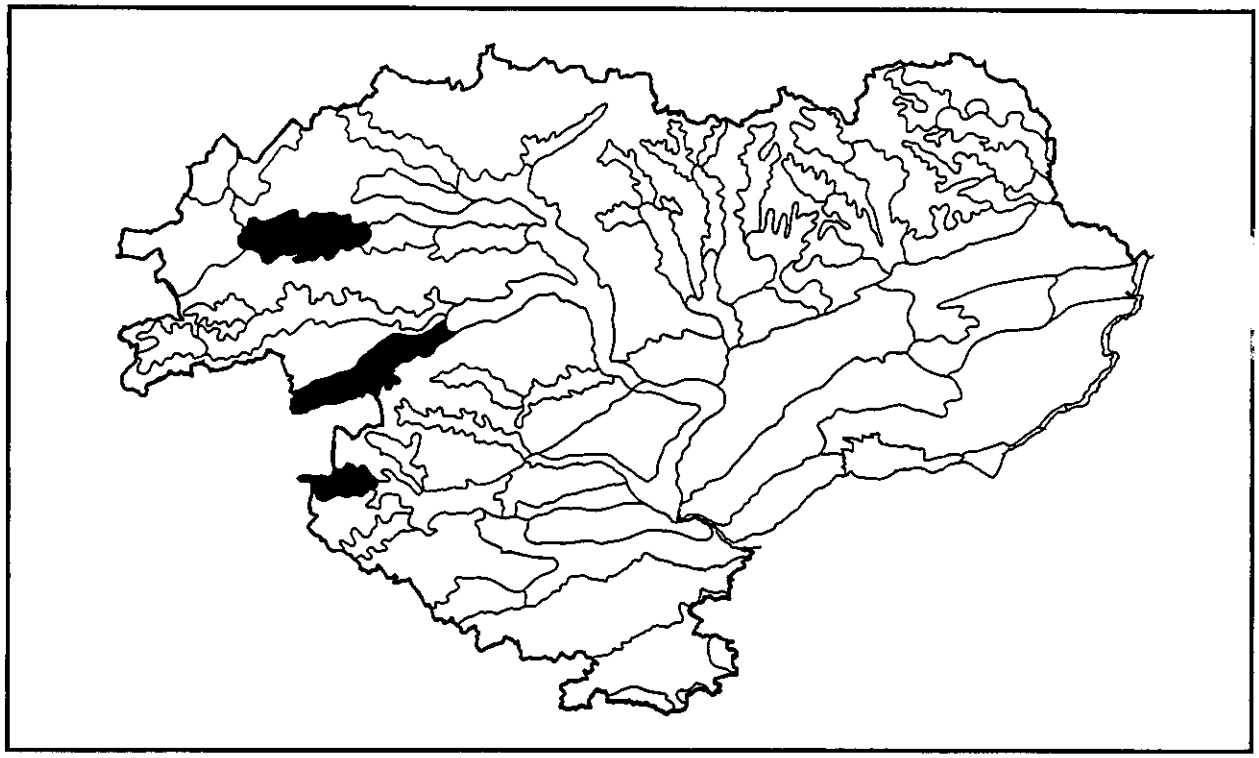
LANDSCAPE GUIDELINES

5.2.12 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristic upland landscape of open, predominantly unsettled moorland vegetation. Maintain the contrast with the more settled lowland sections of the glens.

Agriculture	• Encourage the conservation of dry-stone dykes in local stone with an emphasis on roadside walls and others in highly visible areas.
Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, road paint or features such as concrete kerbing.
Development	• Ensure any woodland expansion complies with the principles of good forest design. • Where development is permitted, ensure that buildings are located so as to minimise their impact on the landscape (utilising any natural screening provided by the landform) and that they adopt vernacular styles, building materials and colours.

Forestry and woodland	• Discourage the creation of additional areas of coniferous forestry within the upland glens. • Encourage the removal of small, geometric plantations, allowing equal increases in planting in more appropriate locations elsewhere. • With respect to the replanting of existing plantations on valley slopes: - encourage the rationalisation of woodland to avoid isolated, small to medium sized areas of plantation woodland which appear very prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes. • Explore opportunities to modify management practices to allow the regeneration of native woodlands on some valley slopes, to create the 'natural' transition from valley woodland, through dwarf alpine woodland to the vegetation of the highland summits and plateaux.
Recreation	• Maintain low-key level of provision.
Tall structures	• Discourage proposals for aerials, masts or wind turbines because of their likely impact on the character of the Upper Highland Glens with Lochs. • Ensure that any proposals are subject to rigorous landscape impact assessment. • Where new power or telephone lines are proposed or required, ensure that operators adopt underground cable solutions.

MID HIGHLAND GLENS WITH LOCHS (2B)



KEY CHARACTERISTICS

- *geological and physical structure similar to Mid Highland Glens*
- *large-scale landscape created by the combination of expansive lochs and large enclosing mountains*
- *concentration of settlement and farming activity on lower slopes and at the ends of the lochs*
- *extensive woodland on lower slopes*
- *extensive corridor views*
- *clear transition from lower pastures through heather midslopes to bare upper summits*

OBJECTIVE DESCRIPTION		Mid Highland Glens with Lochs
Physical scale		1 to 1.5 kilometre wide loch. Loch surface at 120-200 metres AOD Valley sides rise to 300-600 metres AOD Lochs between 50 and 100 metres deep
Woodland	broad-leaf	Native birch and oak woodland on steeper and poorer ground
	coniferous	Substantial areas of plantation
Agriculture	arable	Absent
	pasture	Rough pasture on lower/mid slopes
	fields	Regular fields on smooth valley slopes
	field boundaries	Dry-stone dykes and post-and-wire fences
Settlement pattern		Scatter of farmsteads along shore of loch; greater concentration on sunnier, south-facing slopes
Building materials		Schists and granite with slates
Historic features		Old farmsteads, castles/estates concentrated on lower ground at each end of lochs
Natural heritage features		Native woodlands
Other landscape features		Mills, historic settlement sites
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium to large
Enclosure		Enclosed to semi-enclosed
Variety		Varied
Texture		Smooth to textured
Colour		Colourful
Movement		Peaceful
Unity		Unified
'Naturalness'		Restrained

LOCATION

5.2.12 Glacial overdeepening along faultlines in the West Highlands created a number of substantial lochs between 50 and 100 metres deep. Several of these occupy the middle sections of glens. Examples include Loch Rannoch, Loch Tay and Loch Earn.

PHYSICAL CHARACTERISTICS

5.2.13 The geology and landform of the Mid Highland Glens with Lochs landscape type are very similar to those already described in respect of Mid Highland Glens. The geology is dominated by grits and schists of the Dalradian and Moinian groups. Again, the landscape has been modified by glacial erosion, creating relatively straight, glaciated valley cross sections.

SETTLEMENT AND LAND USE

5.2.14 The lack of valley floor means that human activity has been pushed on to the lower slopes of the glen, or concentrated on alluvial deposits at either end of the loch. Small farmsteads tend to be located at fairly regular intervals along the northern and southern shores of the lochs, with access both to the more sheltered, often less steep, lower slopes, and the rough grazing provided at higher altitudes. The pattern is particularly well-developed along Loch Tay where, along the northern side of the loch, farms are found every kilometre or so. The remains of old farmsteads are very obvious here. Many of these would have formed part of a transhumance economy, with sheep and cattle being moved to the mountain pastures and shielings during the summer months. Settlement tends to cluster at points where the larger burns enter the loch. The water in these burns once powered mills - up to a dozen are said to have been built along the Lawers Burn, north of Loch Tay. A line of woodland along the lochside gives way to a band of pastures which extend a short way up the hillside. Each of the lochs also has substantial areas of woodland (broad-leaf, coniferous or mixed) along the lower slopes. One of the most significant of these is the Black Wood of Rannoch which survives as the largest areas of Caledonian pine forest in the area.

5.2.15 Each loch is encircled by roads, the more major of the two being along the northern side (reflecting the sunnier aspects of these slopes). The lochs would have formed important links in historic communication routes between the central lowlands and the west coast. This is reflected in a range of defensive structures found along these sections of glen including crannogs (e.g. Eilean nam Breaban on Loch Tay), forts (e.g. Dundurn Fort at the eastern end of Loch Earn) and castles. Numerous other historic sites such as stones, tumuli and crosses point to the historic importance of the lochs. During the Victorian era, loch steamers were popular with piers at Kenmore, Killin and other places.

5.2.16 Today, human activity is still focused on the lochs. The growth of tourism and recreation is reflected in the development of hotels, timeshare schemes, and a number of caravan and log-cabin sites. The lochs attract further activities such as sailing, powerboating, water-skiing and jet-skiing. This tends to be particularly the case on Lochs Tay and Earn, where activity is focused at either end of the loch. Loch Rannoch is much less intensively used, partly in response to stricter polices governing recreation development, and partly because of its remoteness. The lochs also form part of a major hydroelectric

power generating scheme, as signalled by the presence of high voltage power lines and power stations such as the one on the northern side of Loch Rannoch. Served by minor roads, the southern sides of the lochs are less developed and in places show signs of decline and abandonment.

5.2.17 These are amongst the largest scale landscapes in Tayside. The scale of the enclosing mountains and the expanse of open water creates a vast sense of space that belittles features such as farms or woods. Equally, however, it is an open landscape where intrusive features would be visible over a considerable distance.

FORCES FOR CHANGE

5.2.18 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.2.19 **Agriculture.** Most agricultural activity in the Mid Highland Glens with Lochs is concentrated in a narrow band on the valley slopes above the loch. Higher ground is dominated by rough grazing, grading into craggy heather or grass moorland. Pastures dominate. The pattern of farmsteads, pastures and hedgerow trees is an important feature of this landscape. However, the physically constrained location of these farms means there is little room to expand and there are several examples of derelict farm buildings and even apparently abandoned fields. In other cases, farm holdings have diversified into tourism, accommodating log cabin developments or static caravan parks. The decline of agriculture, and the deterioration of farm buildings, appears most pronounced on the lochsides served by minor roads (e.g. the southern side of Loch Tay).

5.2.20 **Transport.** Each of the lochs is encircled by roads. The main roads tend to be along the northern side of the glen and the more minor roads along the southern side. This distinction is reflected in the relative prosperity of the two sides of the loch and the degree of settlement and development. Along both sides of the lochs, it is important that the roads continue to be relatively minor features within the large-scale landscape. Improvements such as widening, realignment, lighting or the provision of more extensive signage should be resisted.

5.2.21 **Development.** Although with significantly more farmsteads, cottages and houses than the Upper Highland Glens, this landscape type is still comparatively sparsely settled. Older buildings often share a vernacular of stone walls (sometimes whitewashed) and slate roofs. Victorian buildings, concentrated within settlements found at the heads of the lochs and along roads leading out along the lochside, tend to continue use of local building material, providing interesting interpretations of vernacular styles. Newer buildings adopt more ubiquitous designs and materials which hinder their integration into the landscape. Developers of new buildings should be encouraged to select designs which respond to their location, both in terms of the landscape and the vernacular style. There may be some scope for the sensitive conversion of traditional farm buildings, particularly where these have become redundant or derelict.

5.2.22 **Forestry and woodland.** The Mid Highland Glens with Lochs have a mixture of semi-natural woodland, often marking the edge of the loch and extending up the hillside, and areas of coniferous plantation. The latter tend to be larger in scale, occupying higher areas of the valley sides. While the majority of these plantations sit comfortably within the wider landscape, sometimes the dominance of single species can be locally oppressive. Harvesting of this woodland provides an opportunity to review the best locations and designs for replanting. This is considered further within the management guidelines.

5.2.23 The Mid Highland Glens with Lochs also have some areas of semi-natural woodland, concentrated particularly on steeper valley slopes and on less productive areas along the lochside. Many of the woods that survive today are in very poor condition, overmature and unable to regenerate due to the level of grazing within or around them. There is an urgent need to facilitate the regeneration of these woodlands, an aim which is being pursued by the Tayside Native Woodlands Initiative.

5.2.24 Moving beyond the survival of these woods, there is an opportunity to allow their expansion and growth through the glens and up the valley slopes so as to re-create the more natural patterns of woodland that would have characterised the glens before intensive management for deer and grouse dominated.

5.2.25 **Recreation.** The Mid Highland Glens with Lochs are subject to a range of recreation pressures. This is particularly the case in relation to Lochs Tay and Earn. The remoteness and policy context means that pressures are far less on Loch Rannoch.

5.2.26 Recreation issues fall into two categories. Firstly there are those concerning the development of facilities. While most hotels, guest houses and bed and breakfast establishments are concentrated within, or on the edge of settlements such as Kenmore or St Fillans, there has been considerable historic development of static and mobile caravan parks within woodland along the lochside. There is a particularly large number of sites, both formal and informal, along the southern shores of Loch Earn. While individual static caravans sit within the woodland, some of the larger sites are more intrusive and are visible over a longer distance. There is an obvious concern that the use of mobile homes does not result into the gradual development of holiday cottages or other more permanent structures.

5.2.27 The second type of issue that affects both Loch Earn and Loch Tay is recreation activities such as watersports and walking or climbing. Both lochs have watersports centres (at Lochearnhead and Kenmore, respectively) and a number of smaller facilities along the waterside. The growth of motorcraft use, particularly powerboats and jet-skis, has led to concerns about the impact on the comparatively peaceful landscape of the lochs. Local authorities have pursued a policy which seeks to control the provision of additional motorised watersports facilities and which concentrates activity at the more developed ends of the lochs. As pressures and adverse effects continue to grow, the introduction of bylaws governing the use of the lochs is being considered.

5.2.28 Walkers and climbers generally have a much lower level of impact on the landscape. Problems may emerge, however, at popular locations (e.g. Ardvorlich, at the foot of Ben Vorlich) where there may be concentrations of parked cars. The most well-used routes may also suffer erosion resulting in local landscape and ecological impacts.

5.2.29 **Tall structures.** Each of the Mid Highland Glens with Lochs has a line of pylons running along the northern shore, linking components of the Tummel hydro scheme and serving settlements in the area. These pylons tend to run parallel to the road corridor and are often seen against a backdrop of rising hills. Their impact within the large-scale landscape of the lochs is therefore comparatively limited.

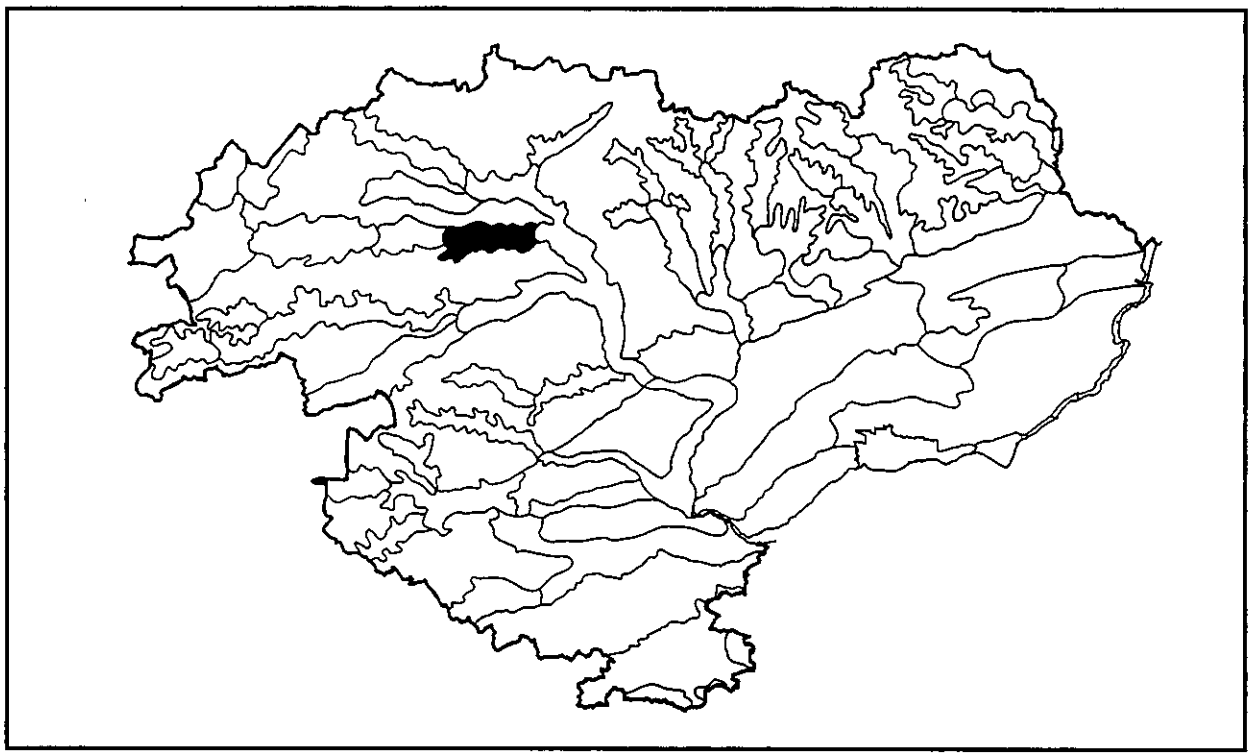
LANDSCAPE GUIDELINES

5.2.30 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristic pattern of farmland, woodland and settlement around the fringes of the lochs, maintaining the tranquil nature of these large-scale landscapes.

Agriculture	• Support farming activities along loch fringes. • Encourage management of farm woods, hedges and hedgerow trees. • Encourage maintenance of farm buildings and structures.
Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, or features such as concrete kerbing.
Development	• Discourage isolated developments in the open landscape. • Where development is permitted, encourage construction to consolidate existing villages. • Do not rely on screening where the screening itself becomes a prominent landscape feature. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Support the appropriate conversion of agricultural buildings where they have become redundant.
Forestry and woodland	• With respect to the replanting of existing plantations on valley slopes: - encourage the rationalisation of woodland to avoid isolated, small to medium sized areas of plantation woodland which appear very prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes;

(Forestry and Woodland contd.)	- vary the size of felling coupes, with smaller areas on lower slopes. • Manage grazing levels in and around semi-natural woodland to allow regeneration and expansion. • Explore opportunities to modify management practices to allow the regeneration of semi-natural woodlands on some valley slopes, to create the 'natural' transition from valley woodland, through dwarf alpine woodland to the vegetation of the highland summits and plateaux.
Recreation	• Restrict the creation of additional caravan parks and chalets. • Encourage more effective screening of caravan parks, consider use of alternative colours in most prominent areas. • Prevent upgrading of static caravans to more permanent structures. • Continue to restrict noisy watersports at the loch-ends. • Monitor levels of watersports activity and degree and extent of disturbance and bring forward byelaws to effect controls. • Monitor car parking patterns and erosion levels in areas popular among walkers and climbers.
Tall structures	• Where new power or telephone lines are proposed or required, encourage operators to adopt underground cable solutions.

LOWER HIGHLAND GLENS WITH LOCHS (2C)



KEY CHARACTERISTICS

- *geological and physical structure similar to Lower Highland Glens*
- *combination of lowland and upland attributes*
- *rich woodland enclosing the loch and providing a transition to upper slopes*
- *significant cultural and historic associations*
- *recreation and other development pressures*

OBJECTIVE DESCRIPTION		Lower Highland Glens with Lochs
Physical scale		0.5 to 1 kilometre wide floodplain Surface of loch at 140 metres AOD Valley sides rise to 500 metres AOD
Woodland	broad-leaf	Extensive: comprising semi-natural woodland on steeper slopes and managed estate woodland
	coniferous	Extensive: on valley sides and associated with estates
Agriculture	arable	Absent
	pasture	Mid slopes
	fields	Medium irregular on valley slopes
	field boundaries	Trees and walls on valley slopes
Settlement pattern		Well settled with villages and large estates.
Building materials		Transitional - granite, schist, slate and some sandstone
Historic features		Castles, lodges and estate features
Natural heritage features		Native woodlands.
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Corridor
Scale		Medium to large
Enclosure		Enclosed to semi-enclosed
Variety		Varied
Texture		Textured
Colour		Colourful
Movement		Peaceful
Unity		Unified
'Naturalness'		Managed

LOCATION

5.2.31 The Lower Highland Glens with Lochs landscape type is confined to the area around Loch Tummel. Although sharing many of the characteristics of the Mid Highland Glens with Lochs, the area around Loch Tummel is subtly different. In part this is due to the lower hills (generally 500-600 metres AOD, compared with 600-1000 metres) and slightly shallower slopes. It also reflects the pattern of woodland since there is a higher proportion of broad-leaf woodland, and the cultural associations of Queen's View on Loch Tummel's northern side. The rich character of this area has more in common with the rich wooded valley to the east (Glen Garry and Killiecrankie) than with the more exposed areas to the west.

FORCES FOR CHANGE

5.2.32 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.2.33 **Agriculture.** Most agricultural activity in the Lower Highland Glens with Lochs is concentrated in a narrow band on the valley slopes above the loch. Higher ground is dominated by rough grazing, grading into craggy heather or grass moorland. The pattern of farmsteads, pastures and hedgerow trees is an important feature of this landscape, allied to rich policy and semi-natural woodland. As in the case of the Mid Highland Glens with Lochs, the physically constrained location of these farms means there is little room to expand and there are several examples of abandoned fields. In other cases, farm holdings have diversified into tourism, accommodating log cabin developments or caravan parks.

5.2.34 **Transport.** Loch Tummel, like the other large lochs is encircled by roads. The main road is along the northern side of the glen and the more minor road along the southern side. This distinction is reflected in the relative prosperity of the two sides of the loch and the degree of settlement and development. Along both sides of the loch, it is important that the roads continue to be relatively minor features within the large-scale landscape. Improvements such as widening, realignment, lighting or the provision of more extensive signage should be resisted.

5.2.35 **Development.** This landscape type is more wooded and less settled than the Mid Highland Glens with Lochs. Where they occur, older buildings often share the vernacular of stone walls and slate roofs. Victorian buildings tend to continue use of local building material, providing interesting interpretations of vernacular styles. Newer buildings adopt more ubiquitous designs and materials which hinder their integration into the landscape.

5.2.36 **Forestry and woodland.** Woodland is an essential component of this landscape type, comprising a combination of semi-natural woodland, commercial forestry, farm woodland

and field boundary trees, policy and estate woodland. The characteristic interplay of woodland and farmland with rough moorland above is particularly important.

5.2.37 Coniferous plantations tend to be medium to large in scale, occupying higher areas of the valley sides. While the majority of these plantations sit comfortably within the wider landscape, sometimes the dominance of single species can be locally oppressive. Harvesting of this woodland provides an opportunity to review the best locations and designs for replanting. A particular aim should be the visual integration of areas of broad-leaf woodland with the existing areas of coniferous plantation. These issues are considered further within the management guidelines.

5.2.38 The Lower Highland Glens with Lochs also have some areas of semi-natural woodland, concentrated particularly on steeper valley slopes and on less productive areas along the lochside. Some have generated on areas of former farmland. Some of the woods that survive today are in poor condition. There is a need to facilitate the regeneration of these woodlands, an aim which is being pursued by the Tayside Native Woodlands Initiative.

5.2.39 **Recreation.** Loch Tummel has attracted visitors at least since Victorian times, and a number of tourism facilities are found along its northern side. A particular example is the visitor centre and forest walks at Queen's View. Hotels, a lochside caravan site and other forms of visitor accommodation, including groups of log cabins are also found here. Although some of these facilities are locally incongruous, their impact on the wider landscape is generally more limited, partly due to the level of woodland cover. The principal exception to this is the caravan site located on a lochside promontory just to the west of Queen's View. This is a prominent and unscreened feature which detracts from the view out over the loch from Queen's View in particular.

5.2.40 **Tall structures.** Loch Tummel has a line of pylons running along the northern shore, linking components of the Tummel hydro scheme. These pylons run along the lower slopes and are seen against a backdrop of rising hills. Their impact within the large-scale landscape of the lochs is therefore comparatively limited. However, the linear nature of the power lines is emphasised by the very straight corridors that are cut through woodlands to accommodate them.

5.2.41 Within this landscape type there is unlikely to be significant pressure for wind turbine construction. However, the effect of proposals on higher ground which are visible from within the glen should be assessed and considered carefully.

LANDSCAPE GUIDELINES

5.2.42 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the rich landscape of loch, woodland and farmland, and to minimise the intrusion of recreation facilities and activities upon it.

Agriculture	• Support farming activities along loch fringes. • Encourage management of farm woods, hedges and hedgerow trees. • Encourage maintenance of farm buildings and structures.
Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, or features such as concrete kerbing.
Development	• Discourage isolated developments in the open landscape. • Where development is permitted, encourage construction to consolidate existing villages. • Encourage the wider use of vernacular designs, materials and colours, while allowing for modern interpretations of traditional styles. • Support the appropriate conversion of agricultural buildings where they have become redundant.
Forestry and woodland	• With respect to the replanting of existing plantations on valley slopes: - encourage the rationalisation of woodland to avoid isolated, small to medium sized areas of plantation woodland which appear very prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes. • Manage grazing levels in and around semi-natural woodland to allow regeneration and expansion. • Explore opportunities to modify management practices to allow the regeneration of semi-natural woodlands on some valley slopes, to create the 'natural' transition from valley woodland, through dwarf alpine woodland to the vegetation of the highland summits and plateaux.

Recreation	• Maintain policy of concentrating tourist facilities within existing settlements. • Influence the design and provision of associated signage. • Encourage the re-location and/or screening of intrusive recreation provision.
Tall structures	• Where new power or telephone lines are proposed or required, encourage operators to adopt underground cable solutions. • Ensure that any proposals for aerials, pylons or masts are subjec' to thorough landscape impact assessment in terms of their visual and landscape impact, both on the local landscape of the loch and on surrounding areas. • Consider any proposals for wind turbines or other tall structures in surrounding areas in terms of their impact on key views and vistas from Loch Tummel and the valley sides.

UPPER HIGHLAND GLENS
Glen Beag, north of the Spittal of Glen Shee. A landscape dominated by the enclosing Highlands and the moorland vegetation.

MIDDLE HIGHLAND GLENS
Glen Shee. Improved pastures on the valley floor, grading into rough grazing, woodland and moorland on the valley slopes.

LOWER HIGHLAND GLENS
Strathardle near the Bridge of Cally - a rich landscape of dense woodland, hedgerow trees, pastures and arable fields, backed by rising hills.

UPPER HIGHLAND GLENS WITH LOCHS
Most of the lochs in the harsh landscape of the upper glens have been impounded by dams to generate hydroelectricity.

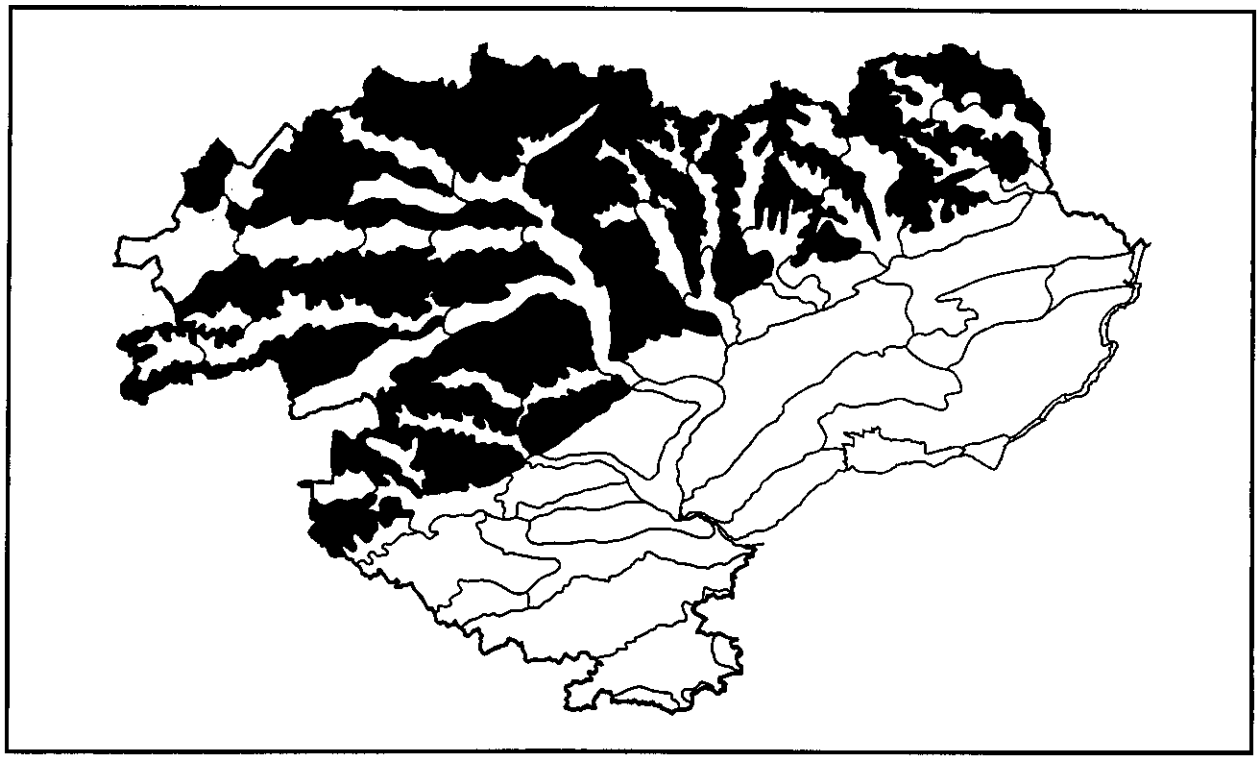
Photo: SNH

MIDDLE HIGHLAND GLENS WITH LOCHS
Loch Tay. A string of farms along the steep lower slopes, with exposed moorland rising above.

FIGURE 13

LANDSCAPE CHARACTER TYPES

HIGHLAND SUMMITS AND PLATEAUX (3)



KEY CHARACTERISTICS

- *areas of upland separating the principal glens*
- *West Highlands comprise distinct summits and ranges, separated by fault line lochs; the hills are sharply defined and often craggy*
- *Mounth Highlands comprise a more extensive area of upland with spurs extending southwards; the hills are more rounded than those to the west and rock outcrops are fewer*
- *vegetation patterns closely reflect altitude and exposure and include heather, grassland, blanket bog and arctic alpine plant communities; variations reflecting the underlying geology*
- *most of the area managed as open moorland*
- *little or no settlement*
- *some extensive plantations*
- *one of the remotest and wildest landscapes in the UK*

OBJECTIVE DESCRIPTION		Highland Summits and Plateaux
Physical scale		400 to 1000 metres AOD, forming individual groups of mountains or extensive upland tracts
Woodland	broad-leaf	A few areas of semi-natural woodland up to 600 metres AOD. Generally cleared by burning, cutting and grazing
	coniferous	Plantations up to about 450 metres
Agriculture	arable	Absent
	pasture	Rough and unimproved
	fields	Unenclosed
	field boundaries	Not applicable
Settlement pattern		Unsettled
Building materials		Not applicable
Historic features		Ancient routeways, former shielings
Natural heritage features		Rich arctic-alpine flora and fauna
Other landscape features		Rock outcrops, glacial features, expansive views
SUBJECTIVE DESCRIPTION		
Views		Panoramic
Scale		Large
Enclosure		Exposed
Variety		Simple to uniform
Texture		Rough
Colour		Muted
Movement		Distant
Unity		Unified
'Naturalness'		Undisturbed to managed

LOCATION

5.3.1 This landscape type comprises the areas of upland separating the principal glens, to the north of the Highland Boundary Fault. As with the glens described above, a broad distinction can be drawn between the West Highlands to the west of Glen Garry/Drumochter, and the Mounth Highlands to the east. While the hills generally reach similar heights, those in the west tend to be craggier and those in the east more rounded. This reflects the higher rates of erosion in the west due to the more rapid accumulation of snow and ice during period of glaciation and the pre-glacial landform. The West Highlands are more heavily dissected than the Mounth. The latter therefore includes more extensive areas of upland plateau. Furthermore, as noted above, east-west fault lines have determined the orientation of western glens while north-south valleys in the Mounth reflect the inclination of the massif.

West Highlands

5.3.2 The West Highlands can therefore be described as a series of comparatively discrete hills or ranges, as follows:

- Ben Vorlich and the Forest of Glenartney, south of Loch Earn;
- Ben Chonzie/Sròn Mhór/Meall nam Fuaran and Craigvinean Forest between Strathearn and Loch Tay/Strath Tay;
- Ben Lawers and Beinn Heasgarnich range south of Glen Lyon;
- Carn Gorm/Schiehallion range between Glen Lyon and Loch Rannoch;
- Meall Tairneachan Group between Strath Tay and Loch Tummel;
- Talla Bheith and Craiganour Forest between Lochs Rannoch and Tummel and Glen Garry.

Mounth Highlands

5.3.3 The Mounth Highlands form a more continuous area of upland with a series of spurs extending southwards towards Strathmore. The principal areas can be summarised as follows:

- Forest of Atholl north of Glen Garry;
- Forest of Clunie west of Strathardle;
- Forest of Alyth between Glen Shee and Glen Isla;
- Caenlochan Forest/Glen Doll Forest between Glen Shee and Glen Clova;
- Muckle Cairn/Hill of Glansie/Hill of Wirren between Glen Clova and Glen Esk;
- Hills of Saughs/Mount Battock, north and east of Glen Esk.

5.3.4 The rest of this section describes the whole of the Highland Summits and Plateaux landscape character type. It draws examples from within both the West Highlands and Mounth Highlands, as appropriate, but also highlights key differences between them, where they occur.

PHYSICAL CHARACTERISTICS

5.3.5 The geology of these Highland areas has already been described in relation to the intervening glens. Dalradian and Moinian grits and schists dominate, forming broad bands running south-west to north-east, parallel to the Highland Boundary Fault. These rocks were once the sediments of limestones, sandstones and shales, metamorphosed by heat and pressure to form huge schist mountains which, over millions of years, were reduced to the mountains we see today. The area also has significant intrusions of other rock forming parallel bands. These rocks include granites, limestones, quartzites and intrusive diorite. These differing rock types can have an important influence on local landform. Harder rocks result in outcrops, softer rocks result in eroded basins. They also influence vegetation patterns. Barytes has been quarried in parts of this area and further proposals for mineral extraction may come forward in the future.

5.3.6 Vegetation on the schists varies with altitude and exposure. On the moorland slopes below 600 metres, the land cover tends to be dominated by heather, mixed with sedge, rush, bog asphodel, cotton grass, and purple moor grass. On some of the shallower plateau slopes (for example on the Atholl upper moors) blanket bog has developed, with peat lying a metre or more deep. Heather is particularly extensive on drier moorland slopes, such as those in Glen Clova, turning the hillsides purple and pink in late August and September. Grass tends to dominate in the western part of the Highlands. At between 600 and 900 metres there is a pronounced transition from heather and grass moorland to the arctic alpine zone with many screes, rock outcrops and, where topography and soil accumulation allows, a low growth of blaeberry and crowberry, and sometimes a mat of prostrate heather. Otherwise, it is lichens which predominate in this exposed, often inhospitable environment. Periglacial features produced by freeze-thaw processes, are also evident in the higher areas.

5.3.7 Vegetation patterns vary with the underlying rock, however. Perhaps the most common of these variations occurs where calcareous schists and limestone rocks occur. Particular plant communities associated with these rocks are found on Ben Lawers, Carn Gorm, Beinn A'Ghlo and Schiehallion among others. A number of these summits are protected as SSSIs, while Ben Lawers, regarded by some as one of the finest examples of arctic alpine flora, is designated as a National Nature Reserve (NNR). Caenlochan is also a NNR.

5.3.8 Most of the vegetation of the Highlands is managed for grouse, deer and sheep. Tree and scrub growth is prevented by burning, grazing and tree-cutting. Although there are a few patches of semi-natural woodland on slopes up to about 600 metres, the tree roots and stumps that are sometimes visible in areas of bog point to the former extent of woodland on these moors. In other countries, where similar sub-arctic conditions occur, land uses have allowed the growth of vegetation such as dwarf birch and willow, forming a transition from lower habitats to the ground vegetation of the arctic-alpine zone.

5.3.9 The Highland areas support a variety of habitats. Notable species of birds found in the area include ptarmigan, dotterel, dunlin and golden plover on the higher ground and peregrine falcon, red and black grouse, snipe, curlew, hen harrier, siskin, lesser redpoll and capercaillie on the lower moors and in the remaining areas of woodland. Red squirrel, mountain hare and wild cat are not uncommon, while much of the area is inhabited by both red deer and roe deer.

SETTLEMENT AND LAND USE

5.3.10 Human activity is specialised in the upland areas. Long managed by the large estates for hunting and shooting (hence the term 'forest' which is used extensively throughout the area), the upland areas also once provided areas of summer grazing when transhumance (the seasonal movement of sheep and cattle between the lowland and upland pastures) was a common practice. The remains of the old shielings, often sited in the most sheltered parts of the upland, can still be found today, for example on the southern and eastern slopes of Ben Lawers above Loch Tay. Historically, there would also have been many tracks and paths through the uplands, providing links with areas to the north or west. Many of these were important droving routes, used when moving stock to and from market. Some of the best examples of these old routes are found at the head of the 'cul-de-sac' glens of the Mounth. Jock's Road, for example climbs out of Glen Doll, crossing a bealach south of the White Mounth before dropping down towards Braemar. Few modern roads follow these old routes, one of the exceptions being the A93 through Glen Shee which crosses the Mounth at Cairnwell. While these historic tracks, together with more recent stalkers' paths and footpaths, are an important recreational resource, the creation of additional tracks and paths could have a local landscape impact and could undermine the special character of these areas.

5.3.11 Other signs of human activity are generally limited to the patterns created by heather burning, and the comparatively small number of upland conifer plantations. Large coniferous woodlands on the upland plateaux (for example above Glen Garry) are less intrusive than within the glens or where the scale of the landscape is less expansive. Here they appear as a thin layer which does not upset the scale or drama of the highlands. The hills are largely free from tall structures with the exception of pylons serving hydroelectric schemes, particularly in the West Highlands. Depending upon the angle of view, the season and the light, these pylons can appear as light grey structures against an otherwise sombre landscape of browns and greens.

5.3.12 In summary, therefore, despite active management which favours heather moorland over other forms of sub-arctic vegetation, the Highland Summits and Plateaux comprise one of the wildest landscapes in the UK. Dramatic mountains, sweeping moorlands, extensive views throughout southern Scotland and constant exposure to changing, often extreme weather conditions, all shape perceptions of the landscape. Hidden from view are the more sheltered, fertile and settled glens. Remoteness is another important factor. With just a few roads climbing out of the glens onto the high moorland, these are relatively inaccessible areas requiring commitment on the part of those visiting them.

FORCES FOR CHANGE

5.3.13 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.3.14 **Transport.** For the most part, the highland summits and plateaux are inaccessible, served only by rough tracks or stalkers' paths. The highland massifs are comparatively dissected so many roads follow lowland routes. There are comparatively few highland passes, and these are generally minor in their impact on the upland landscape.

5.3.15 **Forestry and woodland.** The highland summits and plateaux contain relatively little commercial forestry. Notable exceptions include Craigvean Forest between Aberfeldy and Pitlochry and areas around Glen Isla.

5.3.16 The wider landscape impact of these woods is comparatively limited. In part this is because of the high ratio of open moorland to plantation. It also reflects the grand scale of the landscape, and the appearance of the woods as little more than dark shapes on an already sombre landform. This perception could change if the scale of woodland increased significantly so as to replace the mottled appearance of the heather moorland with more uniform areas of conifers. It is unlikely that such proposals will come forward since the regional Indicative Forestry Strategy describes much of the area as being 'unsuitable for tree crops'.

5.3.17 Much of the Highland Summits and Plateaux are managed for deer and grouse, preventing the natural regeneration of woodland where this could occur. To that extent, the upland landscape that we see today is highly managed and closely allied to the historic pattern of estate management and economy. Appropriate grazing management, supported by appropriate funding mechanisms, could help develop opportunities for natural regeneration of dwarf and other woodland on the lower and mid slopes.

5.3.18 **Recreation.** The management of the Highland Summit and Plateau landscape for game has been noted above. With the exception of this, recreation pressures are relatively few on this remote, harsh landscape type. The principal exceptions are the more popular peaks such as Ben Lawers, Schiehallion and Ben Vorlich where substantial numbers of walkers and climbers can cause local problems of erosion. The creation of new paths and tracks in this mountain environment should be avoided. There may be additional pressures for ski development, particularly at the head of Glen Beag where there are proposals to expand the existing facilities southwards. This would extend the zone of visual influence associated with the ski area. Elsewhere, there may be pressure to expand cross-country skiing, with the provision of cross-country routes in areas such as Ben Lawers.

5.3.19 **Tall structures.** The Highland Summits and Plateaux are comparatively free from tall structures such as pylons and masts. There are, however, a number of electricity pylons lines which link hydroelectric plants and which climb out of the highland glens to cross the exposed upland. Examples include the pylons between Tummel Bridge and Glen Garry, and the pylons between Appin of Dull and Glen Quaich. Though the lines of pylons are relatively small when set within the expansive uplands, they are a modern and functional intrusion into the highland landscape. Opportunities to bury these cables should be taken should they arise. Additional pylons should be resisted.

LANDSCAPE GUIDELINES

5.3.20 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the characteristic upland landscape of open, unsettled moorland vegetation and to maintain the contrast with the more settled and wooded glens and lowlands.

Transport	• Minimise upgrading or improvement of roads particularly where this involves the creation of cuttings and embankments, or the introduction of additional signage, or features such as concrete kerbing.
Development	• Discourage any development on the Highland Summits and Plateaux.
Forestry and woodland	• Ensure any new woodland proposals comply with the agreed standards of good forest design. • Encourage the removal of small, geometric plantations, allowing equal increases in planting in more appropriate locations elsewhere. • With respect to the replanting of existing plantations: - encourage the rationalisation of woodland to avoid isolated, small to medium sized areas of plantation woodland which appear prominent in an otherwise open landscape; - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins at the top and bottom of the slope, allowing views of upper slopes from within the glen; - discourage straight lateral edges - do not plant up to the edge of a land holding where this creates a strong and geometric vertical line; - employ more varied species mixes; - vary the size of felling coupes, with smaller areas on lower slopes.

(Forestry and woodland contd.)	• Explore opportunities to modify management practices to allow the regeneration of native upland treecover in some areas.
Recreation	• Maintain low-key level of provision. • Avoid creation of new mountain tracks and paths. • Expansion of ski facilities into this landscape type should only be permitted if it is clear that: - the visual and landscape impact is limited; - there is no scope to accommodate expansion to the north; - the economic need for the scheme is demonstrated. • Indirect effects including traffic and the proliferation of related facilities (ski hire shops) should also be taken into account.
Tall structures	• Discourage proposals for aerials, masts or wind turbines or additional pylons because of their likely impact on the harsh, undeveloped character of the Highland Summits and Plateaux. • Ensure that any proposals are subject to rigorous landscape impact assessment. • Where new power or telephone lines are proposed or required, ensure that operators adopt underground cable solutions.

Photo: SNH

LOWER HIGHLAND GLENS WITH LOCHS

Loch Tummel - a richly wooded landscape enclosing the enlarged loch; settled and modified by designed landscapes.

Photo: SNH

HIGHLAND SUMMITS AND PLATEAUX

Exposed, craggy uplands along Glen Lyon, punctuated by surviving Scots pines.

Photo: SNH

PLATEAU MOOR

Lochans, blanket bog, granite boulders and grey tree stumps characterise the desolate landscape of Rannoch Moor

HIGHLAND FOOTHILLS

A complex landscape of interlocking, ridge-like hills and intervening valleys - here close to White Caterthun Fort.

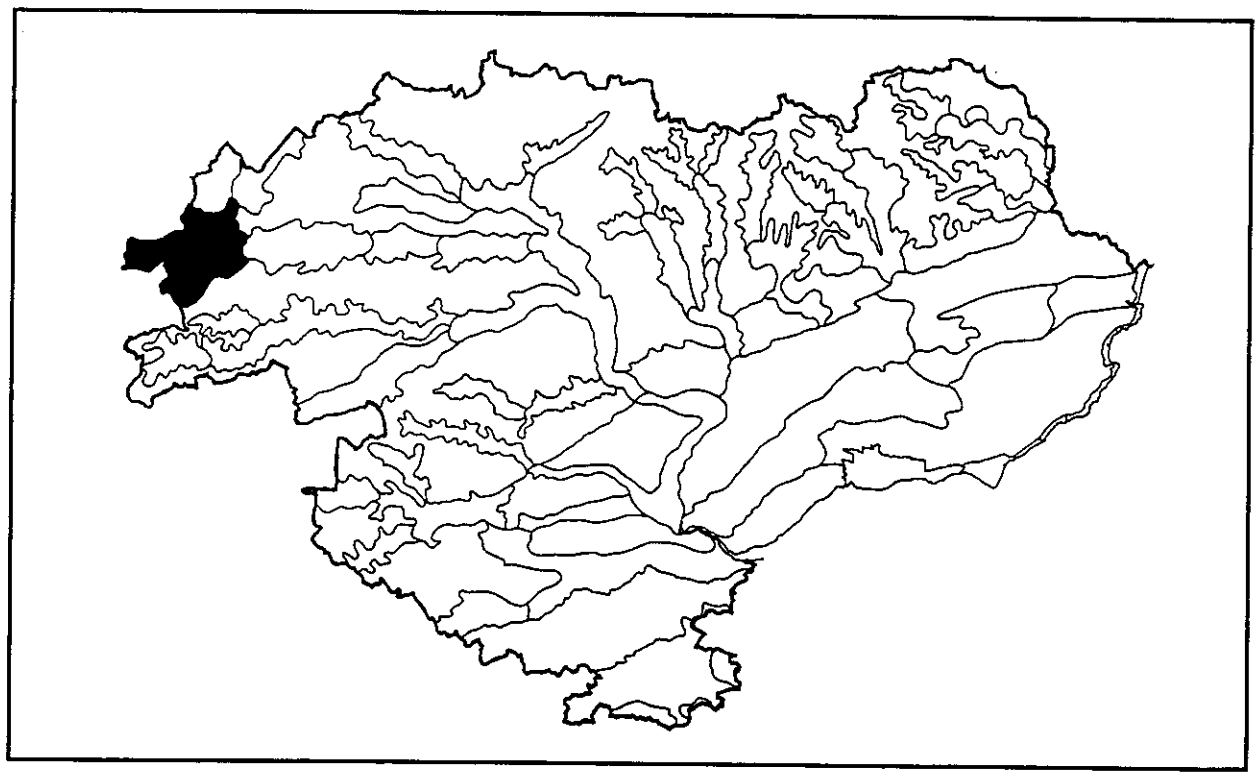
LOWLAND HILLS

The rounded upland character of the hills south of Comrie.

FIGURE 14

LANDSCAPE CHARACTER TYPES

PLATEAU MOOR: RANNOCH MOOR (4)



KEY CHARACTERISTICS

- *highly eroded granite basin overlain with glacial deposits*
- *mosaic of lochans, mires, hillocks and boulders*
- *extensive coniferous woodland to the south*
- *modern development prominent but fails to tame the landscape*
- *wild, exposed and remote*

OBJECTIVE DESCRIPTION		Plateau Moor
Physical scale		300 metres AOD, 25 kilometres in diameter
Woodland	broad-leaf	Scattered trees where shelter/grazing permit
	coniferous	Extensive plantation to the south
Agriculture	arable	Absent
	pasture	Very rough
	fields	Absent
	field boundaries	Not applicable
Settlement pattern		Unsettled with the exception of buildings at Rannoch Station
Building materials		Granite and slate
Historic features		No notable features
Natural heritage features		Rich wetland ecology
Other landscape features		Linear features - railway and pylons; enclosing mountains
SUBJECTIVE DESCRIPTION		
Views		Panoramic
Scale		Large
Enclosure		Exposed
Variety		Simple
Texture		Very rough
Colour		Muted
Movement		Remote
Unity		Unified
'Naturalness'		Undisturbed

LOCATION

5.4.1 At the western end of Loch Rannoch, the Dalradian and Moinian schists which are ascendant throughout much of the Highlands give way to an extensive basin of intrusive granite covering an area about 25 kilometres in diameter. At an altitude of about 300 metres, this is Rannoch Moor.

PHYSICAL CHARACTERISTICS

5.4.2 The moor's landform belies its geological structure. Granite usually comprises the most resistant rocks, remaining as upland when softer rocks around have been eroded away. However, Rannoch Moor formed the epicentre of the ice sheets that were formed during successive periods of glaciation. The elevated rates of accumulation and ice movement resulted in rapid and sustained scouring and erosion on the moor, and along the principal routes emanating from it (including the glens of Loch Rannoch, Loch Ericht and Glencoe and Glen Etive). This accentuated the erosion resulting from chemical weathering of the granite in the pre-glacial era. When the ice sheets melted, the area was left as undulating plateau of morainic deposits punctuated by hundreds of small lochans and a handful of larger lochs.

5.4.3 The vegetation that subsequently developed represents the most extensive area of western blanket mire in Great Britain. Plants include ling, bog myrtle, a variety of grasses and sphagnum mosses. The blanket bog grew under the cool post-glacial conditions that have prevailed since the last Ice Age, sustained by high levels of rainfall. Where shelter is greatest, a scatter of deciduous trees survives, remnants of what would once have been extensive native woodland. The stumps of many trees are preserved in the peat bogs on the moor.

SETTLEMENT AND LAND USE

5.4.4 Though wild and remote, signs of human activity are not absent from Rannoch Moor. Protected by snow fences and sheds, the West Highland railway crosses the moor with a halt at Rannoch Station, 10 kilometres west of Loch Rannoch. Loch Eigheach has been dammed and enlarged to generate hydroelectricity, and a line of grey pylons serving the power station marches defiantly across the moorland landscape. Finally, an extensive area of coniferous plantation (about 50 square kilometres) covers the moor to the south of Rannoch Station.

5.4.5 Like the Highland Summits and Plateaux, the Plateau Moor landscape type comprises one of the wildest areas and, for many, most forbidding landscapes in Scotland. Treacherous mires, boulder-strewn moorland, a complete lack of shelter, and exposure to winds and rain make this an inhospitable environment. Enclosing summits such as Sgor Gaibhre often disappear into the swirling clouds that often descend onto the moor. It is a constantly changing landscape, transforming itself according to the light, the weather and the season. Though these qualities are valued by many, most people prefer to hurry through, travelling along the West Highland railway line, or the A82 further to the west.

FORCES FOR CHANGE

5.4.6 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.4.7 **Forestry and woodland.** Though much of Rannoch Moor comprises a mosaic of lochans, bog and boulder strewn moorland, large areas were planted with conifers in the earlier part of the 20th century. These woods have matured and now comprise monocultures of even-aged trees which hide much of the variety of the underlying landscape. Since they were planted, opinions have changed. On the one hand, the wilderness of Rannoch Moor is now more valued as a landscape resource. On the other hand, as has been described in preceding sections, forestry practices have progressed to the extent that comprehensive, large-scale afforestation has been abandoned in favour of a more sensitive approach which takes into account more fully the importance of landscape. The challenge at Rannoch Moor is to decide how replanting, when it occurs, should create a more natural form. Much has to do with the nature of the woodland edge, the ratio of open space to woodland, the size and shape of planting and felling coupes and the degree of integration with native and semi-natural woodland.

5.4.8 Rannoch Moor includes a few areas of remnant native woodland. It is likely that grazing and other forms of management are preventing natural regeneration outside of fenced areas. There may be opportunities to change management practices so as to encourage regeneration, particularly where this allows integration with commercial forestry.

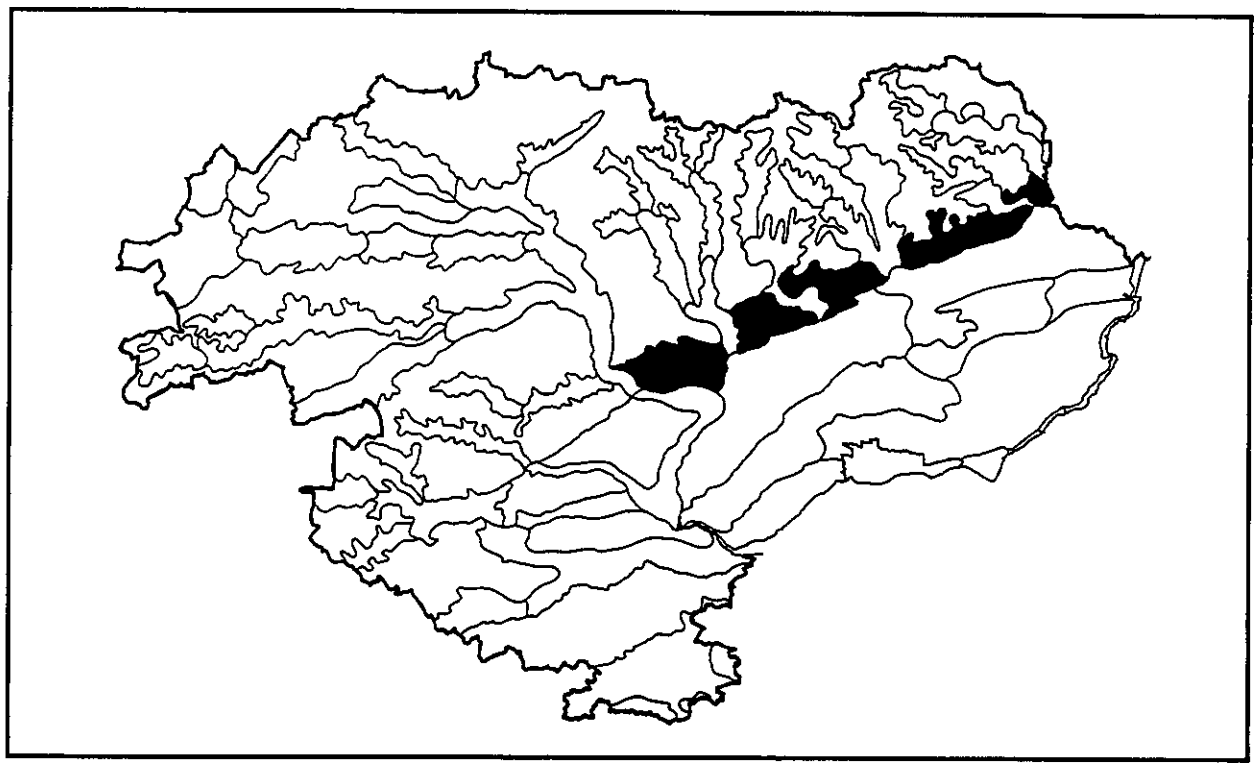
5.4.9 **Tall structures.** Rannoch Moor is currently comparatively free from tall structures such as pylons and masts. There is, however, a line of pylons which follows the road to Rannoch Station before turning south to follow the railway line. The grey of the pylons makes them stand out against the dark green of the conifer plantations. Though the line of pylons is relatively small when set within the expansive moorland, it is a modern and functional intrusion into the landscape. Opportunities to bury these cables should be taken should they arise. Additional pylons should be resisted.

LANDSCAPE GUIDELINES

5.4.10 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the exposed upland character of the moor and to reduce the impact of modern features such as commercial woodland and electricity pylons.

Forestry and woodland	• Ensure any proposals for further woodland expansion are rigorously tested by environmental assessment and comply with the principles of good forest design. • With respect to the replanting of existing plantations: - adopt a more naturalistic appearance, responding to the landform and features such as burns, gullies and crags; - create graded and irregular margins; - integrate conifers with native species; - employ more varied species mixes; - vary the size of felling coupes. • Explore opportunities to modify management practices to allow the regeneration of native upland treecover in some areas, particularly where this can provide a transition to commercial woodland.
Tall structures	• Discourage proposals for aerials, masts or wind turbines or additional pylons because of their likely impact on the harsh, undeveloped character of the moor. • Where new power or telephone lines are proposed or required, ensure that operators adopt underground cable solutions. • Explore options for burying existing cables, and for alternative colours for pylons to reduce their prominence in the landscape.

HIGHLAND FOOTHILLS (5)



KEY CHARACTERISTICS

- *complex geological structure resulting from their position along the line of the Highland Boundary Fault*
- *glacial deposits*
- *steep whale backed hills and south-west to north-east valleys*
- *winding, gorge-like main river valleys*
- *gateway to the Angus Glens with a rich historic heritage*
- *building materials reflecting geological transition*
- *complex, sometimes disorientating landscape with glimpses of Highland and lowland*

OBJECTIVE DESCRIPTION		Highland Foothills
Physical scale		Climbing from about 100 metres at their southern edge to summits between 300 and 400 metres AOD
Woodland	broad-leaf	Scattered areas of woodland
	coniferous	Small to medium sized coniferous plantations, often geometric in form
Agriculture	arable	On gentler, lower slopes, particularly along northern edge of Strathmore
	pasture	Extensive areas of pasture
	fields	Medium, regular shaped where landform permits
	field boundaries	Hedges, sometimes heathy in character and some dry-stone walls
Settlement pattern		Settlement concentrated on low ground, particularly where rivers have cut corridors through to the lowland
Building materials		Combination of hard rocks from the north and sandstones from the south
Historic features		Very rich in defensive sites, hill-forts, castles and fortified manor houses
Natural heritage features		Mainly confined to intervening valleys and gorges
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Intermittent
Scale		Small to medium
Enclosure		Semi-enclosed
Variety		Varied
Texture		Smooth/rough
Colour		Muted
Movement		Peaceful
Unity		Fragmented
'Naturalness'		Tamed

LOCATION

5.5.1 Along the Highland Boundary Fault, at the foot of the Mounth Highlands, a series of foothills mark the transition to the lowland of Strathmore. Dissected by the rivers that flow out of the highland glens, the Highland Foothills landscape type forms a series of units running eastwards from Dunkeld to Edzell.

PHYSICAL CHARACTERISTICS

5.5.2 The geology of this area is mixed, comprising areas of schist to the north-west and Old Red Sandstone to the south-east, separated in places by a variety of resistant conglomerates, intrusive and extrusive rocks including slates, lavas and tuffs. Superimposed upon this structure is a mass of glacial moraine, deposited as the ice sheets retreated into the glens. The complexity of the geology is reflected in a landscape of steep, whale-backed hills and intervening valleys, generally orientated on an east-west axis. Many of the Highland Boundary rocks are harder than those to the north and south, and rivers flowing off the highlands have been forced to find the least resistant route. Each turns north-eastwards before turning to the south once again. The hills are most distinct in the east. In the west, the hills between Dunkeld and Blairgowrie are less well-defined, though there are many signs of glacial deposition.

SETTLEMENT AND LAND USE

5.5.3 Much of the Highland Foothills landscape type is under intensive agricultural use, comprising a mixture of fertile grasslands and, on the more level, better drained land, arable fields. A small number of coniferous plantations are found on the foothills, while broad-leaf woodland is concentrated on steeper slopes, particularly along the narrow river valleys, or dens, that cut through the hills. Many of these valleys are ecologically important, supporting ancient woodland and the cool damp conditions favouring ferns and mosses. Many of the valleys are designated as SSSIs.

5.5.4 Historically, this area represented the gateway to the glens, the boundary between the highland and lowland glens, and the limit of Roman occupation. It is not surprising, therefore, that the Highland Foothills have a rich heritage of archaeological sites, ranging from sculptured stones and crosses, through hill-forts and Roman camps to dramatic medieval castles and fortified manor houses. Particularly significant examples of prehistoric hill-forts are found at Brown Caterthun and White Caterthun. A number of large houses, for example The Burns near Edzell, are located in this landscape type. Modern settlement echoes the past importance of the glens, most towns and villages of any size being sited close to one of the valleys emanating from the foothills. Building materials reflect the geological transition, comprising a mixture of grey schists and granites and the more colourful lowland red sandstones.

5.5.5 In contrast to the apparent simplicity of lowland Strathmore and the clear structure of the Mounth Highland and glens, this is a confusing, almost disorientating landscape. The hills and their intervening valleys mean that it is relatively well-contained, with only occasional glimpses to the heath moorland above, or open lowland below. Valleys appear to run in all directions, twisting up into the Highlands, running along the fault line and leading down to Strathmore.

VARIATIONS IN LANDSCAPE CHARACTER

5.5.6 The Highland Foothills are most pronounced, but also narrowest in the east. Here the whale-backed hills are sharpest in relief, enclosing a narrow valley running parallel to the Highland Boundary Fault to the north. Further west, the foothills are less pronounced, and their width increases to over 5 kilometres. There is a gradual transition in character and the area of foothills between Rattray and Dunkeld, which includes a series of small kettle hole lochs along the course of the Lunan Burn, is quite different in appearance from those areas near Edzell. The waterbodies are of considerable nature conservation importance, adding further interest to this landscape.

FORCES FOR CHANGE

5.5.7 This section contains a description of the principal types of change that have affected this landscape type in the recent past or which are likely to affect it in the future. Changes may be positive or negative in terms of their effect on the landscape. The aim of this section is to gain a clear understanding of the nature and direction of change and its likely impact on the essential character and quality of the landscape. This analysis provides the basis for management guidelines to assist other organisations develop more detailed policies for agriculture, forestry and development.

5.5.8 **Agriculture.** The transitional nature of the Highland Foothills is reflected in the pattern of agriculture. Many farms straddle the transition, combining sheep and cattle rearing on the uplands with arable cultivation on the lowlands. This pattern of mixed farming means that farms have the opportunity to vary the extent of arable cultivation or grazing to reflect prevailing market conditions. The support mechanisms for cereal production in particular may have encouraged farmers to extend arable cultivation from the lowlands into parts of the foothills, in places weakening the contrast between the hills and the lowland strath. On the other hand, the Highland Foothills mark the approximate boundary of the Less Favoured Area which covers much of the Highlands, providing support for hill farming. This scheme offers income stability for sheep and cattle farmers on higher ground. However, as with all forms of support, it makes the economy potentially vulnerable to changes in national or European policy.

5.5.9 Many farms in the Highland Foothills have constructed modern agricultural buildings such as sheds and barns. These are generally of a smaller scale than those found in the lowland straths. Furthermore, the more complex landform provides a much greater degree of screening.

5.5.10 **Transport.** The Highland Foothills are laced with a network of minor roads, often bordered by hedgerows (sometime comprising gorse) or contained within steep banks. The circuitous nature of many of these roads emphasises the complicated nature of the landform. It is important that the small scale and rural character of these roads is retained. Hedges and hedgerow trees should be conserved and signage and 'improvements' such as widening or kerbing resisted.

5.5.11 **Development.** Though relatively close to the string of small towns and villages located at the mouths of the Angus Glens, development within the foothills is very limited, generally comprising little more than a scatter of farmsteads and a few small hamlets. While further residential development could be accommodated without major impacts on

the wider landscape, the effect on the local landscape could be significant. Although there may be some scope for residential conversions where traditional farm buildings have become redundant, generally new development should be focused outwith this landscape type.

5.5.12 **Forestry and woodland.** The Highland Foothills have a limited amount of woodland, in some places hidden within the complex of hills, in others crowning the hills overlooking the lowland straths. While much of this woodland is commercial in nature, some has been planted to provide shelter for game, stock or crops. The Tayside Indicative Forestry Strategy categorises much of the Highland Foothills landscape type as being 'preferred' or 'potential' areas for new planting. Taking a regional perspective it is evident that the foothills are relatively free from the constraints associated with the most productive agricultural land and the sensitive highland areas. At a more local level, there is obviously a concern that the scale of any new planting should not be such as to change significantly the landscape character of the foothills. Key factors to be considered include:

- scale of new planting relative to the landform and the proportion of unplanted land;
- species composition;
- relationship with existing semi-natural or planted woodland;
- retention of key views within and outwith the foothills;
- size of felling coupes;
- factors such as agricultural viability, nature conservation and historic sensitivities.

5.5.13 These issues are addressed by Forestry Authority woodland design guidance (see section 4.19.), and are summarised in the landscape guidelines presented at the end of this section.

5.5.14 **Recreation.** Access to the Highland glens, the proliferation of castles and other historic sites, and the particular nature conservation interest of areas such as the Lunan Valley, means that the Highland Foothills are popular for recreation and tourism. A number of caravan parks are found within or immediately adjoining the foothills. While these generally have a limited impact on the wider landscape, it is possible, however, that there may be pressure to expand these sites or create new ones. There may also be pressure for chalet developments or timeshare schemes. Where they are permitted, such developments should be located in less prominent lowland locations, exploiting the natural screening provided by the topography and existing woodland. Additional impacts on the landscape, including traffic levels on narrow roads, signage, an increase in the loss of tranquillity, should also be taken into account.

5.5.15 **Tall structures.** The Highland Foothills remain comparatively free of tall structures. The principal exception is the high voltage electricity transmission line which climbs into the foothills near Airlie before running north-eastwards through the hills. Given the comparatively small scale of the foothills and the intervening valleys, this line of pylons is a substantial feature in the landscape, conflicting with the area's otherwise rural character.

The effect is particularly significant where the pylons run across hilltops or along ridgelines, or where they run along narrow glens such as that of the Paphrie Burn.

5.5.16 Masts and aerials are largely absent from these hills. Given the growth of telecommunications and the position of the foothills overlooking the lowland straths, however, it is possible that proposals for new masts may come forward. Where possible, these should be resisted, but operators should be encouraged to develop a strategy that reflects the local and strategic landscape effects of masts. Given the density of hill-forts, castles and other significant sites, there must also be concern about the potential effect on the historic component of the landscape, and on people's enjoyment of historic sites in their wider context.

5.5.17 Wind turbines represent a further potential development pressure. Though wind speeds are likely to be significantly lower than in more elevated parts of the Highlands or the Sidlaws/Ochils, it is possible that the lower level of perceived constraint, together with the proximity to the existing electricity distribution network, could favour this area. This would be even more likely if the efficiency of wind turbines continues to improve, thereby making areas with lower wind speeds viable. It is acknowledged that development here could avoid the need to locate turbines in even more sensitive upland areas, or in less sensitive, but more populated areas closer to settlements. It would also mean that, from a distance, turbines would be viewed against a backdrop of higher ground. However, the insensitive development of wind turbines in this area would conflict with the small scale, historic and deeply rural character of the landscape. It would also weaken and confuse the area's role of providing a transition from the unsettled uplands to the fertile and settled lowland.

LANDSCAPE GUIDELINES

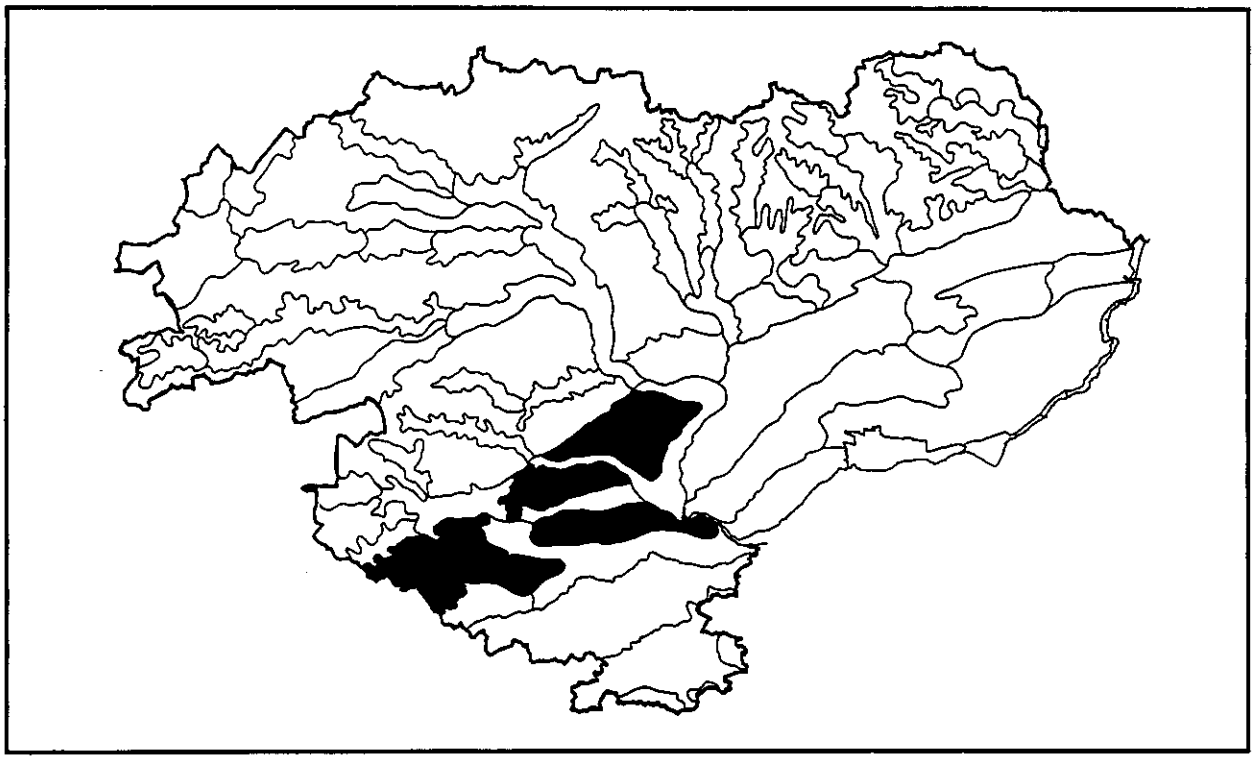
5.5.18 The following guidelines reflect the sensitivities of the landscape and the pressures for change acting upon it. They are intended to provide a broad basis for the development of more detailed management strategies. The overall aim of such strategies should be to conserve the small-scale, rural and historic character of the Highland Foothills, recognising their importance in providing a transition zone between the highlands and the lowlands.

Agriculture	• Maintain the distinction between lowland cereals and highland grazing areas. • Encourage farmers and landowners to maintain and replant trees and farm woodlands. Species to include oak, maple, beech and ash. • Use the agricultural development notification scheme to influence the design, colour, materials, screening and location of new farm buildings. Explore the use of planning conditions attached to new buildings to provide screening where appropriate.

Transport	• Where road improvement schemes take place, ensure that hedges and hedgerow trees are reinstated. • Avoid the use of suburban features such as concrete kerbing in a rural setting unless absolutely necessary. Explore more appropriate alternatives. • Develop a road use hierarchy as a basis for management.
Development	• Discourage significant development in the Highland Foothills. Instead, encourage new development to reinforce the existing settlement pattern in surrounding areas, particularly within the lowland straths. • Where small-scale development is permitted, encourage developers to use local building materials and to adopt local vernacular in respect of density, massing, design, colour and location. Avoid standard designs and layouts. Assess and adopt existing traditional layouts. Consider the preparation of design guides as supplementary planning guidance. • Encourage the appropriate conversion of redundant farm buildings. Guidance should be provided on the way buildings should be converted (including the provision of drives, gardens etc.) to prevent the suburbanisation of the countryside.
Forestry and woodland	• New planting should conform to the Forestry Authority's design guidelines. In particular, it should respond to the small-scale nature of the landscape, complex topography, the importance of views within and out of the hills, and historic and ecological values. • Use new woodland planting to enhance the landscape and nature conservation value of the foothills. New woodland could link existing plantations and semi-natural woodlands in the foothills and lower parts of the Highland glens. • The broad principles of new woodland could include: - overall planting strategy that emphasises the transitional character of the foothills; - expansion/regeneration of native woodlands from highland glens into foothill glens; - mixture of broad-leaf (oak and ash) and conifer species; - small coupes to reflect the small scale of the landscape; - concentration of new woodland on steeper slopes, around the lower slopes of whale backed hills and through small glens towards highlands and lowlands; - retention of key views out from foothills.

Recreation	• Concentrate recreation and tourism developments, including caravan sites, chalet developments and timeshare schemes, in well-screened locations within valleys and glens. Secondary effects resulting from signage, traffic and activity levels should also be taken into account.
Tall structures	• Assess proposals for aerials, pylons or masts in terms of their visual and landscape impact on the local landscape of the Highland Foothills, and the broader landscape of the lowland straths and Highlands. • Encourage telecommunications companies to share facilities where it is evident that this would reduce the overall landscape impact. • Encourage telecommunication companies to develop a strategy for mast provision which reflects the sensitivity of the local landscape. • Encourage the development of a regional strategy for renewable energy, including wind power, in order that the most appropriate types of development and areas come forward.

LOWLAND HILLS (6)



KEY CHARACTERISTICS

- *low ridges and hills separating lowland straths and adjoining the nearby uplands*
- *composed of soft, red sandstones*
- *transitional character with pastures on lower slopes, giving way to rough grazing and even open moorland*
- *evidence of several phases of historic settlement*
- *extensive woodland, including forestry plantations*
- *influence of modern development*

OBJECTIVE DESCRIPTION		Lowland Hills
Physical scale		Broad ridges and rounded hills rising to between 150 and 600 metres AOD
Woodland	broad-leaf	Small farm woods and woodland along sheltered burns
	coniferous	Extensive areas of plantation
Agriculture	arable	Limited to lower slopes and some sheltered, gentler upper slopes
	pasture	Improved pasture dominant, giving way to rough grazing and moorland on upper slopes
	fields	Medium, rectilinear where landform allows
	field boundaries	Hedges on lower slopes and walls on upper slopes
Settlement pattern		Sparse scatter of farmsteads. Also masts, roads
Building materials		Sandstone and harder schists and granites
Historic features		Prehistoric, Roman, medieval and later influences
Natural heritage features		Moorland areas
Other landscape features		No notable features
SUBJECTIVE DESCRIPTION		
Views		Panoramic/framed
Scale		Medium
Enclosure		Open to semi-enclosed
Variety		Varied to simple
Texture		Textured to rough
Colour		Muted
Movement		Still
Unity		Interrupted
'Naturalness'		Tamed to restrained

LOCATION

5.6.1 Between Strathallan and the Strath Tay at Dunkeld lies a series of low ridges and hills, separating the lowland valleys. The principal examples include the Gask Ridge west of Perth, the Keillour Forest south of Glen Almond, the Bankfoot Hills between Glen Almond and Dunkeld, and what we have termed the Knaik Hills lying to the south of Glen Artney.

PHYSICAL CHARACTERISTICS

5.6.2 Unlike the Highland Foothills (described above) which have a complex geological structure, the Lowland Hills lie to the south of the Highland Boundary Fault, entirely on the broad band of Old Red Sandstone which runs south-west to north-east across the region. A series of quartz-dolerite dykes run through several of the hills, however, contributing to their greater resistance to erosion. One such dyke runs westwards from Perth along the Gask Ridge to the River Earn near Crieff.

5.6.3 These Lowland Hills form the transition between the Highlands to the north and west and the lowlands to the south and east. They vary in height, the highest being the Knaik Hills which rise to over 600 metres AOD, and the lowest being the Gask Ridge which rises to just 150 metres AOD. In contrast to the areas of true upland to the north, these hills are generally smooth and well-rounded. Small valleys cut easily into the sandstone creating a series of convex ridges and valleys to the north of the lower part of Glen Almond.

5.6.4 The transitional nature of the hills is reflected in landcover and vegetation. Pastoral and even arable fields on the lower slopes give way to rough grazing and then to open moorland as height is gained. This is particularly evident on the Knaik Hills which, because of their scale and height, have a particularly upland character. Even on the low Gask Ridge, where farmland extends onto the summit line, and the land is quite fertile, the greater exposure contributes to the transitional character. There is a considerable amount of coniferous forestry in this landscape type, though this is concentrated where less fertile glacial till occurs. Large plantations are found on the lower slopes of the Knaik Hills, along the Gask Ridge and in the Keillour Forest. Smaller plantations are found along the valleys which drain the Bankfoot Hills. In places, stands of conifers are extremely geometric. Particular examples are found east of the A822 above Crieff where narrow bands of conifers extend up the hillside from the floor of the glen, pushing over the summit and beyond.

SETTLEMENT AND LAND USE

5.6.5 With the exception of their most elevated parts, the landscape of these hills shows evidence of thousands of years of settlement and land use. The hills are rich in prehistoric remains including standing stones (for example on the lower slopes of Dunruchan Hill south of Comrie, and in the vicinity of Fowlis Wester in the Keillour Forest), cairns, stone circles and hut circles. Roman occupation is equally well-represented by forts (e.g. at Braco and west of Buchanty at the head of lower Glen Almond), roads (e.g. along the Gask Ridge) and signal stations. The hills' location close to several 'gateways' to the Highlands is reflected in the number of castles and fortified houses. Examples include Huntingtower, Keillour and Drummond Castles. Many of these became transformed into landscaped estates over subsequent centuries. Today,

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Angus Council

Strategic Landscape Capacity Assessment for Wind Energy in Angus

Final Report

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March 2014
7933

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FIGURES **Page No**

APPENDICES

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 turbines 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 turbines 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.

Angus Council
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)
- (i) LCA Sub Areas (Ref. Table 6.1)
- Settlements
- Areas with Highest Underlying Capacity:
  1. Careston Farmland
  2. Muir of Pert
  3. Montreathmont 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 Clova
  2. Menmuir / Hill of Ogil
  3. Brechin and Muir of Pert
  4. Letham to Firth Muir of Boysack
  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 A

Wind Turbine Development Opportunitites and Constraints

N 0 2.5 5 10 Km

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

Stage 1 – Identify areas requiring significant protection
- Sites designated for their national or international landscape or natural heritage value
- Green belt
- Where the cumulative impact of existing and consented wind farms limit further development

↓

Stage 2 – Identify areas with potential constraints
- Consider matters relating to the historic environment; regional and local landscape and natural heritage designations; tourism and recreational interests; communities; aviation and defence interests; and broadcasting installations
- Where proposals will be considered on their individual merits against identified criteria

↓

Stage 3 – Identify areas of search
- Where there are no significant constraints on development
- Where appropriate proposals are likely to be supported subject to detailed consideration against identified criteria

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.

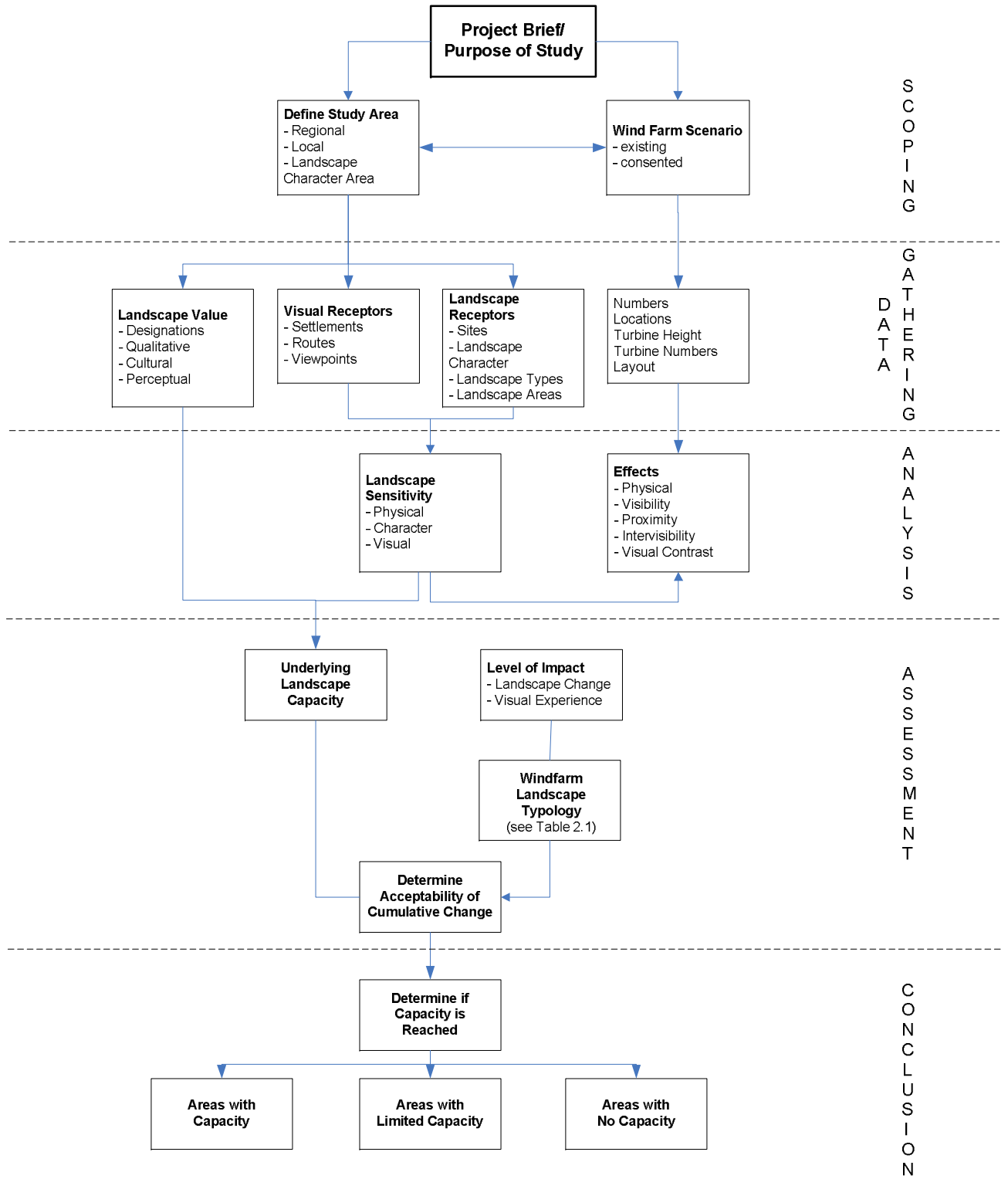
4) Record the current type and extent of consented wind energy development in Angus and the surrounding local authorities.

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* (Ironside 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 gradated 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 *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 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.

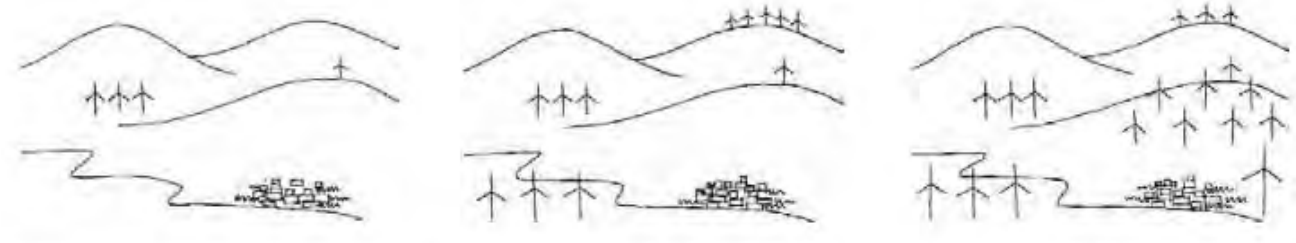


Figure 2.2: Illustrative Sketches of Wind Turbine Development (from SNH)

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 360^0 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 2,181km^2 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	*Glen Isla* *Glen Prosen* *Glen Clova* *West Water Valley* *Glen Mark*
	1b. Mid Highland Glens	*Glen Isla* *Glen Prosen* *Glen Clova* *West Water Valley* *Glen Esk*
	3. Highland Summits & Plateaux	*Forest of Alyth* *Caenlochan Forest/ Glendoll Forest* *Muckle Cairn/ Hill of Glansie/ Hill of Wirren* *Hills of Saughs/ Mount Battock*
	5. Highland Foothills	*Alyth Foothills* *Kirriemuir Foothills* *Menmuir Foothills* *Edzell Foothills*
Lowland and Hills	8. Igneous Hills	*Sidlaws*
	10. Broad Valley Lowland	*Strathmore* *Lower South & North Esk Valleys*
	12. Low Moorland Hills	*Forfar Hills*
	13. Dipslope Farmland	*SE Angus Lowland*
Coast	14a.Coast with Sand	*Montrose* *Lunan bay* *Elliott* *Barry Links*
	14b.Coast with Cliffs	*Usan* *Auchmithie* *Carnoustie*
	15. Lowland Loch Basins	*Montrose Basin*

**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.

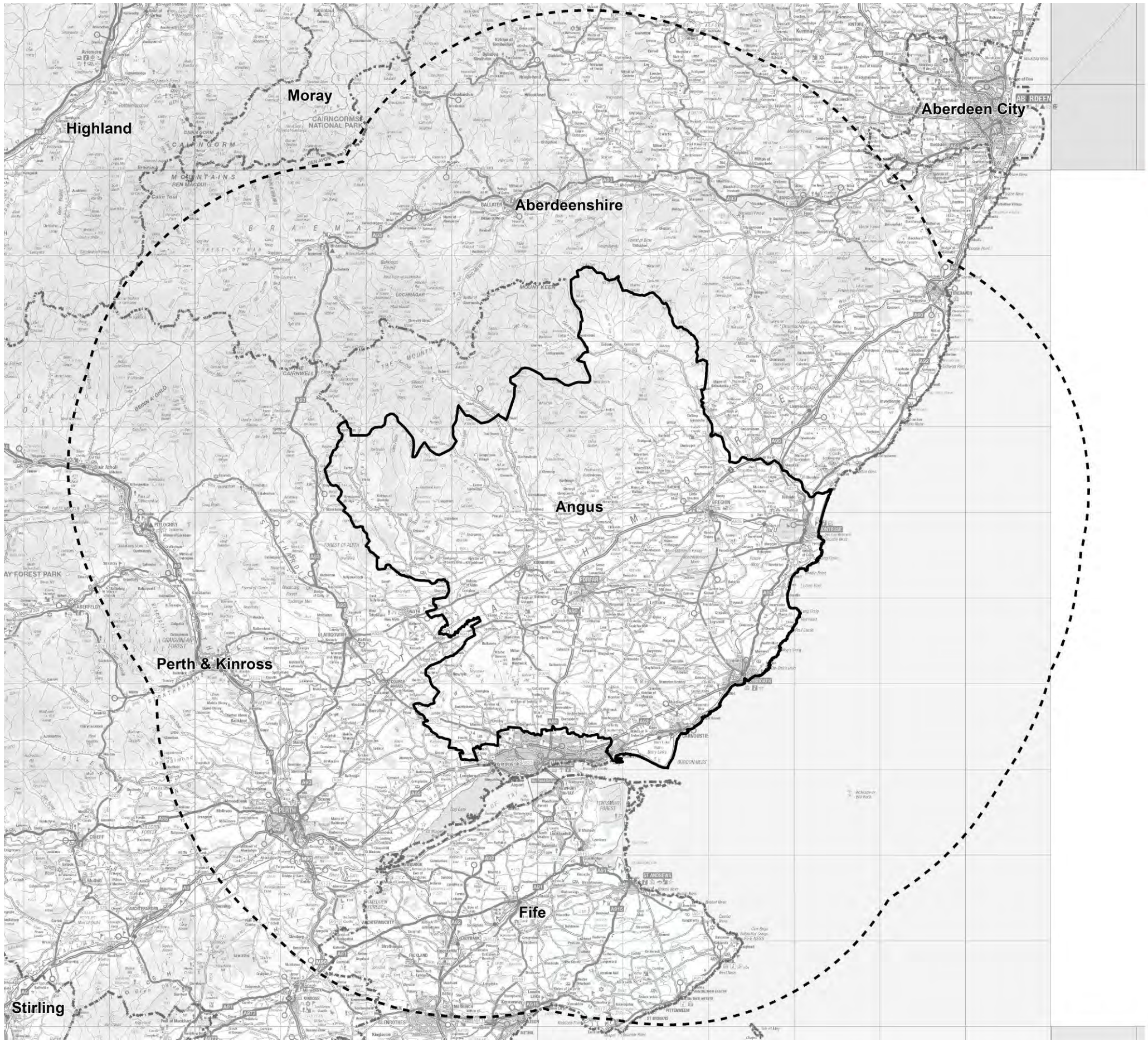
The two main lowland areas are separated by ranges of lowland hills: To the west the *Igneous Hills* of the Sidlaws divide the *Dipslope Farmland* and Dundee from Strathmore, this pattern extending west into Perth & Kinross. To the east the smaller scale *Low Moorland Hills* around Forfar separate the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



Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 101

Legend

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

Figure 3.1

Study Area

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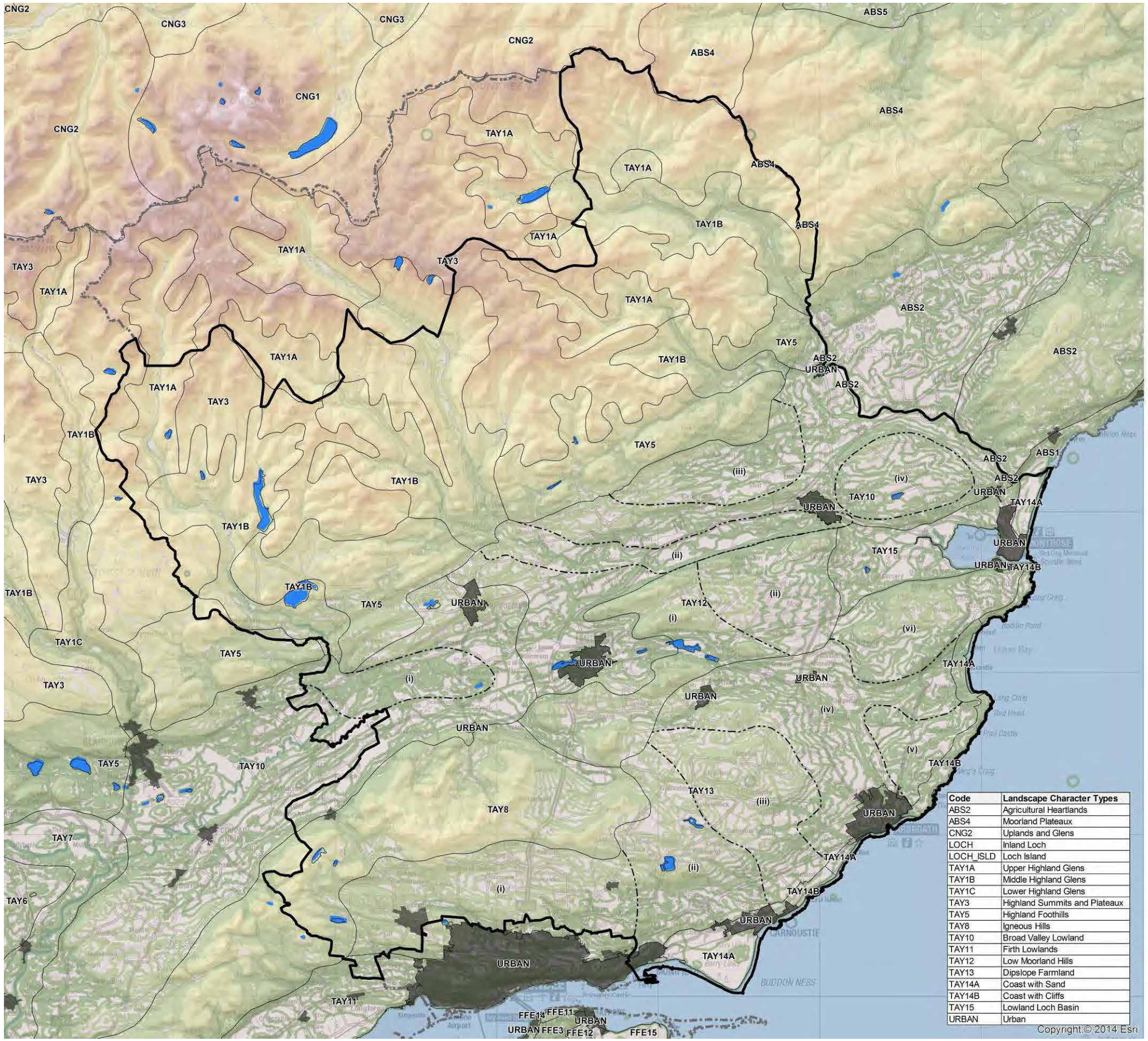
0 5 10 20 Km



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

Angus Council

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Legend

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

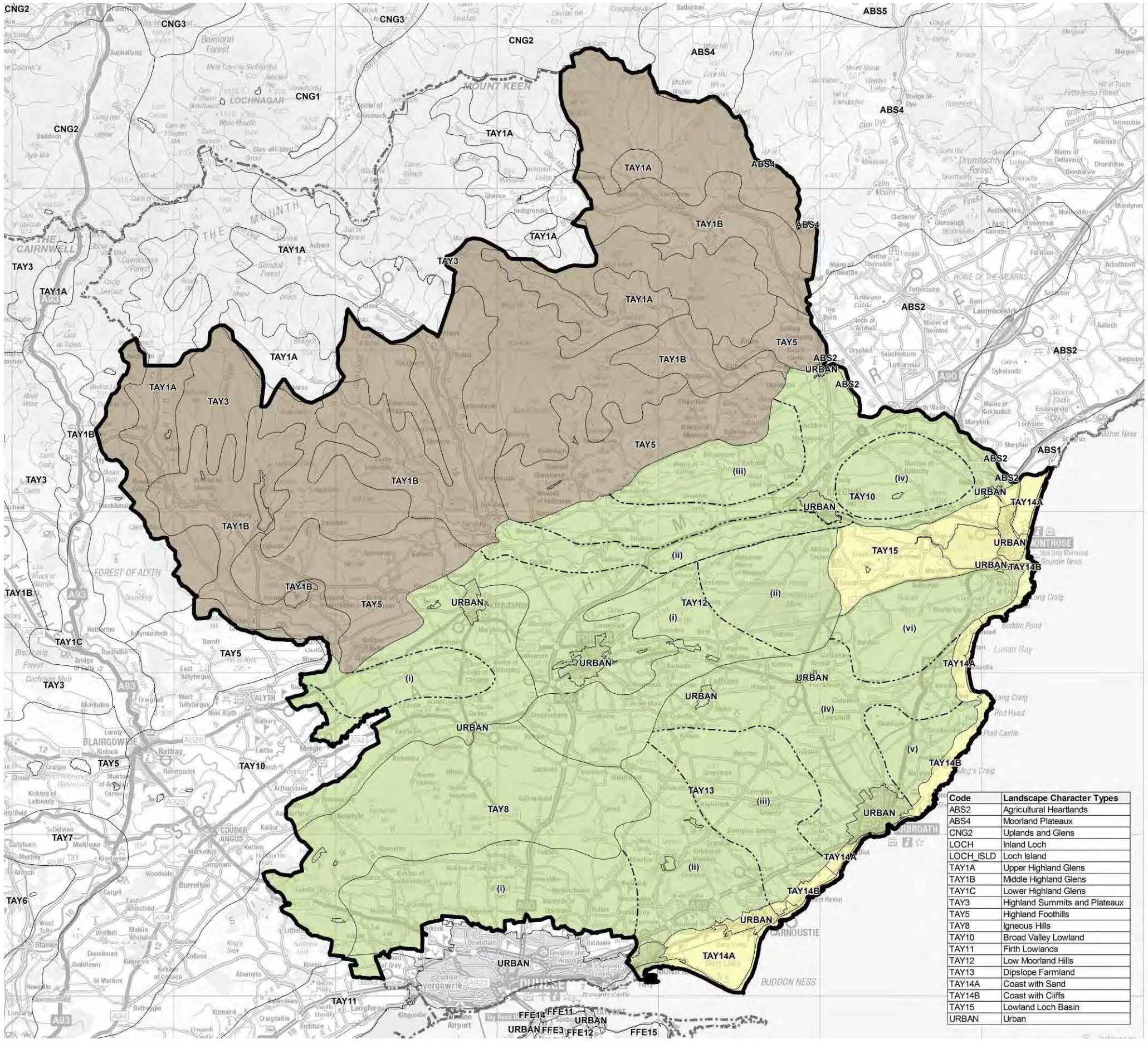
Elevation

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

Figure 3.2

Topography

N 0 2.5 5 10 Km



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

Angus Council

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Legend

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

Geographic Areas

- Highland
- Lowland and Hills
- Coast

NB. Geographic Areas are based on the Angus Council Local Plan Review and Implementation Guide for Renewable Energy Proposals. Landscape Characters Areas are based on the Tayside Landscape Character Assessment. (LUC 1999)

Figure 3.3

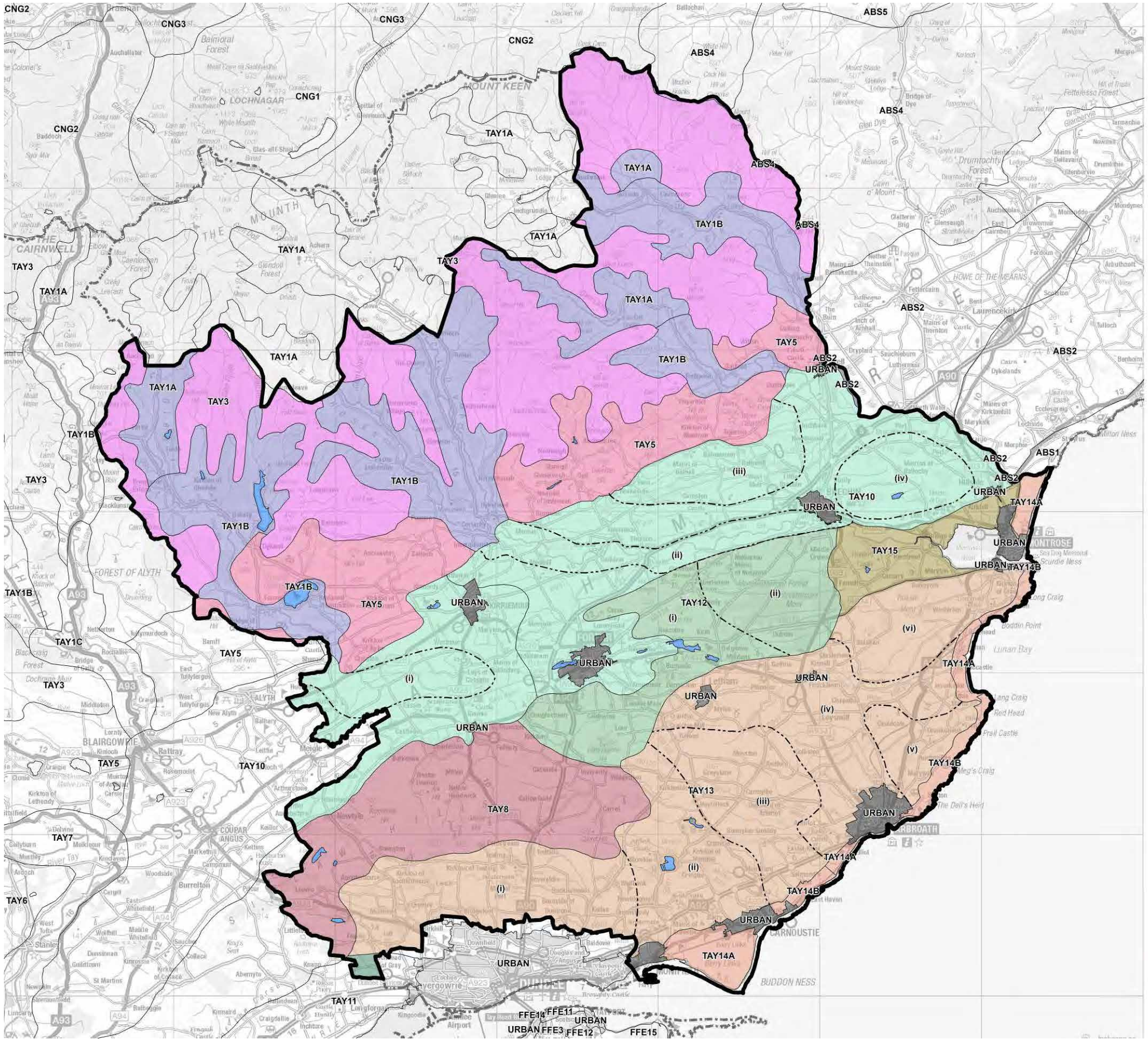
Geographic Areas

N

0 2.5 5 10 Km

1455

1456



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Legend

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

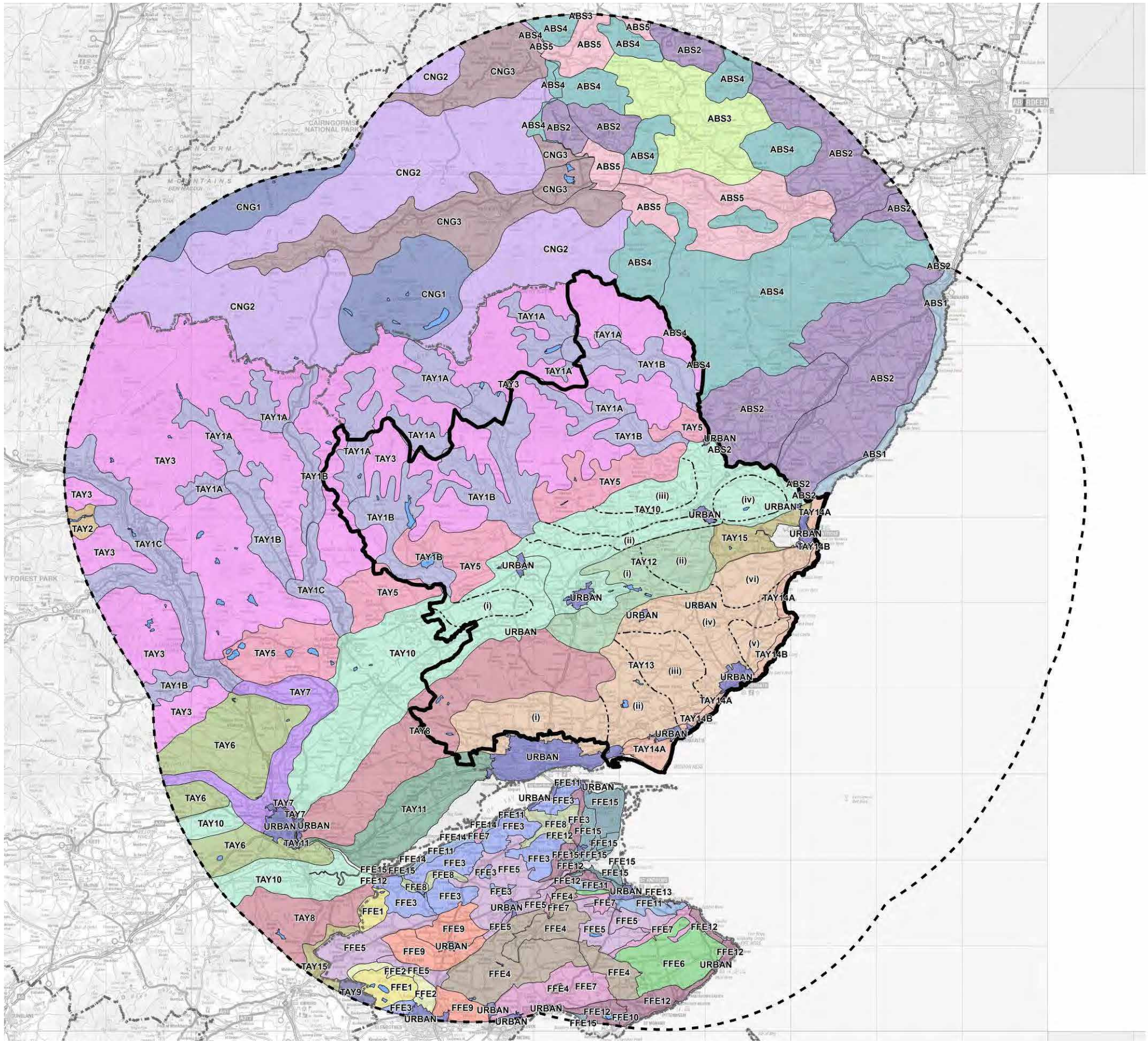
Landscape Character Type Key:

- 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

N 0 2.5 5 Km 10



Angus Council

Angus Council
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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)
- (i) 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_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

Figure 3.4b

Landscape Character Types and Areas in Study Area

N 0 5 10 20 Km

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)
- (i) 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

N 0 2.5 5 10 Km

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March 2014 7933 ANC 107

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- (i) 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

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 3.6

Natural and Cultural Designations

N 0 2.5 5 10 Km

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.

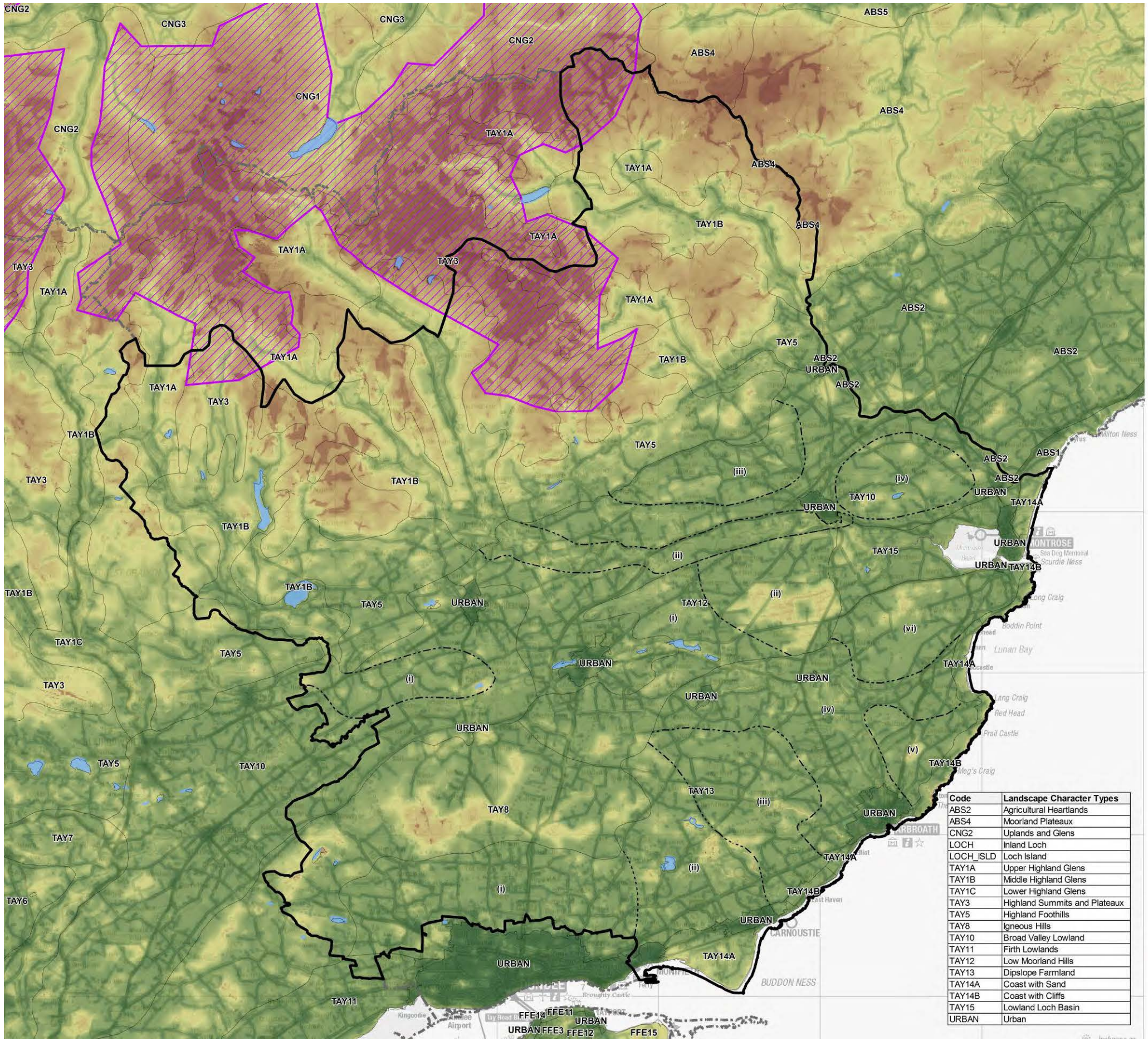
SNH has recently completed a mapping exercise in which the factors that contribute to wildness in a landscape have been combined and mapped to create a detailed picture of wildness on a relative scale (*Mapping Scotland's Wildness, Wildness Map January 2012*). Figure 3.7 of this report shows this in 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 Cateran 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.



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

Angus Council
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March 2014 7933 ANC 108

Legend

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

Level of Wildness

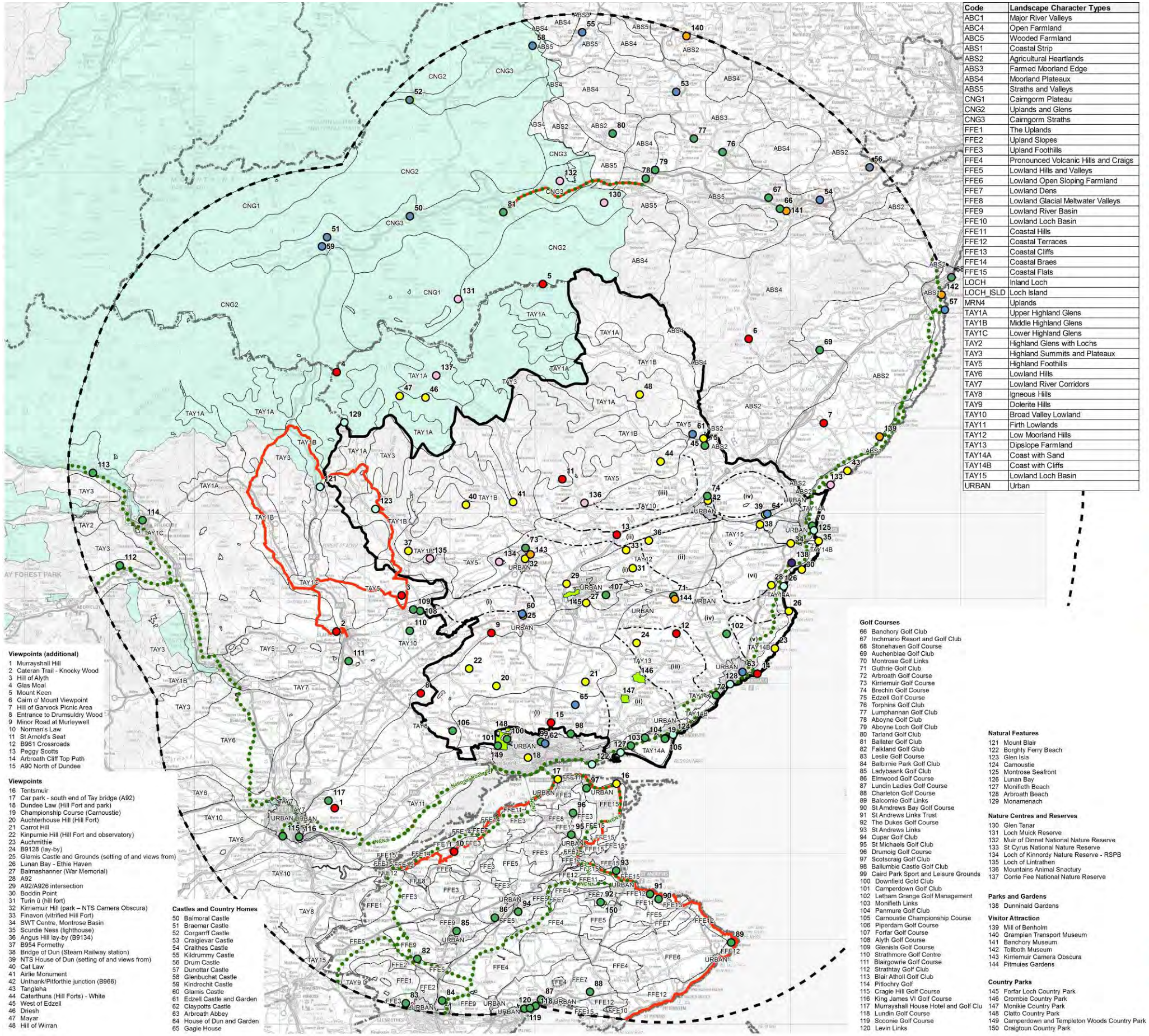
High

Low

Figure 3.7

Scottish Wildness and Core Areas of Wild Land

N 0 2.5 5 10 Km



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

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 109

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

Golf Courses
66 Banchory Golf Club
67 Inchmario Resort and Golf Club
68 Stonehaven Golf Course
69 Auchenblae Golf Club
70 Montrose Golf Links
71 Guthrie Golf Club
72 Arbroath Golf Course
73 Kirriemuir Golf Course
74 Brechin Golf Course
75 Edzell Golf Course
76 Torphins Golf Club
77 Lumphannan Golf Club
78 Aboyne Golf Club
79 Aboyne Loch Golf Club
80 Tarland Golf Club
81 Ballater Golf Club
82 Falkland Golf Glub
83 Leslie Golf Course
84 Balbirnie Park Golf Club
85 Ladybank Golf Club
86 Elmwood Golf Course
87 Lundin Ladies Golf Course
88 Charleton Golf Course
89 Balcomie Golf Links
90 St Amdrews Bay Golf Course
91 St Andrews Links Trust
92 The Dukes Golf Course
93 St Andrews Links
94 Cupar Golf Club
95 St Michaels Golf Club
96 Drumoig Golf Course
97 Scotscraig Golf Club
98 Ballumbie Castle Golf Club
99 Caird Park Sport and Leisure Grounds
100 Downfield Gold Club
101 Camperdown Golf Club
102 Letham Grange Golf Management
103 Monifieth Links
104 Panmure Golf Club
105 Carnoustie Championship Course
106 Piperdam Golf Course
107 Forfar Golf Course
108 Alyth Golf Course
109 Glenisla Golf Course
110 Strathmore Golf Centre
111 Blairgowrie Golf Course
112 Strathtay Golf Club
113 Blair Atholl Golf Club
114 Pitlochry Golf
115 Cragie Hill Golf Course
116 King James VI Golf Course
117 Murrayshall House Hotel and Golf Clu
118 Lundin Golf Course
119 Scoonie Golf Course
120 Levin Links

Natural Features
121 Mount Blair
122 Borghty Ferry Beach
123 Glen Isla
124 Carnoustie
125 Montrose Seafront
126 Lunan Bay
127 Monifieth Beach
128 Arbroath Beach
129 Monamenach

Nature Centres and Reserves
130 Glen Tanar
131 Loch Muick Reserve
132 Muir of Dinnet National Nature Reserve
133 St Cyrus National Nature Reserve
134 Loch of Kinnordy Nature Reserve - RSPB
135 Loch of Lintrathen
136 Mountains Animal Snactury
137 Corrie Fee National Nature Reserve

Parks and Gardens
138 Dunninald Gardens

Visitor Attraction
139 Mill of Benholm
140 Grampian Transport Museum
141 Banchory Museum
142 Tollbooth Museum
143 Kirriemuir Camera Obscura
144 Pittmuies Gardens

Country Parks
145 Forfar Loch Country Park
146 Crombie Country Park
147 Monikie Country Park
148 Claitto Country Park
149 Camperdown and Templeton Woods Country Park
150 Craigtoun Country Park

Figure 3.8

Locations of Landscape Interest

N 0 5 10 20 Km

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

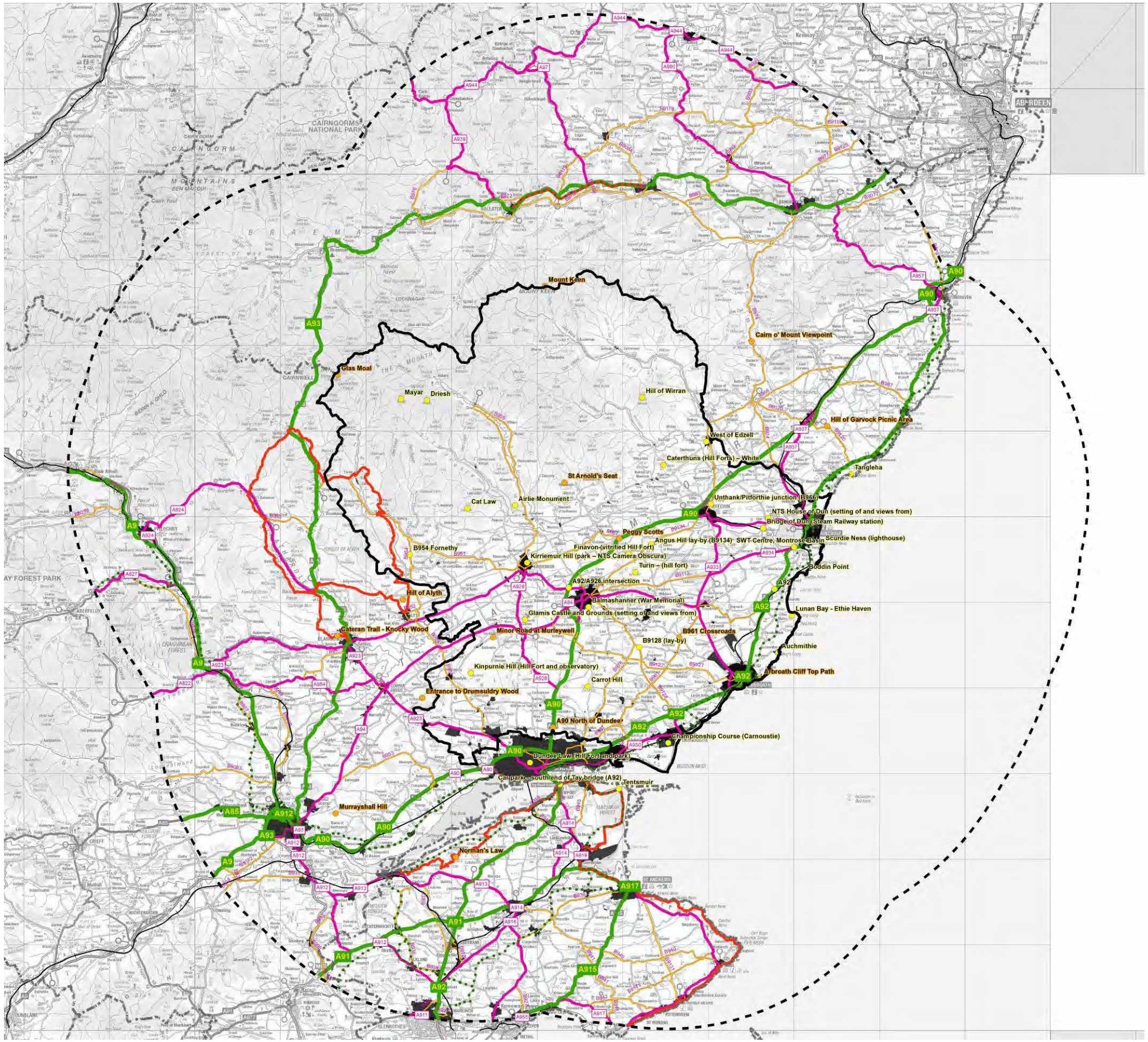
- Local Authorith Boundary
- Scottish Local Authority Boundaries
- Settlements
- Viewpoints
- Additional Viewpoints
- Cycle Routes
- Long Distance Footpaths
- Railway

Road Classifications

- Primary Road
- A Road
- B Road

Figure 4.1a
Transport Routes, Settlements & Viewpoints in Angus

N 0 2.5 5 10 Km



Angus Council

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Legend

- Local Authorith 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

N 0 5 10 20 Km

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 (*SNH 2012*)
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. *E.g. Between 4 turbines over 50m and 10x2MW turbines or 6x3MW turbines*
SPP 2010 'Cutoff' 20MW		
Medium	A windfarm between 20MW and 50MW output	Windfarms up to 50MW are dealt with as local planning authority applications. *E.g. Between 7x3MW and 16x3MW turbines*
Large	Windfarms greater than 50MW output	Windfarms over 50MW are section 36 Applications dealt with by Scottish Ministers. *E.g. A minimum size of 20x2.5MW or 17x3MW turbines*
Very Large	Windfarms greater than 100MW output	*E.g. A minimum size of 50 turbines over 125m tall*

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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).

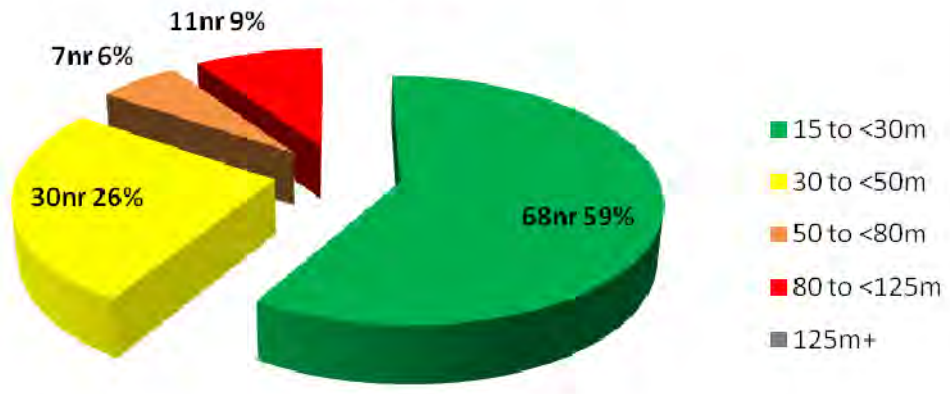
At May 2013 there were within Angus a total of 116 turbines 15m and taller that are consented and 51 that are planned or S36 applications pending a decision. There are many further turbines consented and at planning stage in Perth & Kinross to the west, in Aberdeenshire to the east and in proposed offshore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

Figure 5.1 Consented Turbines in Angus (May 2013) 116 Turbines

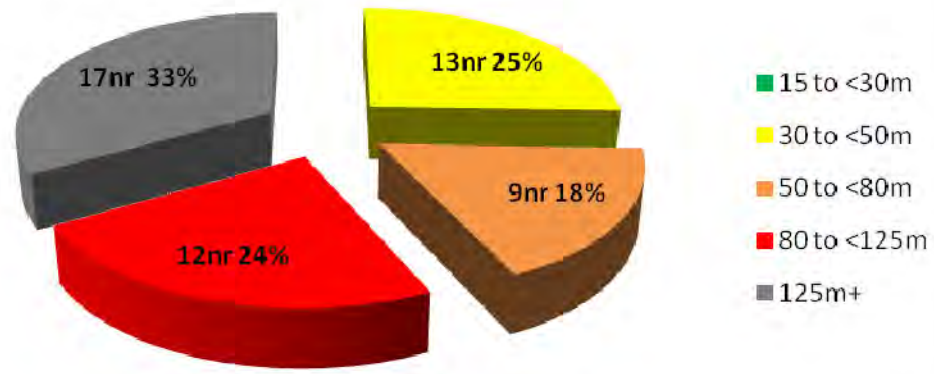


The consented wind energy developments in Angus are all therefore at the smaller end of the size range. The only windfarm is Ark Hill with 8 x 81m turbines at 25MW. This is at the lower end of 'medium' in Table 5.2, and reflects the restrictions inherent in the Angus landscape.

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.

Figure 5.2 Application Turbines in Angus (May 2013) 51 Turbines



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.

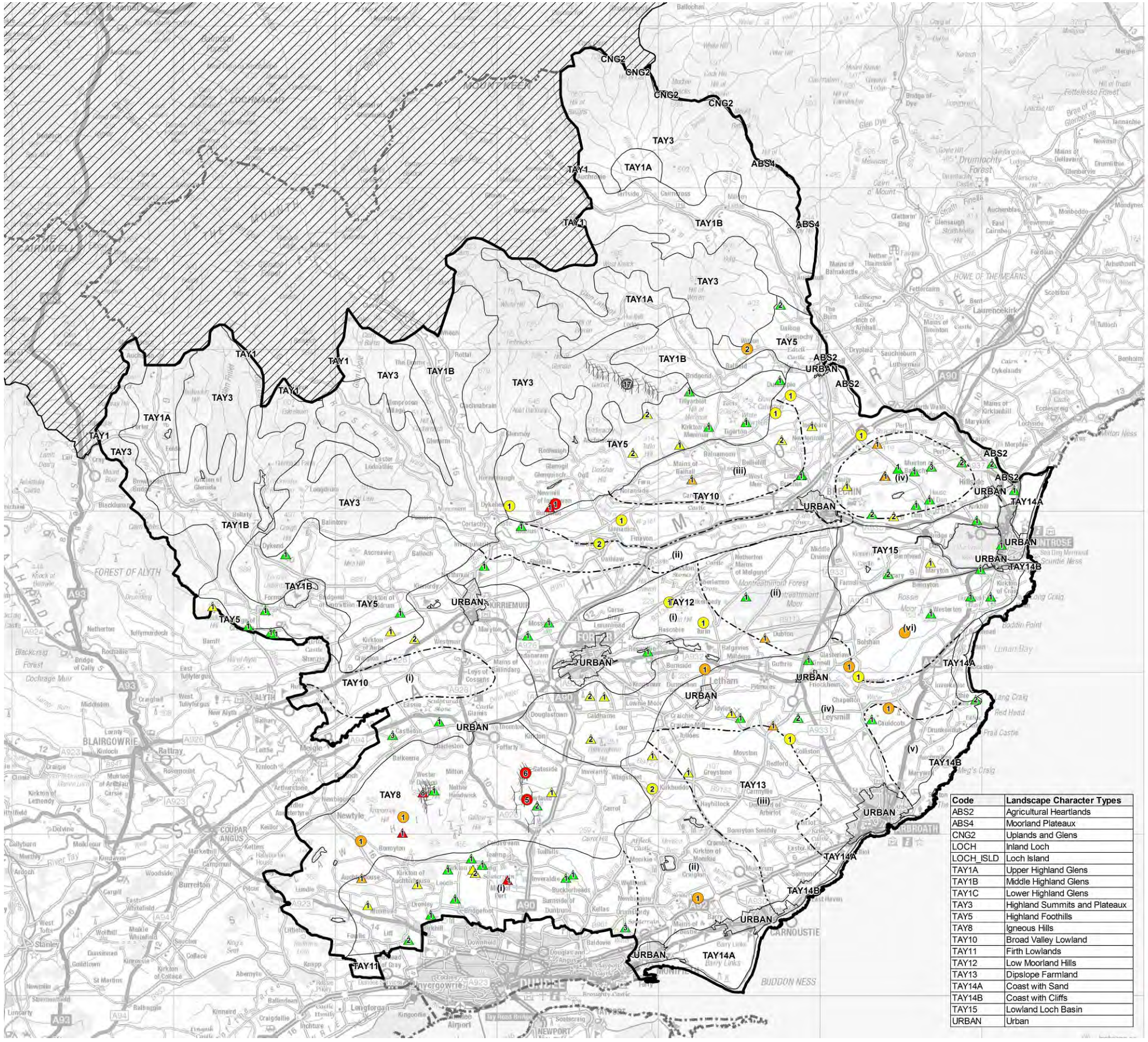
Two other small/medium windfarm proposals lie in the eastern Sidlaws: Frawney and Govals. The remaining proposals are predominantly single turbines.

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.



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

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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)
- (i) 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+

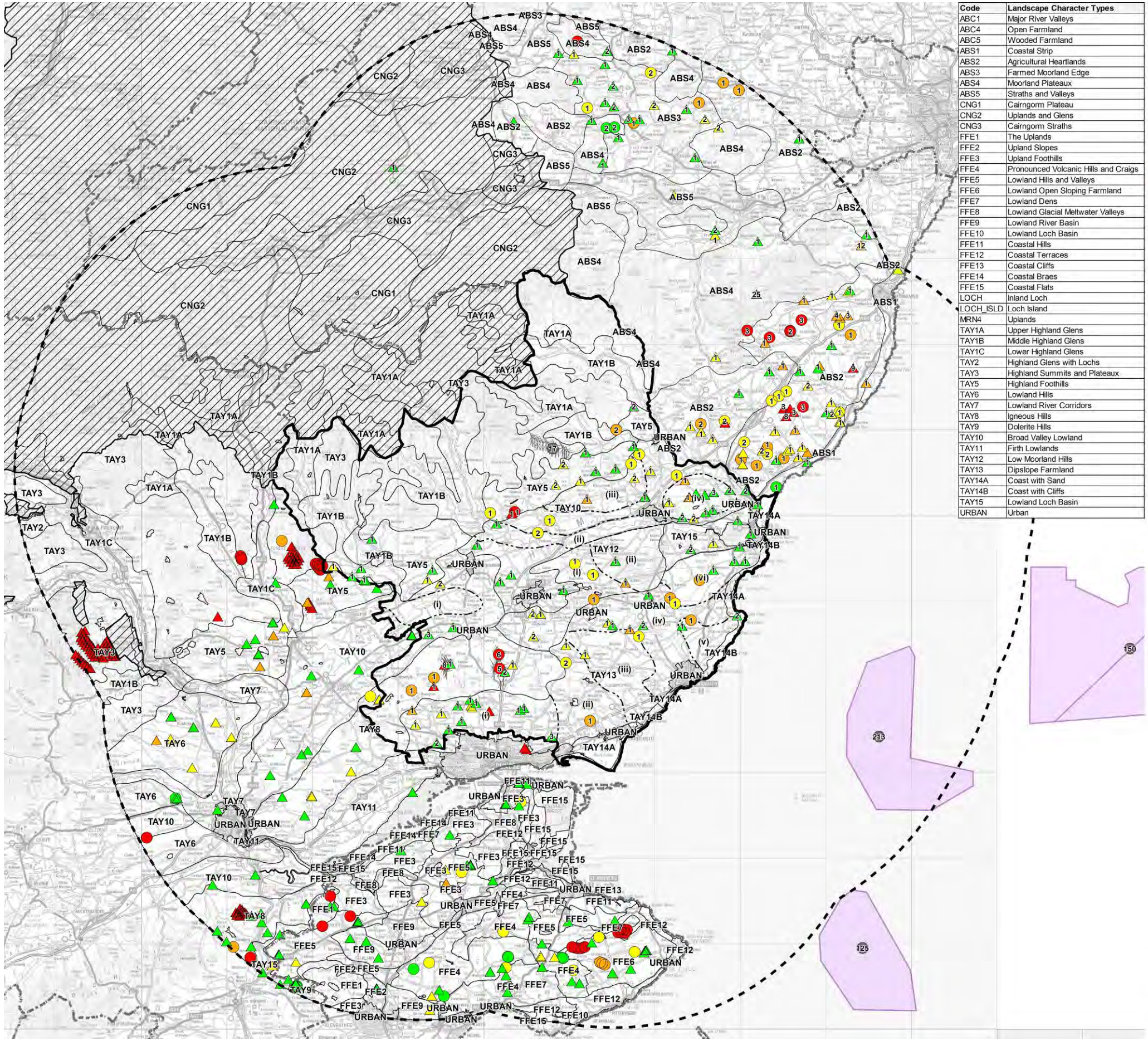
Application Turbines:
(Height Category and No. of Turbines)

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

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

N 0 2.5 5 10 Km

1471



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)
- (i) 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

N 0 5 10 20 Km

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)

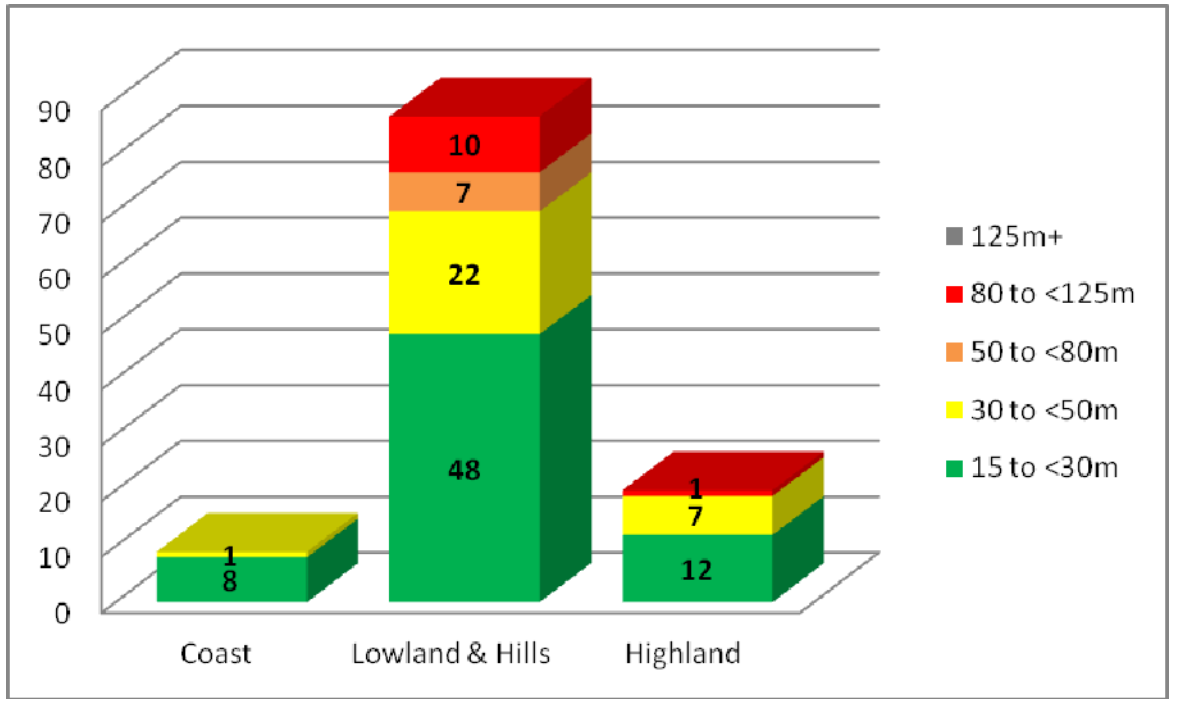
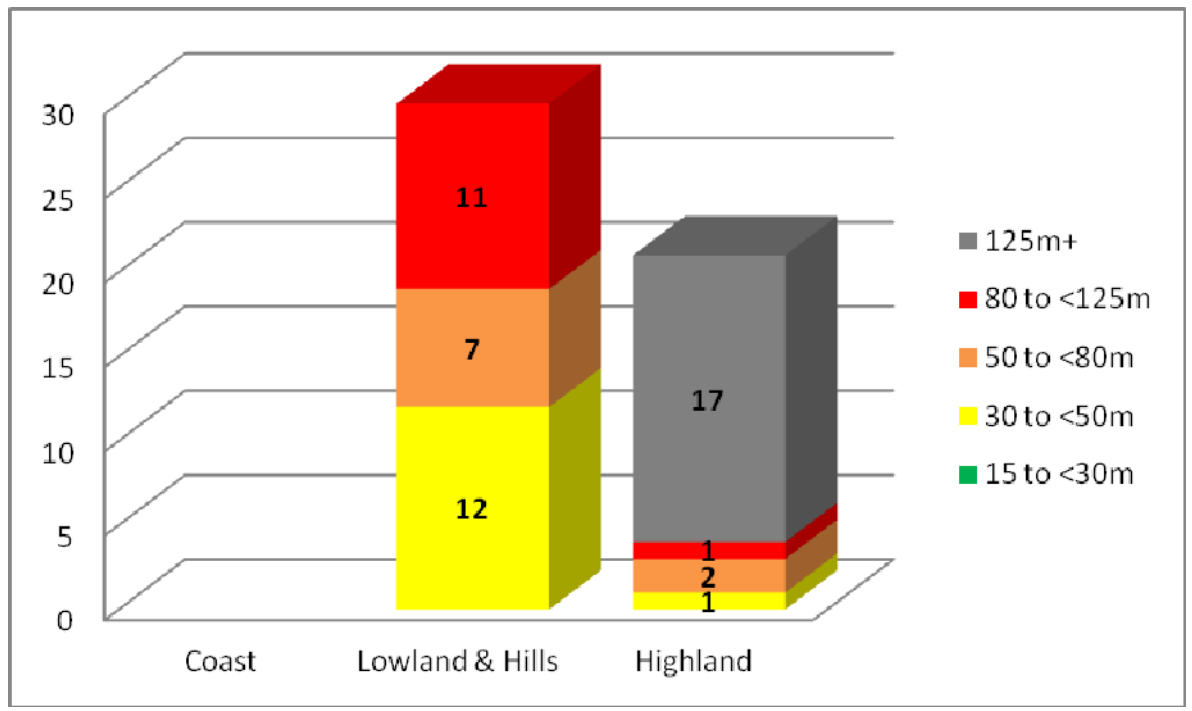


Figure 5.5: Application Turbine Location and Heights in Relation to Landscape Character (May 2013)



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 360^0 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 360^0 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.

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Explanation of Table 6.1

LANDSCAPE CHARACTER TYPE: (SNH Classification Code/Number) / NAME OF LANDSCAPE CHARACTER TYPE

Key: ○ **No Capacity** ◔ **Low Capacity** ◑ **Medium Capacity** ● **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: *Name of Landscape Character Area/ Sub-Area*																	
Med/ High	Med/ High	**Med/ High**	**Med/ High**	◔	◑	○	○	○	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)	◔	◑	○	○	○	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* Suggested range/ maximum number of turbines in groupings to ensure capacity is not exceeded	*1-3*	*1-3*					
											Min Group Separation Distances (km) Suggested separation distance between turbine groupings to ensure capacity is not exceeded	*2-4*	*3-5*					

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:

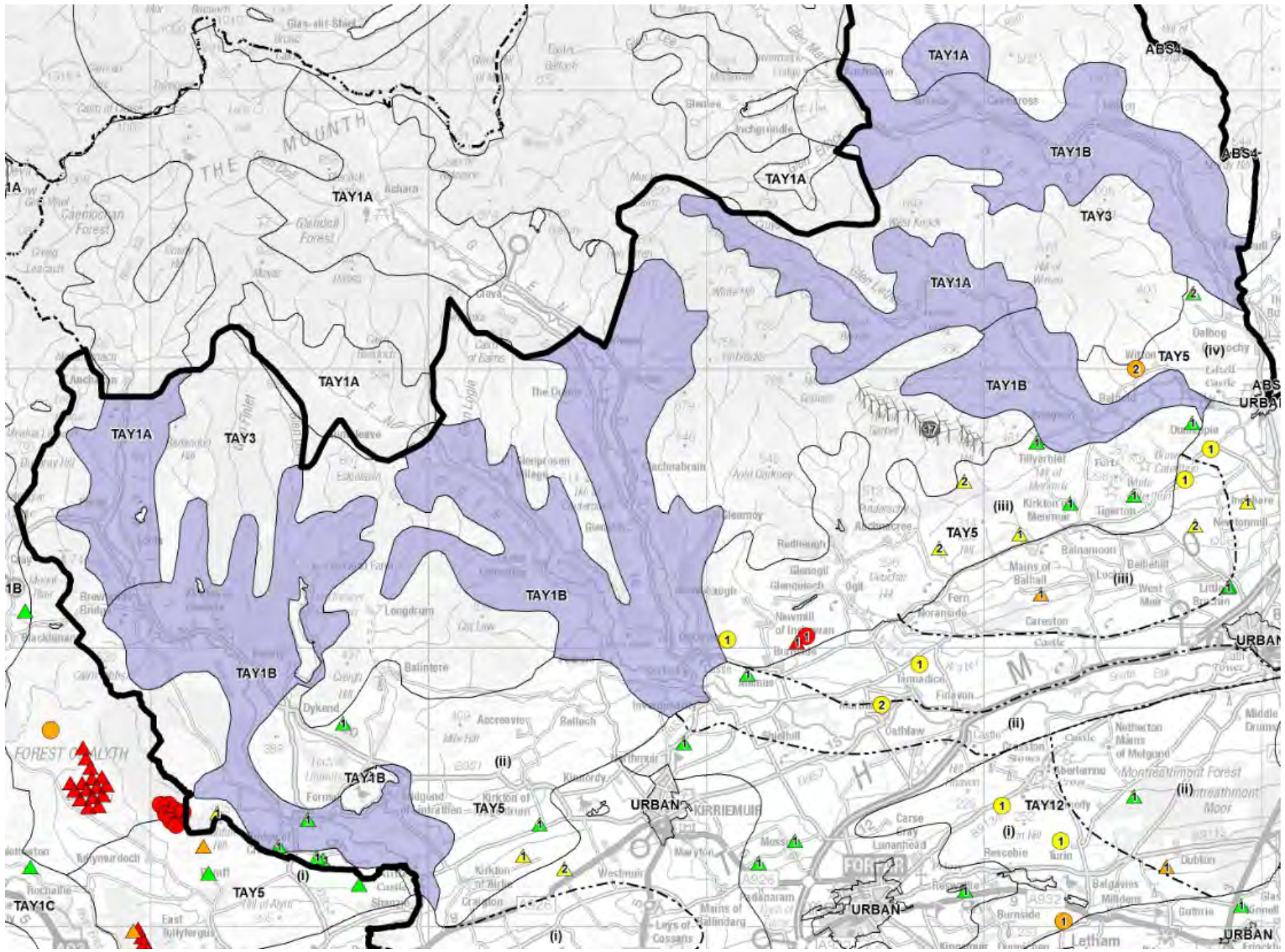
1A UPPER HIGHLAND GLENS

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.	***Upper Highland Glens with No Wind Turbines***	***Upper Highland Glens with No Wind Turbines/ Occasional Wind Turbines***	●	○	○	○	○	No current applications within UHG type. Proposed 17x135m turbine windfarm at Nathro above Glen Lethnot in neighbouring *Highland Summits and Plateaux*	**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 *Highland Foothills* at Kilry above Glen Isla.	***Mid Highland Glens with No Wind Turbines/ Occasional Wind Turbines***	***Mid Highland Glens with No Wind Turbines/ Occasional Wind Turbines***	●	●	○	○	○	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 *Highland Summits and Plateaux*. 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

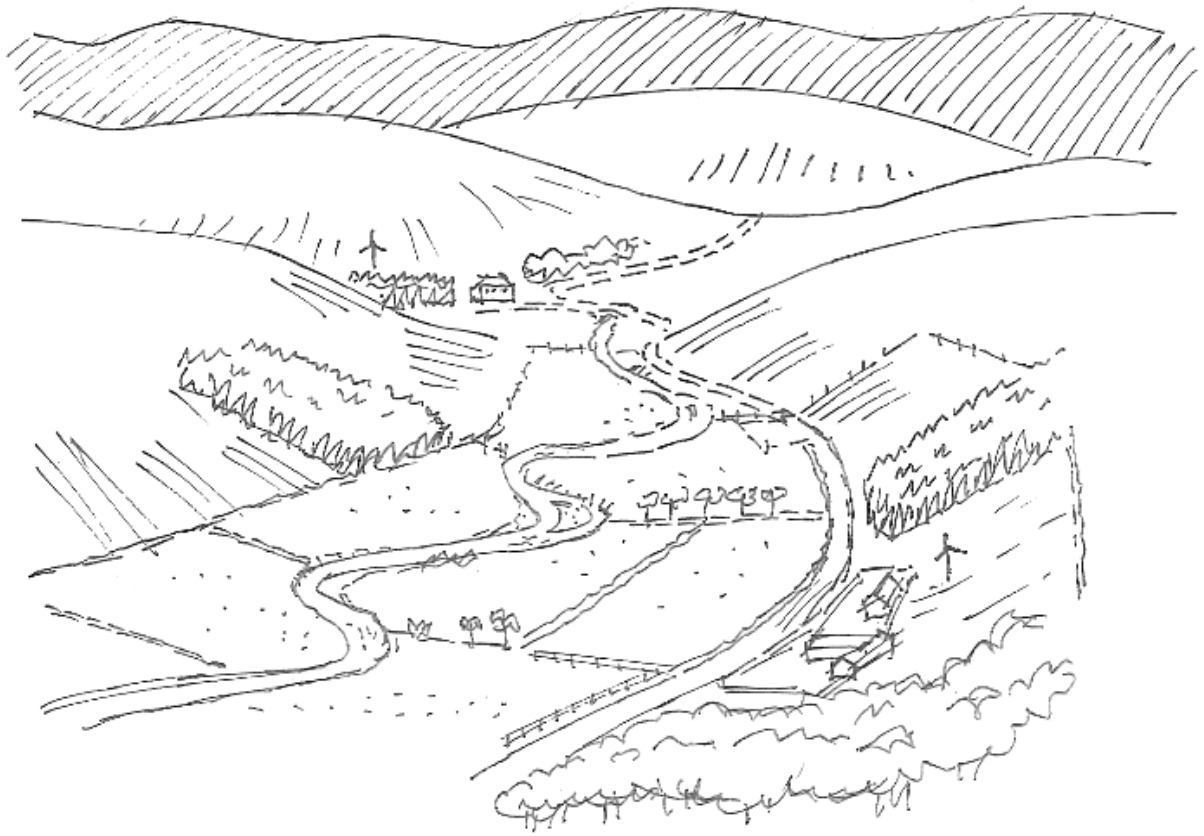
The Highland Glens have little capacity to accommodate wind turbines without adverse effects on their key characteristics of relative remoteness, wildness and low levels of built development.

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.



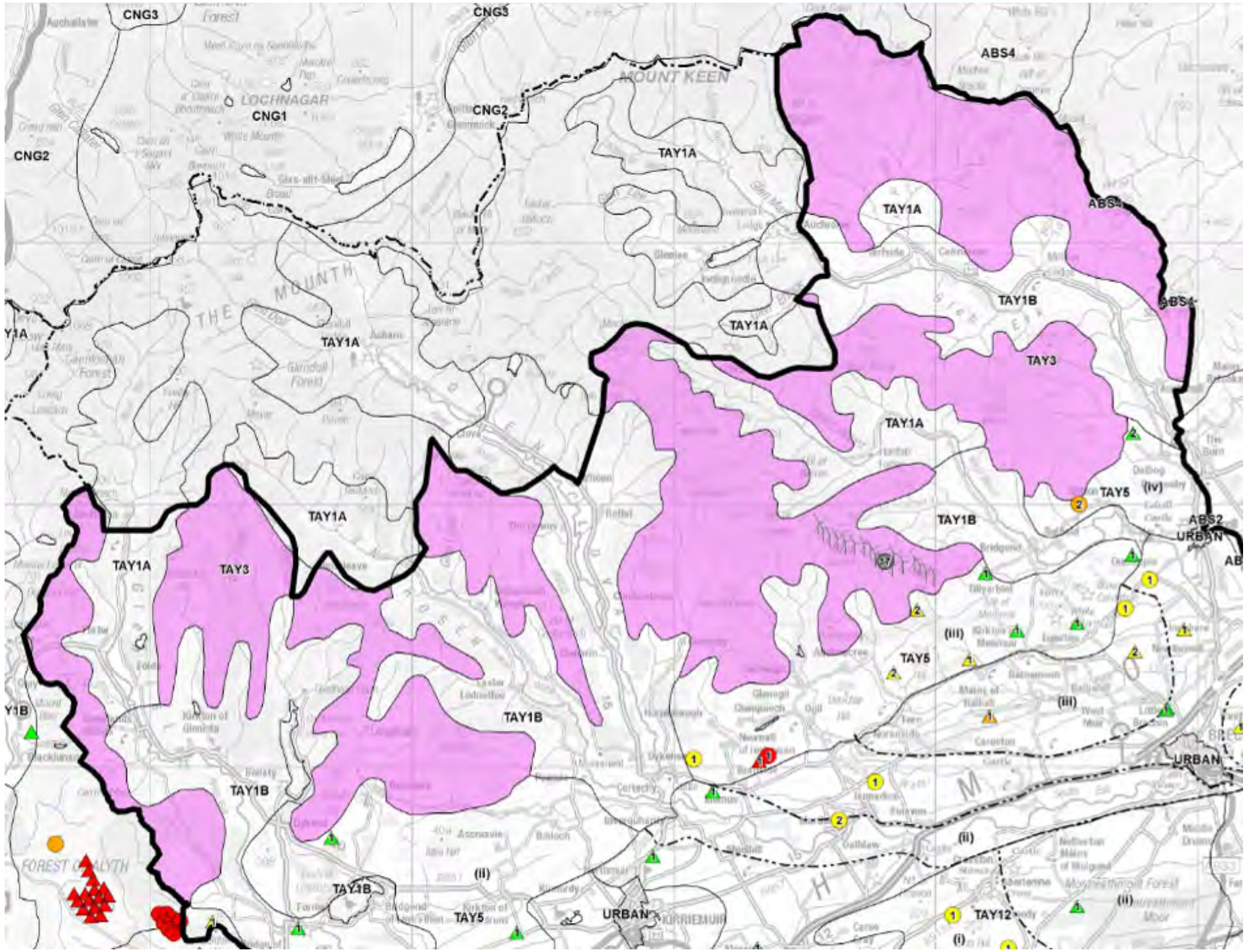
Mid and Upper Highland Glens can only accommodate smaller turbines in the more settled lower sideslopes or valley floor where they are associated with scattered built development and other signs of human intervention

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: ○ 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 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**	○	○	○	○	○	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)***	○	○	○	○	○	One windfarm application at Tullymurdoch above Glen Isla (7x120m turbines); Proposed 17x135m turbines at Nathro windfarm above Glen Lethnot in neighbouring *Highland Summits and Plateaux*. Two medium/large (74m) turbines at Witton above the West Water.	**Landscape Analysis:** 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, beyond the Highland Boundary Fault, to much of the rest of Angus. 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. Due to these reasons this LCT is not considered to be suitable for wind turbines. **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 *HSaP with Wind Turbines,* slightly reinforced by the consented turbine at Kilry. The proposed turbines at Nathro would create a substantial area of *HSaP with Wind Turbines* 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.
											Max. Numbers in Group							
											Min Group Separation Distances (km)							

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

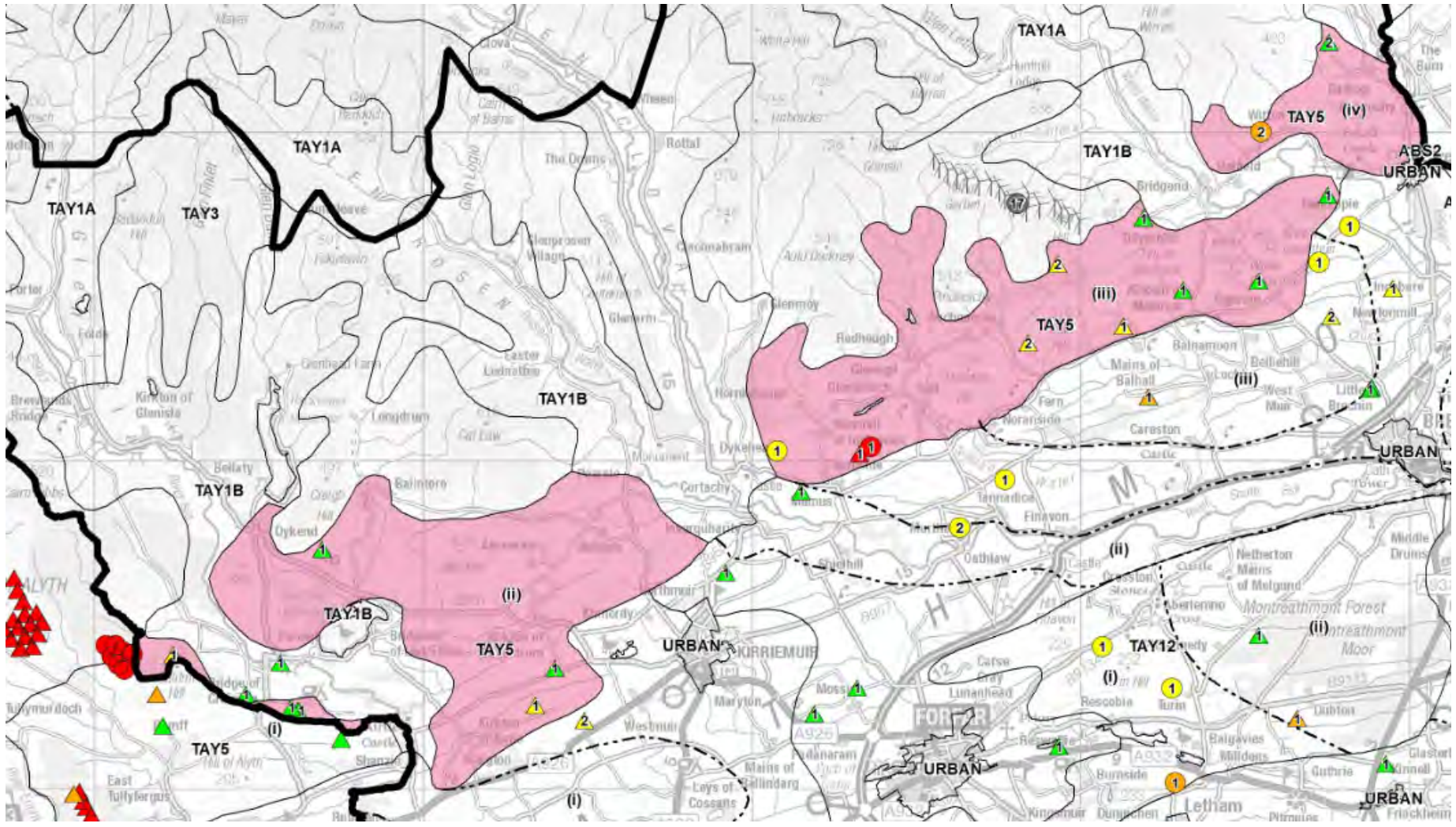
An area of complex topography including hills, small glens, small settlements and a network of roads extending into Strathmore. A key feature is Mile Hill, which as highest landform at 409m is dominant locally and more widely visible across Strathmore and the lower end of Glen Clova. It is separated 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: ○ 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: *(i) Alyth Foothills (eastern edge only in Angus)*																		
Med/ High	Med/ High	**Med/ High**	**Med/ High**	●	●	○	○	○	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***	○	○	○	○	○	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 *Highland Foothills with Wind Turbines* 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 *Highland Foothills with Wind Turbines* type and create an area of *Wind Turbine Landscape* across the boundary between *Highland Summits and Plateaux* and *Highland Foothills* 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**	●	●	○	○	○	Currently two small/medium and one medium turbine consented.	***Highland Foothills with Occasional Wind Turbines/ No Wind Turbines***	***Highland Foothills with Occasional Wind Turbines***	●	●	○	○	○	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: ○ 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: *(iii) Menmuir Foothills*																		
Med/ High	Med/ High	**Med/ High**	**Med/ High**	●	○	○	○	○	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***	○	○	○	○	○	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.	**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. **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. 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 *Highland Foothills with Wind Turbines* at south and west edges of the LCA.
											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**	●	○	○	○	○	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***	●	○	○	○	○	Two medium/large (74m) turbines at Witton in the west above West Water.	**Landscape Analysis:** Smallest of the LCAs. Predominantly a single hill above Strathmore with lower slopes of *Highland Summits and Plateaux* 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. **Comments on Consented and Proposed Turbines:** Current consented development remains well within capacity. The proposed turbines at Witton are significantly taller than the recommended 50m maximum for this LCA and *Middle Highland Glens* LCA, although would not affect the setting of Edzell castle and village.
											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

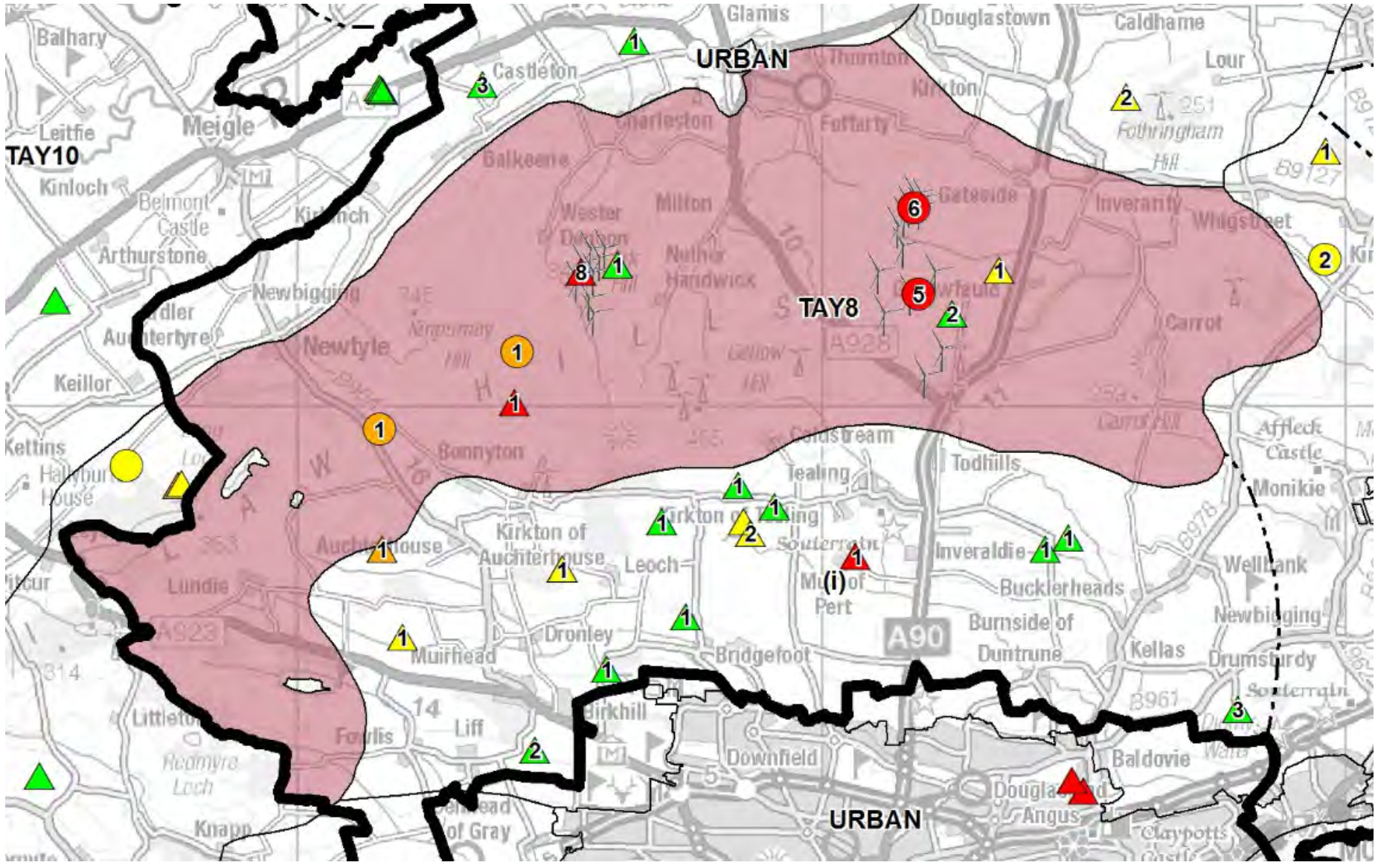
The Sidlaw Hills are a varied landscape of distinctive, predominantly steep open hills and enclosed valley farmland that extends through Perth & Kinross and Angus, where they merge into the *Dipslope Farmland* and Forfar Hills. The hills provide a northern backdrop to Dundee and define the southern edge 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: ○ 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: *Sidlaw Hills*																		
Med	Med/ High	**Med**	**Med**	●	●	●	○	○	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	***Igneous Hills with Wind Turbines/ Occasional Wind Turbines/ No Wind Turbines***	***Igneous Hills with Wind Turbines/ No Wind Turbines***	●	●	●	○	○	Two windfarm proposals in the east: Frawney (5x100m turbines) and Govals (6x87m turbines) west of the A90.	**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. 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. **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. Current proposals at Govals and Frawney would exceed recommended turbine height, group numbers, and separation if both were consented. 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.
											Max. Numbers in Group	*1-3*	*1-3*	*1-10*				
											Min Group Separation Distances (km)	*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.

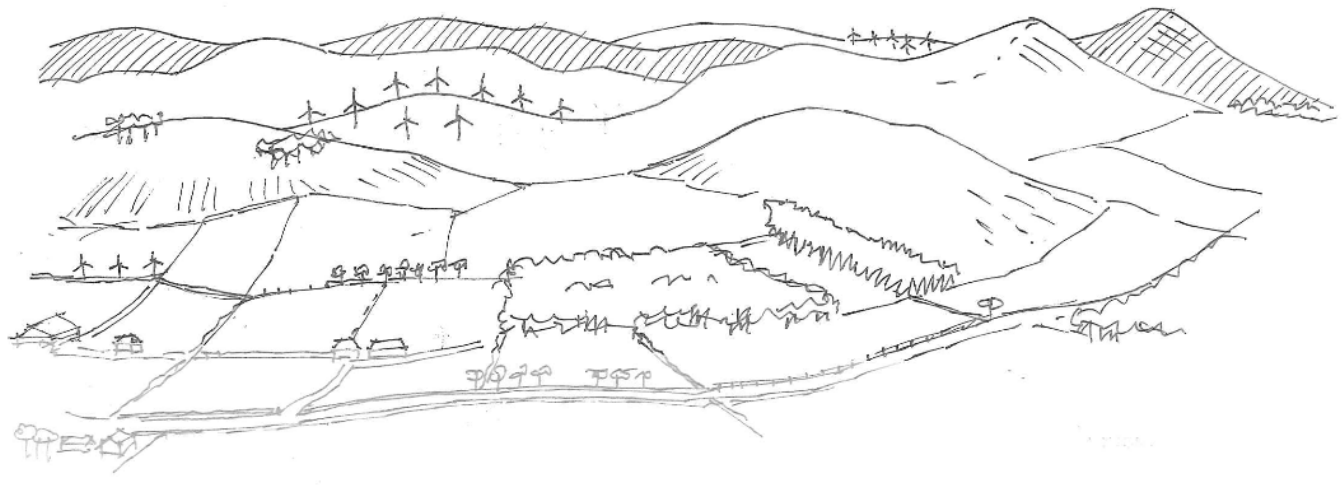
Ark Hill Windfarm

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

TAY 10: BROAD VALLEY LOWLAND

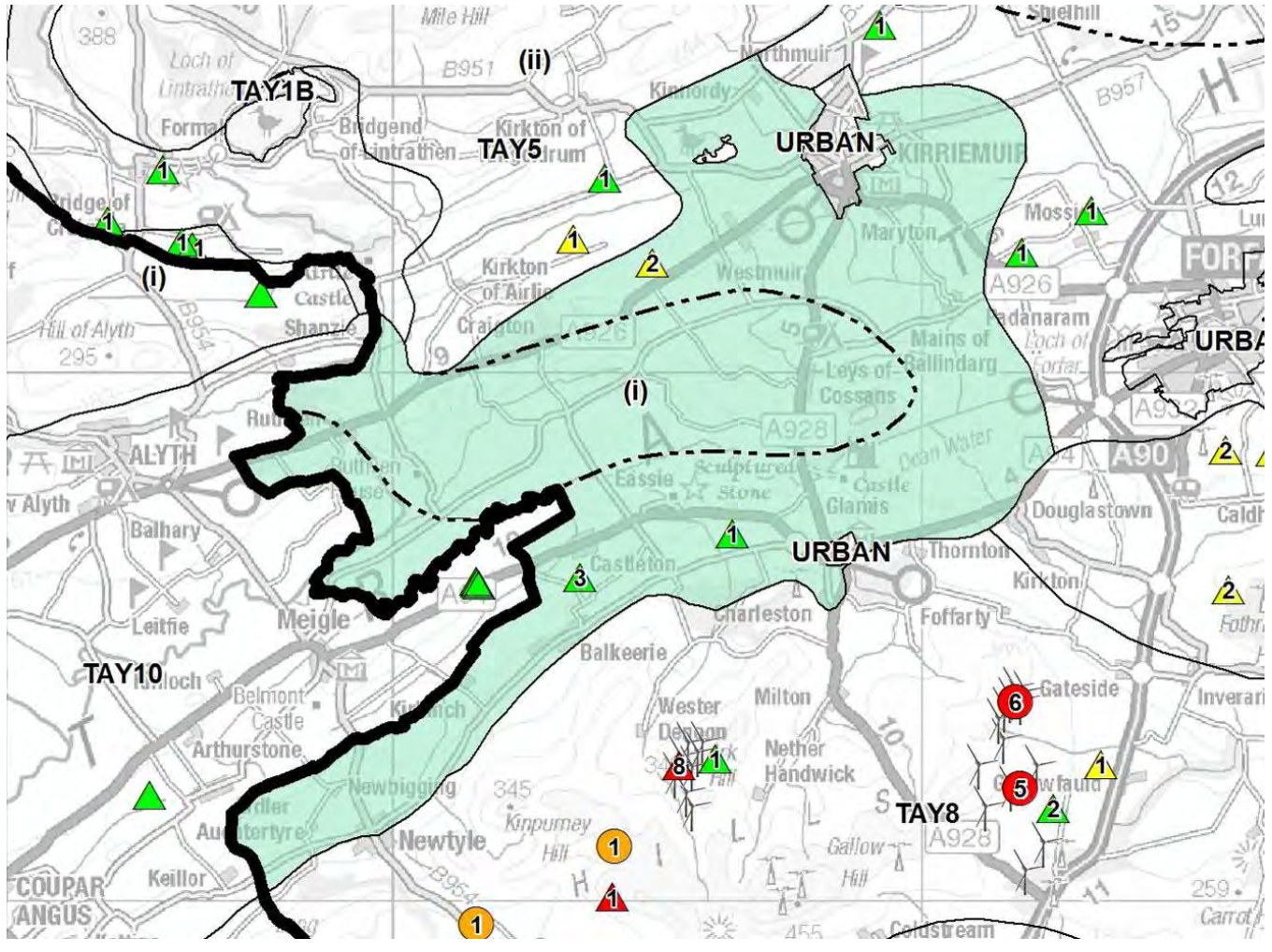
The *Broad Valley Lowland* comprises two LCAs (Strathmore and the Lower South and North Esk Valleys) located in Strathmore; a broad, settled, lowland agricultural valley stretching over 60km from the River Tay in Perthshire in the southwest through Angus to Aberdeenshire in the northeast. Whilst the 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 fluvioglacial 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*.

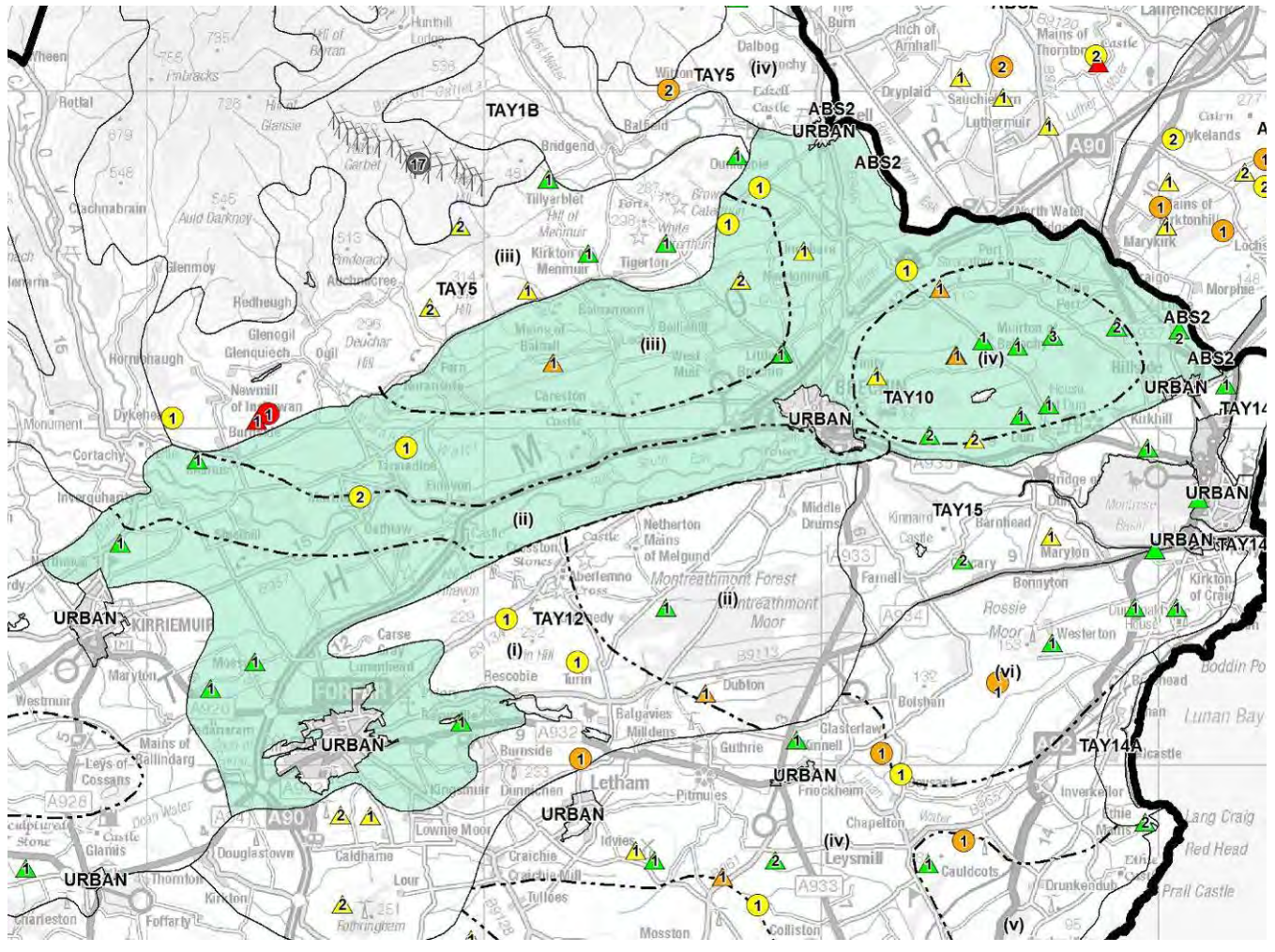


Table 6.1(e): Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Broad Valley Lowland

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.
											Max. Numbers in Group	*1-5*	*1-3*					
											Min Group Separation Distances (km)	*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 *Highland Foothills*). 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 *Highland Foothills* 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
											Max. Numbers in Group	*1-5*	*1-3*	*1*				
											Min Group Separation Distances (km)	*2-4*	*3-6*	*5-10*				

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		
									A90 and Montrose Basin. This pattern continues across the Aberdeenshire border into Howe of Mearns.									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 *Dipslope Farmland* 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 *Broad Valley Lowland with Wind Turbines* 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 *Broad Valley Lowland with Occasional Wind Turbines*. The nearby consented and proposed turbines at Memus are larger than recommended for this LCT or the *Highland Foothills*.

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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.

14
66

TAY12: LOW MOORLAND HILLS

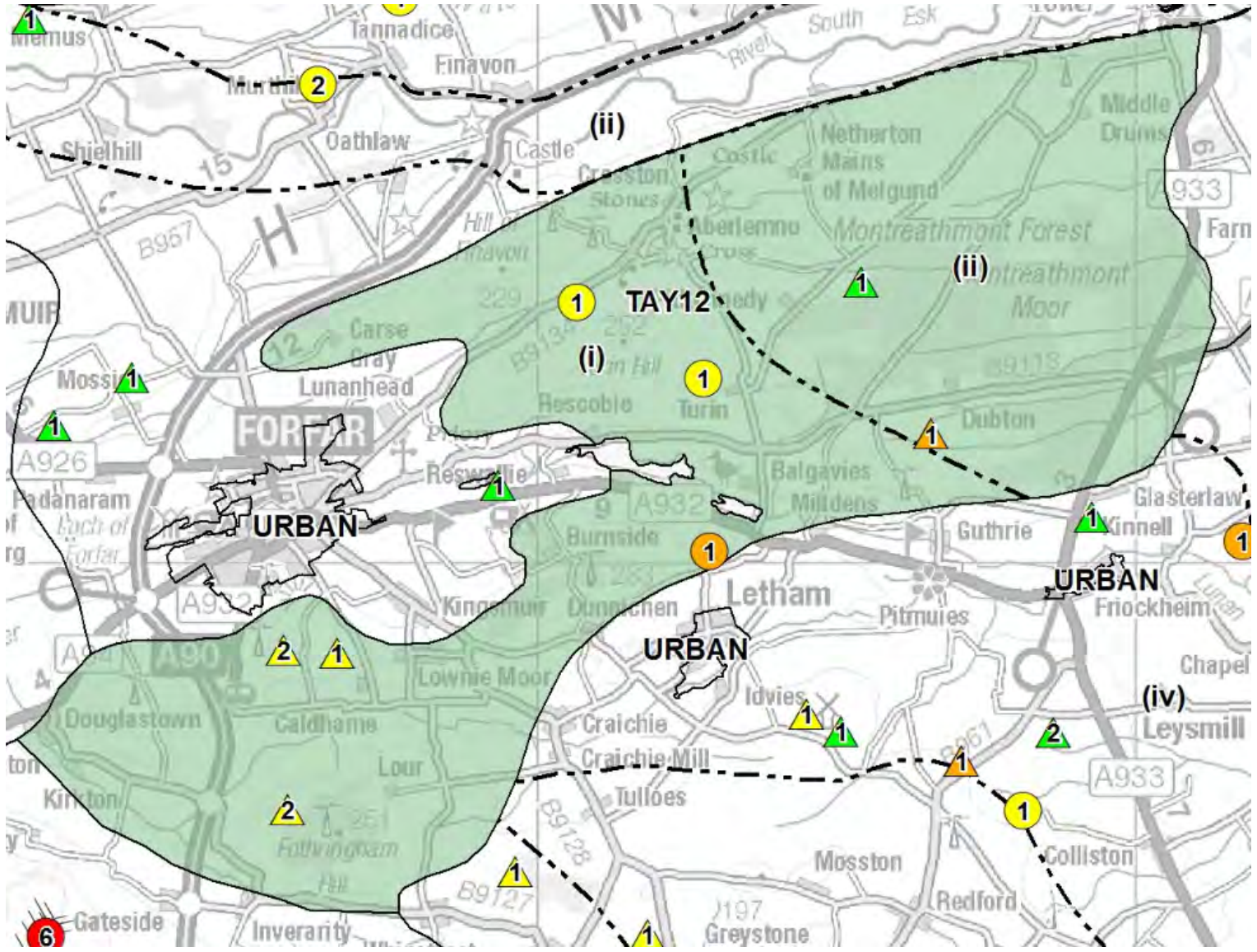
The Low Moorland Hills LCA is situated to the east and south of Forfar and lies between Strathmore and the *Dipslope Farmland*, continuing a gradually diminishing line of hills from the Sidlaws in the west to near sea level farmland at the Montrose Basin in the east. The LCA has been divided into two 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.	***Low Moorland Hills with Wind Turbines/ Occasional Wind Turbines/ No Wind Turbines***	***Low Moorland Hills with Wind Turbines/ Occasional Wind Turbines***	●	◑	○	○	○	Two medium turbines either side of Turin Hill east of Forfar and one medium/large (66m) turbine on southern boundary with *Dipslope Farmland* 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.
											Max. Numbers in Group	*1-5*	*1-3*					
											Min Group Separation Distances (km)	*2-4*	*3-6*					
											South of Forfar	*2-4*	*2-4*					
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.	***Low Moorland Hills with Occasional Wind Turbines/ No Wind Turbines***	***Low Moorland Hills with Occasional Wind Turbines***	●	●	◔	○	○	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.
											Max. Numbers in Group	*1-5*	*1-3*	*1-3*				
											Min Group Separation Distances (km)	*2-4*	*3-6*	*5-10*				

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)

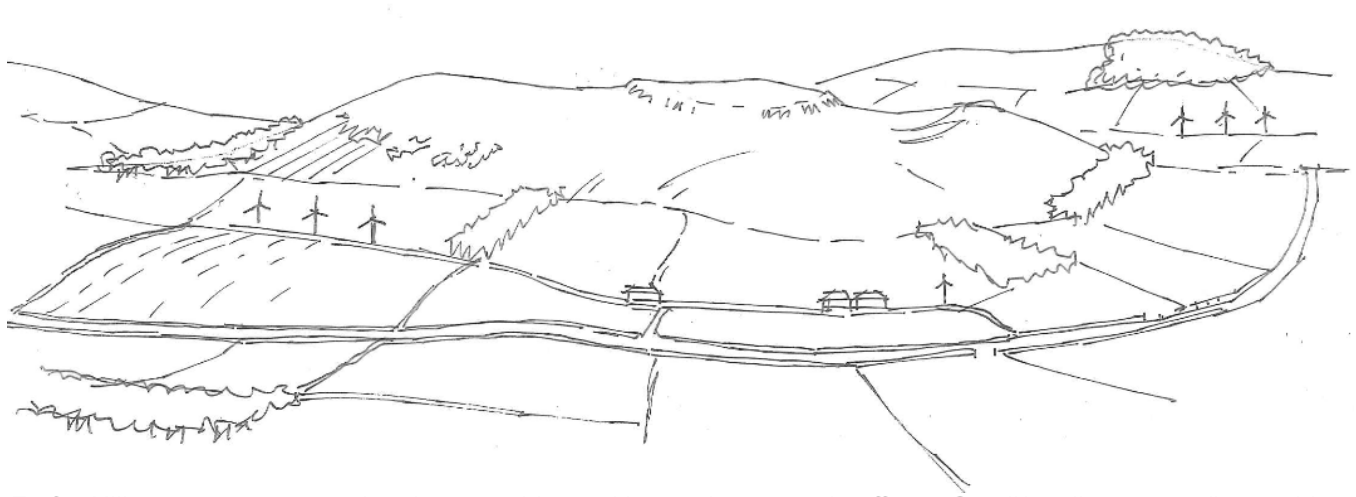
Group Sizes: 1-5 (small/medium); 1-3 (medium)

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.

15 03

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.

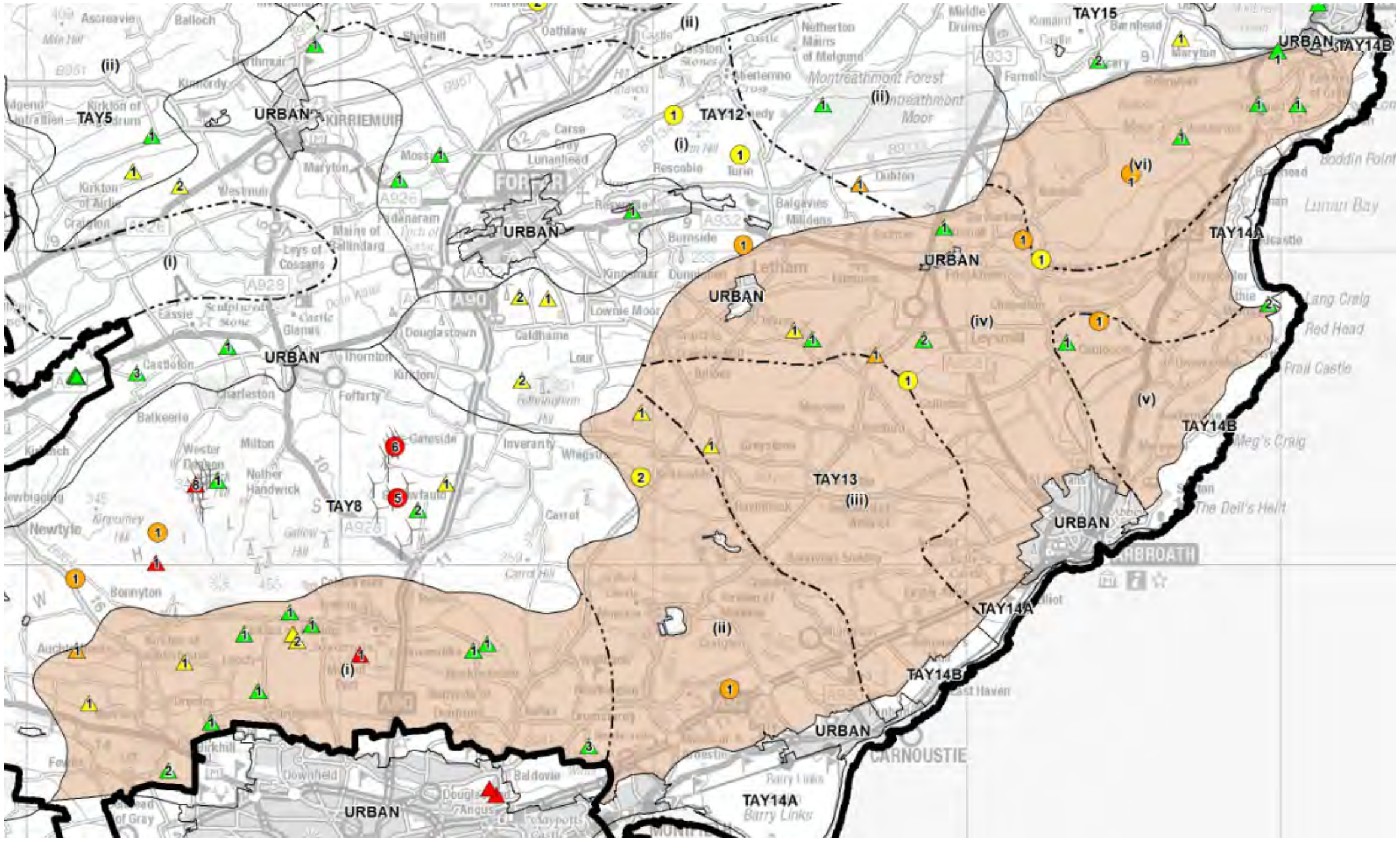


Table 6.1(g) Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Dipslope Farmland

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND

Key: ○ 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: ***Southeast Angus Lowland*** **Sub Area:** ***(i)Tealing Farmland***																		
Med	Med	**Med**	**Med**	●	●	○	○	○	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***	●	◑	○	○	○	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**	●	●	◔	○	○	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***	●	●	◔	○	○	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 *Dipslope Farmland* 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: ○ 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: ***Southeast Angus Lowland*** **Sub Area:** ***(iii)Redford Farmland***																		
Med	Med	**Med**	**Med/ Low**	●	●	●	○	○	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***	●	●	●	○	○	Current application for one medium turbine in the NE.	**Landscape analysis:** This sub-area is the largest scale, highest and most open within the *Dipslope Farmland* 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 *Dipslope Farmland* 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. **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.
											Max. Numbers in Group	*1-5*	*1-5*	*1-5*				
											Min Group Separation Distances (km)	*2-4*	*3-6*	*5-10*				

1507

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND

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: ***Southeast Angus Lowland*** **Sub Area:** ***(iv)Letham, Lunan and Arbroath***																		
Med	Med	**Med**	**Med/ High**	●	●	○	○	○	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***	●	●	○	○	○	Currently scattered applications for 5 turbines (2 medium and 3 medium/ large) all lying on the sub area boundary.	**Landscape analysis:** This sub-area, lying between three sub-areas of higher *Dipslope Farmland* and the *Low Moorland Hills*, 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 *Dipslope Farmland* and is visually sensitive. More suited to small/medium and medium turbines associated with settlement or intensive agriculture. **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.
											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**	●	●	○	○	○	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***	●	●	○	○	○	One medium/large turbine near Lunan valley.	**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. **Comments on Consented and Proposed Turbines:** Current turbines within capacity but proposed medium/large turbine is taller than recommended.
											Max. Numbers in Group	*1-5*	*1-5*					
											Min Group Separation Distances (km)	*2-4*	*3-6*					

1508

LANDSCAPE CHARACTER TYPE TAY 13: DIPSLOPE FARMLAND

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: ***Southeast Angus Lowland*** **Sub Area:** ***(vi)Rossie Moor***																		
Med	Med/ High	**Med/ High**	**Med**	●	●	●	○	○	Currently 4 consented small/medium turbines in the northeast.	***Dipslope Farmland with Occasional/ No Wind Turbines***	***Dipslope Farmland with Occasional Wind Turbines***	●	●	●	○	○	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.	**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. **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.
											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.

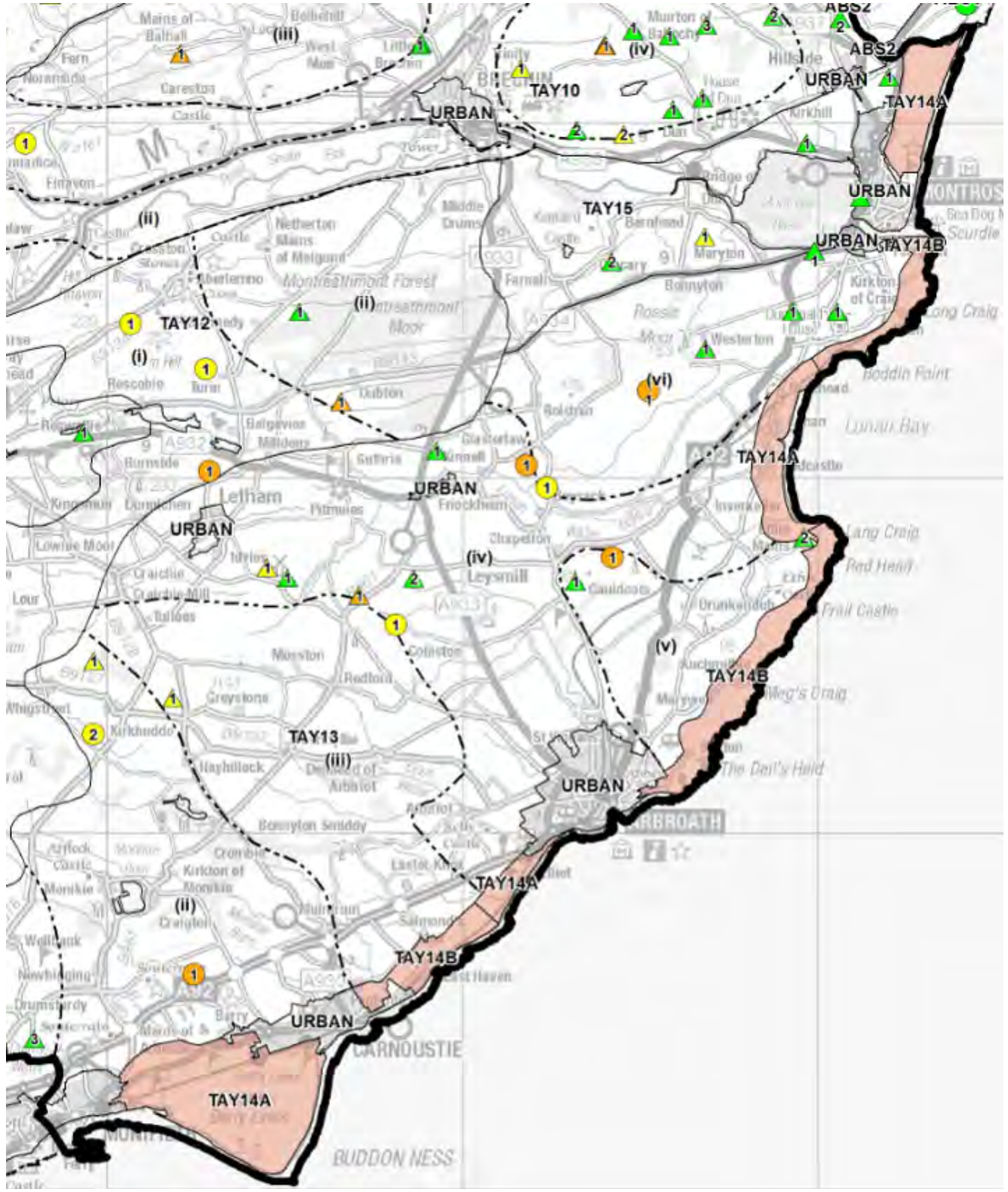


Table 6.1(h) Summary of Landscape Capacity, Cumulative Effects and Guidance for Future Wind Energy Development: Coast

LANDSCAPE CHARACTER TYPE TAY 14: COAST

Key: ○ 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		
14a Coast with Sand Landscape Character Areas: ***Barry Links, Elliott, Lunan Bay, Montrose***																		
Med	Med/ High	**Med/ High**	**Med/ High**	◑	○	○	○	○	2 small/medium turbines on Ethie headland above Lunan Bay.	***Coast with No Wind Turbines/ Occasional Wind Turbines***	***Coast with Occasional Wind Turbines***	◑	○	○	○	○	No current applications Scoping for offshore windfarm at Inchcape and 125x197m turbines at Neart na Gaoithe 15km and 30km SE from Angus coast	**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. **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. 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.
											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**	◑	○	○	○	○	2 small/medium turbines by Ethie Mains above Lunan Bay lie within 200m.	***Coast with No Wind Turbines/ Occasional Wind Turbines***	***Coast with Occasional Wind Turbines***	◑	○	○	○	○	No current applications Scoping for offshore windfarm at Inchcape and 125x197m turbines at Neart na Gaoithe 15km and 30km SE from Angus coast	**Landscape analysis:** Whilst more elevated than the surrounding *Coast with Sand* 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. **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.
											Max. Numbers in Group	*1-3*						
											Min Group Separation Distances (km)	*2-4*						

1513

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)

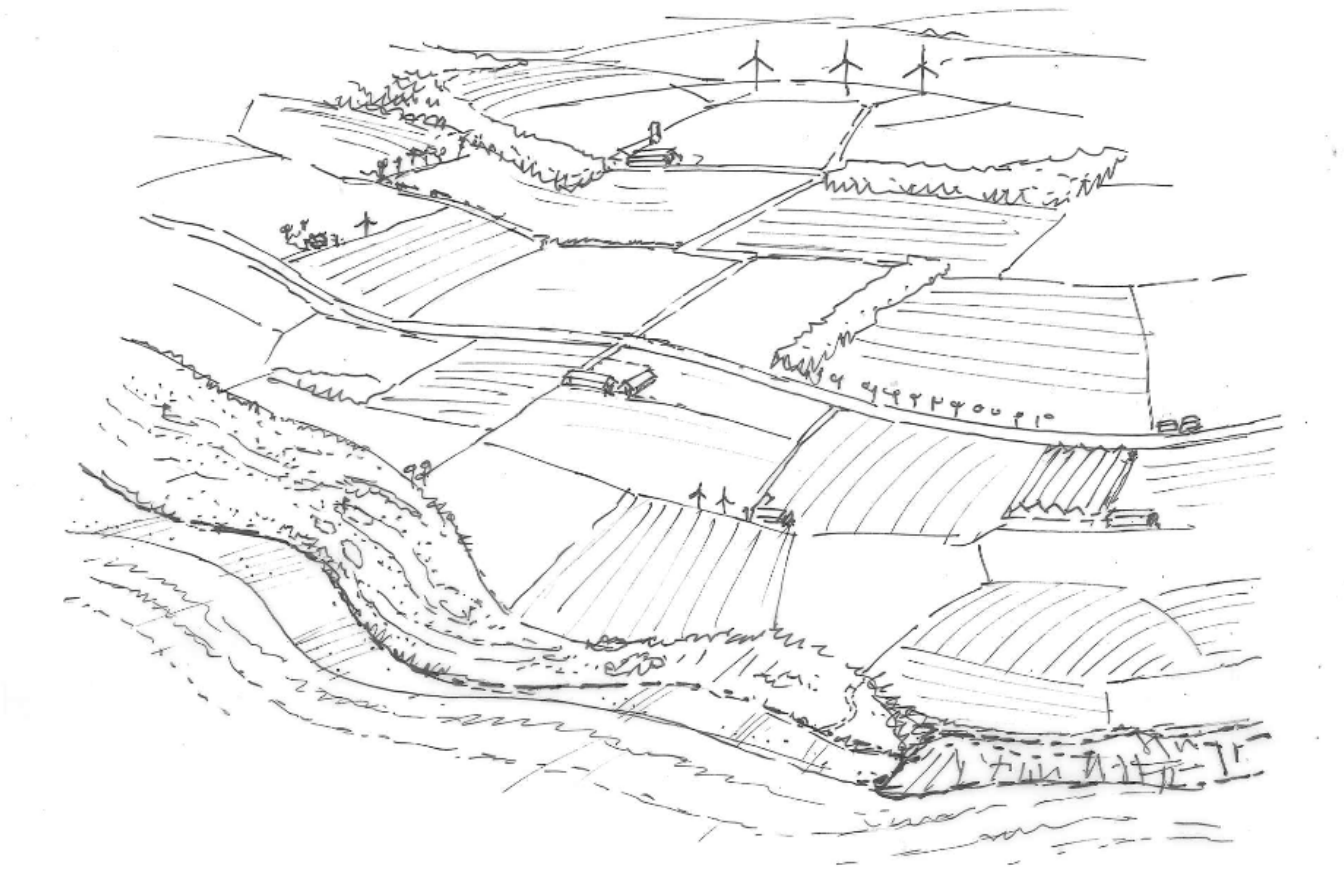
Detailed Guidance

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.

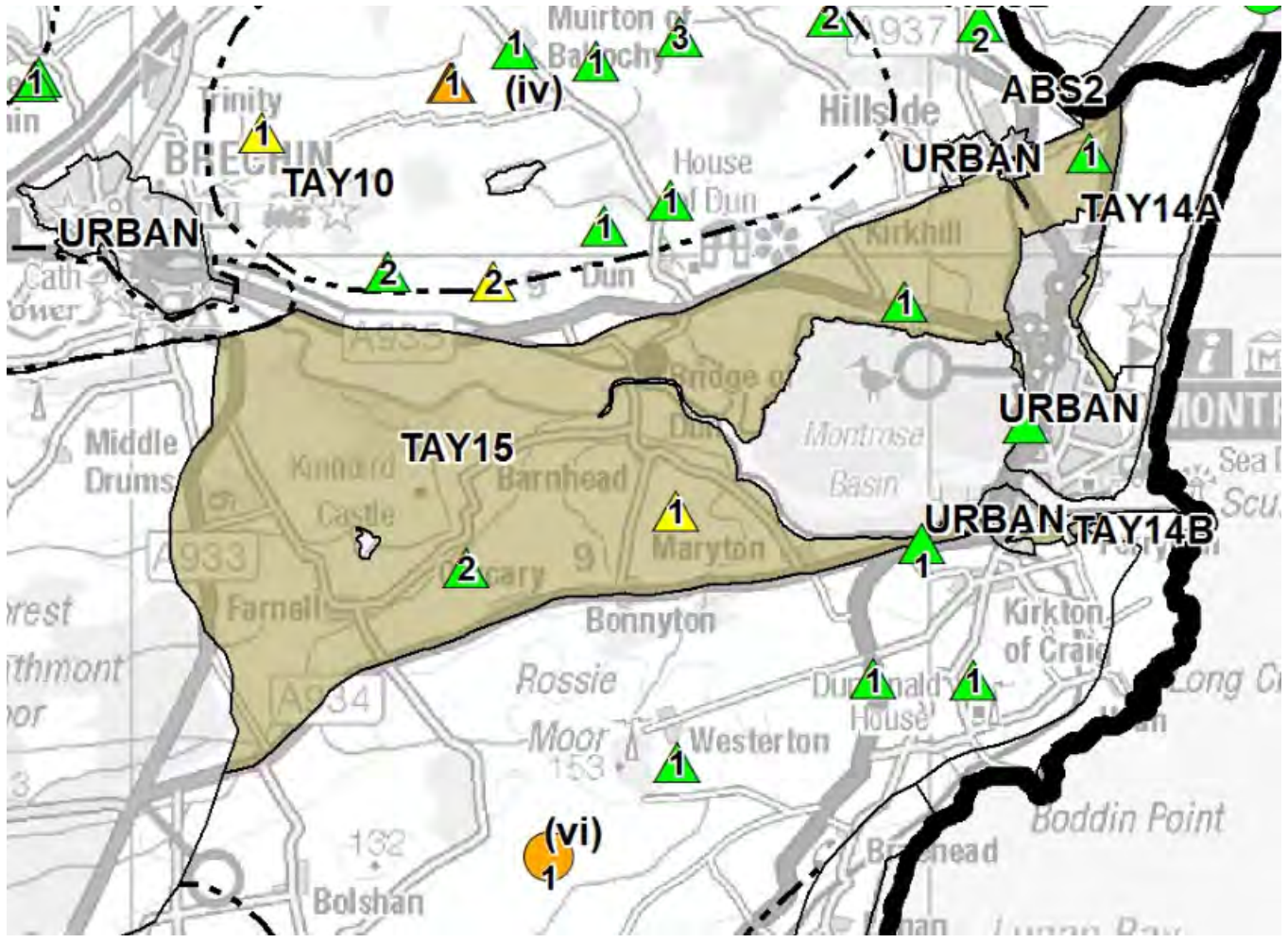


Coastal landscapes and Dipslope Farmland often merge seamlessly. Large turbines should be set well back into the Dipslope Farmland with turbines under 30m associated with development near the coast.

15

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: ○ 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 Areas: ***Montrose Basin***																			
Med/ High	Med/ High	**Med/ High**	**Med/ High**	○	○	○	○	○	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.	***Lowland Loch Basin with Occasional Wind Turbines/ no Wind Turbines***	***Lowland Loch Basin with Occasional Wind Turbines***	○	○	○	○	○	No current applications	**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. **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.
											Max. Numbers in Group	*1-3*	*1-3*						
											Min Group Separation Distances (km)	*2-4*	*3-5*						

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)
- (i) LCA Sub Areas (Ref. Table 6.1)

Capacity

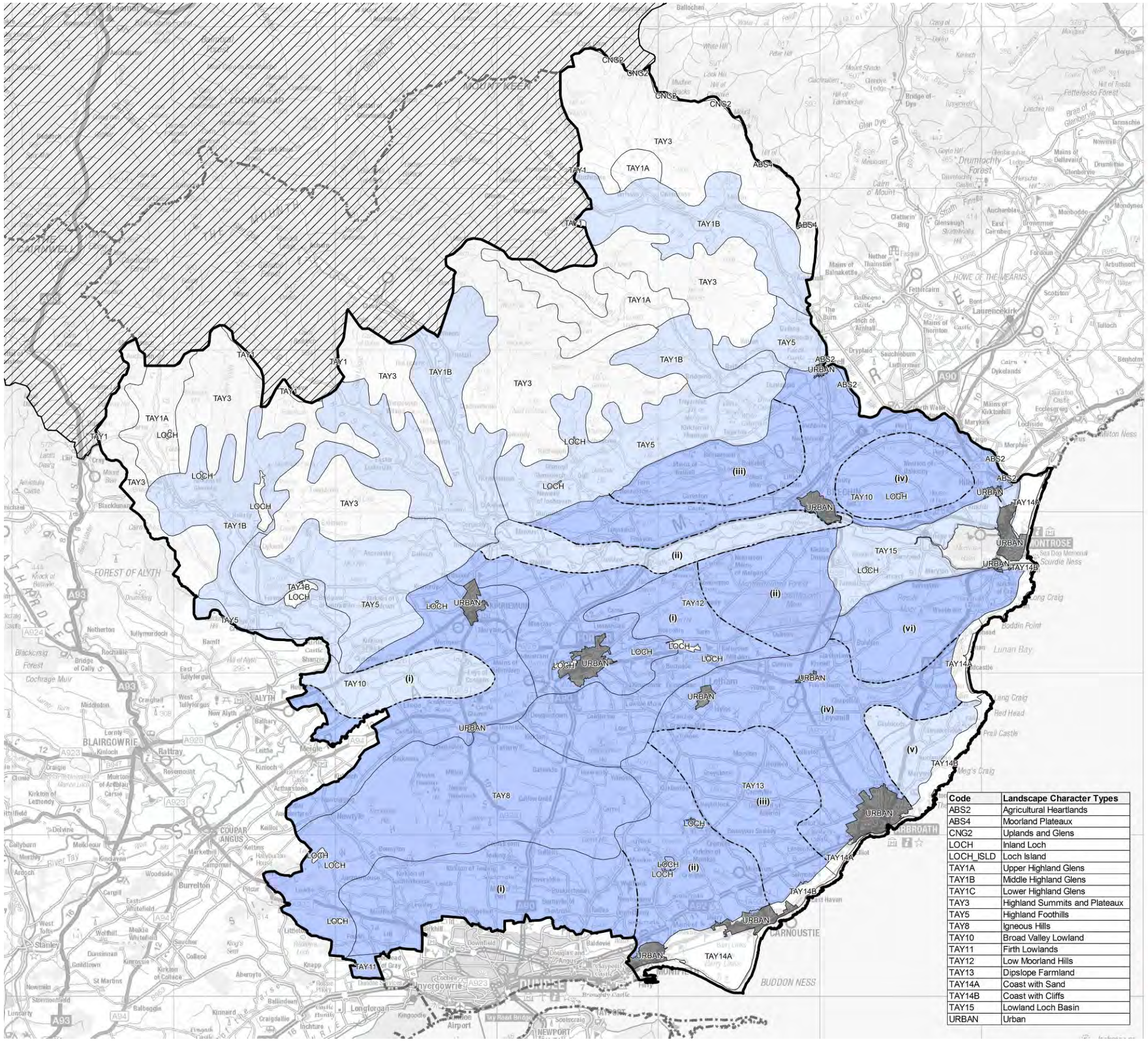
- High Capacity
- Medium Capacity
- Low Capacity
- No Capacity
- Urban

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 6.1a

Underlying Landscape Capacity (15 to 30m Turbines)

N 0 2.5 5 10 Km



Code	Landscape Character Types
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ABS4	Moorland Plateaux
CNG2	Uplands and Glens
LOCH	Inland Loch
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TAY1A	Upper Highland Glens
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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

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- (i) 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)

N 0 2.5 5 10 Km

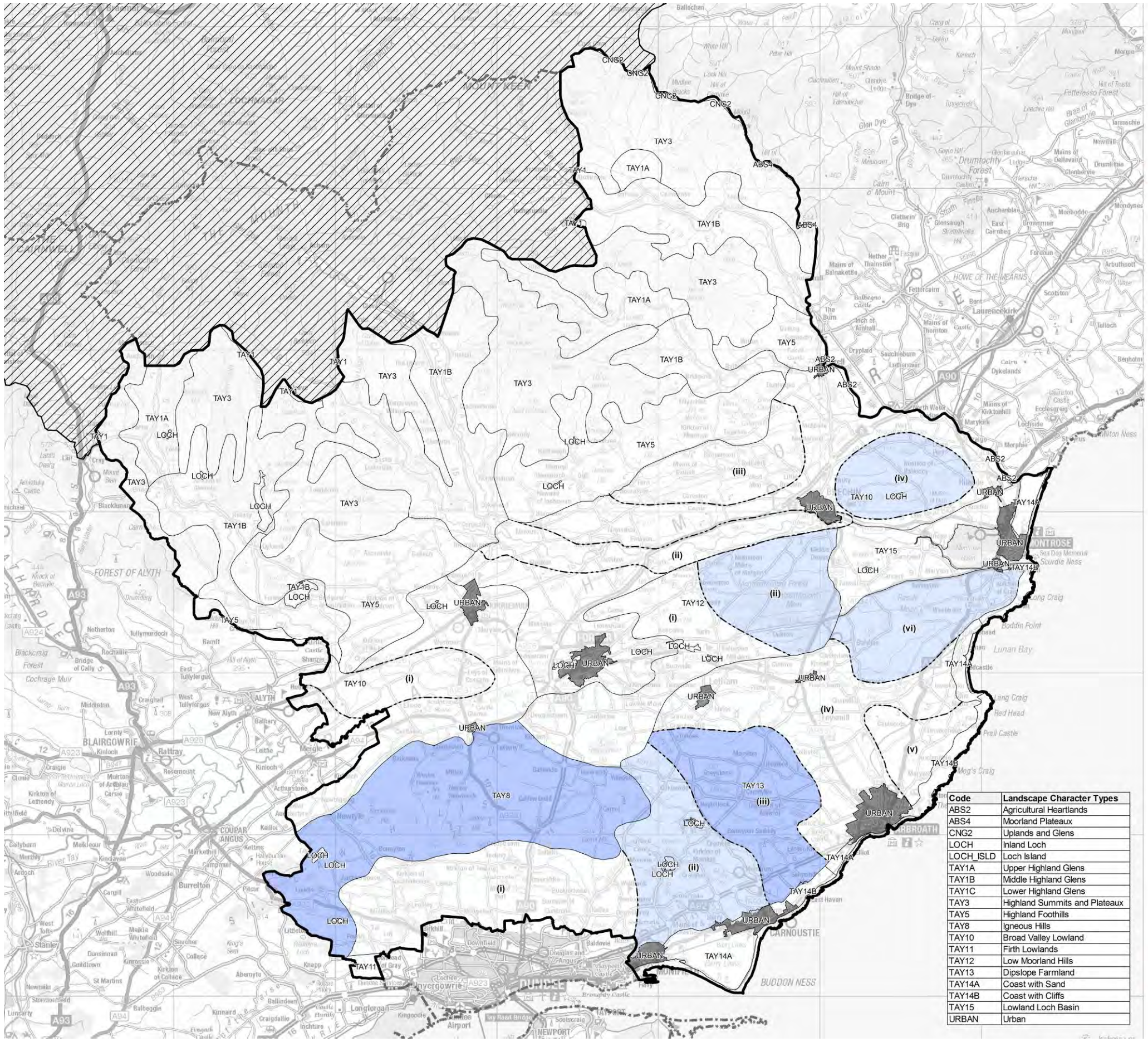
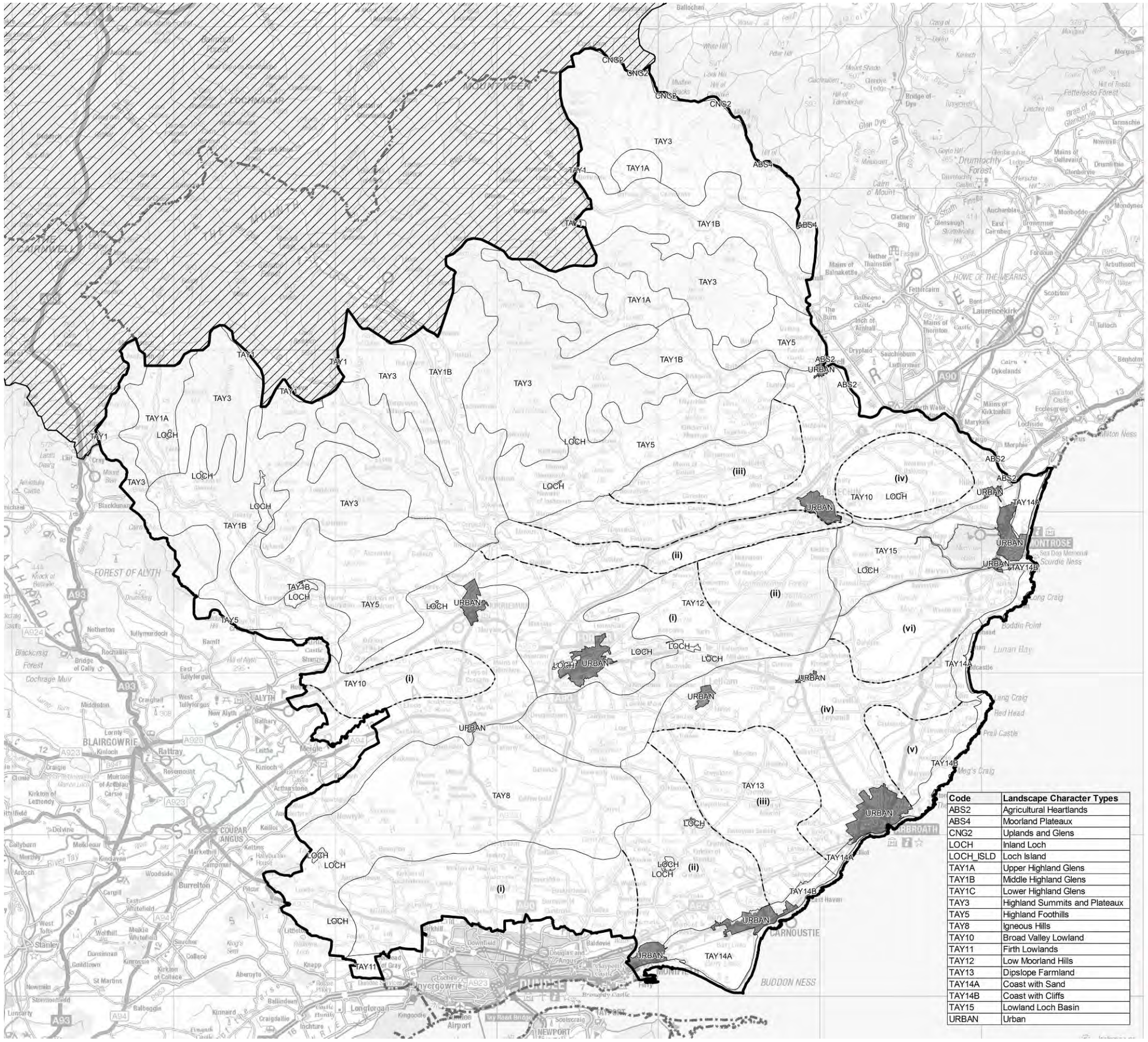


Figure 6.1c

Underlying Landscape Capacity (50 to 80m 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)
- (i) LCA Sub Areas (Ref. Table 6.1)

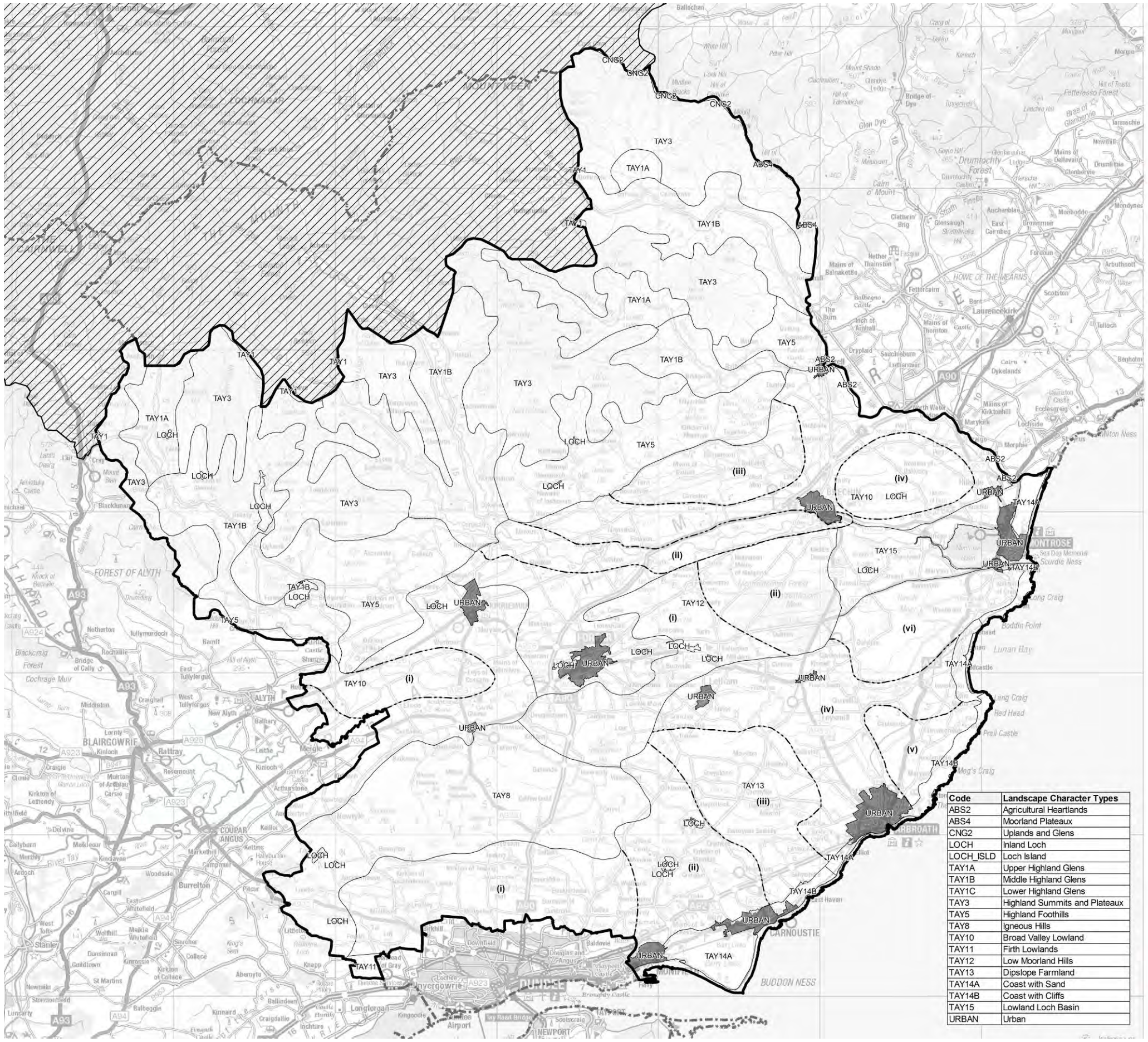
Capacity

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

Figure 6.1d

Underlying Landscape Capacity (80 to 125m Turbines)

N 0 2.5 5 10 Km



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

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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)
- (i) LCA Sub Areas (Ref. Table 6.1)

Capacity

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

Figure 6.1e

Underlying Landscape Capacity (125m+ Turbines)

N

0 2.5 5 10 Km

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 Inchcape15km 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 an 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

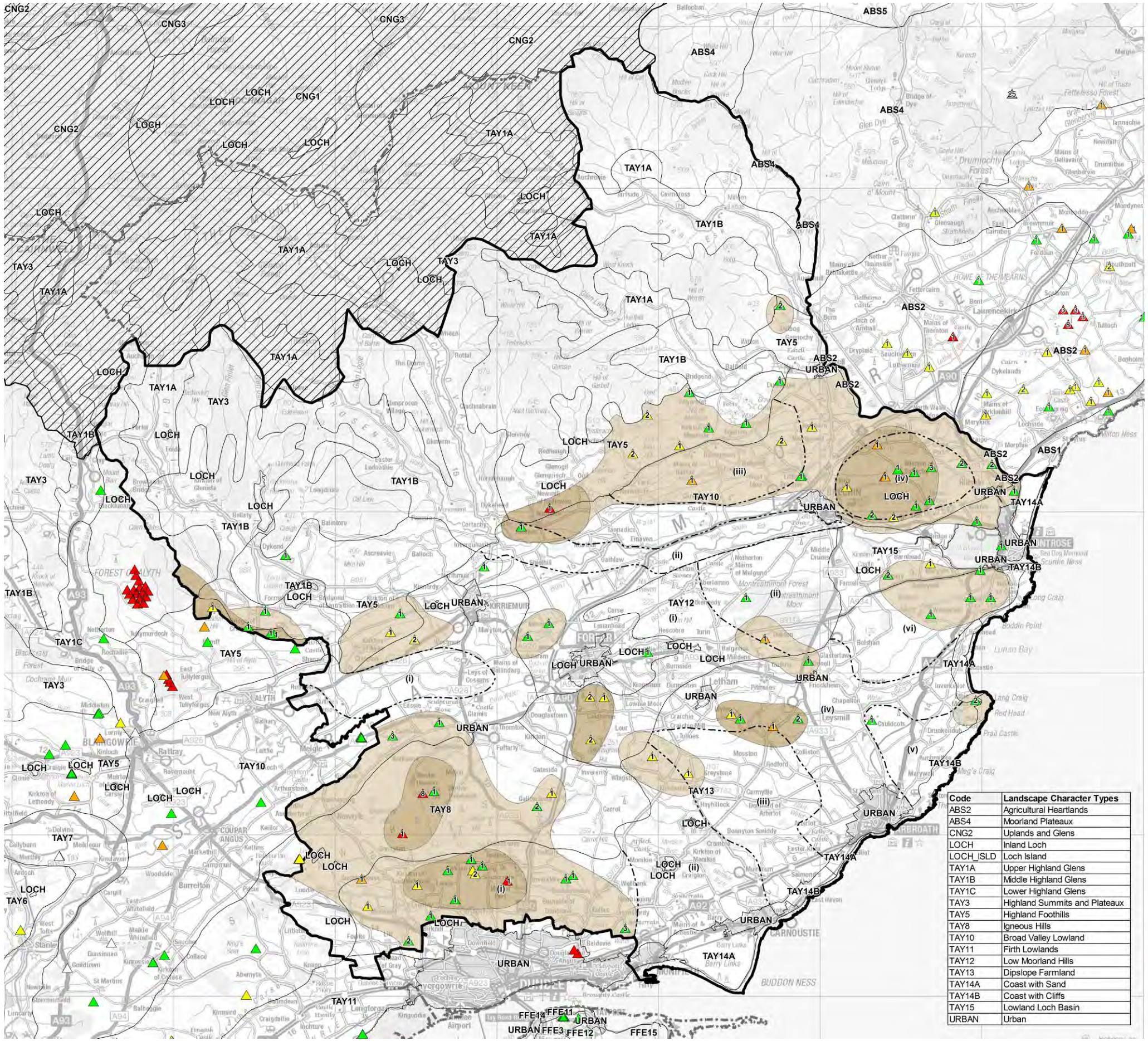
The Coastal Landscapes comprise three LCTs: *Coast with Sand; Coast with Cliffs* and *Lowland Loch Basin.*

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.

1526



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

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Legend

- Study Area
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- Scottish Local Authority Boundaries
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- (i) 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)

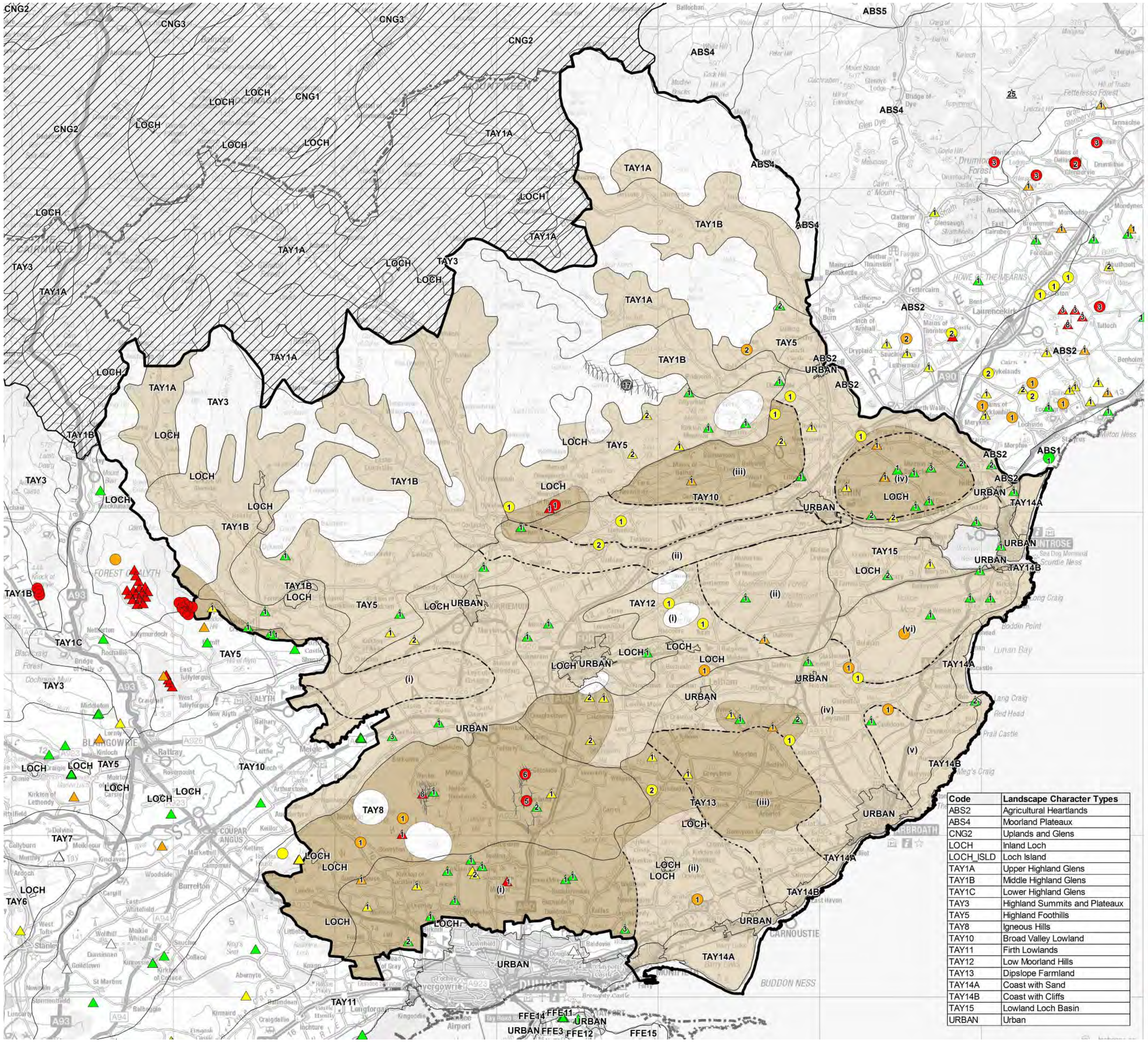
- Unknown Height
- 15 to <30m
- 30 to <50m
- 50 to <80m
- 80 to <125m
- 125m+

Figure 6.2

Current Consented Development: Wind Energy Landscape Type

N

0 2.5 5 10 Km



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TAY13	Dipslope Farmland
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- (i) 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

Figure 6.3

Proposed Limits to Development: Wind Energy Landscape Type

N 0 2.5 5 10 Km

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 turbines 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 turbines 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 turbines 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.

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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)
- (i) LCA Sub Areas (Ref. Table 6.1)
- Settlements
- Areas with Highest Underlying Capacity:
  1. Careston Farmland
  2. Muir of Pert
  3. Montreathmont Forest
  4. Sidlaw Hills and Dipslope Farmland
- Areas with Limited Underlying Capacity
- Areas with No Underlying Capacity
- Areas where Cumulative Impact Limits Development:
  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

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 Opportunitites and Constraints

N 0 2.5 5 10 Km

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	
Description The boundaries of this area include: • 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	**Development Situation and Key Objectives** The Alyth Hills on the boundary with Perthshire are *Highland Foothills with Wind Turbines* 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: 1) Retaining sufficient spacing between individual windfarms and turbines to maintain the *Landscape with Wind Turbines* character and avoid a *Wind Turbine Landscape* character in the *Highland Foothills*; 2) To prevent further extension of the *Landscape with Wind Turbines* 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	
Description The boundaries of this area include: • the *Highland Foothills* LCA between the Noran Water and Glen Clova, including Hill of Ogil and Den of Ogil; • *The Broad Valley Lowland* 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;	**Development Situation and Key Objectives** 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 *Highland Foothills with Wind Turbines* on the south side of Hill of Ogil, extending south into the *Broad Valley Lowland* A further medium size turbine is proposed near Cortachy. The objectives governing the area are: 1) Avoiding further extension of the *Landscape with Wind Turbines* character into the *Highland Foothills, Broad Valley Lowland* and *Mid Highland Glens* 2) Retaining sufficient spacing between turbines so as not to exceed the *Landscape with Wind Turbines* character and avoid areas of *Wind Turbine Landscape* character in the *Highland Foothills* and *Broad Valley Lowland*; 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	
Description The boundaries of this area include: • 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	**Development Situation and Key Objectives** Currently this area has consents for eleven small turbines, three medium turbines and two medium/large turbines, creating an extensive area of *Broad Valley Lowland with Wind Turbines*. There is a proposal for a further medium turbine. The objectives governing the area are: 1) Avoiding coalescence with the *Landscape with Wind Turbines* in Aberdeenshire by minimising development in the North Esk corridor; 2) Retaining sufficient spacing between individual turbines to maintain a *Landscape with Wind Turbines* and avoid a *Wind Turbine Landscape* 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	
Description The boundaries of this area include: • 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.	**Development Situation and Key Objectives** Currently this area has one medium/large turbine, three small turbines and one medium turbine creating a small area of *Dipslope Farmland with Wind Turbines*, with proposals for a further medium size turbine. The objectives governing the area are: 1) Retaining sufficient spacing between individual turbines to maintain a *Landscape with Wind Turbines* and avoid a *Wind Turbine Landscape* 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	
Description The boundaries of this area include: • The *Igneous Hills* between the B954, Newtyle to Glamis; A928 to Milton of Ogilvie and Gallow Hill Ridge descending to Tealing; • The *Dipslope Farmland* south of the Igneous Hills between Auchterhouse, Dronley, Bridgefoot and the A90 north to Tealing;	**Development Situation and Key Objectives** Ark Hill Windfarm and Scotston with large size turbines creates a *Landscape with Wind Turbines* in the central Sidlaw Hills. There are several turbines consented in the *Dipslope Farmland* 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: 1) Retaining sufficient spacing between individual windfarms and turbines to maintain the *Landscape with Wind Turbines* character and avoid areas of *Wind Turbine Landscape* character in the *Igneous Hills* and *Dipslope Farmland*; 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.

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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 **L**arge 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 area s 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 360^0. 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'.*

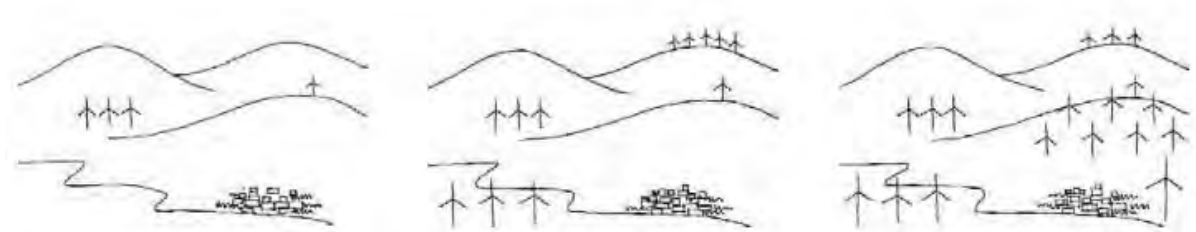
To this list might be added turbine height and windfarm size. In determining an acceptable level of development, it is necessary to clearly define what differing levels of development actually entail.

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 gradated 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:



Separate isolated features

Windfarms become key characteristic of the landscape

Windfarms become dominant characteristic of the area, creating a 'windfarm landscape'

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 assignation 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

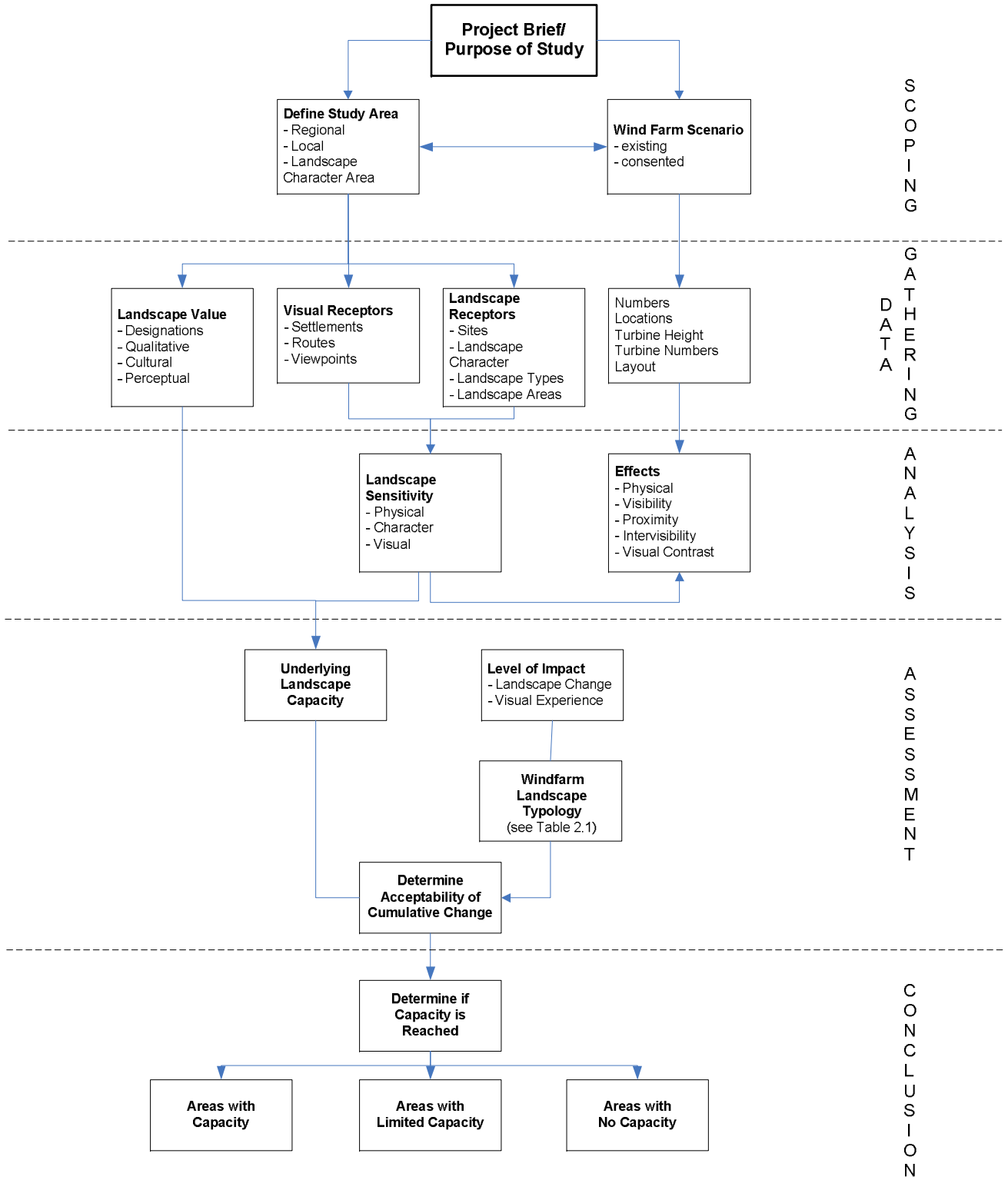
2.8.1 Assessment Process

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 to 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.

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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 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.
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 fluvioglacial 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 *Dipslope Farmland* 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.
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.

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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

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 112

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

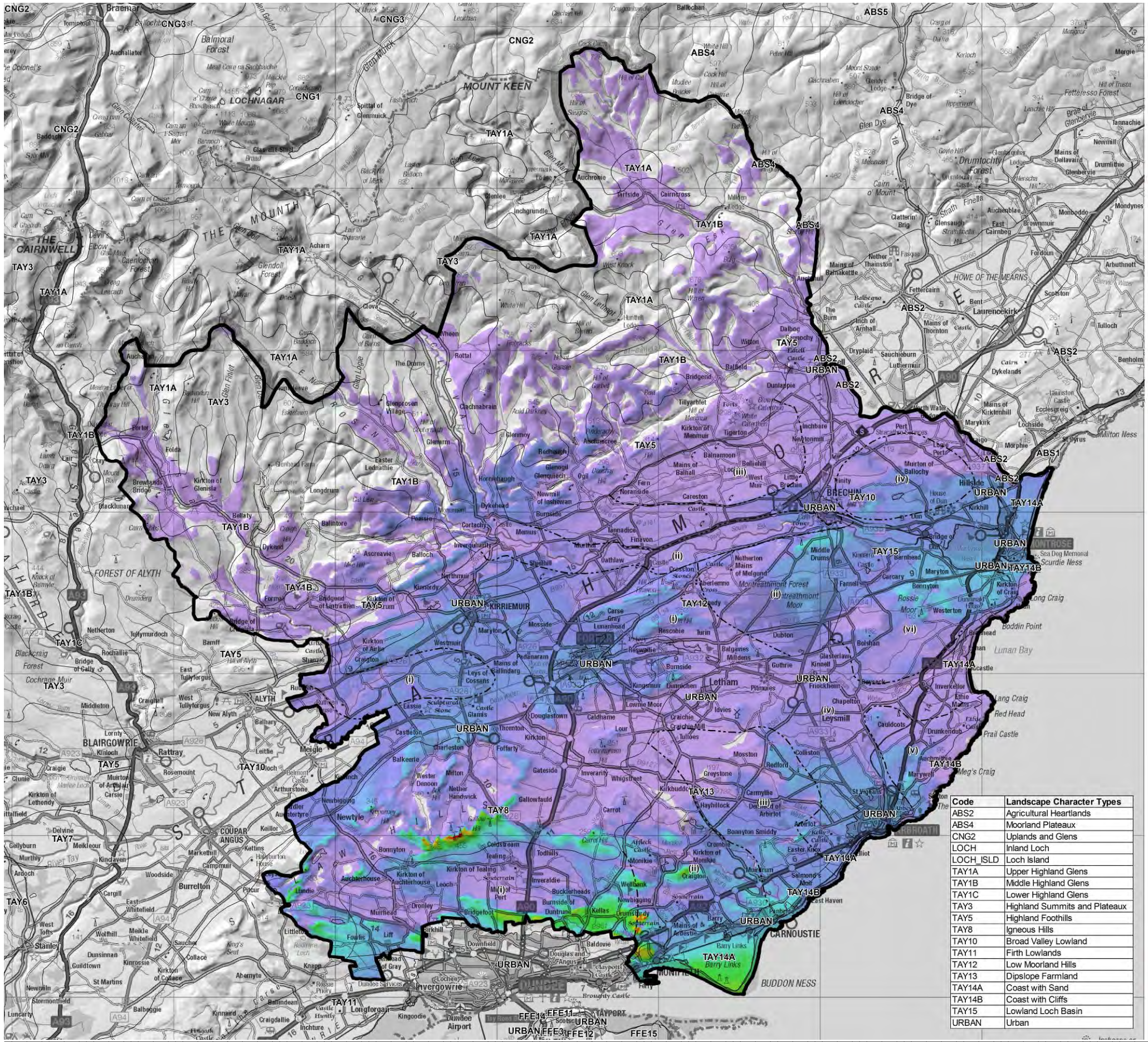
Lowest Visibility

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 4.2a

Visibility from Settlements (0m high object)

N 0 2.5 5 10 Km



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

Angus Council

Angus Council
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March 2014 7933 ANC 113

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

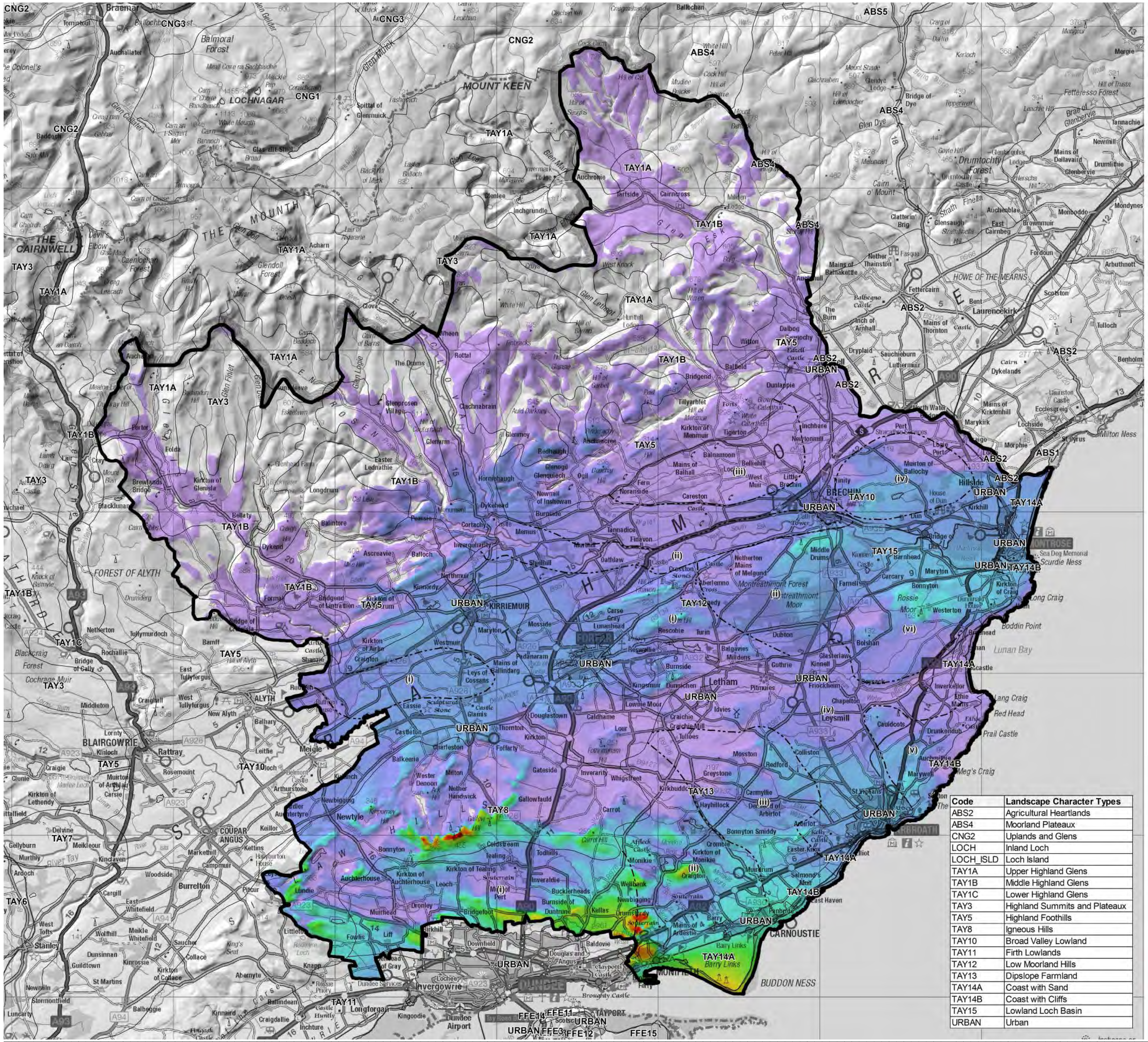
Highest Visibility

Lowest Visibility

Figure 4.2b

Visibility from Settlements (15m high object)

N 0 2.5 5 10 Km



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

Angus Council
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March 2014 7933 ANC 114

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

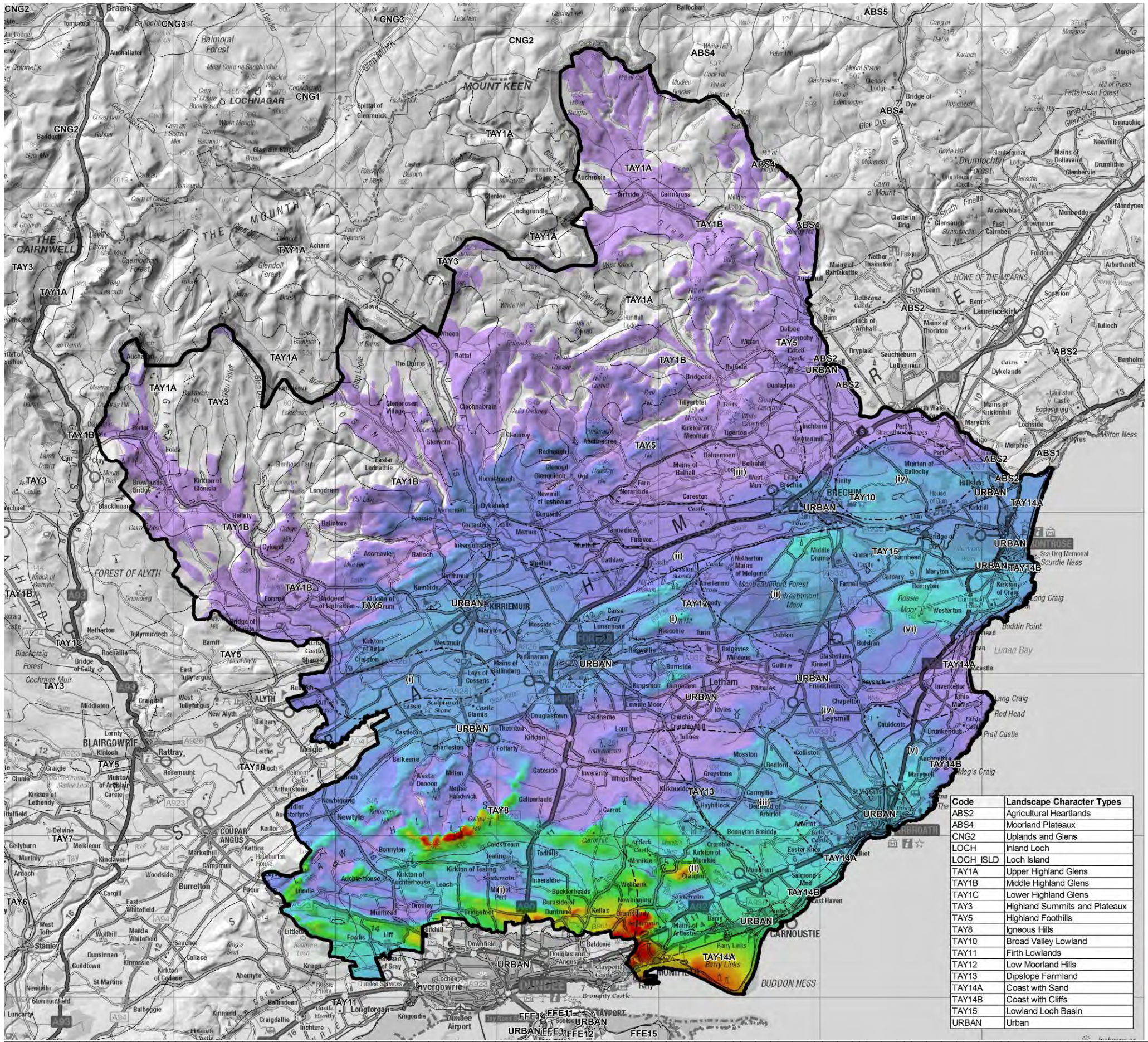
Highest Visibility

Lowest Visibility

Figure 4.2c

Visibility from Settlements (30m high object)

N 0 2.5 5 10 Km



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Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) 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 4.2d

Visibility from Settlements (50m high object)

N

0 2.5 5 10 Km

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 116

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) 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)

N 0 2.5 5 10 Km

Angus Council
Wind Energy Consultancy

November 2013 7933 ANC 117

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

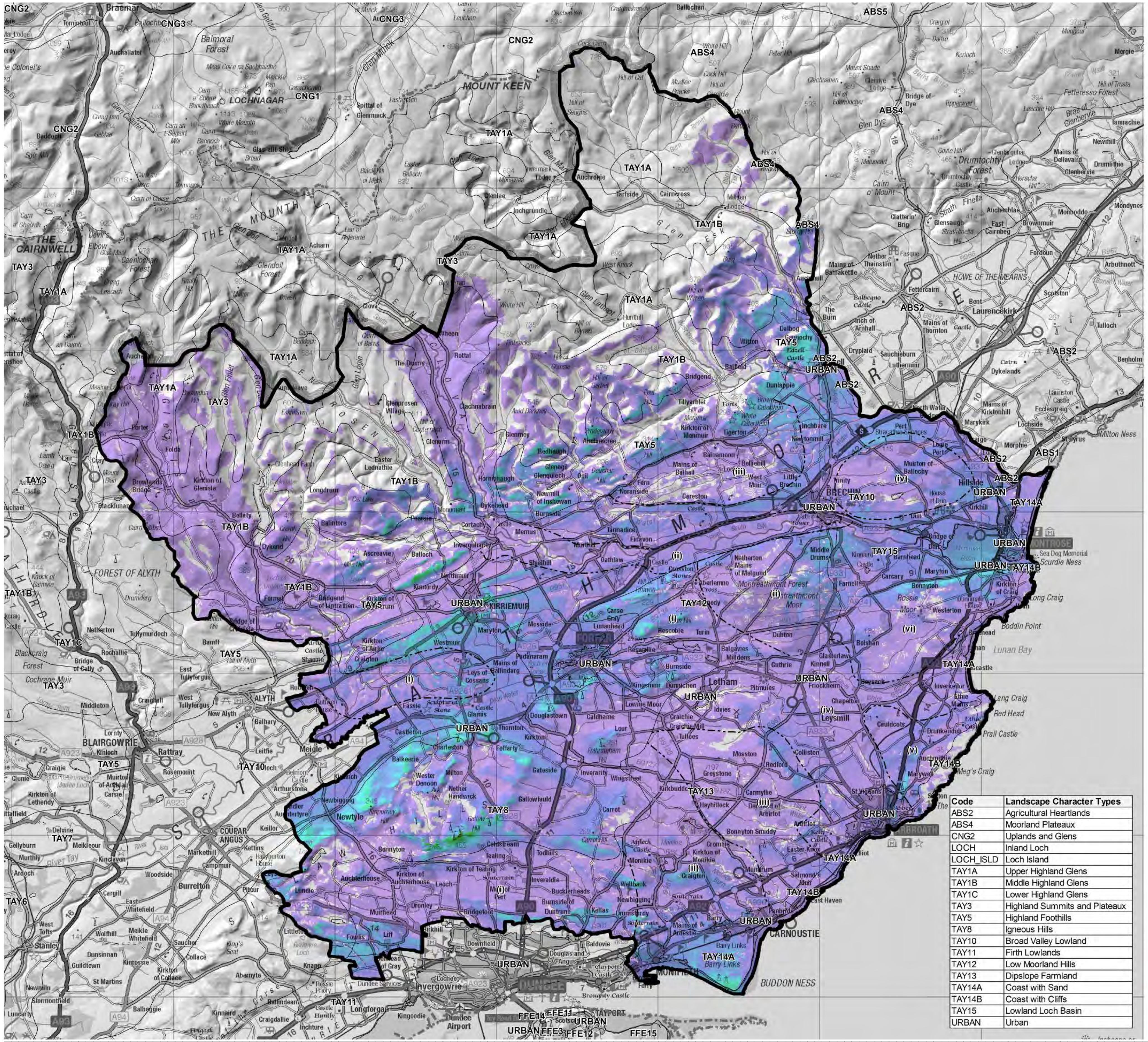
Lowest Visibility

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 4.2f

Visibility from Settlements (125m high object)

N 0 2.5 5 10 Km



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

Angus Council
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March 2014 7933 ANC 118

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

Lowest Visibility

Figure 4.3a

Visibility from Transport Routes (0m high object)

N

0 2.5 5 10 Km

Angus Council
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March 2014 7933 ANC 119

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) 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)

N 0 2.5 5 10 Km

Angus Council
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March 2014 7933 ANC 120

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) 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 4.3c

Visibility from Transport Routes (30m high object)

N 0 2.5 5 10 Km

Angus Council
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March 2014 7933 ANC 121

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

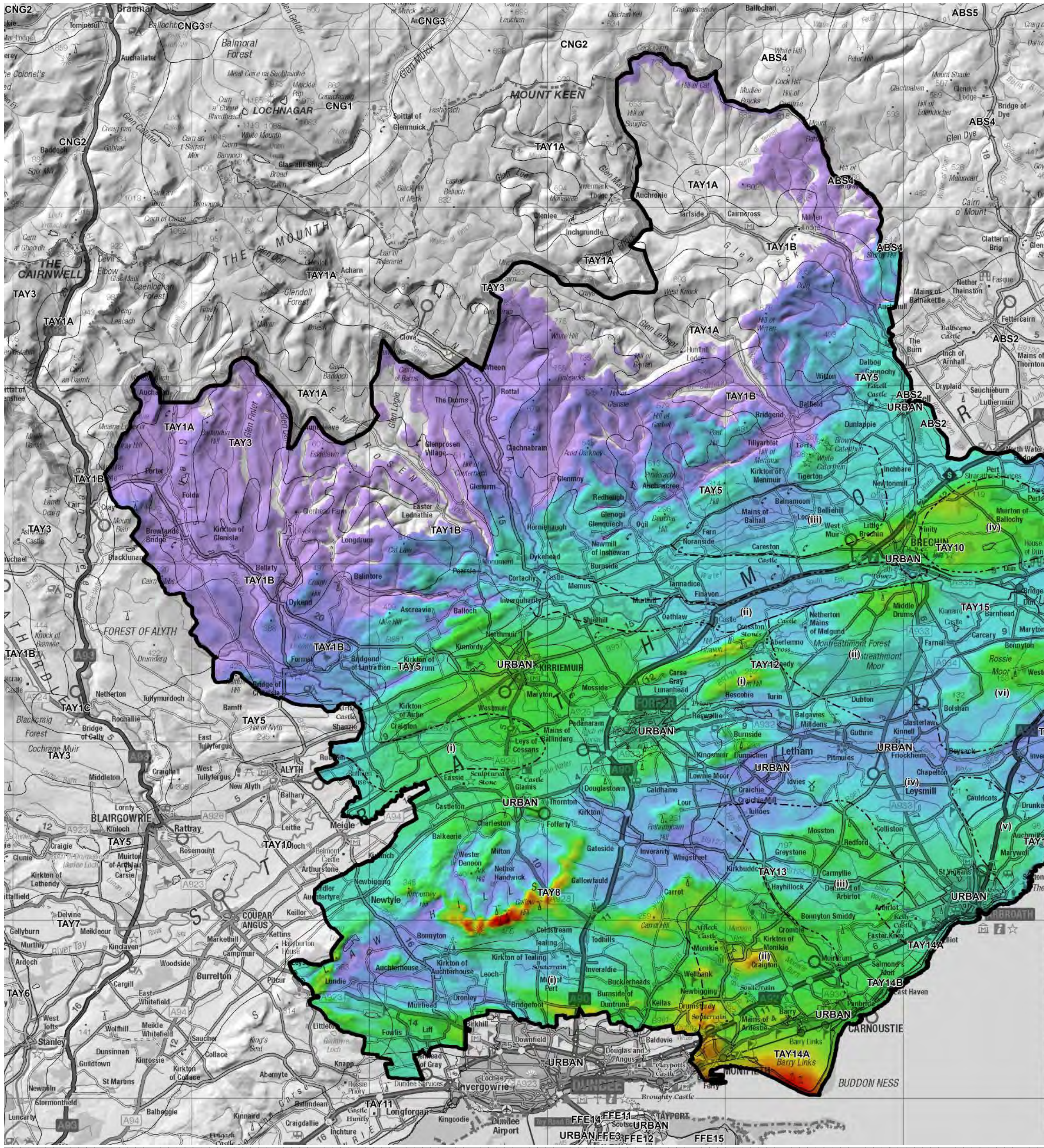
Lowest Visibility

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 4.3d

Visibility from Transport Routes (50m high object)

N 0 2.5 5 10 Km



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

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 122

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

Lowest Visibility

Figure 4.3e

Visibility from Transport Routes
(80m high object)

N 0 2.5 5 10 Km

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 123

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) 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 4.3f

Visibility from Transport Routes (125m high object)

N 0 2.5 5 10 Km

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 124

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

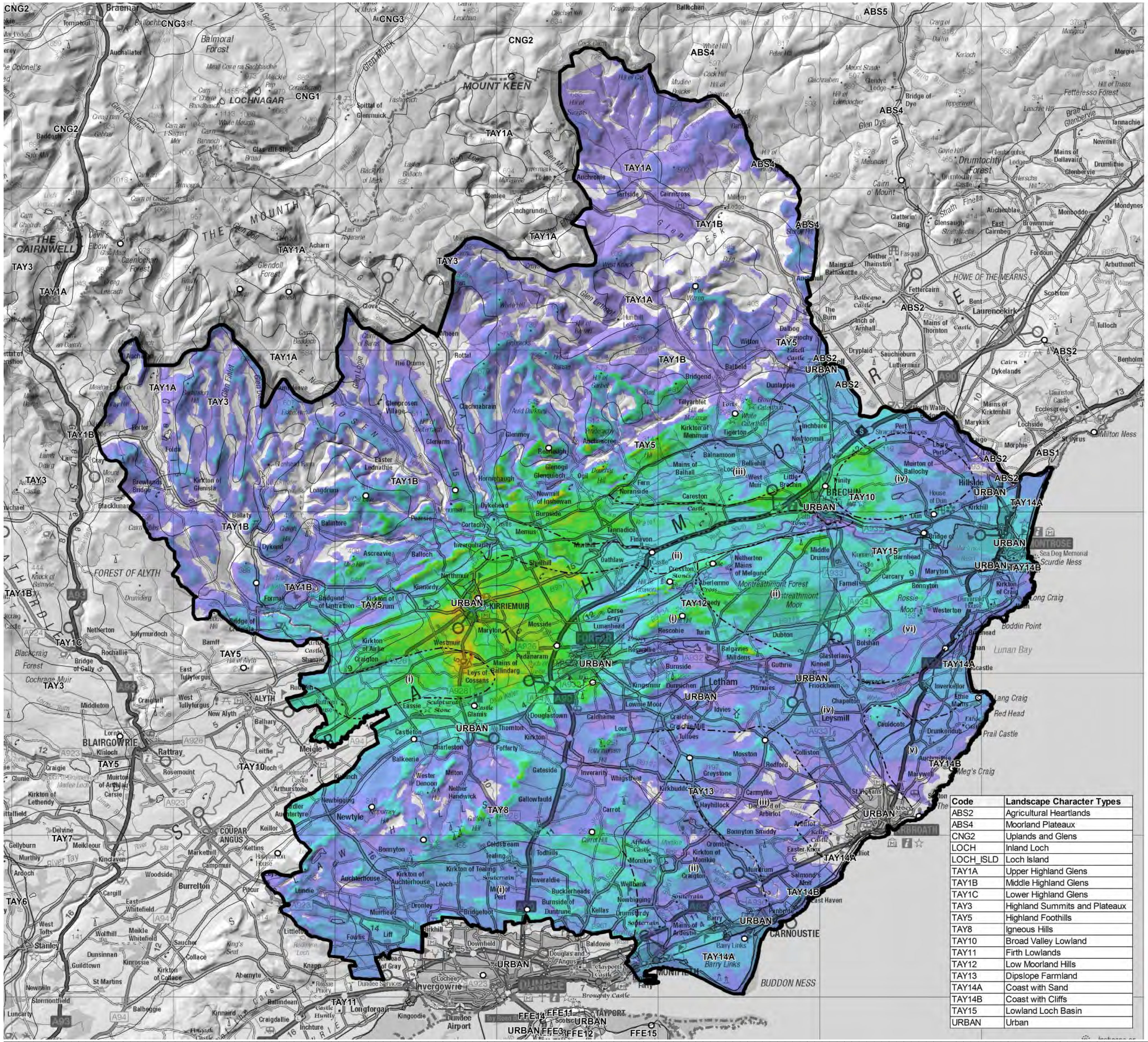
Lowest Visibility

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 4.4a

Visibility from Viewpoints
(0m high object)

N 0 2.5 5 10 Km



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

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 125

Legend

Study Area
Scottish Local Authority Boundaries
Landscape Character Areas
LCA Sub Areas (Ref. Table 6.1)

ZTV:
Highest Visibility
Lowest Visibility

Figure 4.4b

Visibility from Viewpoints
(15m high object)

N 0 2.5 5 10 Km

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 126

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

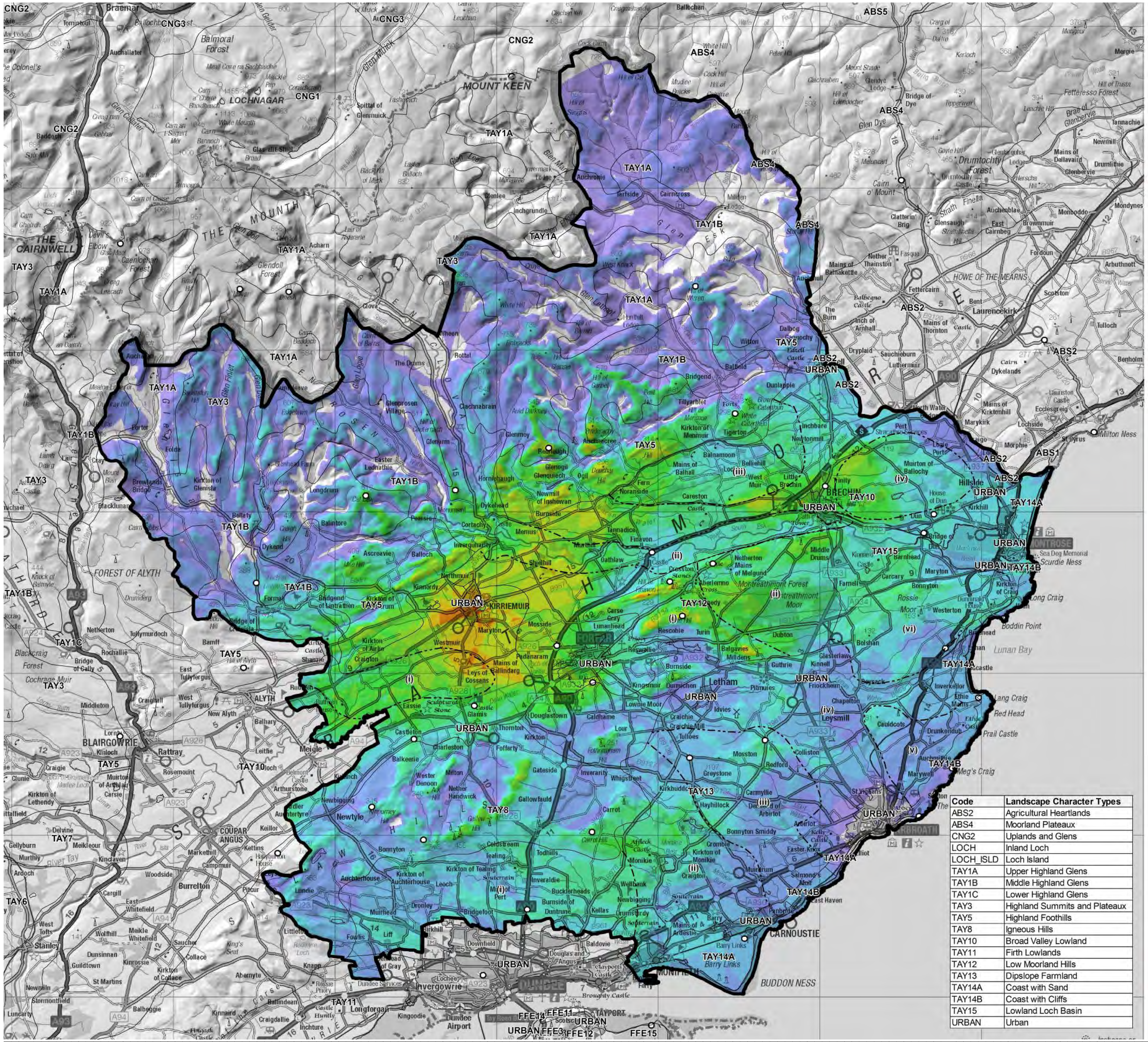
Lowest Visibility

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 4.4c

Visibility from Viewpoints
(30m high object)

N 0 2.5 5 10 Km



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

Angus Council
Wind Energy Consultancy

November 2014 7933 ANC 127

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) LCA Sub Areas (Ref. Table 6.1)

ZTV:

Highest Visibility

Lowest Visibility

Figure 4.4d

Visibility from Viewpoints (50m high object)

N

0 2.5 5 10 Km

Angus Council
Wind Energy Consultancy

March 2014 7933 ANC 128

Legend

- Study Area
- Scottish Local Authority Boundaries
- Landscape Character Areas
- (i) 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 4.4e

Visibility from Viewpoints
(80m high object)

N 0 2.5 5 10 Km

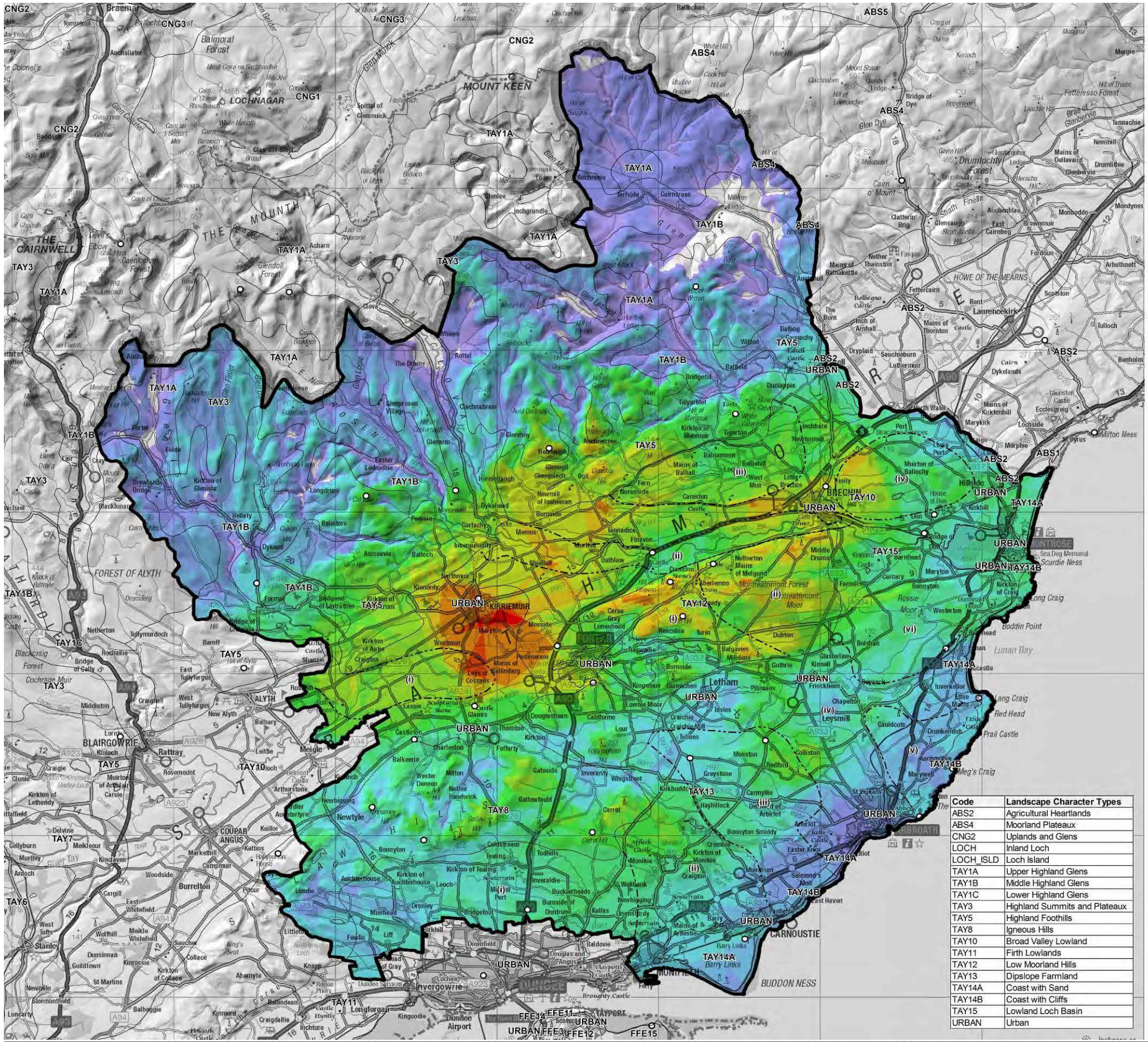


Figure 4.4f

Visibility from Viewpoints (125m high object)

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 (*SNH 2012*)
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. *E.g. Between 4 turbines over 50m and 10x2MW turbines or 6x3MW turbines*
SPP 2010 'Cutoff' 20MW		
Medium	A windfarm between 20MW and 50MW output	Windfarms up to 50MW are dealt with as local planning authority applications. *E.g. Between 7x3MW and 16x3MW turbines*
Large	Windfarms greater than 50MW output	Windfarms over 50MW are section 36 Applications dealt with by Scottish Ministers. *A minimum size of 20x2.5MW or 17x3MW turbines*
Very Large	Windfarms greater than 100MW output	*A minimum size of 50 turbines over 125m tall*

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 landscapes 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				
Neart 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
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
Afflochie 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 Ballochy, 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 Ballochy 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 SENSTIVITY 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 broadleafed 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**

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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 *Dipslope Farmland* 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**

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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 form 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**

Guidance

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Assessing the impact of small-scale wind energy proposals on the natural heritage

Version 2, June 2014

Contents

1. Introduction

We view groups of three or fewer wind turbines with an output greater than 50kW to be 'small-scale wind energy', even when the turbines themselves might be quite large. This small-scale wind energy development makes a valuable contribution to managing climate change, but as with larger wind energy development, it is important to ensure that it happens in the right places and that natural heritage impacts are minimised.

There is however a limit to the engagement SNH is able to have with individual small-scale wind energy proposals, and this will normally be restricted to proposals that require an EIA, or where a protected area is likely to be affected (see our Service Statement for Planning & Development).

This guidance aims to help applicants and planning authorities to consider the natural heritage impact of small-scale wind energy proposals without the need for direct input from SNH. The guidance seeks to promote a consistent and proportionate level of assessment, but ultimately it is for the planning authority to determine what is required. In some locations this may differ from what we suggest.

For smaller wind energy development of less than 50kW, please refer to our guidance on micro-renewables.

2. Encouraging a spatial approach to small-scale wind energy development

We strongly encourage planning authorities to plan spatially for small-scale wind energy projects. We will support this strategic work through staff engagement and capacity building. Where necessary and resources allow, we will fund specialist capacity studies if these will deliver benefits for the natural heritage. Spatial planning should build on the work done to plan for larger wind farms, with further analysis undertaken to consider how small-scale development can sit alongside them.

Given the rapidly expanding development of small-scale wind energy, good spatial planning will be critical to achieving a balance between social, economic and natural heritage objectives. The requirements for a spatial framework are set out in Scottish Planning Policy. Planning authorities should also consider the following factors in relation to small scale wind:

- the appropriate **scale** of turbines;
- design guidance in relation to **turbine form and location**;
- **cumulative impacts** on bird and landscape interests, including the interactions with larger scale wind energy

3. Assessing the impact of small-scale wind energy developments

It is the responsibility of the planning authority to clearly set out the appropriate level of assessment required to determine the risk to the natural heritage. We recommend consideration of the potential impacts on:

- Landscape;
- Protected areas;
- Protected habitats and species.

Specific considerations also apply to the construction stage and further guidance is provided below.

3.1 Landscape
Poorly located wind turbines can have a significant impact on landscape and visual/amenity interests. The impacts can be particularly significant if the turbines are too large for the receiving landscape, especially in lowland, populated landscapes where the scale of the turbines will be more apparent.

We acknowledge that a simplified form of assessment is more appropriate for small-scale development. Whilst the level of assessment required will vary depending on the sensitivity of the location of the turbines, we recommend three indicative levels of assessment based on different wind turbine heights (to blade tip) as described below.

An appropriate study area should be identified on a case-by-case basis, based on a clear rationale derived from a Zone of Theoretical Visibility (ZTV) map. Further guidance on this can be found in Visual representation of windfarms.

The height thresholds below are indicative. For example, a 100m turbine in a low sensitivity location will require less assessment than a 55m turbine in a more sensitive landscape. Therefore, the recommendations should be tailored to the height of the turbine and the sensitivity of the location. We have also published guidance on siting and design for small turbines of between 15 and 50m which will aid in the assessment process.

Although we have advised that cumulative assessment is carried out for turbines over 50m height, such information/ assessment may well be required for the smaller height categories. This should be determined by the planning authority.

The majority of proposals will require grid connection and may require wider infrastructure (such as substations, access tracks, anemometers, etc). The impact of this infrastructure should be considered as part of the assessment described below.

Recommended levels of landscape appraisal based on wind turbine heights:

> *(i) Landscape appraisal for turbines of less than 15m in height*
> For turbines of less than 15m (outwith National Scenic Areas), a formal landscape and visual impact assessment (LVIA) is less likely to be required. However, detailed information on the location and design of the proposal should be provided to the planning authority. It is then for the planning authority to determine whether any additional supporting information for the planning application is necessary. Basic ZTV studies, photomontages and/or wireline drawings may be helpful in certain locations.

(ii) Landscape appraisal for turbines of between 15m and 50m height
A basic level of LVIA is likely to be required for the planning authority. The precise detail should be agreed by the planning authority but, as a minimum, we recommend:

- a ZTV map covering an area up to 15km (radius) from the turbine/outermost turbines; and
- wireline drawings and/ or photomontages from a **limited** number of key viewpoints.

(iii) Landscape appraisal for turbines over 50m in height
For turbines of this scale, a more detailed LVIA is likely to be required. We recommend that the LVIA, as a minimum, should include:

- a ZTV map out to 20km (may need to be larger radius for very large turbines);
- visualisations and photomontages, focusing on key viewpoints. The number and location of viewpoints should be proportional to the scale of the development and the sensitivity of the location, and should be agreed with the planning authority. In most locations between 5 and 10 viewpoints should be sufficient;
- an assessment of the sensitivity of the landscape, magnitude of change and residual impacts;
- a base plan map of all other wind turbine proposals in the public domain to 20km.

The assessment should focus on the likely key landscape and visual interactions of the proposal with other constructed, consented or applied-for wind energy schemes, and other significant man-made structures within a 20km radius of the site.

In certain circumstances, for example where sequential impacts with other developments may be a key issue, it may be appropriate to extend the study area but this is less likely to be required for small developments. Our guidance on cumulative effects provides further information.

3.2 Protected areas
All developers of small-scale wind developments should undertake a basic desk study to ascertain if their proposal is likely to affect any protected area. These sites include:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) (including candidate sites), and Ramsar sites;
- Sites of Special Scientific Interest (SSSIs);
- National Nature Reserves (NNRs);
- Geological Conservation Review sites[i];
- National Scenic Areas.

The planning authority may also wish to see consideration of potential impacts on any regional/ local natural heritage designations.

The onus is on the developer to collate relevant information, conduct a preliminary assessment, and present this to the planning authority. In order to establish all potential scenarios where there could be an impact on a protected area from a development, we recommend that the developer check for all protected areas within a 20km radius of the proposal using SNHi.

It will be possible to discount any likely impacts on most protected areas that aren't in close proximity because of the separation distance and lack of ecological connectivity. The possible exceptions are:

- protected areas (notably SPAs) that are designated for birds that can forage over long distances;
- protected areas that are designated for wetland or freshwater features in the downstream catchment.

Establishing whether or not a proposal is *within* a protected area is relatively straightforward using our SNHi information service. (Note that associated infrastructure such as access roads and grid connection should also be considered.)

Determining whether or not a proposal *outwith* a protected site could affect the site requires further consideration. The key question is whether the proposal could affect the site through any ecological pathway, for example by:

- effects on species which use the protected area but move outside this area to feed or for other activities;
- noise during construction and operation;
- run-off or dust from construction works.

A Habitat Regulations Appraisal (HRA) is required where a plan or project could affect a European site. More information on HRA is available on our website. Where the proposal has a likely significant effect on a Natura site, an appropriate assessment is required and we should be consulted.

- SPAs
  For SPA bird interests, our guidance on connectivity to SPAs should be consulted as a first step in assessing the risks from proposals within 20km. Many species do not travel as far as 20km and sites designated for those species can be quickly discounted. Applicants may wish to record/present this information to the planning authority in the form of a matrix (see example in **Annex 1**).

  Our guidance on '*Assessing impacts to pink-footed and greylag geese from small-scale wind farms in Scotland'* should also be referred to in situations where small-scale wind energy proposals lie within the core foraging range from SPAs classified for these species. In most cases, using this guidance, the applicant/ planning authority should be able to conclude that there will be no likely significant effect on these SPAs.

– Freshwater SSSIs and SACs
  If the development proposal is likely to have a hydrological connection with a wetland or freshwater protected area (including riverine SSSIs or SACs) we advise that applicants provide the planning authority with an outline construction method statement (CMS) or construction environmental management plan (CEMP) showing how the works will avoid impacts. We recommend that any construction works undertaken upstream of the protected site are carried out in compliance with SEPA's Pollution Prevention Guidelines and any authorisations required under the Water Environment (Controlled Activities)(Scotland) Regulations 2005 (CAR 2005).

3.3 Protected habitats and species
We advise that the developer collates relevant information on other protected habitats and species, and presents a preliminary assessment of the potential impacts (including any proposed further survey requirements and/or mitigation) to the planning authority. This should include a desk study and a reconnaissance visit to the development site by a competent consultant.

A basic assessment will require:

– a brief description of the site, its context, and the habitats and species present;
– identification of the presence of any protected species, description of any potential impacts and any required mitigation.

The need for further assessment should be determined by the planning authority following the submission of the initial appraisal. Advice on survey effort should be sought well in advance of the planned submission of any application to ensure that sufficient time remains available to carry out any surveys that are necessary.

Information on species survey requirements and legislation can be found on our website. In some circumstances developers should consider adapting our existing guidance for large scale developments. For example see the discussion of adapting bird survey for small-scale developments at section 2.1.5 of our wind farm bird survey guidance. The assessment of existing bird data for the area may be all that is needed. Our guidance on '*Assessing impacts to pink-footed and greylag geese from small-scale wind farms in Scotland*' is also quite specific about when surveys may need to be done for these species.

We recommend that developers follow the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (2nd edition) 2012, which provides a steer on tailoring bat survey effort to the sensitivity of the site.

3.4 Impacts arising at the construction stage
The construction stage of a small-scale wind development may lead to a number of impacts on the natural heritage, depending on scale and location. It is the planning authority's responsibility to ensure that developers have adequately addressed these risks. To identify potential impacts and possible mitigation the developer should refer to 'Good practice during Windfarm Construction'. In most cases construction

effects will be manageable through appropriate design, mitigation and, where necessary, planning conditions.

4. Environmental Impact Assessment (EIA)

The planning authority has a statutory obligation to consider whether or not EIA is required for any wind energy project of more than **two** turbines or for turbines of more than **15m** to hub height. Wind energy developers should approach the planning authority for a formal opinion on whether EIA is required for each project at the earliest opportunity.

The Scottish Government has developed a useful small-scale wind energy screening checklist to help determine if an EIA is required. We encourage planning authorities to use this (or their own adapted versions). This will ensure that effects on protected areas and protected species are properly considered.

More information on EIA can be found on our website.

5. Contact us

For further information on this guidance contact **Kenny Taylor**, Scottish Natural Heritage, The Beta Centre, Innovation Park, University of Stirling, Stirling FK9 4NF.

Telephone: 01786 435387. Email: kenny.taylor@snh.gov.uk

Annex 1 – Example SPA connectivity matrix

To help assess connectivity with an SPA a simple matrix can be used. Having identified SPAs within a **20km** search radius using SNHi, these can be listed in column A along with their distance from the proposed scheme. The relevant SPA qualifying interests can then be listed in column B.

Their core foraging ranges (from our guidance on *Assessing Connectivity with Special Protection Areas (SPAs) July 2013*) can be listed in column C. If the proposal is within the core foraging range of any of the qualifying interests this can be noted in column D, and the potential impact on these can then be explored further. In many cases this will not be significant, but potentially significant effects should be assessed through this process.

A **SPA name (and distance from proposal)**	B **SPA qualifying interests**	C **Core foraging range**	D **Is the proposal within the core foraging range for any of the SPA qualifying interests?**
X SPA (8km from the proposal)	Whooper swan	5km	No
	Golden eagle	6km	No
	Osprey	10km	Yes

[i] The features of most GCRs are notified as features of SSSIs, but not all.