APPENDIX 2

DEVELOPMENT MANAGEMENT REVIEW COMMITTEE

APPLICATION FOR REVIEW

ANCILLARY DEVELOPMENT AT LAND 600M WEST OF WITTON FARM, LETHNOT, EDZELL

APPLICATION NO 14/00669/FULL

APPLICANT'S SUBMISSION

ITEM 1 Notice of Review

ITEM 2 Notice of Review Statement with Supporting Information Appended

APP1	Environment and Planning Report August 2014
APP2	Design Statement
APP3	Paragraph 182, Scottish Planning Policy
APP4	File note of meeting with Angus Council Planning – 9 February 2012
APP5	File note of meeting with Historic Scotland – 3 November 2011
APP6	Screening Opinion Response – 13 April 2012
APP7	Decision Notice – 5 February 2015
APP8	Tayside Landscape Character Assessment
APP9	Report of Handling
APP10	Strategic Landscape Capacity Assessment of Wind Energy in Angus – March 2014
APP11	Bradwell-on-Sea Public Inquiry excerpt on views
APP12	Sixpenny Wood Public Inquiry excerpt on views
APP13	North Tawton Public Inquiry excerpt on views
APP14	Enifer Downs Public Inquiry excerpt on views
APP15	Historic Scotland Consultation Response – 2 September 2014
APP16	Angus Council Archaeology Consultation Response – 1 September 2014
APP17	SNH Siting and Designing Wind Farms in the Landscape 2014
APP18	Angus Council Renewable Energy Implementation Guide 2012
APP19	Planning Application Form

County Buildings Market Street Forfar DD8 3LG

Tel: 01307 461460

Fax: 01307 461 895

Email: plnprocessing@angus.gov.uk

Applications cannot be validated until all necessary documentation has been submitted and the required fee has been paid.

Thank you for completing this application form:

ONLINE REFERENCE 000118338-001

The online ref number is the unique reference for your online form only. The Planning Authority will allocate an Application Number when your form is validated. Please quote this reference if you need to contact the Planning Authority about this application.

Applicant or Agent Details

Are you an applicant, or an agent? * (An agent is an architect, consultant or someone else acting on behalf of the applicant in connection with this application) ☐ Applicant ☑ Agent

Agent Details

Please enter Agent details

Company/Organisation:	Roddy Yarr Consulting Ltd
Ref. Number:	
First Name: *	Roddy
Last Name: *	Yarr
Telephone Number: *	07881247955
Extension Number:	
Mobile Number:	
Fax Number:	
Email Address: *	roddy@thewindfarmer.co.uk

You must enter a Building Name or Number, or both:*

Building Name:	
Building Number:	61
Address 1 (Street): *	Spottiswoode Gardens
Address 2:	
Town/City: *	St Andrews
Country: *	Scotland
Postcode: *	KY16 8SB

Is the applicant an individual or an organisation/corporate entity? *

☑ Individual ☐ Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title: *	Mr	You must enter a Building Name or Number, or both:*	
Other Title:		Building Name:	Witton Farm
First Name: *	Greg	Building Number:	
Last Name: *	Yarr	Address 1 (Street): *	Glen Lethnot
Company/Organisation:		Address 2:	
Telephone Number:		Town/City: *	Edzell
Extension Number:		Country: *	Scotland
Mobile Number:		Postcode: *	DD9 7UF
Fax Number:			
Email Address:			

Site Address Details

Planning Authority: Angus Council

Full postal address of the site (including postcode where available):

Address 1:		Address 5:	
Address 2:		Town/City/Settlement:	
Address 3:		Post Code:	
Address 4:			

Please identify/describe the location of the site or sites.

Land 600m west of Witton Farm, Lethnot, Edzell

Northing	770097	Easting	356320

Description of the Proposal

Please provide a description of the proposal to which your review relates. The description should be the same as given in the application form, or as amended with the agreement of the planning authority: *
(Max 500 characters)

Request for a Review under Section 43A(8) of the Town and Country Planning (Scotland) Act 1997 against a decision of Angus Council to refuse Planning Permission for the erection of 2 wind turbines of 50 metres to hub height and 74 metres to blade tip, temporary anemometer mast and ancillary development at land 600 metres west of Witton Farm, Lethnot, Edzell.

Type of Application

What type of application did you submit to the planning authority? *

☑ Application for planning permission (including householder application but excluding application to work minerals).

☐ Application for planning permission in principle.

☐ Further application.

☐ Application for approval of matters specified in conditions.

What does your review relate to? *

☑ Refusal Notice.

☐ Grant of permission with Conditions imposed.

☐ No decision reached within the prescribed period (two months after validation date or any agreed extension) – deemed refusal.

Statement of reasons for seeking review

You must state in full, why you are seeking a review of the planning authority's decision (or failure to make a decision). Your statement must set out all matters you consider require to be taken into account in determining your review. If necessary this can be provided as a separate document in the 'Supporting Documents' section: * (Max 500 characters)

Note: you are unlikely to have a further opportunity to add to your statement of appeal at a later date, so it is essential that you produce all of the information you want the decision-maker to take into account.

You should not however raise any new matter which was not before the planning authority at the time it decided your application (or at the time of expiry of the period of determination), unless you can demonstrate that the new matter could not have been raised before that time or that it not being raised before that time is a consequence of exceptional circumstances.

Please refer to Section 4 of attached Notice of Review Statement.

Have you raised any matters which were not before the appointed officer at the time the determination on your application was made? * ☐ Yes ☑ No

Please provide a list of all supporting documents, materials and evidence which you wish to submit with your notice of review and intend to rely on in support of your review. You can attach these documents electronically later in the process: * (Max 500 characters)

Please see Appendix 1 of attached Notice of Review Statement.

Application Details

Please provide details of the application and decision.

What is the application reference number? * 14/00669/FULL

What date was the application submitted to the planning authority? * 03/08/14

What date was the decision issued by the planning authority? * 05/02/15

Review Procedure

The Local Review Body will decide on the procedure to be used to determine your review and may at any time during the review process require that further information or representations be made to enable them to determine the review. Further information may be required by one or a combination of procedures, such as: written submissions; the holding of one or more hearing sessions and/or inspecting the land which is the subject of the review case.

Can this review continue to a conclusion, in your opinion, based on a review of the relevant information provided by yourself and other parties only, without any further procedures? For example, written submission, hearing session, site inspection. *

☐ Yes ☑ No

Please indicate what procedure (or combination of procedures) you think is most appropriate for the handling of your review. You may select more than one option if you wish the review to be conducted by a combination of procedures.

Please select a further procedure *

Inspection of the land subject of the appeal. (Further details below are not required)

Please explain in detail in your own words why this further procedure is required and the matters set out in your statement of appeal it will deal with? * (Max 500 characters)

A site inspection of the site and surrounding area is required to fully understand how the layout and design of the Proposed Wind Cluster has sought to minimise potential adverse landscape and visual impacts whilst respecting operational efficiency. It is also required to fully understand the potential landscape and visual impacts and impacts upon residential amenity that would occur.

In the event that the Local Review Body appointed to consider your application decides to inspect the site, in your opinion:

Can the site be clearly seen from a road or public land? * ☑ Yes ☐ No

Is it possible for the site to be accessed safely and without barriers to entry? * ☑ Yes ☐ No

Checklist - Application for Notice of Review

Please complete the following checklist to make sure you have provided all the necessary information in support of your appeal. Failure to submit all this information may result in your appeal being deemed invalid.

Have you provided the name and address of the applicant? * ☑ Yes ☐ No

Have you provided the date and reference number of the application which is the subject of this review? * ☑ Yes ☐ No

If you are the agent, acting on behalf of the applicant, have you provided details of your name and address and indicated whether any notice or correspondence required in connection with the review should be sent to you or the applicant? *

☑ Yes ☐ No ☐ N/A

Have you provided a statement setting out your reasons for requiring a review and by what procedure (or combination of procedures) you wish the review to be conducted? * ☑ Yes ☐ No

Note: You must state, in full, why you are seeking a review on your application. Your statement must set out all matters you consider require to be taken into account in determining your review. You may not have a further opportunity to add to your statement of review at a later date. It is therefore essential that you submit with your notice of review, all necessary information and evidence that you rely on and wish the Local Review Body to consider as part of your review.

Please attach a copy of all documents, material and evidence which you intend to rely on (e.g. plans and drawings) which are now the subject of this review * ☑ Yes ☐ No

Note: Where the review relates to a further application e.g. renewal of planning permission or modification, variation or removal of a planning condition or where it relates to an application for approval of matters specified in conditions, it is advisable to provide the application reference number, approved plans and decision notice (if any) from the earlier consent.

Declare - Notice of Review

I/We the applicant/agent certify that this is an application for review on the grounds stated.

Declaration Name:	Roddy Yarr
Declaration Date:	30/04/2015
Submission Date:	30/04/2015

Notice of Review Statement

Cairny Wind Cluster

Request for a Review under Section 43A(8) of the Town and Country Planning (Scotland) Act 1997 against a decision of Angus Council to refuse Planning Permission for the erection of 2 wind turbines of 50 metres to hub height and 74 metres to blade tip, temporary anemometer mast and ancillary development at land 600m west of Witton Farm, Lethnot, Edzell, reference 14/00669/FULL

Project Number: 8000SAP

28 April 2015

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APPENDIX 1 – INDEX OF SUPPORTING INFORMATION

1 INTRODUCTION

1.1 This Notice of Review Statement is submitted by RPS on behalf of Greg Yarr (the "**Applicant**") under Section 43A(8) of the Town and Country Planning (Scotland) Act 1997 in support of a request for a review of Angus Council's refusal for planning permission to construct, operate and then decommission a wind cluster comprising two wind turbines with a maximum blade tip height of 74 m (the "**Proposed Wind Cluster"**) on land 600m west of Witton Farm, Lethnot, Edzell (the "**Application Site**"), otherwise known as **Lower Cairny**.

1.2 The Applicant submitted an application for planning permission on the 1 April 2014. The Planning Application was given reference number 14/00669/FULL by the Council. The Planning Application was accompanied by an Environment and Planning Report ("**EPR**") **[Document APP 1]** which provided a detailed project description of the Proposed Wind Cluster and identified the planning policy and guidance context for the determination of the application. The EPR also assessed the impacts of the Proposed Wind Cluster on the environmental issues which had been raised by the Council during pre-application discussions. In addition to the EPR, the Planning Application was accompanied by a Design Statement **[Document APP 2]** which explains the rationale for the design layout of the Proposed Wind Cluster, in particular setting out how the design sought to minimise the landscape and visual impacts of the proposal.

1.3 As a local development (as defined in the Hierarchy of Development), the Planning Application was determined by the Council's appointed planning officer under delegated powers. A decision notice refusing planning permission was issued on the 5 February 2015 **[Document APP 7]**. The Applicant seeks a review of this decision for the reasons given within this Notice of Review Statement.

1.4 This Notice of Review Statement sets out the Applicant's reasons for requesting a review and the procedures by which the Applicant wishes the review to be conducted.

2 THE PROPOSED WIND CLUSTER

Site Description

2.1 The Application Site is located at Cairny, which lies on farmland approximately 600m west of Witton Farm and 5km north west of Edzell.

2.2 The Application Site comprises approximately 1.1 hectares of land which forms part of the Witton farm unit. This farm has been in the ownership of the Applicant for the last 10 years and comprises a mixture of arable and improved grassland which is used to support livestock.

2.3 The Application Site is located on land at a height of 170 to 180m above ordnance datum some 220m north of the C34 classified roadway between Edzell and Bridgend. The surrounding hills to the north west of the site range in height from 393m (Black Hill), to 634m (East Wirren) and 678m (The Wirren).

2.4 There are no nature conservation, historic environment or landscape designations within or in close proximity to the Application Site. The nearest occupied properties to the Appeal Site are located at:

- Tillydovie Cottage, located approximately 490m to the south of the site boundary and 500m from the nearest proposed turbine;
- Tillydovie Farmhouse, located approximately 600m south east of the site boundary and 620m to the nearest proposed turbine;
- Witton, located approximately 600m east of the site boundary and 720m to the nearest proposed turbine;
- Larkhall, located approximately 600m south west of the site boundary and 700m to the nearest proposed turbine; and
- Oldtown, located approximately 700m west of the site boundary and 710m to the nearest proposed turbine.

2.5 All of the above properties, with the exception of Oldtown, are in the ownership of the Applicant. In addition, a derelict and abandoned property is located at Bogton, approximately 200m north west of the site boundary and 210m to the nearest proposed turbine. Angus Council has accepted that the cottage is a ruin and uninhabitable.

The Need for the Proposed Wind Cluster

2.6 The rising cost of energy is a threat to the long term finances of the farm operation. Since 2005, energy prices have risen by an average of 12% year on year while consumption has remained

relatively steady. Energy forecasts predict a continually rising electricity price escalator into the future. In addition to the rising cost of energy, the Applicant wishes to develop the wind turbines as part of the farm's range of diversification options. This proposed development is in line with the policy requirements announced in August 2011 by Environment Minister, Richard Lochead where he notes that his vision for an Agri-Renewables Strategy will, *'ensure that land managers can benefit from the renewables revolution and unlock the green energy potential of their land'*.

2.7 In addition to seeking to secure the viability of the existing farming business, the development of the Proposed Wind Cluster will also generate economic benefits for the wider rural community.

2.8 As detailed in Chapter 12 of the EPR **[Document APP 1]**, it is estimated that the development and construction of the Proposed Wind Cluster will contribute economic benefits to the local and regional supply chain both in terms of direct and indirect benefits. The capital expenditure of several million pounds sterling and an ongoing revenue spend over a 25 year life will bring considerable benefits to the area that do not presently exist. The net benefit could be £0.8 million and 7 job years. The turbines will also directly benefit Angus Council in terms of the rateable value generated by the development.

2.9 Furthermore, the development of small scale renewable energy projects is also in accordance with Scottish Government policy. Paragraph 182 of Scottish Planning Policy **[Document APP 3]** outlines the Scottish Minister's commitment to increasing the amount of electricity generated in response to climate change as well as the need to ensure and diversify energy supplies. It identifies that Scottish Ministers have set a target of generating the equivalent of 100% of electricity demand from renewable sources by 2020.

2.10 As detailed in Chapter 2 of the EPR **[Document APP 1]**, the annual electricity generation from the Proposed Wind Cluster is estimated at approximately 4 GWh, enough to supply the annual domestic electricity needs of up to 854 homes in Angus. The land is in the ownership of the Applicant and it has a good wind resource. The Proposed Wind Cluster will therefore make a positive and valuable contribution towards both the development of Scotland's renewable energy potential and the development of a more decentralised pattern of energy generation in Angus.

The Proposed Wind Cluster

2.11 The Proposed Wind Cluster would comprise the following:

- Two variable pitch (three bladed) wind turbines, each with a maximum hub height of 50m and a maximum blade tip height of 74m;
- A crane hardstanding area adjacent to each wind turbine;
- A temporary anemometer mast;
- An upgraded and extended access track from the site entrance to the turbine locations;

- A substation and control building;
- Underground cabling linking each turbine with the substation;
- A temporary construction compound; and
- A temporary laydown area.

2.12 The installed capacity of each wind turbine will not be greater than 800 kW and the total installed capacity of the Proposed Wind Cluster will not be greater than 1.6 MW. A range of wind turbine models may be suitable for the site, and the final choice of turbine will be dependent on the wind analysis, turbine economics and available technology at the time of procurement.

2.13 It is expected that the majority of the wind turbine components would travel to the Application Site by road from Dundee harbour. The route from Dundee harbour will be likely be via the A930 Broughty Ferry Road, then the A92 Greendykes Road, A972 Kingsway East to A90 Forfar Road and trunk road A90 to B966 at Keithock and B966 to Edzell village into Lethnot Road west to site access in vicinity of Tillydovie Farm.

2.14 Approximately 200m of existing access track, currently used for access to part of the farm, will be upgraded in order to enable the construction of the proposed wind turbines. A widened bellmouth junction will also be provided onto the C34 roadway.

2.15 The power produced by the wind turbines will be fed to a substation and control building, located close to the current access track area. The proposed substation and control building will measure approximately 4.2m long x 3m wide and will provide the housing for all switchgear, metering and fault protection equipment. Cabling connecting the wind turbines to the substation is to be laid alongside the existing access tracks where practicable to minimise the environmental impact of the cable laying operation.

2.16 A temporary construction compound and a temporary laydown area, to be located to the north east of the Application Site, will be required during the construction period. The construction compound will provide space for temporary site office cabins, car parking and welfare facilities. The laydown area will provide space for materials storage. Once construction is completed the construction compound and the laydown area will both be removed and the area restored.

2.17 The Proposed Wind Cluster will require a connection to the electrical transmission network. An initial grid connection application has been made and initially agreed.

2.18 It is estimated that construction of the Proposed Wind Cluster will take approximately twelve months, including commissioning and site reinstatement. Construction activities will be carried out between the hours of 07:00 to 18:30 during week days. In the event that construction will be required outwith these hours, e.g. for delivery of abnormal loads, this would be agreed in advance with Angus Council.

2.19 The Proposed Wind Cluster is expected to operate for a period of 25 years. At the end of this period, if the operational period is not extended, the Proposed Wind Cluster will be decommissioned and the site reinstated.

2.20 A full description of the Application Site and the Proposed Wind Cluster can be found in Chapter 2 of the EPR **[Document APP 1]**.

Design Development Process

2.21 The finalised layout and design of the Proposed Wind Cluster is the result of an extensive design development process, details of which are summarised below. Discussions were held with Angus Council in February 2012 **[Document APP 4]** and with Historic Scotland **[Document APP 5]** in order to inform the size and scale of the development. The comments received in Angus Council's Screening Opinion **[Document APP 6]** were also taken on board. Full details of this design process are contained within Chapter 4 of the EPR **[Document APP 1]** and in the Design Statement **[Document APP 2]**.

2.22 A preliminary Landscape Capacity Study of the proposed site and its surroundings was undertaken to establish if the site was considered appropriate in landscape and visual terms for a wind farm development, and if so, to advise on the most appropriate scale of development and design approach to be adopted.

2.23 Whilst the capacity study concluded that the site and its surroundings had certain landscape and visual sensitivities to wind farm development, these were not considered to be of such a magnitude that they would preclude a wind farm development entirely. The study also concluded that the landscape capacity of the site was dependent on the adoption of a specific siting, layout and design strategy for the site relating to turbine numbers, heights and locations, and made recommendations on an appropriate siting and design strategy which would be required to be adopted to ensure that any potential adverse landscape and visual impacts were avoided or minimised.

2.24 The Landscape Capacity Study recognised that the role of design, in as much as it determines the visual appearance of a wind farm within the landscape and how it relates to particular characteristics and features of the landscape, is considered fundamental to the principle of capacity – how a wind farm looks within and relates to the landscape is equally, if not, more important than whether it can be seen. This approach is consistent with the guidance contained within SNH's document 'Siting and Designing Windfarms in the Landscape' 2014 **[Document APP 17]**, which reinforces the role and importance of design in the strategic siting and detailed design of wind farm developments. In relation to the Lower Cairny Wind Cluster, this design-led

approach has been fundamental to ensuring that the proposal achieves the best overall 'fit' with its landscape context, and minimised landscape and visual impacts as much as practical.

2.25 The key siting and design principles adopted for the project comprised:

- Generally, turbine base elevations/levels should be kept as low as possible within the site, to minimise their overall spread of visibility within the surrounding area, to maximise the potential screening effect of the eastern Caterthun ridgeline to the south and to create a better relationship with the 'lowland' landscape of the adjacent improved farmlands rather than appearing as part of the more visually sensitive upland landscape
- Scale of turbines should be restricted to medium – medium/large in order to relate to the medium scale of the surrounding landscape, as described in the Strategic Landscape Capacity Assessment for Wind Energy in Angus (SLCWE) **[Document APP 10]**, and to achieve an appropriate scale relationship and avoid the scale of the turbines dominating the landscape
- Consider the detailed appearance of the turbine layout in views from the key viewpoints of Brown and White Caterthun, to achieve a simple clarity of visual composition and balanced spacing between turbines
- The combination of turbine layout and height should aim to avoid visibility from the Edzell Castle Garden and Designed Landscape.
- Detailed turbine layout and arrangement should attempt to follow existing contour levels as much as possible, so that the turbines appear at a similar height and level on the site when seen within key views

2.26 A series of alternative design layouts were developed using different turbine heights and the site constraints mapping which sought to meet the siting and design principles, in order to establish the most appropriate scale and number of turbines for the site. This process, which was primarily led by landscape and visual considerations, concluded that a 2 x 74m turbine option represented the optimum balance of generating output whilst relating well to the landscape and visual context and minimising potential landscape and visual impacts, and achieved the best overall balance of considerations.

2.27 Consideration of landscape capacity issues have influenced the strategic approach to the design development of the Proposed Wind Cluster layout and landscape and visual issues have been at the forefront of the design development process, seeking to establish a layout of an appropriate scale to its landscape and visual context, avoid or minimise potential visibility from the surrounding area and establish balanced visual compositions of turbines when seen from the key local viewpoints, specifically Brown Caterthun.

3 REASONS FOR REFUSAL

3.1 The Decision Notice **[Document APP 7]** dated 5th February 2015 refused Planning Permission for the Proposed Wind Cluster on the following grounds:-

1. That the proposed turbines by virtue of their height and location would result in unacceptable landscape and visual impacts and accordingly the siting and appearance of the turbine has not been chosen to minimise impact on amenity. As such the proposal is contrary to Policy 3 of TAYplan and policies ER5, ER34, and S6 of the Angus Local Plan Review 2009.

2. That the proposed turbines by virtue of their height and proximity to the Caterthun Hillforts would have an adverse and unacceptable impact on the setting of a Scheduled Ancient Monument. As such, the proposal is contrary to Policy 3 of TAYplan and Policies ER18 and ER34 of the Angus Local Plan Review 2009.

4 REASONS FOR SEEKING A REVIEW

4.1 This section outlines the Applicant's reasons for seeking a review. The following section provides detailed support for each of these reasons.

1. The Proposed Wind Cluster would not result in any unacceptable adverse landscape and visual impacts or impacts upon residential visual amenity as a result of the successful attention given to the location, scale and design of the Proposed Wind Cluster.

2. The Proposed Wind Cluster would not have an adverse and unacceptable impact on the setting of the Caterthun Hillforts Scheduled Ancient Monument.

3. The Proposed Wind Cluster complies with all Development Plan policies and material considerations relevant to the determination of this review.

5 NOTICE OF REVIEW STATEMENT

Reason 1 – Landscape Impacts, Visual Impact and Residential Visual Amenity

Landscape Impacts

5.1 The Application Site is located within the Highland Foothills Landscape Character Type (LCT) as defined in the Tayside Land Character Assessment (TLCA) **[Document APP 8]**. The Report of Handling (ROH) **[Document APP 9]** contends that the development of wind turbines within this landscape character type would conflict with the small scale, historic and deeply rural character of the landscape. It also submits that the development of the proposed turbines in this landscape would weaken and confuse the area's role in providing a transition from the unsettled uplands to the fertile and settled lowland.

5.2 The Applicant disagrees with this conclusion and submits that the proposal is consistent with the TLCA guidance. The proposed turbines have been kept low within the site, avoiding the more visually sensitive elevated slopes above the site and closer to the more settled lowland landscape of Angus. In mid-distance views from the Howe of the Mearns, the turbines would be fully backclothed by higher ground behind, and therefore avoid sensitive skyline profiles.

5.3 Additionally, the Council's Renewable Energy Implementation Guide **[Document APP 18]** indicates that the Highland Foothills LCT provides a dramatic transition between highland and lowland. The Implementation Guide considers that in order to avoid the risk of turbines adversely affecting perceived scale in this LCT, 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. The proposal is entirely consistent with the Councils guidance, given that:

- The turbines are proposed at 74m to blade tip height, which is below the 80m height limit
- The turbines are located on the lower ground of the LCT, around 180m AOD
- The proposal would have no theoretical visibility at Airlie Monument, and would not affect its setting
- Historic Scotland **[Document APP 15]** consider that any impact on the setting of the White and Brown Caterthuns would be limited and localised.

5.4 Consequently, given these factors, it is not considered that the proposed turbines would weaken and confuse the areas transitional role between uplands and lowlands.

5.5 The Application Site lies in the Highland Foothills LCT within the Edzell Foothills Landscape Character Area (LCA) as defined in the Strategic Landscape Capacity Assessment for Wind Energy in Angus (SLCWE) **[Document APP 10]**. The ROH identifies that the SLCWE advises that the Edzell Foothills LCA is only suitable for turbines below 50m. The ROH also identifies

that the SLCWE advises that the height of turbines should relate to the vertical scale of the hills and that larger turbines should be located away from the smaller scale hills to avoid diminishing the apparent scale of the slopes. The ROH considers that the scale and location of the Proposed Wind Cluster conflicts with the apparent scale of the slopes and would result in the turbines becoming dominant gateway features at the lower end of Glen Lethnot. It therefore concludes that the Proposed Wind Cluster is not in accordance with the guidance in the SLCWE and on this basis concludes that there would be an unacceptable impact on the landscape character of Glen Lethnot and its setting.

5.6 The Applicant disagrees with this conclusion. In order to initially clarify use of particular landscape character references in the ROH, the Applicant submits that the SLCWE only refers to Glen Lethnot as part of the Upper Highland Glens LCT, and calls the lower part West Water Valley, rather than Glen Lethnot. Glen Lethnot is identified on the OS mapping as north of Waterhead, and might only reasonably be considered to extend as far south as Bridgend, where it becomes the West Water Valley. So the Council's comments within the ROH are inconsistent in terms of landscape character references to those adopted within their own SLCWE, and consequently present a considerable degree of confusion between the landscape characteristics of the Highland Foothills, Upper Highland Glens and Mid Highland Glens LCTs.

5.7 It is important to recognise that the small geographic extent of the Edzell Foothills LCA obviously limits the overall topographic range which occurs within the LCA, specifically as the LCA predominantly comprises of Hill of Edzell. The design development of the proposal has therefore given consideration to the wider topographic context within which the Edzell Foothills are experienced in determining an appropriate scale of turbine for the site and its surroundings. Consequently, it is considered that the proposed turbines do not 'visually dominate or overwhelm' the scale of the hill slopes on which they are located and which are seen within the context of the higher adjacent hills to the north.

5.8 Additionally, the inter-relationship between the LCA and the surrounding LCTs/LCAs is such that the LCA is not seen in isolation but as part of a wider and more extensive landscape continuum extending from the lowland agricultural landscape of Strathmore to the open upland summits. The LCA is therefore predominantly seen and experienced in visual combination with these larger scale surrounding LCTs, with the Highland Summits and Plateaux LCT forming a higher and more extensive backdrop to the lower, smaller scale foothills. Consequently, the proposed turbines would not be seen purely in visual relationship with the LCA but within part of a wider landscape context, where their scale would be more readily absorbed in relation to the surrounding larger scale landscapes.

5.9 Given that the Application Site is located on the higher ground above the West Water Valley, with a more open character and where the landscape scale described in the SLCWE is medium, it is considered that the scale of the proposed turbines at 74m, which is classified as medium/large in accordance with the SLCWE categories provide an appropriate scale relationship with the surrounding landscape. The hills immediately to the north of the site, and

against which the proposed turbines would be predominantly seen, rise to over 600m, and are considerably higher and of greater scale than those to the south. This appreciation of the topographic scale of the context of the site is important in understanding the site's relationship to the relative scale of the surrounding landscape, how this relates to the scale of turbine proposed and in understanding the sympathetic and considered design development work which has been carried out in order to relate the scale and design of the proposal to its context to avoid and minimise landscape and visual impacts. In the large majority of views, the turbines will be set well below the skyline and would be fully backclothed. The proposed turbines would not diminish the scale of the adjacent hills to the north, due to their limited height, small number and location set well down below the upper ridgelines, and these hills would remain the physically and visually dominant feature in views from the surrounding area. The location of the site in both the Highland Foothills LCT and the Edzell Foothills provides a clear indication of its key landscape characteristics and scale which differentiate it from the adjacent West Water Valley. Consequently, it is considered that there is a close correlation of scale relationship between the proposed turbines and the landscape in which they are located.

5.10 In reference to the so-called 'Gateway' to the Glen, the Zone of Theoretical Visibility (ZTV) submitted with the EPR indicates that following the minor road westwards from Edzell, at what might be classed as the 'gateway' to the glen, there is no or little visibility, and visibility only becomes more available once you have passed Edzell Hill and then more so beyond Margie. Additionally, such is the steep-sided meandering nature of the river valley and the road network that views are often very localised, constrained by the rolling contours and sinuous character of the valley and its wooded lower slopes, which further restricts views of the proposed turbines until in close proximity. The turbines will only break the skyline in very close distance views from immediately below the level of the turbines, as with any close proximity views to wind turbines. At Bridgend, it might be argued that you are entering the gateway to the Glen Lethnot itself, and when travelling northwards into the glen, the turbines would be peripheral in views for a short duration before becoming no longer visible within the glen itself. The Applicant therefore disagrees that there would be an unacceptable impact on the landscape character of Glen Lethnot and its setting.

5.11 Finally, the ROH contends that the size of the proposed turbines would replace the Caterthuns as the dominant landscape feature, resulting in significant and unacceptable landscape impacts upon localised areas of lower Glen Lethnot.

5.12 The Applicant disagrees with this conclusion and quotes from the consultation response on this issue from Historic Scotland **[Document APP 15]**, Scottish Governments advisors on national heritage issues. Their response states "….due to their proposed location and design, the turbines will not challenge the monument for dominance within its setting, will not interrupt any obvious key views of the monument from the surrounding area, and will not disrupt any perceived relationships between The Caterthuns and other monuments or landscape features in the vicinity." Given such a clear and unambiguous statement on this issue by Historic Scotland,

based on their experience and detailed understanding of the Caterthun monument and its historical and current relationship with its surroundings and landscape context, the Applicant fails to understand why the Council has refused to accept their consultation advice and submits that any impacts cannot be considered to be significant and unacceptable.

5.13 Taking the above considerations and conclusions into account, it is submitted that:

- The Proposed Wind Cluster would not conflict with the objectives of Policy S3 of the TAYplan which, amongst other matters, seeks to protect the regional distinctiveness and scenic value of the TAYplan area through safeguarding landscapes.
- The Proposed Wind Cluster would not conflict with the objectives of Policy ER34 of the Angus Local Plan which provides that renewable energy developments will be supported where, amongst other matters, there will be no unacceptable landscape impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints.
- The Proposed Wind Cluster would not conflict with the objectives of Policies ER5 and S6 of the Angus Local Plan Review which provides that development proposals should have regard to the landscape character of the local area as set out in the TLCA.
- The Proposed Wind Cluster would not conflict with the guidance for the landscape character area of the Application Site provided in the SLCWE or within the Council's Implementation Guide.

Visual Impact

5.14 The ROH, whist accepting that the topography of the surrounding landscape considerably reduces the visual impacts of the proposed turbines, considers that the proposed turbines would be prominent and visually dominant within the lower part of Glen Lethnot. Although not explicitly stated in the ROH, it implies that this perceived local visual impact would be unacceptable and would justify refusal of the application.

5.15 The Applicant disagrees with this conclusion and submits that the Caterthuns would remain the visually dominant feature in views form the West Water Valley. Views from north of Bridgend in Glen Lethnot would be unaffected, as the proposed turbines would not be visible within these views. In terms of general views towards the Caterthuns, the landscape scale of the Caterthuns and its associated hills of the Menmuir Ridge would remain the key visually dominant feature of views. The turbines would be of a minor size and scale compared to the key features of the Caterthuns, and there would be a sufficiently large extent of open space both horizontally and vertically between the turbines and the Caterthuns so that direct scale comparisons would be unlikely to occur. Whilst the proposed turbines would be visually prominent in close proximity, resulting in some locally significant adverse impacts, it is widely recognised that all wind energy projects are likely to have some significant adverse visual effects as recognised in national guidance. The siting and design approach has minimised these to the immediate local area in

compliance with Angus Council planning guidance, and consequently it is considered that these effects are not considered to be unacceptable.

5.16 The ROH also identifies that the proposed turbines would be visually prominent and significant in views from the summit of the Caterthuns, and notes that these viewpoints are a popular visitor attraction. Again, the ROH implies that this visual impact on visitors to the summit of the Caterthuns would be unacceptable and again justifies refusal of the application.

5.17 The Applicant disagrees with this conclusion. Whilst the LVIA concludes that the proposal would result in moderate adverse visual impacts on views from the summits of Brown and White Caterthun, and which therefore would be classed as significant, it is submitted that significant effects are not necessarily considered to be unacceptable. Considerable design development work, in consultation with Historic Scotland, was undertaken using the Brown Caterthun viewpoint, to establish a proposal in terms of turbine numbers, heights, layout and location which aimed to meet a series of design objectives. These objectives for the view from the summit of Brown Caterthun, and which are consistent with SNH guidance on the siting and design of windfarms, were:

- The proposed turbines should not compete with the scale and mass of the Hill of Wirren within the view;
- The proposed turbines should be fully backclothed and should not compete with the skyline profile;
- The proposed turbines should appear as a simple, visually balanced composition and should be well related to the landscape pattern of the valley hillside.

5.18 It is considered that the proposal has achieved these design objectives. The turbines would be of a minor vertical scale to their key backdrop of the hills to the north. Equally, the turbines would be of a significantly reduced horizontal scale in relation to the hill sides which define the valley of the West Water, ensuring that the horizontal scale of these hillsides remains the dominant landscape feature of this area. Additionally, it is important to note that the key view direction from the summits of The Caterthuns is considered to be towards Strathmore and the coast, and not towards the Application Site, so the introduction of the proposed turbines would not impact on this direction of view. Consequently, it is considered that any impacts on views from The Caterthuns would not be unacceptable.

5.19 Taking the above considerations and conclusions into account, it is submitted that:

- The Proposed Wind Cluster would not conflict with the objectives of Policy ER34 of the Angus Local Plan Review which provides that renewable energy developments will be supported where, amongst other matters, there will be no unacceptable visual impacts.

Residential Amenity

5.20 The ROH's conclusion that the Proposed Wind Farm will result in unacceptable impacts upon residential amenity is wholly based upon the perceived visual impacts of the proposal on those residential properties within 2 km of the proposed turbines. The ROH considers that the Proposed Wind Farm would result in significant visual impacts (in EIA terms) on Oldtown Cottage, Larkhall, Tillydovie Farmhouse and Tillydovie (new house), and concludes that these perceived significant visual impacts amount to unacceptable impacts on residential amenity. There is no explanation provided as to what it is about the nature of these significant adverse visual effects that has led the ROH to come to the view that they amount to unacceptable impacts upon residential amenity.

5.21 For example, the view from Larkhall towards the turbine site is almost completely obscured by the trees surrounding the rear of the property (see photo below). The trees are a mix of tall evergreen pine species and deciduous ash and birch trees. In addition, the windows that look onto the site at Larkhall consist of frosted glass from a bathroom and 3 very small Utility/Store windows. The ROH refers to the hedging being 'low'. This image below clearly shows that the hedging is high enough to obscure the hill where the turbines would be located. The ROH is mistaken in claiming that there would be any loss of amenity.

Larkhall – view from back door. Property is surrounded by relatively high evergreen Leylandii and Larch hedging. Site is directly behind tall Leylandii hedging which obscures the view.

Larkhall – view into property from direction of site. Note evergreen hedging obscures expansive views.

5.22 Similarly at Tillydovie Cottage, the view towards the site is immediately obscured by the tenant's sheds which obscure any potential view of the turbines. The tenant has planted a mixed evergreen tall hedge to obscure the surrounding views from this property which are of the farmyard industrial buildings and a silage store. The ROH is mistaken in claiming that there would be any loss of amenity.

Tillydovie Cottage – view into property from direction of site. Note how views are obscured by tenant's sheds and no windows are visible.

Tillydovie Cottage. Note how views are obscured by tenant's sheds.

Tillydovie – view from property is of industrial farmyard that obscures any views of the site. Tillydovie Cottage is located in the middle distance and is surrounded by high Leylandii hedging.

5.23 At Oldtown, the ROH notes that the house sits at right angles to the site with views to the coast and Glen Lethnot to the east and north east. The ROH also notes that, "the convex landform between the house and the proposed turbines would provide a level of screening, but it is anticipated that a large part of the turbines would be prominent in views down the glen." It has already been established in the EPR that Glen Lethnot really begins at Bridgend, located to the east and north east of the site, not to the west of the site, so the ROH is mistaken when it refers to western views down the Glen to the west. It has also already been established in the EPR that Oldtown is surrounded by walls which further limit views to the west from the property.

5.24 It is a long established principle of planning law that there is no "right to a view" per se. In general, the outlook from a private property is a private interest and not a public one to be protected by the planning system. However, where the degree of harm to the amenity of local residents is so severe, it is acknowledged that the impact may be a material planning consideration when deciding whether planning permission should be granted. Although there is no guidance quantifying what levels of visual impact are deemed to be so severe that they harm the amenity of local residents, several Planning Inspectors have provided recent clarification on this matter as discussed in paragraphs 5.20 to 5.25 below.

5.25 At the Inquiry for the Npower Renewables Limited 10 turbine wind farm at Bradwell-on-Sea in Essex (APP/X1545/A/06/2023805) **[Document APP 11]**, the Planning Inspector concluded that:

> "*It is a well-established planning principle that there is no right to retain unchanged a view from private property. However it can be in the public interest to safeguard the outlook from such a property in respect of unacceptably overbearing or dominating development*."

5.26 At the Inquiry for the Sixpenny Wood Limited 10 turbine wind farm at Sixpenny Wood, East Riding of Yorkshire (APP/E2001/A/09/2101851) **[Document APP 12]**, the Planning Inspector concluded that:

> "*There is no right to a view per se, and any assessment of visual intrusion leading to a finding of material harm must therefore involve extra factors such as undue obtrusiveness, or an overbearing impact, leading to a diminution of conditions at the relevant property to an unacceptable degree*."

5.27 Perhaps the two most pertinent appeals at which the issue of impact on visual amenity of living conditions has been considered are the North Tawton Public Inquiry (APP/Q/153/A/08/2017162) **[Document APP 13]** and the Enifer Downs Public Inquiry (APP/X22201/A/08/2071880) **{Document APP 14]**.

5.28 Paragraph 21 of the North Tawton decision states:

> "*.... it may be the case that development is proposed of such a scale and design or proximity that it would be so visually intrusive as to turn an otherwise satisfactory dwelling into one that is an unsatisfactory place in which to live. That would compromise the aim of ensuring that*

everyone has the opportunity of a decent home. From the standpoint of those affected, this is a different test than simply judging whether the view would be significantly affected or not, because (as with non-visual impacts, such as noise and un-neighbourliness in general) it is the resulting adequacy of living conditions within dwellings and their gardens that is determinative, not the view in itself. In essence, being able to see the turbines is one thing but not, in itself, sufficient to demonstrate unacceptable harm in a land use planning context.

Indeed, to adopt visibility alone as the decisive criterion would potentially represent an arbitrary and unduly stringent restraint on development of many kinds in many locations."

5.29 Paragraph 66 of the Enifer Downs Public Inquiry the decision notice states:

"*... when turbines are present in such number, size and proximity that they represent an unpleasantly overwhelming and unavoidable presence in main views from a house or garden, there is every likelihood that the property concerned would become widely regarded as an unattractive and thus unsatisfactory (but not necessarily uninhabitable) place in which to live*."

5.30 On the basis of the decisions noted above, the Applicant submits that visual impacts should only be deemed to result in unacceptable impacts upon residential amenity when the change in view would result in:

"*...unacceptable overbearing or oppressive effects on nearby dwellings that would adversely affect the living conditions of occupiers*." (Paragraph 215, Appeal decision APP/F2415/A/09/2096369 dated 9 October 2009 for Land to the North East of Swinford).

5.31 As a result, the Applicant contends that these sorts of effects would not arise in the proposed development at Cairny.

5.32 The Applicant acknowledges that there would be likely to be potential for significant adverse visual impacts on the properties at Margie and Newbigging, but contends that the overall impression of the proposal would not result in an overbearing presence and visual dominance on these properties, so as to render them as unattractive places to live. Such impacts would be no greater than those which would be expected to occur for a development of this nature at distances of 1-1.5km.

5.33 At Margie, 1km to the east of the site boundary, the views from the principle rooms are away from and not towards the Application Site. Tree belts along the minor burn to the west of the property will provide some degree of intervening screening of views from the garden areas, such that the proposed turbines would not form a noticeable intrusion nor have an overbearing effect on users of these areas.

5.34 At Newbigging, located 1.5km west south west of the site, the principle views are to the south east, away from the Application Site. Some rooms at the rear of the property look eastwards. There would be visibility from the garden areas and lane to the immediate east/south of the house

but intervening woodland will provide some degree of screening, such that the proposed turbines would not form a dominant intrusion into these views.

5.35 Additionally, an assessment of the potential visual impact on other residential properties within a 2km radius of the Application site was undertaken, and concluded that all of these properties predominantly face west, south west or south, away from the direction of the Proposed Wind Cluster, and associated buildings and/or boundary vegetation would limit views towards the development. Any visual impacts on these properties would be slight or no effect, with their primary views being unaffected, and their overall visual amenity would not be significantly adversely affected.

5.36 Consequently, the Applicant disagrees with the conclusions in the ROH, and submits that the proposed turbines would not be so dominant or overbearing from any of these properties so as to render them unattractive places to live, and consequently that their residential amenity would not be significantly adversely affected and that there would be no unacceptable effects on residential visual amenity as a result of the proposal. It should be noted that many of these properties are owned by the Applicant and occupied by the Applicant's family, namely Witton, Larkhall, Bogton, Tillydovie Cottage, Tillydovie Farmhouse and Tillydovie (New House). None of the occupants of the properties surrounding the development have raised objections to the application.

5.37 As well as the visual impact, wind turbines may also have impacts on individual dwellings due to noise, shadow flicker and reflected light. These matters are fully addressed in the EPR and deemed to be acceptable at all residential properties. This conclusion is supported in the ROH.

5.38 Taking the above considerations and conclusions into account, it is submitted that:

- The Proposed Wind Cluster would not conflict with the objectives of Policy ER34 of the Angus Local Plan Review which provides that renewable energy developments will be supported where, amongst other matters, their siting and appearance have been chosen to minimise the impact on amenity whilst respecting operational efficiency.

Reason 2 – Impact on the setting of the Caterthuns Hillforts Scheduled Ancient Monument

5.39 The ROH identifies that the Proposed Wind Cluster will have an adverse impact on the setting of the Caterthuns Hillforts Scheduled Monument and concludes that this adverse impact is sufficient to warrant refusal of the application. The Applicant submits that this conclusion in unreasonable, since it is accepted in planning law that adverse effects in themselves are not a sufficient reason for refusal.

5.40 The Applicant also fails to understand why the Council has refused to accept the conclusions from Historic Scotland in their consultation response **[Document APP 15]** on the impacts of the Proposed Wind Cluster on the setting of the Scheduled Monument. This conclusion states that:

"*The wind farm will have an impact on the setting of the scheduled monument known as The Caterthuns, hillforts. However, due to their proposed location and design, the turbines will not challenge the monument for dominance within its setting, will not interrupt any obvious key views of the monument from the surrounding area, and will not disrupt any perceived relationships between The Caterthuns and other monuments or landscape features in the vicinity. The turbines will be visually obvious from The Caterthuns but will not fundamentally disrupt the relationship between the forts themselves, or the relationship between the forts on their hill summits and the low-lying fertile land which they dominate.*

As a result, while we acknowledge an impact on the setting of the monument, we consider that impact to be limited and localised. Consequently, we do not consider the proposed development will adversely affect the way in which this monument is understood, appreciated and experienced to such an extent that issues of national significance are involved."

5.41 The Applicant is in agreement with Historic Scotland's conclusion, this conclusion being similar to that assessed within the EPR. On the basis that the impacts on the setting of the Caterthuns Scheduled Monument will be limited and localised, the Applicant submits that these impacts are deemed to be acceptable.

5.42 However, the ROH appears to imply that theses limited and localised impacts on the setting are unacceptable and warrant sufficient grounds for refusal. As with visual amenity, again there is no explanation provided in the ROH about what it is about these impacts that the led the ROH to come to the view that they are unacceptable.

5.43 The Applicant acknowledges that the impact on the landscape setting of designated assets is the responsibility of the planning authority to protect. However Aberdeenshire Archaeology Service, which provides advice on this matter to Angus Council, has confirmed that that they have no objection to the Proposed Wind Cluster **[Document APP 16]**. On this basis, and in light of the Historic Scotland response, it is concluded that there is no justification for the ROH's conclusion that the impact of the Proposed Wind Cluster on the setting of the Caterthuns Scheduled Monument is unacceptable.

5.44 Taking the above considerations and conclusions into account, it is submitted that:

- The Proposed Wind Cluster would not conflict with the objectives of Policy 3 of the TAYplan which, amongst other matters, seeks to protect the regional distinctiveness and scenic value of the TAYplan area through safeguarding historic buildings and monuments.
- The Proposed Wind Cluster would not conflict with the objectives of Policy ER34 of the Angus Local Plan Review which provides that renewable energy developments will be supported where, amongst other matters, there will be no unacceptable detrimental effect on sites designated for historic or archaeological reasons.

- The Proposed Wind Cluster would not conflict with the objectives of Policy ER18 of the Angus Local Plan Review which provides that development proposals will not be permitted that will result in damage to a scheduled monument or the integrity of its setting.

Reason 3 – Development Plan Policies and Relevant Material Considerations

5.45 For the reasons set out in detail in the EPR **[Document APP 1]** and in this Notice of Review Statement, it is considered that the Proposed Wind Cluster complies with all Development Plan policies and material considerations relevant to the determination of this review. Compliance with the key Development Plan policies and material considerations relevant to the determination of this appeal are summarised in the table below.

Policy	Comment
Policy 3D : Natural and Historic Assets and Policy ER5 : Conservation of Landscape Character TAYplan Policy 3 seeks amongst other things to safeguard landscapes and to allow development where it does not adversely impact on or preferably enhances the asset. Local Plan Policy ER5 (Conservation of Landscape Character) requires development proposals to take account of the guidance provided by the Tayside Landscape Character Assessment (TLCA), prepared for Scottish Natural Heritage (SNH) in 1999, and indicates that, where appropriate, sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape. Policy ER34 of the Local Plan indicates that proposals for renewable energy development will be assessed on the basis of no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints. The Tayside Landscape Character Assessment (TLCA) identifies that the application site lies within the "Highland Foothills Landscape Character Type' (LCT). This LCT marks the transition of the Mounth Highlands to the lowland of Strathmore. The complex geology of this area is said to lead to a landscape of steep whale-backed hills with intervening valleys, generally oriented on an east west axis. In this LCT, the hills in the east are most distinct and in the west between Dunkeld and Blairgowrie they are less well defined. The TLCA describes forces for change in this LCT. In respect of tall structures, the TLCA indicates that the Highland Foothills LCT is comparatively free from tall structures with the exception of the high voltage overhead electricity line which climbs in the foothills near Airlie before running	The landscape and visual sensitivity of the proposed site location as part of a complex transitional landscape has been recognised in the detailed landscape capacity and design work undertaken in developing the proposal. TAYplan Policy 3D notes that the TLCA acknowledges 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. The design and layout work carried out as part of this application has reflected that opinion. The TLCA notes the presence of the high voltage pylons that are present. Generally, the proposal site does not comprise a prominent feature within the overall landscape but forms a small part of a more extensive, both horizontally and vertically, area of hills which form the important visual backdrop to the settled lowlands of the Howe of the Mearns. Detailed consideration of the turbine height, layout and elevation has sought to minimise any adverse impacts on the Highland Boundary Fault, in order to protect the visual integrity of the central 'core' area of higher hill summits and the wider skyline profile of hill slopes along the fringe of the *Highland* landscape region when viewed from Strathmore. As such, it is considered that the proposal site has the landscape capacity to accommodate the scale of development proposed. The design approach of siting the proposed turbines at a low elevation, where they would be more directly related to the surrounding agricultural landscape rather than to the upland moorland, and where they would avoid compromising the important skyline profile of the Highland Boundary Fault, has been a key factor in establishing a layout of an appropriate scale to its landscape and visual context, and demonstrates that some limited and considered wind energy development can be accommodated with the *Edzell Foothills* LCA. The proposed turbines would not affect the 'striking contrast' between highlands and lowlands. They would appear as a small-scale element located low on the hill slopes of the Highland Boundary Fault, subservient to the larger scale and visual prominence of the hills. The visual separation between

Policy	Comment
north east through the hills. The TLCA acknowledges 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. **Policy ER5 : Conservation of Landscape Character** Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria: (a) sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape; (b) where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting; (c) new buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development; (d) priority should be given to locating new development in towns, villages or building groups in preference to isolated development	the proposed turbines and the skyline profile would ensure that the important skyline remains intact and undeveloped. The proposed wind cluster comprises of two turbines and therefore is categorized as a small development. Although the proposed turbines fall within the medium/large scale category, the proposed development is not considered to constitute a significant development. Location on the 'prominently visible backdrop to the lowlands' does not necessarily result in a very significant or significant (landscape and visual) effect. Assessment of selected viewpoints within the surrounding lowlands indicates that the proposed turbines would have limited overall visual impact on these, and where any visual impacts would be of a minor, and not significant, nature. The proposal for two turbines continues the current size pattern of wind energy developments in the highland areas, although they would be of a medium/large scale. Detailed landscape capacity work indicates that the proposal site and its surroundings have the capacity to accept the scale of turbines proposed. The proposal site is not located in the highest area of the Highland landscape area, but on the much lower lying periphery close to the boundary with the adjacent lowland agricultural landscape.
Policy S3 : Design Quality A high quality of design is encouraged in all development proposals. In considering proposals the following factors will be taken into account:- • site location and how the development fits with the local landscape character and pattern of development; • proposed site layout and the scale, massing, height, proportions and density of the development including consideration of the relationship with the existing character of the surrounding area and neighbouring buildings; • use of materials, textures and colours that are sensitive to the surrounding area; and • the incorporation of key views into and out of the development.	The proposal is for a rural energy development which meets the need for a countryside location. The design development process adopted for the proposal sought to establish a layout of an appropriate scale to its landscape and visual context; establish a layout and design that avoids or minimise potential visibility from the surrounding area; and establish a balanced visual composition of turbines when seen from key local viewpoints. As a result of this extensive design development process it is considered that the layout and design of the Proposed Wind Cluster is in accordance with Policy S3. The EPR [Document APP 1] demonstrates that the landscape and visual impacts of the Proposed Wind Cluster will not result in any unacceptable adverse impacts on landscape character. In relation to **cumulative effects**, no unacceptable cumulative effects are predicted to occur. The Council's Planning Service supports this conclusion. This criterion is therefore met.
Policy S6 : Development Principles (Schedule 1) Proposals for development should where appropriate have regard to the relevant principles set out in Schedule 1 which includes reference to amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information.	In relation to **residential amenity**, the EPR demonstrates that no unacceptable noise or shadow flicker effects are predicted. In the ROH, **[Document APP 6],** the Environmental Health and Roads Services have raised no concerns regarding such impacts. The Council's Planning Service considers that there are not any unacceptable amenity impacts from noise, shadow

Policy	Comment
Schedule 1 : Development Principles Amenity (a) The amenity of proposed and existing properties should not be affected by unreasonable restriction of sunlight, daylight or privacy; by smells or fumes; noise levels and vibration; emissions including smoke, soot, ash, dust, grit, or any other environmental pollution; or disturbance by vehicular or pedestrian traffic. (b) Proposals should not result in unacceptable visual impact. (c) Proposals close to working farms should not interfere with farming operations, and will be expected to accept the nature of the existing local environment. New houses should not be sited within 400m of an existing or proposed intensive livestock building. (Policy ER31). (h) Development proposals should have regard to the Landscape Character of the local area as set out in the Tayside Landscape Character Assessment (SNH 1998). (Policy ER5)	flicker, light, surrounding land uses or road safety that cannot be satisfactorily addressed by conditions. This criterion is therefore met. Many of the properties that are located close to the proposed turbine cluster are in the ownership of the Applicant. The property at Oldtown may receive a minor impact from views from the garden grounds to the east. Other properties at Margie and at Newbigging may also see the turbines to a limited degree from various parts of the garden grounds and laneways with intermediate tree screening providing some attenuation of views. The topography and distance from the site means that properties in and around Bridgend will not have any visibility of the machines. It is acknowledged that those residing there will see the machines as they pass by on the road. It is considered that the careful siting of the machines as described in the Landscape and Visual Impact chapter of the EPR **[Document APP 1]** and the benefit of the topography and tree belts in the area means that there will be no significant impact on residential amenity.
. **Policy ER18 : Archaeological Sites of National Importance** Priority will be given to preserving Scheduled Ancient Monuments in situ. Developments affecting Scheduled Ancient Monuments and other nationally significant archaeological sites and historic landscapes and their settings will only be permitted where it can be adequately demonstrated that either: (a) the proposed development will not result in damage to the scheduled monument or site of national archaeological interest or the integrity of its setting; or (b) there is overriding and proven public interest to be gained from the proposed development that outweighs the national significance attached to the preservation of the monument or archaeological importance of the site. In the case of Scheduled Ancient Monuments, the development must be in the national interest in order to outweigh the national importance attached to their preservation; and (c) the need for the development cannot reasonably be met in other less archaeologically damaging locations or by reasonable alternative means; and (d) the proposal has been sited and designed to minimise damage to the archaeological remains.	The EPR **[Document APP 1]** demonstrates that the Proposed Wind Cluster will have no unacceptable adverse effects on the setting of any listed buildings. This conclusion is supported by Historic Scotland [Document APP 15]. The EPR **[Document APP 1]** demonstrates that the Proposed Wind Cluster will have no unacceptable adverse effects on any Scheduled Monument such as the Caterthuns or any other archaeological site. This conclusion is supported by Historic Scotland [Document APP 15]. Today, the Caterthuns are well-visited monuments, appreciated for the spectacular views from their summits. Now, as in the past, access for most visitors is controlled, although not by ramparts and palisades, but by clear paths though otherwise difficult terrain. This constrains views for most, from the paths. For both monuments, the views of the turbines are confined to their north or north eastern quadrant. No views over Strathmore and to the coast eastwards and southwards are affected. No views towards the mountains of the Braes of Angus westwards are affected. The turbines come clearly into view from the Brown Caterthun from a point just north of the summit. From here and the northern quadrant of the monument, they would appear as new elements within the geometric, cultivated lower ground back dropped by the Highland landscape of the Braes of Angus. There is no visibility of the turbines from other parts of the Brown Caterthun. When looking south and eastwards over Strathmore and to the coast, the turbines would not be visible. From the White Caterthun, the turbines would be clearly seen as new elements in the landscape when making the descent along the path from the summit to the car park and picnic area, and from the top of the summit rampart at the north eastern end. When looking over to the summit of the Brown Caterthun from these areas, the turbines would be peripheral to this view and positioned lower than the natural line of sight. There are no views out from the enclosed summit of the White Caterthun. As shown above, the setting of the Caterthuns cannot be defined singly. At the regional level, their setting is about their relationship with the landscape and with other contemporary prominent sites with similar hilltop locations, e.g. Green Cairn,

Policy	Comment
	Finavon Fort and Turin Hill forts. This landscape sale context is perhaps of greatest importance to the modern setting of the Caterthuns. Most visitors who scale their summits do so for the view. At this scale, the two turbines would be new but small scale elements in the landscape. In most of these panoramic landscape views the turbines would not be visible. In views north and north eastwards towards the mountains, the turbines would be associated with the modern agricultural landscape and be below a natural line of sight. The magnitude of impact to the setting of the monument at a landscape scale is therefore assessed to be slight. It is not considered that the regional setting of the monument will be harmed by the presence of the turbines and that the significance of the impact is predicted to be **moderate/minor**. At a local scale, the setting of the Caterthuns may be defined as their relationship with the contemporary settlement and other sites on the lower land where the people who built and used the Caterthuns lived and worked. In a modern intensively farmed landscape, the evidence for these is gone or survives as below ground deposits, the agricultural erosion of which creates cropmarks. On marginal land, these sometimes survive as slight earthworks, and in most cases are protected by scheduling. Despite these rare survivals, the contemporary local context of the Caterthuns is long gone. It would not be possible to see and comprehend the physical remains of the relationship between settlement and hillfort from anywhere on the Caterthuns. The magnitude of impact to the setting of the monument at a local scale is therefore assessed to be slight. It is not considered that the local setting of the monument will be harmed by the presence of the turbines and that the significance of the impact is predicted to be **moderate/minor**. Finally, there is consideration of setting within and between the monuments themselves. During their use, high earthen and stone ramparts, topped with palisades and possibly hedges or fences would have controlled access and restricted views within and between the forts – although views of them from elsewhere in the landscape would have been much more dramatic. The massive stone ramparts enclosing the summit of the White Caterthun still effectively close off all views out of the monument by creating a stadium-like space. The turbines appear as peripheral lower level features in the modern view from the path to the White Caterthun across to the Brown Caterthun. It is not considered that the interior setting of the monuments will be affected at all by the presence of the turbines and so the significance of the impact is predicted to be **minor**.
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	**Policy ER 34** For the reasons set out above and contained within the EPR **[Document APP 1]**, , all the elements described within Policy ER34 are met an in particular, the siting and appearance of the apparatus; no unacceptable landscape and visual impacts having regard to landscape character, setting and sensitive viewpoints; there will be no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons; **Policy ER35** For the reasons set out above and contained within the EPR **[Document APP 1]**, all the elements described within Policy ER35 are met.

Policy	Comment
quantity or quality of groundwater or surface water resources during construction, operation and decommissioning of the energy plant. **Policy ER35 : Wind Energy Developments** 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.	

6 DETERMINATION OF THE REVIEW

6.1 The Town and Country Planning (Appeals) (Scotland) Regulations 2008 require an applicant to state the review procedure by which he considers his review should be determined. In view of the comprehensive nature of the documents accompanying this application and review request, the Applicant considers that this review can be determined on the basis of these written representations and an accompanied site visit.

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APP 3	Paragraph 182, Scottish Planning Policy
APP 4	Filenote of Meeting with Angus Council Planning, 9 February 2012
APP 5	filenote of Meeting with Historic Scotland, 3 November 2011
APP 6	Screening Opinion Response,13th April 2012
APP 7	Decision Notice, 5 February 2015
APP 8	Tayside Landscape Character Assessment
APP 9	Report of Handling
APP 10	Strategic Landscape Capacity Assessment of Wind Energy in Angus, March 2014
APP 11	Bradwell-on-Sea Public Inquiry excerpt on views
APP 12	Sixpenny Wood Public Inquiry excerpt on views
APP 13	North Tawton Public Inquiry excerpt on views
APP 14	Enifer Downs Public Inquiry excerpt on views
APP 15	Historic Scotland Consultation Response, 2 September 2014
APP 16	Angus Council Archaeology Consultation Response, 1 September 2014
APP 17	SNH Siting and Designing Wind Farms in the Landscape 2014
APP 18	Angus Council Renewable Energy Implementation Guide 2012
APP 19	Planning Application Form

LOWER CAIRNY WIND CLUSTER

ENVIRONMENT AND PLANNING REPORT

AUGUST 2014

Revision No.	Date	Reason
0	Aug 2014	

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1. INTRODUCTION

1.1 General

The applicant is applying to Angus Council for permission to develop a wind energy resource at Lower Cairny, by Edzell, Angus by erecting two 74m high (tip height) wind turbines with associated infrastructure. Lower Cairny is part of Witton Farm which is a 1,400 acre working farm and the site is located 5km west of Edzell. The site lies at the foot of the south west side of Cairny Hill. The proposed location and the various site constraints associated with the turbine layout are shown within Figure 1.1 and Figure 1.2.

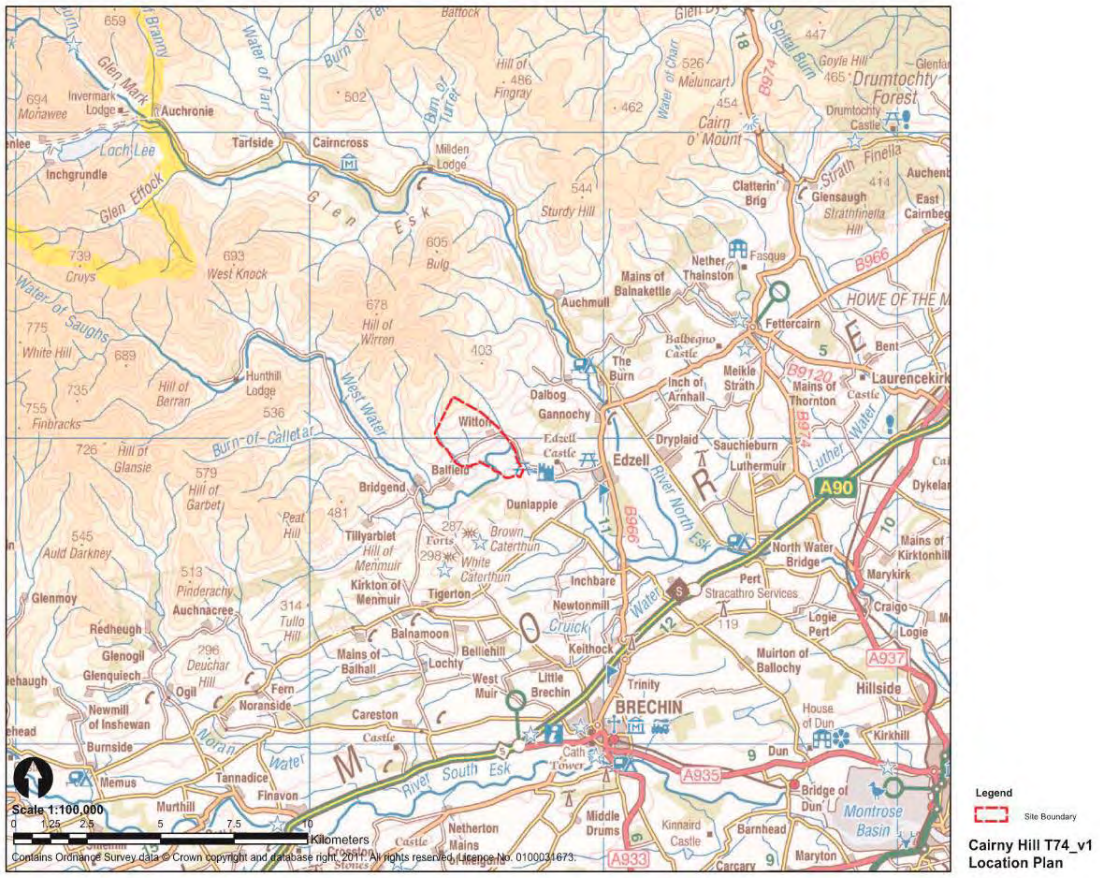


Figure 1.1 Site Location Plan

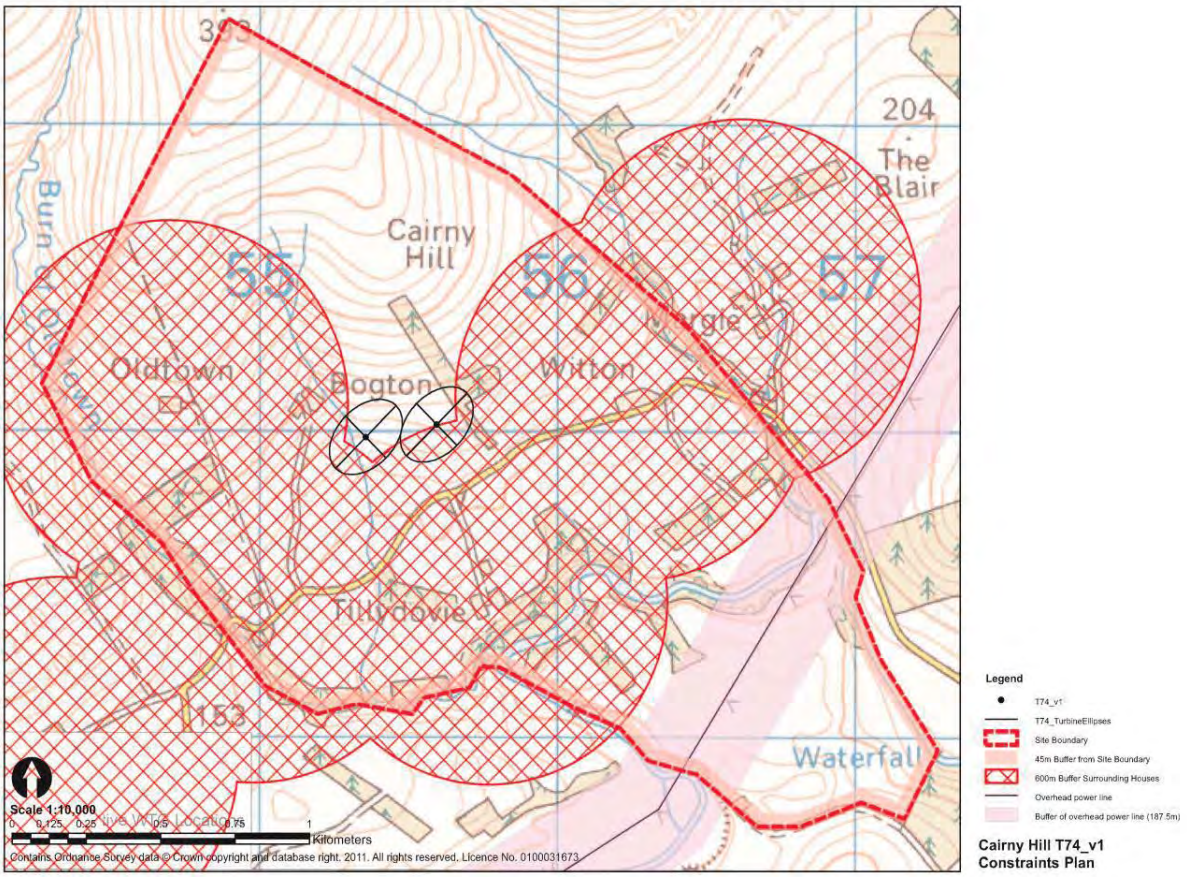


Figure 1.2 Site Constraints Map showing 600m buffer applied to dwellings.

1.2 The Applicant

The applicant procured the farm business in 2005 and since then has invested considerable capital and resources in improving the land and property asset to develop the economic viability of the farm enterprise. The applicant's aim is to diversify part of the farm's operation towards renewable energy generation to reduce energy consumption from fossil fuels and protect the business from rising energy costs and at the same time to lower the farm's carbon footprint.

1.3 Local Authority Pre-Application Discussions, Request for a Screening Opinion and Post-Application Discussions

Pre-application discussions were held with Angus Council and guidance was obtained on the nature of the environmental issues that should be addressed as part of the assessment of the proposed development (Pre-application enquiry 11/00678/PREAPP). Following further discussions, a formal request for a Screening Opinion was submitted to Angus Council on 7th March 2012 (12/00234/EIASCR). In its response of 13th April 2012, Angus Council determined that, based on the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, (regulations 6 (4)) the proposed development does not require an environmental impact assessment. The reasons cited as:

- The development does not give rise to any unusually complex or potentially hazardous environmental effects; and
- The likely impacts are localised and from the initial information provided do not appear to affect any particularly environmentally sensitive or vulnerable locations in the immediate area.

The development does not require the submission of a full Environmental Statement as required by regulation 2(1) and Schedule 4 of the Regulations.

As part of its deliberations, Angus Council supplied guidance to the applicant as to the relevant policies and issues that should be addressed. These include the following

- TAYplan and Dundee and Angus Structure Plan
- Angus Local Plan and Local Development Plan Scheme March 2014
    - Natural and Built Heritage Policies ER4, 5, 16, 18, 19, 34, 35
        1. North Esk and West Water paleochannels SSSI
        2. Gannochy Gorge SSSI
        3. Protected species
        4. Brown and White Caterthuns
        5. Listed Buildings
        6. Impact on the village of Edzell
    - Landscape and Visual (Policy ER35)
        1. Landscape and Visual Impact Assessment to be carried out in accordance with SNH guidance. Viewpoints to be agreed with Angus Council.
        2. Cumulative ZTV and assessment (ER35)
    - Residential Amenity within 2km (Policies S6, ER11 and 35)
        1. Noise
        2. Shadow Flicker
        3. Interference with TV and radio reception
    - Roads and Access
        1. Transport and construction traffic assessment and statement
    - Recreation and Leisure (Policy ER35)
    - Aviation (Policies S5, ER34, 35)
    - Other Aspects such as flooding

An application was made in March 2013 under the application reference, 13/00257/FULL - WITTON FARM. This application was commented on by a number of statutory consultees without objection. However, the Environmental Health Officer noted that several of the nearby properties within the ownership of the Applicant would not meet the Council's noise criteria. As a result, the application was withdrawn in August 2013 in order to enable the Applicant to resolve these noise related issues. The Applicant has now developed mitigation measures that respond to the Council's concerns. It is possible to reduce the noise levels of the candidate Enercon E48 turbine by reducing the rotational speed of the

blades, with a resultant reduction in the amount of electrical energy produced. This will be done for wind direction when the property is downwind of the wind turbine, and for the wind speed range over which there is a predicted exceedance of the noise limit. Details are included within Chapter 8.

1.4 **Purpose of this Environment and Planning Report**

The purpose of this Environment and Planning Report is to present the results of the studies that include environmental and planning assessment of the proposed development. The Report is based on the guidance given to the applicant by Angus Council (detailed above) as part of the formal request for screening opinion described above. The Report details the nature of the scheme that is to be developed and the results of assessment of the likely effects on the environment. The Report also describes the scale and practicalities of mitigation measures that may be required.

The Report is structured in the following format:

The proposed development and scheme design is included within Section 2. Section 3 of the report provides a review of the relevant planning policy for a development of this nature within this part of Angus. Sections 4 – 14 set out the findings of the technical studies and present the conclusions of this work.

1.5 **Cumulative Assessment**

'Cumulative effects' by definition are effects that result from incremental changes caused by past, present or reasonably foreseeable actions together with the proposed development.

Initial reference has been made to the Scottish National Heritage (SNH) Wind Farm Footprint Map dated February 2011 and August 2013, as well as Angus Council's own register of wind turbine applications which takes the form of a regularly updated spreadsheet, to gain an indication of the status of operational, consented and application wind farm developments within Angus and South Aberdeenshire. Cumulative effects of these developments have been considered in the appropriate technical assessment chapter.

2 THE PROPOSED DEVELOPMENT

The proposal comprises of 2 no. 74m high wind turbines to blade tip, installation of a 50m high meteorological mast (meteorological mast is for a 12 month period only) and associated temporary and permanent access infrastructure.

2.1 Site Description

Lower Cairny is located five kilometers west of the village of Edzell. The farm unit where the site lies consists of improved farmland that has been in the ownership of the applicant for 8 years. The actual site for wind turbines lies on the northern part of the farm on the junction between improved and unimproved land parcels.

2.2 Justification for the Development

The rising cost of energy is a threat to the long term finances of the farm operation. Since 2005, energy prices have risen by an average of 12% year on year while consumption has remained relatively steady. Energy forecasts predict a continually rising price escalator into the future. In addition to the rising cost of energy, the applicant wishes to develop the wind turbines as part of the farm's range of diversification options. This proposed development is in line with the policy requirements announced in August 2011 by Environment Minister, Richard Lochead where he notes that his vision for an Agri-Renewables Strategy will, 'ensure that land managers can benefit from the renewables revolution and unlock the green energy potential of their land'. The land is in the ownership of the applicant and it has a good wind resource based on the wind speeds recorded by experience from other similar developments in the area, initial monitoring data and the records of the national wind database (NOABL). The development will generate in the order of 4,000MWh/annum electrical output equivalent to 854 homes or 27% of the consumption of the local households in the area.

2.3 Site Selection

The topography of the site at Lower Cairny is that of improved grazing and arable land that lies at the junction between lowland and highland foothills at a height of 170m to 180m AOD. The surrounding hills to the north west of the site range on height from 393m (Black Hill), to 634m (East Wirren) and 678m (The Wirren). The wind cluster has been designed so as not to be visible on the skyline from as many viewpoints as possible. The applicant has carried out initial constraints assessment work including a detailed Landscape Capacity assessment, a Design Statement Study using the information from the Landscape Capacity assessment. This landscape assessment work included the review of other parts of the farm for wind turbine placement. One of the sites considered in the initial stages of the design layout was at a higher level to the north east of Cairny Hill, further up the scarp slope. This particular site was discounted because of landscape capacity and skyline issues. Another potential site on the south side of the road was also discounted because of its proximity to a geological SSSI. The assessment of the preferred Lower Cairny site on the northern side of the road indicates that this location has the capacity to facilitate this development.

Apart from detailed Landscape Capacity assessment work, part of the site selection and assessment included the defining of other site constraints. A 'Constraints' Study was completed to determine the

relevant elements that would dictate the ability of the site to accommodate turbines such as noise receptors, residential amenity and shadow flicker; roads and construction access; telecommunications and fixed links; ecological aspects and impact on the settlement of Edzell, Edzell Castle and the Caterthuns.

As part of the methodical process to address these issues, a full assessment of noise impacts has been completed in close consultation with the Environmental Health Officer from Angus Council including agreeing a detailed noise impact assessment methodology. A detailed ecological survey in the form of a phase 1 habitat survey with associated bat habitat survey and detector count was completed. A telecommunications and fixed link review was also completed. Discussions with Historic Scotland regarding the impact of the proposal on scheduled ancient monuments in the area were also undertaken prior to planning and the impacts assessed. A construction and transport assessment has also been completed. The details of these assessments are included within this Report.

2.4 **The Wind Turbine Development**

The wind turbine development will consist of 2 machines designed to produce a clean energy source that reduces the farm's energy costs, cuts farm carbon emissions and provides a sustainable financial income for the farm enterprise and the local economy. A 50m high temporary meteorological mast is proposed as part of the development. The collection of weather data using this mast would be for a 12 month period.

The typical components which will be required to facilitate the proposed development are detailed below:

- 2 x 800kW wind turbine generators (dependent upon the final design solution)
- Grid connection and associated infrastructure (cables, substation and transformers)
- 50m high meteorological mast in place for 12 months for collation of wind and other meteorological data
- Upgraded and new access tracks and 'laydown areas' for construction, operation and decommissioning.

Turbine details are as follows:

- Hub height max 50 metres
- Rotor diameter max 48 metres
- Height to blade tip max 74 metres
- Generating capacity (per turbine) max 800 kW
- Total Wind farm generation capacity max 1600kW
- Grid Co-ordinates:
    - Turbine 1 NO 355356mE NO 769976mN
    - Turbine 2 NO 355594mE NO 770017mN
    - 50m high meteorological mast – NO 355400mE NO 770050mN

The final choice of turbine is based on an 800kW Enercon E48 machine. This wind turbine specification has been used for assessing the various receptors for the scheme, including noise impacts. Figures 2.1 to 2.9 illustrate the nature of the layout of the turbines, their location and the associated infrastructure.

2.5 Access

The site is currently accessed from a track leading north from the unclassified road that proceeds west from Edzell towards Glen Lethnot. The existing farm track that will be used to access the site commences 800m from the main farm buildings at Witton Farm. This existing access track is 200m in length and will need some improvement works in order to make it strong enough to facilitate movement of heavy plant and machinery. This detail is described within the Transport and Construction Impact Assessment section of this report.

2.6 Meteorological Mast

The application includes for the installation and operation (for a minimum 12 month period) of a 50m high meteorological mast. This temporary structure will be used to gain the necessary data to confirm the applicant's existing knowledge of the wind regime at the site obtained from earlier assessment.

2.7 Grid Connection

The wind turbine generators would be connected via underground cables into a local substation. All electricity generated from the wind farm would then be exported into the existing local grid. An initial grid connection assessment is currently being carried out which will identify the potential connection option. The connection to the grid will be the subject of a separate application.

2.8 Decommissioning

The anticipated operational life of the wind cluster is 25 years. Before the end of the operational period a decision will be made on whether the wind farm will be decommissioned and the wind turbines removed from site or whether the site is maintained with the turbines replaced. The final option will be subject to an agreement with the Planning Authority.

3. REVIEW OF PLANNING POLICY

This section of the report details the relevant policies and guidance that are relevant to the application and comments on how the proposed turbine cluster aligns with these from a planning perspective.

3.1 Introduction

Sections 25 and 37 (2) of The Town and Country Planning (Scotland) Act 1997 as amended by The Planning etc. (Scotland) Act 2006 require that planning decisions be made in accordance with the development plan unless material considerations indicate otherwise.

This chapter identifies and assesses the development plan policies and material considerations relevant to the determination of this planning application.

Strongly pro-renewables policy frameworks have recently emerged at EU, UK and Scottish government levels. The need to reduce greenhouse gases and our dependence on fossil fuels in order to tackle climate change and the imperative of filling the emerging energy gap with low carbon alternatives are the two main drivers for change. For the farming community, greater energy security and cost certainty are also drivers.

EU and UK Climate Change and Renewable Energy Targets
The Intergovernmental Panel on Climate Change (IPCC) determined that global emissions will have to be stabilized by around 2020 and then reduced by 50% of 1990 levels by 2050. Developed countries will need to cut their emissions by 30% of 1990 levels by 2020 and 60 to 80% by 2050. The EU has unilaterally agreed a new Climate and Energy Package which aims to deliver cuts in emissions of 20% by 2020 which will be increased to 30% cuts in the event of a global deal.

In the UK, energy responsibilities have been split (post-devolution) between Scottish and UK governments. Energy policy remains a reserved matter and is a UK responsibility. The protection of the environment, planning and the promotion of energy efficiency are devolved Scottish government responsibilities. Most recently, the Climate Change Act 2008 established a system of 5 year carbon budgets to manage the trajectory of UK emissions to a target of 80% cuts by 2050. It also provided devolved administrations with the ability to set their own carbon budgets and control other climate change issues.

Scottish Climate Change and Renewable Energy Targets
The Climate Change (Scotland) Act 2009 requires Scotland's greenhouse gas emissions to be at least 80% lower in 2050 compared with 1990 levels. An interim target also requires emissions to be at least 42% lower by 2020 compared with 1990 levels. The Act requires the Scottish Government to act to:

- Reduce greenhouse gas emissions year on year from 2011 to 2050

- Increase the rate of reduction from 2020 onwards to at least 3% per year; and
- Specify more detailed annual targets in 2010 for each year to 2022.

The Climate Change Delivery Plan (2009)
The Scottish Government produced a plan entitled 'Meeting Scotland's Statutory Climate Change Targets' in June 2009. The Plan sets out high level measures required in a range of sectors to meet Scotland's statutory climate change targets to 2020 and the work that needs to be done over the next decade to meet an 80% reduction target. For electricity, the target is for 100% of Scotland's electricity to be generated from renewable sources by 2020 with an interim target of 31% by 2011.

The Renewables Action Plan (2009)
In addition to the Climate Change Delivery Plan 2009, the Scottish Government has set out a Renewables Action Plan (RAP) for 2009. This Plan identifies collective actions by government, its agencies and partners to ensure that 20% of Scotland's energy use comes from renewable sources by 2020. These include:

- Maximising the economic, social and environmental potential of Scotland's renewable resource, across different technologies;
- Establishing Scotland as a UK and EU leader in the field;
- Ensuring maximum returns for the Scottish domestic economy; and
- Meeting the targets for energy from renewables, and for emissions reduction, to 2020 and beyond.

Section 8 of the RAP covers energy consents and planning. Actions needed in this sector describe the need to:

- Create a supportive planning landscape;
- Ensure the planning and consenting regimes better support investment in renewables in Scotland; and Continue to work with Planning Authorities to develop their strategic locational guidance in line with Planning Advice Note (PAN) 45 (now superseded) and to ensure that the planning system produces decisions that are efficient, transparent, consistent and timely.

Each renewable technology is referred to in the Annex of the RAP. With regard to onshore wind, the vision is expressed as "continued expansion of portfolio of onshore wind farms to help meet renewables targets, with robust planning frameworks supporting timely processing of consents applications and ensuring wind farms are consented where they are environmentally acceptable."
The headline ambitions are expressed as:

- Supporting the development of onshore wind farms in locations where it is environmentally acceptable, and hence contributes most effectively to sustainable economic growth; and
- Maximising community engagement with onshore wind projects and providing support for small scale and community-scale developments.

Agri-Renewables Strategy (August 2011)

On 5th August 2011, the Environment Minister, Richard Lochead announced the creation of a Agri-Renewables Strategy to be in place by Summer 2012. Mr Lochhead said, "Working with the industry, the Scottish Government is keen to deliver a strategy that ensures our renewables potential, boosts rural development, and a more profitable agriculture sector. The Agri-Renewables Strategy will be developed in cooperation with industry representatives and will build on the Scottish Government's existing renewables activity in the agricultural sector. In a few years' time, I hope every farm in Scotland is benefiting from renewable energy in some shape or form. If we can make that vision reality, then that will be truly transformational." The wind cluster at Lower Cairny complies with this Agri-Renewables Strategy.

3.2 National Planning Policy and Advice

Scottish Planning Policy

Policy:

The new Scottish Planning Policy (SPP) was published in June 2014 and is a statement of Scottish Government policy on land use planning. It re-affirms inter alia that electricity generated from renewable energy sources is a vital part of the response to climate change. The following policy aspects are considered to be particularly relevant to the proposed Lower Cairny Wind Cluster.

The SPP 17 notes that National Planning Framework 3 (NPF3) will facilitate the transition to a low carbon economy, particularly by supporting diversification of the energy sector. The spatial strategy as a whole aims to reduce greenhouse gas emissions and facilitate adaptation to climate change.

The SPP notes in Paragraph 75 that planning policies should encourage rural development that supports prosperous and sustainable communities and businesses whilst protecting and enhancing environmental quality.

Paragraph 83 notes that in remote rural areas, where new development can often help to sustain fragile communities, plans and decision-making should support and sustain fragile and dispersed communities through provision for appropriate development, especially housing and community-owned energy; and other development which supports sustainable economic growth in a range of locations, taking account of environmental protection policies and addressing issues of location, access, siting, design and environmental impact.

The SPP subject policies on renewable energy (Paragraphs 152-174) set out how the planning system should manage the process of encouraging, approving and implementing renewable energy proposals when preparing development plans and determining planning applications.

SPP paragraph 154 outlines the Scottish Ministers' commitment to increasing the amount of electricity generated from renewable sources in response to climate change, and the need to ensure and diversify energy supplies. It identifies that Scottish Ministers wish to expand renewable energy generation capacity. It confirms 30% of overall energy demand from renewable sources by 2020 and it confirms the equivalent of 100 % of Scotland's electricity demand. The intention of the SPP is that this renewable energy target should be met by a range of renewable technologies. However, paragraph 182 recognises that onshore wind power is currently making the most significant contribution of any renewable technology and that this is expected to continue.

SPP Paragraph 153 states that "*Efficient supply of low carbon and low cost heat and generation of heat and electricity from renewable energy sources are vital to reducing greenhouse gas emissions and can create significant opportunities for communities. Renewable energy also presents a significant opportunity for associated development, investment and growth of the supply chain, particularly for ports and harbours identified in the National Renewables Infrastructure Plan 62. Communities can also gain new opportunities from increased local ownership and associated benefits*."

SPP paragraph 154 states that the planning system should *"support the development of a diverse range of electricity generation from renewable energy technologies – including the expansion of renewable energy generation capacity – and the development of heat networks*." Paragraph 155 also states that, "*Development plans should seek to ensure an area's full potential for electricity and heat from renewable sources is achieved, in line with national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations*."

SPP paragraph 161 establishes that planning authorities should develop spatial frameworks that support the development of wind energy farms in locations where there is potential for wind farm development according to designations and environmental interests noted in Table 1. This Table notes that wind farm development in areas (Group 3 Areas) that fall outwith Groups 1 and 2 are likely to be acceptable, subject to detailed consideration against identified policy criteria. It provides that development plans should provide a clear indication of the potential for development of wind farms of all scales, and should set out the criteria that will be considered in deciding applications for all wind farm developments. It states that the criteria will vary depending on the scale of the development and its relationship to the character of the surrounding area, but are likely to include:

- Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities
- Landscape and visual impact;
- Effects on the natural heritage and historic environment;
- Contribution of the development to renewable energy generation targets;
- Effect on the local and national economy and tourism and recreation interests;

- Benefits and disbenefits for communities;
- Aviation and telecommunications;
- Noise and shadow flicker; and
- Cumulative impact.

Paragraphs 202 and 203 state that, "*The siting and design of development should take account of local landscape character. Development management decisions should take account of potential effects on landscapes and the natural and water environment, including cumulative effects. Developers should seek to minimise adverse impacts through careful planning and design, considering the services that the natural environment is providing and maximising the potential for enhancement. Planning permission should be refused where the nature or scale of proposed development would have an unacceptable impact on the natural environment. Direct or indirect effects on statutorily protected sites will be an important consideration, but designation does not impose an automatic prohibition on development*."

Whilst the NPF3 sets out in statute the Scottish Government's proposals to protect National Parks and National Scenic Areas from further onshore wind energy development, SPP provides the details around how these proposals should be implemented through the development planning process.

Spatial Frameworks

A key change from the former SPP is that the new SPP (June 2014) removes the distinction requiring planning authorities to only produce spatial frameworks for wind farms of greater than 20 MW. Instead, paragraph 161 of the new SPP now requires that planning authorities develop spatial frameworks for all scales of wind farm development appropriate to their areas. The new SPP also proposes a more detailed hierarchy and explanation of constraints to and opportunities for wind energy developments in local authority areas, in paragraph 169 for instance and Table 1 of the SPP.

It is considered that the production of a spatial framework for the consideration of wind energy developments under 20 MW is particularly applicable to Angus given that that the vast majority of wind energy developments in Angus have to date been in the form of single turbines, or small clusters of turbines, rather than wind farms. However, Angus Council's Implementation Guide does not currently provide a spatial framework for the consideration of wind farms under 20 MW.

Angus Council has carried out a Strategic Landscape Capacity Assessment for Wind Energy in Angus – Ironside Farrar, Final Report, March 2014. This Strategic Landscape Capacity Assessment for Wind Energy in Angus (SLCAWEA) report, undertaken as part of a joint study with neighbouring Aberdeenshire to the north, is to provide strategic guidance on the capacity of the landscape across both areas to accommodate wind turbine development, and to inform the review of the Angus Development Plans' spatial framework and supplementary planning guidance, in line with Scottish Planning Policy. SPP and Scottish Government guidance identifies cumulative impacts and landscape capacity as being critical to the identification of areas of search as part of spatial frameworks, and the assessment within this Environment and Planning Report has thus been

prepared to inform the Council on the issues of landscape capacity and cumulative impact. A detailed assessment of the proposal in accordance with this recently published guidance is contained in Chapter 4 below.

The criteria that will be considered by Angus Council when determining planning applications for medium to large wind turbines are set out in the Implementation Guide for Renewable Energy Proposals which was published in June 2012, Policies ER34 Renewable Energy Developments and ER35 Wind Energy Development. The compliance of the proposal with Angus Council's planning guidance and policies is discussed later in this chapter.

National Planning Framework 3 (NPF3)

Policy:

Scotland's third National Planning Framework (NPF3) sets out a long term vision for the development of Scotland. It was adopted in June 2014.

NPF3 is the spatial expression of the Scottish Government's Economic Strategy - with a focus on supporting sustainable economic growth and the transition to a low carbon economy. NPF3 sets out the ambition for Scotland as a whole, and highlights the distinctive opportunities for sustainable growth in our cities and towns, our rural areas and our coast and islands. NPF3 will be taken into account in all strategic and local development plans in Scotland.

The generation of renewable energy remains a key theme of NPF3, with paragraph 3.8 identifying that the Scottish Government want to generating the equivalent of at least 100% of gross electricity consumption from renewables by 2020 and paragraph 3.9 stating that "*we want to continue to capitalise on our wind resource*."

Paragraph 3.23 identifies that the Scottish Government expect that onshore wind will continue to make a significant contribution to the diversification of energy supplies. However, whilst there is continued support for the development of onshore wind there is also an increased focus in NPF3 on balancing this commitment with protecting nationally important landscapes, with paragraph 3.23 stating that "*we do not wish to see wind farm development in our National Parks and National Scenic Areas*."

Commentary
The location of the proposal, which lies outwith any National Parks and National Scenic Areas, is also in accordance with the policy thrust within NPF3 which seeks to protect nationally important landscapes.

For the reasons set out above, it is therefore considered that the proposal is in accordance with the aims and objectives of the proposed NPF3.

Policy:

At paragraph 3.15 it states that, *"In line with our commitment to reducing social and spatial inequalities in Scotland, the transition to a low carbon economy will provide opportunities for communities across the country. As a key part of this, we are aiming to achieve at least 500 MW of renewable energy in community and local ownership by 2020 and are working to secure greater benefits from commercial-scale developments."*

NPF3 is also supportive of the role of small-scale renewable energy projects. Paragraph 3.24 states that, *"Local and community ownership and small-scale generation can have a lasting impact on rural Scotland, building business and community resilience and providing alternative sources of income. Collectively, the potential benefits of community energy projects are nationally significant."*

Commentary:
The annual generation from the proposed turbines is estimated at approximately 4.0 gigawatt-hours (GWh) based on a capacity factor of 27.9 %. This 27.9 % capacity factor is taken from the most recent figures of capacity factors for onshore wind in Scotland from 2000 to 2012 provided by the Department for Energy and Climate Change (DECC) (2014a). Capacity factor is the ratio of the actual energy produced in a given period to the hypothetical maximum possible, i.e. running full time at rated power. This figure is derived as follows:

- 1,600 kilowatts (kW) (2 x 800 kW) x 8,760 hours/year x 0.279 (capacity factor) = 3,910,464 kilowatt hours (kWh) or approx. 4.0 GWh.

DECC (2014b) gives 2012 average electricity consumption in Scotland as 4,577 kWh and average consumption in Aberdeenshire at 5,823 kWh. On the basis of these figures and the predicted annual generation figure of 4.0 GWh, it is estimated that the proposal will supply renewable electricity equivalent to the approximate annual domestic needs of up to 854 Scottish households and 671 Aberdeenshire households per annum.

The proposal will therefore make a positive and valuable contribution towards both the development of Scotland's renewable energy development and the development of a more decentralised pattern of energy generation in Angus.

For the reasons set out above, it is therefore considered that the proposal is in accordance with the aims and objectives of NPF3.

Scottish Government Web Based Advice on Onshore Wind Turbines

Policy:

In February 2011, the Scottish Government introduced the first tranche of web based renewables advice which replaces PAN 45 – Renewable Energy Technologies (revised in 2002) and its supporting Annex 2: Spatial Frameworks (2008). The on-line advice is intended to be more succinct

and to provide a user-friendly resource offering guidance on new technologies and processes, with clarification of the roles of planning authorities, consultees and developers in enabling development.

The guidance (last updated 24 October 2012) states that the suggested areas of focus for planning authorities should include:

- Providing greater clarity on where groups of wind turbines can be located by ensuring that a spatial framework for wind farms >20 MW has been set out in the development plan and addressing the potential below 20 MW where appropriate;
- Detailing criteria to be applied in assessing wind turbine applications; and
- Ensuring that planning conditions and agreements for wind turbine approvals are reasonable and proportionate.

In considering the landscape impacts of wind farms when determining planning applications, the guidance recognises that the receiving landscape features and the design of the development can play a significant role in ensuring the proposals are integrated into the landscape setting. It states that "*the ability of the landscape to absorb development often depends largely on features of landscape character such as, landform, ridges, hills, valleys and vegetation. This can also be influenced by careful siting and the skills of the designer*". The guidance also refers to the Scottish Natural Heritage (SNH) Landscape character Assessments that should be used to define the characteristics of the landscape in which any proposed wind turbine would be located.

Other criteria identified in the guidance to be assessed in the determination of wind farm proposals include impacts on wildlife and habitats, communities (as a result of shadow flicker, noise, electro-magnetic interference and ice throw), aviation and other defence matters, road traffic impacts and cumulative impacts.

Commentary:
It is considered that all of the criteria identified in the Scottish Government guidance to be considered in the determination of wind farm proposals (with the exception of a spatial framework to guide development proposal) are currently met within the policies contained with the TAYplan, June 2012. An assessment of the proposal against these policy criteria is discussed below.

3.3 TAYplan June 2012

The approved strategic development plan is the TAYplan which was approved in June 2012. This strategic plan replaces the Dundee and Angus Structure Plan 2002. This plan sets out the strategic policies for the Tay region, namely, Dundee, Perth, Angus and North Fife. The TAYplan comments on sustainability issues in a number of strategic areas with objectives and a vision, Figure 3.1. The TAYplan is a long term plan for Scotland's 'susTAYnable' region, with sustainability placed at the heart of policy. The vision for the TAYplan is that, "*by 2032, the Tayplan region will be sustainable,*

more attractive, competitive and vibrant without creating an unacceptable burden on our planet". The Plan provides a clear policy framework for shaping better quality place and in doing so assisting in meeting Climate Change targets. This approach was applauded by the Scottish Government in July 2010, "TAYplan Partnership is currently the best example we have of a public body responding to climate change duties". This forms the basis for the TAYplan's response to climate change embedded in all policy thinking.

The TAYplan identifies that the most appropriate locations for energy developments will be determined by Policy 6: Energy and Waste/Resource Management Infrastructure. Policy 6 Part A provides that suitable locations for energy infrastructure should be identified through Local Development Plans.

Policy 6 Part B relates to locational guidance for waste/resource management infrastructure only and is not therefore considered relevant to the proposed Wind Cluster.

Policy 6 Part C provides that 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 the following considerations:

Consideration 1 - The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;

Consideration 2 - Waste/resource management proposals are justified against the Scottish Government's Zero Waste Plan and support the delivery of the waste/resource management hierarchy.

Consideration 3 - 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;

Consideration 4 - 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;

Consideration 5 - 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;

Consideration 6 – Impacts of associated new grid connections and distribution or access infrastructure;

Consideration 7 - Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure;

Consideration 8 - Impacts upon neighbouring planning authorities (both within and outwith TAYplan); and,

Consideration 9 - Consistency with the National Planning Framework and its Action Programme.

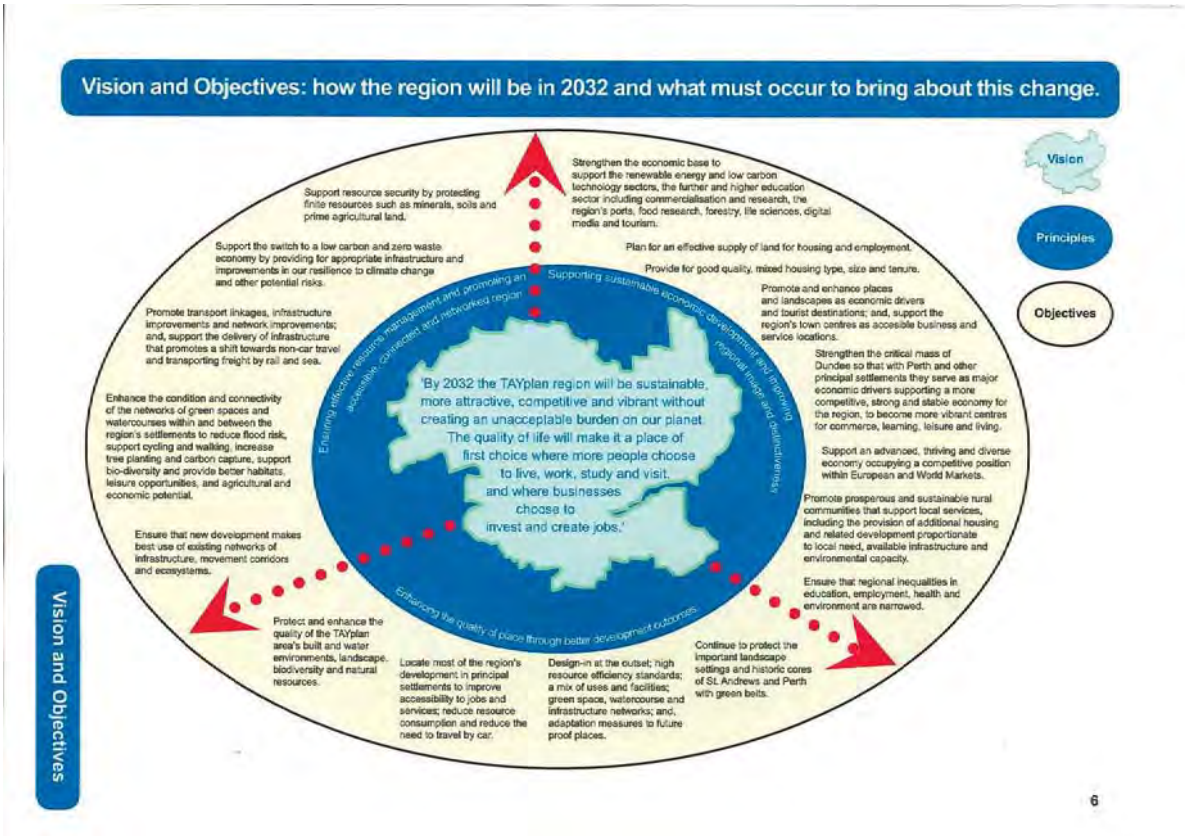


Figure 3.1 TAYplan Vision and Objectives (source: TAYplan June 2012)

Commentary

Dealing with the consideration of Policy 6 Part C (noted in Section 3.1.2 above), in turn, as regards **consideration 1**, the proposed Wind Cluster will have a relatively small footprint of approximately 1.1 hectares, and the majority of land on which it is built can continue to be used for agricultural purposes whilst the proposed Wind Cluster is operational. Furthermore, this direct loss would be fully reversible once the turbines have been decommissioned. The proposed Wind Cluster does not fall within any statutory safety exclusion zones. It is therefore considered that the proposed Wind Cluster is in accordance with this consideration, Policy 6 Part C.

The proposed Wind Cluster is not for a waste/resource management proposal and is not therefore subject to **consideration 2**.

With regard to **consideration 3**, the proposed Wind Cluster is located on a site that benefits from exposure to high wind speeds. The site also enables the energy to be used directly by the institution to offset the use of grid electricity and thus significantly reduce the farm's carbon emissions. Direct use of the electrical energy generated also reduces the farm's exposure to rapidly rising energy costs. It is therefore considered that the proposed Wind Cluster is in accordance with this consideration.

Turning to **consideration 4**, the Environment and Planning Report submitted in support of this planning application assesses the construction and operational impacts of the proposed Wind Cluster in relation to air quality, noise, surface and ground water pollution and drainage. The Report also assesses the impacts of the proposed Wind Cluster on aviation and defence interests. Potential nuisance impacts on off-site properties which may arise due to telecommunications interference, noise and shadow flicker are also comprehensively assessed within the Report. On the basis of the Report findings it is considered that the impacts of the proposed Wind Cluster on the above considerations will not be significantly detrimental and could be adequately controlled through both the mitigation measures proposed or through conditions. In view of this it can be concluded that the proposed Wind Cluster therefore complies with this consideration.

As regards **consideration 5**, extensive effort has been made during the design strategy for the proposed Wind Cluster to minimise impacts on the local and wider landscape character. As a result, the landscape and visual impact assessment within the Environment and Planning Report concludes that the layout of

the proposed Wind Cluster as submitted is of a simple, geometric composition closely related to the detailed grain of the landscape and that the proposed Wind Cluster constitutes a pleasing, balanced and coherent appearance from key viewpoints in terms of its visual composition and arrangement. It is considered that the application site has the landscape capacity to accommodate the proposed Wind Cluster.

Subject to best construction practice and appropriate mitigation measures as identified in the Environment and Planning Report being employed, no significant adverse impacts are predicted on the water environment.

The habitats on the site of the proposed Wind Cluster are typical of the agricultural landscape common in this part of Angus and are considered to be of no more than local conservation value. On the basis of the Environment and Planning Report it is concluded that the proposed Wind Cluster would not have any detrimental impacts on biodiversity and habitats.

The impacts of the proposed Wind Cluster upon tourism and recreation are assessed within the Environment and Planning Report. It is concluded that the likelihood of unacceptable impacts on tourism and recreation as a result of the proposed Wind Cluster are small and would certainly not justify the withholding of planning permission.

The Environment and Planning Report concludes that there would be no significant impacts upon any listed and scheduled buildings as a result of the proposed Wind Cluster.

In view of the above it can be concluded that the proposed Wind Cluster complies with consideration 5.

As regards **consideration 6**, at this stage it is submitted that it is unreasonable to require full details of the proposed grid connection from the proposed Wind Cluster. The grid connection will be the subject of a separate Section 37 application under the Electricity Act 1989 and should consequently be considered separately once this planning application has been determined. However, indicative details of the route and scale of transmission lines required in order to achieve a grid connection have been received from SSE.

With regards **consideration 7**, the cumulative impact of the proposed Wind Cluster has been assessed against landscape and visual, ecology, ornithology, hydrology, hydrogeology and geology, cultural heritage, noise and vibration and traffic and transport within the Environment and Planning Report. In accordance with Scottish Planning Policy, this cumulative assessment takes into account existing wind farms and turbines, those which have permission and valid applications for wind farms which have not been determined. No unacceptable cumulative impacts as a result of the proposed Wind Cluster are predicted. On this basis it is considered that the proposed Wind Cluster complies with this consideration.

In relation to **consideration 8**, no consultation has yet been undertaken by Angus Council with neighbouring planning authorities. The Landscape and Visual Impact Assessment shows that there is no reason why there would be an impact beyond the boundaries of Angus. Consequently the proposed Wind Cluster is considered to comply with this consideration.

Turning finally to **consideration 9**, core parts of the National Planning Framework 3 (NPF3) relate to the realisation of the potential of Scotland's renewable energy resources and strengthening local communities. Section 3.8 of NPF3 notes that, "by 2020, we aim to reduce total final energy demand by 12%. To achieve this, and maintain secure energy supplies, improved energy efficiency and further diversification of supplies will be required. We want to meet at least 30% of overall energy demand from renewables by 2020 – this includes generating the equivalent of at least 100% of gross electricity consumption from renewables, with an interim target of 50% by 2015." With onshore wind offering the most efficient and competitive renewable technology in the short to medium term, this ambitious policy target provides a strong justification for the principle of the proposed Wind Cluster.

Section 3.7 of NPF3 goes on to state that "*A planned approach to development has ensured that onshore wind energy development largely avoids our internationally and nationally protected areas. Whilst there is strong public support for wind energy as part of the renewable energy mix, opinions about onshore wind in particular locations can vary. In some areas, concern is expressed about the scale, proximity and impacts of proposed wind energy developments. In others, it is recognised as an opportunity to improve the long-term resilience of rural communities. We are seeing more communities benefiting from local ownership of renewables, with at least 285 MW of community and locally-owned schemes installed by 2013.*"

Section 3.24 of NPF3 notes that, "Local and community ownership and small-scale generation can have a lasting impact on rural Scotland, building business and community resilience and providing alternative sources of income. Collectively, the potential benefits of community energy projects are nationally significant."

The Environment and Planning Report submitted in support of this application establishes that the site is capable of accommodating the proposed Wind Cluster and will not result in any unacceptable impacts on any environmental resources and communities. The development will help a rural business to diversify and it will support a local supply chain that is of significant benefit to the local community in terms of the productivity of the farm unit as a result of this development. On this basis it is considered that the proposed Wind Cluster is consistent with NPF3 and this policy consideration.

For the reasons set out above it is therefore considered that the proposed Wind Cluster is justified in terms of the considerations above and is therefore in accordance with Policy ECON 6.

There are no other policies within the TAYplan which are considered to be relevant to the proposed Wind Cluster. In conclusion, the proposed Wind Cluster has been assessed against the provisions of the approved TAYplan and is in accordance with the aims and objectives of the policies included therein.

3.4 Angus Local Development Plan Scheme, March 2014 and Angus Local Plan Review, February 2009

The system of development planning for Scotland introduced by the Planning etc. (Scotland) Act 2006 is based on Strategic Development Plans (SDPs) for the city region areas of Aberdeen, Dundee, Edinburgh and Glasgow, and Local Development Plans (LDPs) throughout Scotland. Angus Council is a joint partner in the preparation of TAYplan (the SDP for the Dundee, Perth, Angus and North Fife area) and is also required to prepare a new Local Development Plan (LDP) for Angus excluding that part in the Cairngorms National Park. The Angus LDP will deal with the full breadth of the authority's planning policy, look at least 10 years ahead , and reflect the TAYplan spatial strategy and strategic planning guidelines.

During 2013 Angus Council Forward Planning staff continued work towards preparation of the Angus LDP including continued assessment of the consultation responses to the Main Issues Report and Environmental Report. An overview of the consultation response was the subject of a report to the

Infrastructure Services Committee in March 2013 (Report 137/13 refers). Officers have since assessed each individual consultation response (including a significant number made after the deadline) and their impact on the development strategy proposed in the Main Issues Report. Other work has included:
Commissioning and managing the drafting and publication of the Strategic Landscape Capacity Assessment for Wind Energy in Angus.

Angus Local Development Plan Scheme, March 2014 and Angus Local Plan Review, 2009

The Local Plan Review 2009 is in the process of being updated and the Angus Development Plan Scheme and the Main Issues Report of March 2014 includes details on how wind energy developments will be treated. The ideas include the plan to create a more detailed map-based approach that builds on the output from the recently completed Ironside Farrar Report on Strategic Landscape Capacity Assessment for Wind Energy in Angus. The following Policies are considered to have relevance to the proposal and the proposal has been evaluated against these.

Policy S1 : Development Boundaries

(a) Within development boundaries proposals for new development on sites not allocated on Proposals Maps will generally be supported where they are in accordance with the relevant policies of the Local Plan.
(b) Development proposals on sites outwith development boundaries (i.e. in the countryside) will generally be supported where they are of a scale and nature appropriate to the location and where they are in accordance with the relevant policies of the Local Plan.
(c) Development proposals on sites contiguous with a development boundary will only be acceptable where there is a proven public interest and social, economic or environmental considerations confirm there is an overriding need for the development which cannot be met within the development boundary.

Commentary

In terms of Policy S1, the turbine development has considered a range of guidance including the Angus Windfarms – Landscape Capacity and Cumulative Impacts Study (AWLC) (Ironside Farrar September 2008), as well as the recently published '*Strategic Landscape Capacity Assessment for Wind Energy in Angus*' (SLCAWEA) report. The development has also considered the Implementation Guide for Renewable Energy Proposals issued by Angus Council.

In the Implementation Guide of June 2012, Page 47 refers to the Landscape Unit, Highland Foothills. The development site is located within the Highland Foothills (Edzell Foothills) Landscape Type number 5. The Implementation Guide provides commentary on the size and scale of turbines that can be accommodated within the Edzell Foothills. It notes that machines should be located on lower ground only.

The design approach for Lower Cairny has located the proposed turbines on the lower slope areas within the LCT, where they relate directly to the local landscape pattern of the improved and unimproved agricultural fields rather than the more open moorland upper slope area. This approach also ensures that the proposed turbines would not appear as skyline features except in views from within very close proximity, and they would be considerable visual separation between the turbines and the skyline of hills which forms the backdrop to much of Angus. Siting the turbines low down also assists in reducing inter-visibility with other wind energy projects, although these currently limited within the immediate surrounding area.

In reality, the topography and geomorphology of the land is such that the development site lies on the boundary of Lowland, Glens and Highland Foothills where highly cultivated arable and grassland passes into improved and semi-improved grazing land. The Ironside Farrar study of 2008 concludes that, "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 and Brown Caterthuns". The development at Lower Cairny has used this guidance as well as that provided by SNH in designing and assessing the impact of a layout that complies with these considerations. More detail on this is included within the Landscape and Visual Impact Chapter 4 and it is the applicant's contention that the development complies with this guidance and the Policy S1.

Policy S5 : Safeguard Areas

Planning permission for development within the consultation zones of notifiable installations, pipelines or hazards will only be granted where the proposal accords with the strategy and policies of this Local Plan and there is no objection by the Health & Safety Executive, Civil Aviation Authority or other relevant statutory agency.

Commentary

This policy is met because as a working farm that is regularly cultivated, there are no nearby cables, pipelines or hazards on or near the site that are unknown to the Applicant. Aberdeen Airport has said that the site is outwith its area of concern. It is assumed that this also applies for Dundee Airport. The applicant assumes that the Local Authority will consult with the relevant statutory consultees on this aspect to confirm this.

Policy S6 : Development Principles

Proposals for development should where appropriate have regard to the relevant principles set out in Schedule 1 which includes reference to amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information.

Commentary

This policy has been addressed within the assessments made by the applicant in terms of residential amenity; roads and parking; landscape impact; ecology, flooding and protection of surface and groundwater resources; cultural heritage and archaeology. The applicant considers that the results of these assessments are such that Policy S6 is met.

Schedule 1 : Development Principles

Amenity

(a) The amenity of proposed and existing properties should not be affected by unreasonable restriction of sunlight, daylight or privacy; by smells or fumes; noise levels and vibration; emissions including smoke, soot, ash, dust, grit, or any other environmental pollution; or disturbance by vehicular or pedestrian traffic.

(b) Proposals should not result in unacceptable visual impact.

(c) Proposals close to working farms should not interfere with farming operations, and will be expected to accept the nature of the existing local environment. New houses should not be sited within 400m of an existing or proposed intensive livestock building. (Policy ER30).

Commentary

The Environment and Planning Report comments on aspects such as residential amenity, noise and shadow flicker. It is considered that the careful siting of the machines as described in the Landscape and

Visual Impact chapter and the benefit of the topography and tree belts in the area means that there will be no significant impact on residential amenity. In terms of noise, a detailed assessment has been carried out. The methodology was agreed with the Council's Environmental Health Officer. The results show that the development complies with noise limits as all the properties that could be affected are within the ownership of the Applicant. However, the EHO still have some concern regarding one property, Tillydovie Cottage (owned by the Applicant). The Applicant has now developed mitigation measures that respond to the Council's concerns. It is possible to reduce the noise levels of the candidate Enercon E48 turbine by reducing the rotational speed of the blades, with a resultant reduction in the amount of electrical energy produced. This will be done for wind direction when the property is downwind of the wind turbine, and for the wind speed range over which there is a predicted exceedance of the noise limit. More detail on this aspect in included within the Noise chapter.

Roads/Parking/Access

(d) Access arrangements, road layouts and parking should be in accordance with Angus Council's Roads Standards, and use innovative solutions where possible, including 'Home Zones'. Provision for cycle parking/storage for flatted development will also be required.

(e) Access to housing in rural areas should not go through a farm court.

(f) Where access is proposed by unmade/private track it will be required to be made-up to standards set out in Angus Council Advice Note 17 : Miscellaneous Planning Policies. If the track exceeds 200m in length, conditions may be imposed regarding widening or the provision of passing places where necessary.

(g) Development should not result in the loss of public access rights. (Policy SC33)

Commentary

A Transport Assessment has been carried out which covers transport routes and construction traffic and the potential impacts from these. The Transport Assessment concludes that the construction of a Wind Cluster at Lower Cairny, Glen Lethnot, Angus can be accommodated without significant impacts on the identified approach road network during the construction or de-commissioning phases.

Landscaping / Open Space / Biodiversity

(h) Development proposals should have regard to the Landscape Character of the local area as set out in the Tayside Landscape Character Assessment (SNH 1998). (Policy ER5)

(i) Appropriate landscaping and boundary treatment should be an integral element in the design and layout of proposals and should include the retention and enhancement of existing physical features (e.g. hedgerows, walls, trees etc) and link to the existing green space network of the local area.

(j) Development should maintain or enhance habitats of importance set out in the Tayside Local Biodiversity Action Plan and should not involve loss of trees or other important landscape features or valuable habitats and species.

(k) The planting of native hedgerows and tree species is encouraged.

(l) Open space provision in developments and the maintenance of it should be in accordance with Policy SC29.

Commentary

The proposal has taken account of landscape and biodiversity impacts and this is detailed within the relevant chapters of this report.

Drainage and Flood Risk

(m) Development sites located within areas served by public sewerage systems should be connected to that system. (Policy ER21)

(n) Surface water will not be permitted to drain to the public sewer. An appropriate system of disposal will be necessary which meets the requirements of the Scottish Environment Protection Agency (SEPA) and Angus Council and should have regard to good practice advice set out in the Sustainable Urban Drainage Systems Design Manual for Scotland and Northern Ireland 2000.

(o) Proposals will be required to consider the potential flood risk at the location. (Policy ER28)

(p) Outwith areas served by public sewerage systems, where a septic tank, bio-disc or similar system is proposed to treat foul effluent and /or drainage is to a controlled water or soakaway, the consent of SEPA and Angus Council will be required. (Policy ER22).

(q) Proposals should incorporate appropriate waste recycling, segregation and collection facilities (Policy ER37)

(r) Development should minimise waste by design and during construction.

Commentary

The site is not within a flood risk location and there is no risk of flooding from the proposal.

Supporting Information

(s) Where appropriate, planning applications should be accompanied by the necessary supporting information. Early discussion with Planning and Transport is advised to determine the level of supporting information which will be required and depending on the proposal this might include any of the following: Air Quality Assessment; Archaeological Assessment; Contaminated Land Assessment; Design Statement; Drainage Impact Assessment; Environmental Statement; Flood Risk Assessment; Landscape Assessment and/or Landscaping Scheme; Noise Impact Assessment; Retail Impact Assessment; Transport Assessment.

Commentary

This Environment and Planning Report contains details of the supporting information needed to inform the Local Authority of the necessary detail of potential environmental impacts. It is considered that the supporting information shows that the proposals comply with all relevant planning policies.

Policy ER4 : Wider Natural Heritage and Biodiversity

The Council will not normally grant planning permission for development that would have a significant adverse impact on species or habitats protected under British or European Law, identified as a priority in UK or Local Biodiversity Action Plans or on other valuable habitats or species.

Development proposals that affect such species or habitats will be required to include evidence that an assessment of nature conservation interest has been taken into account. Where development is permitted, the retention and enhancement of natural heritage and biodiversity will be secured through appropriate planning conditions or the use of Section 75 Agreements as necessary.

Commentary

The proposed wind cluster has been assessed in terms of natural heritage designations in Chapter 5 Ecology. Detailed ecological surveys and associated assessments have been carried out in and around the development site. An extended Phase 1 Habitat Assessment and protected species survey have been carried out to establish if the site of the proposed wind cluster has any value for protected species or ecological habitats. The results of these indicate that there are no issues and therefore this policy is met.

The site of the proposed wind cluster is not protected by any international, national, regional or local nature conservation designations. The nearest SSSI is the 'Paleochannels' of the North Esk and West Water to the south east of the site. There is no direct or indirect impact of the development on this SSSI.

Mitigation measures for runoff have been established and these are explained in detail in the hydrology section at Chapter 6 and Appendix 6.

Policy ER5 : Conservation of Landscape Character

Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria:

(a) sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;
(b) where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;
(c) new buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development;

Priority should be given to locating new development in towns, villages or building groups in preference to isolated development.

Commentary

A thorough process of Landscape Capacity, Design Layout and Landscape and Visual Impact Assessment has been applied to this development. The results of which are detailed within Chapter 4 and Appendix 4. On the basis of this, the applicant believes that this policy commitment has been fully achieved using careful layout and design and scale of turbine.

Environmental Resources Policy 5A: Historic Environment

Local Plans will establish a policy framework to safeguard and enhance important features of the area's historic environment as a means of conserving the diverse and distinctive qualities of Dundee and Angus. The historic environment of Dundee and Angus is a valuable, non-renewable resource which must be protected, conserved and enhanced. Local Plans shall identify these assets and include policies which:-

- Protect the site and setting of listed buildings and ancient scheduled monuments;
- Protect other archaeological sites and sensitive areas. Where this is not feasible, proper recording and analysis shall take place;
- Protect and enhance conservation areas and historic gardens and designed landscapes.

Commentary

The Cultural Heritage Section at Chapter 7 details the specific assessment of this element. In summary, the development has been designed so as to minimise any potential impact on cultural heritage and in particular that of Edzell Castle, the village of Edzell, the Burn, Brown and White Caterthuns. This has been achieved by careful siting and using an appropriate scale of turbine technology. The development is therefore in accordance with the requirements of the Environmental Resources Policy.

Environmental Resources Policy 10: 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.

Commentary

The development is aligned with the Agri -Renewables Strategy announced by the Environment Minister Richard Lochead in August 2011 that will, 'ensure that land managers can benefit from the renewables revolution and unlock the green energy potential of their land'. The development will enable the farm enterprise to generate local income to secure its future and those involved in the supply chain activities associated with the farm unit. This includes direct and indirect labour and contracting companies. The turbines will also generate a significant quantity of renewable electricity every year during the turbines' 25 year life and this will mean a real reduction of 2,300 tonnes of carbon per annum which will contribute to Scottish Government and Local Authority climate change targets. The development has taken into account Angus Council and Government guidance in relation to the locational setting of the development and this element is covered in the detailed Landscape and Visual Impact Assessment at Chapter 4. In summary, the development meets the requirements of Environmental Resources Policy 10: Renewable Energy.

Policy ER11 : Noise Pollution

Development which adversely affects health, the natural or built environment or general amenity as a result of an unacceptable increase in noise levels will not be permitted unless there is an overriding need which cannot be accommodated elsewhere.

Proposals for development generating unacceptable noise levels will not generally be permitted adjacent to existing or proposed noise-sensitive land uses. Proposals for new noise-sensitive development which would be subject to unacceptable levels of noise from an existing noise source or from a proposed use will not be permitted.

Commentary

A detailed Noise Impact Assessment has been carried out in consultation with the Environmental Health Officer for Angus Council. The results show that the development does not cause any detrimental noise impact on the properties close to the site, the majority of which are owned or occupied by the Applicant. The EHO dealing with the original application raised some concerns regarding a potential noise level exceedance at Tillydovie Cottage. The Applicant has developed mitigation measures that respond to the Council's Environmental Health Officer's concerns. It is possible to reduce the noise levels of the candidate Enercon E48 turbine by reducing the rotational speed of the blades. This will be done for the wind direction when the property is downwind of the wind turbine, and for the wind speed range over which there is a predicted exceedance of the noise limit.

Policy ER18 : Archaeological Sites of National Importance

Priority will be given to preserving Scheduled Ancient Monuments in situ. Developments affecting Scheduled Ancient Monuments and other nationally significant archaeological sites and historic landscapes and their settings will only be permitted where it can be adequately demonstrated that either:

a) the proposed development will not result in damage to the scheduled monument or site of national archaeological interest or the integrity of its setting; or
b) there is overriding and proven public interest to be gained from the proposed development that outweighs the national significance attached to the preservation of the monument or archaeological importance of the site. In the case of Scheduled Ancient Monuments, the development must be in the national interest in order to outweigh the national importance attached to their preservation; an

c) the need for the development cannot reasonably be met in other less archaeologically damaging locations or by reasonable alternative means; and
d) the proposal has been sited and designed to minimise damage to the archaeological remains.

Where development is considered acceptable and preservation of the site in its original location is not possible, the excavation and recording of the site will be required in advance of development, at the developer's expense.

Commentary

A detailed cultural heritage assessment has been carried out. There is no detrimental impact and this policy has been met.

Policy ER19 : Archaeological Sites of Local Importance

Where development proposals affect unscheduled sites of known or suspected archaeological interest, Angus Council will require the prospective developer to arrange for an archaeological evaluation to determine the importance of the site, its sensitivity to development and the most appropriate means for preserving or recording any archaeological information. The evaluation will be taken into account when determining whether planning permission should be granted with or without conditions or refused.

Commentary

This policy commitment has been met on the basis of there being no potential impact on archaeological aspects.

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.

Commentary

As described above, the development has been designed to meet the terms of the relevant policies described above. The detailed assessment of each of the criteria within Policies ER34 and ER35 are described within the rest of this report. Existing land uses on the site will be unaffected by the development. The Applicant has considered the Angus Council Renewable Energy Implementation Guide in designing the layout and size and scale of the proposal. The detail of this is described in Chapter 4 and Appendix 4 (Landscape Design Statement, Visualisations and Visual Impact Methodology). It is the Applicant's belief that this development complies with the guidance in the Implementation Guide. Overall, it is the applicant's opinion that this development complies with policy ER34.

Policy ER35 : Wind Energy Development

Wind energy developments must meet the requirements of Policy ER33 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.

Commentary

As described above, the development has been designed to meet the terms of the relevant policies described above. Existing land uses on the site will be unaffected by the development. The Applicant has considered the Angus Council Renewable Energy Implementation Guide in designing the layout and size and scale of the proposal. The detail of this is described in Chapter 4 and Appendix 4 (Landscape Design Statement, Visualisations and Visual Impact Methodology). It is the Applicant's belief that this development complies with the guidance in the Implementation Guide. Overall, it is the applicant's opinion that this development complies with policy ER35.

4 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

4.1 Introduction

4.1.1 This chapter outlines the findings of the assessment of the proposed Lower Cairny Wind Cluster on the 'landscape resource' and on 'visual amenity'. This assessment has been undertaken by Horner + MacLennan Landscape Architects (h+m).

4.1.2 Landscape and visual impact assessments (LVIA) are separate, although linked, processes, as stated within 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA) (Landscape Institute and Institute of Environmental Management and Assessment, 2002). Assessments of effects on the landscape resource and visual amenity were carried out in parallel.

Sources of Information

4.1.3 The following principal sources of information were used for undertaking this assessment:

- Tayside Landscape Character Assessment, Land Use Consultants, SNH Report No 122, 1999
- Implementation Guide for Renewal Energy projects, Angus Council January 2012
- Angus Windfarms, Landscape Capacity and Cumulative Impacts Study, Ironside Farrar, September 2008
- Review of Strategic Landscape Capacity Assessment for Wind Energy in Angus – Ironside Farrar, Final Report, March 2014
- Angus Council Renewables Database, February 2014
- Aberdeenshire Council Renewables Database, February 2014
- Inventory of Gardens and Designed Landscapes in Scotland, Volume 3 Grampian and Volume 4 Tayside, Central and Fife; Countryside Commission for Scotland, 1987
- Historic Scotland website.

This Chapter also includes a review of the Review of Strategic Landscape Capacity Assessment for Wind Energy in Angus – Ironside Farrar, Final Report, March 2014.

Preliminary Landscape Capacity Study

4.1.4 A preliminary Landscape Capacity Study of the proposed site and its surroundings was undertaken to establish if the site was considered appropriate in landscape and visual terms for a wind farm development, and if so, to advise on the most appropriate scale of development and design approach to be adopted.

4.1.5 Whilst the capacity study concluded that the site and its surroundings had certain landscape and visual sensitivities to wind farm development, these were not considered to be of such a magnitude that they would preclude a wind farm development entirely. The study also concluded that the landscape capacity of the site was dependent on the adoption of a specific siting, layout and design strategy for the site relating to turbine numbers, heights and locations, and made recommendations on an appropriate siting and design strategy which would be required to be adopted to ensure that any potential adverse impacts were avoided or minimised.

4.1.6 The Landscape Capacity Study recognised that the role of design, in as much as it determines the visual appearance of a wind farm within the landscape and how it relates to particular characteristics and features of the landscape, is considered fundamental to the principle of capacity – how a wind farm looks within and relates to the landscape is equally, if not, more important than whether it can be seen. This approach is consistent with the guidance contained within SNH's document 'Siting and Designing Windfarms in the Landscape' 2009, which reinforces the role and importance of design in the strategic siting and detailed design of wind farm developments. In relation to the Lower Cairny Wind Cluster, this design-led approach has been fundamental to ensuring that the proposal achieves the best overall 'fit' with its landscape context, and minimised landscape and visual impacts as much as practical.

4.1.7 Appendix 4 – Design Statement and Visualisations provides a comprehensive description of the landscape capacity work and the associated design development process for the project.

Consultations

4.1.8 A Pre-Application Request report was submitted to Angus Council in November 2011, outlining the wind cluster proposal and incorporating the landscape capacity, design development and cultural heritage work undertaken at that time. A subsequent consultation meeting with Angus Council Planning officers was held on 9 February 2012, to review the pre-application report and discuss in more detail the

scope of environmental assessment work which would be required in support of an application for the wind cluster development. Further correspondence was undertaken with Angus Council on the selection and finalisation of viewpoints for detailed visual impact assessment.

4.1.9 Detailed consultations were undertaken with Historic Scotland as part of the landscape capacity and design development work, in relation to the appearance and layout of the proposed wind cluster in views from the Brown and White Caterthuns, and to gain a better understanding of issues relating to the setting and context of these Scheduled Ancient Monuments.

Study Area

4.1.10 The Study Area, on which the LVIA focuses and as shown on Figure 4.1, extends to a radius of 25km beyond a radius which contains the full extent of the turbine layout of the proposed wind cluster. This radius has been chosen in accordance with the advice contained within Table 2 of the 'Visual Representation of Windfarms Good Practice Guidelines', in order to include all areas from within which potential significant visual effects (as defined by EIA Regulations) are most likely to occur for a turbine height to blade tip of 74m.

Site Visits

4.1.11 A Chartered Landscape Architect made various site visits during 2011/2012, during clear weather conditions, in order to survey the existing landscape, to assess the local and wider landscape character and to assist in the confirmation of the boundaries of particular landscape character types/areas. These visits were used to inform a general appreciation of the landscape and visual characteristics of the area, which was used to prepare the initial landscape capacity study of the site and its surroundings, as well as forming the basis for the landscape impact assessment.

4.1.12 These visits also considered the existing visual character of the Study Area, and were used to inform the selection of viewpoints for visual assessment. Subsequently the selected viewpoints were visited again for visual assessment and site photography purposes. Various roads were driven to gain an understanding of the landscape and visual character of the area, and to undertake the sequential visual assessments. A series of photographs were taken of the site and its surroundings.

Assessment Process, Criteria and Definitions

4.1.13 The aim of this assessment is to identify, predict and evaluate potential key impacts on the landscape resource and visual amenity of the Study Area and the resulting overall significance of these effects arising from the introduction of the proposed development, in accordance with the EIA Regulations.

4.1.14 In order to provide a level of consistency to the assessment, these assessments have been based on pre-defined methodologies, assessment criteria and their associated definitions. These are described in detail in Appendix 5.

4.1.15 It should be noted that within this LVIA, 'moderate' and 'substantial' impacts are considered to constitute 'significant' impacts in relation to the EIA Regulations. Additionally, it is normal practice to consider wind farm developments, which are commonly proposed for operation for a 25 year period, as temporary but long term developments. Consequently all impacts are considered to be of a temporary nature.

4.2 The Proposed Development

4.2.1 The site of the Lower Cairny Wind Cluster is shown on Figure 4.2. The proposal comprises of 2no 74m high wind turbines to blade tip. In terms of SNH's classification of wind farm developments, the proposal is classified as a 'small' development, comprising a development of 3 or fewer turbines of more than 50m in height.

4.3 Structure of Assessment

4.3.1 The assessment will adopt a structured approach to considering the likely landscape and visual impacts on a range of landscape and visual issues. For specific issues, baseline conditions and assessments of impact will be considered together, rather than be included within separate baseline and assessment sections. The basic structure of this LVIA will comprise:

- Comments on proposal in relation to landscape and visual issues within Angus Council Implementation Guide for Renewable Energy projects
- Assessment of Effect on the Landscape Resource
    - Baseline Landscape Character

- Analysis of the Zone of Theoretical Visibility Mapping
- Effect on Landscape Character
- Effect on Designated Landscapes

- Assessment of Effect on Visual Amenity
  - Influences on General Visibility
  - Visual Characteristics of the Proposed Wind Cluster
  - Zone of Theoretical Visibility Mapping
  - Selection of Viewpoints
  - Assessment of Effect on Visual Amenity at Selected Viewpoints
  - Visual Impact on Settlements
  - Visual Impact on Individual Local Properties
  - Sequential Visual Assessment
- Scope for and Mitigation Measures
- Assessment of Cumulative Landscape and Visual Impact
- Conclusion

4.4 Angus Council 'Implementation Guide for Renewable Energy Projects' (IGREP)

4.4.1 This recently published document provides strategic guidance in relation to a range of issues associated with developing renewable energy projects within Angus, and includes various issues of relevance to this LVIA.

4.4.2 Prior to undertaking the detailed landscape and visual impact assessment of the proposed wind cluster, consideration is given to the proposal in relation to relevant landscape and visual aspects of the Implementation Guide, in order to set the proposal within a broader strategic planning context.

4.4.3 'Table 4: Levels of Acceptable Landscape Character Change' of the Implementation Guide document indicates, for each landscape character type and unit within Angus, the 'existing windfarm character' and the 'acceptable future windfarm character', along with associated guidance specific to

each character type/unit. The existing windfarm character for the *'Highland Foothills'* in which the proposed wind cluster is located, is described as '*Landscape with Views of Windfarms'*, whilst the acceptable future windfarm character is described as '*Landscape with Occasional Windfarms'.* The associated guidance for the *'Highland Foothills'* states:

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.

4.4.4 In relation to these descriptions and guidance, the following comments can be made in relation to the wind cluster proposal:

- The proposal is a small-scale wind energy development which would be compatible with the acceptable future windfarm character for the '*Highland Foothills*' of '*Landscape with Occasional Windfarms*'
- The turbine height to blade tip proposed is 74m, below the 80m maximum height advised, and specifically chosen to create an appropriate scale relationship with the smaller scale foothills which typify the site and its surroundings
- The proposed turbines would be located around the 170m contour level, to relate their position more closely to the improved agricultural landscape pattern of the lower ground and to ensure that the turbines were set well below the skyline profile of the higher moorland hills to their north, such that these higher hills rather than the turbines form the dominant visual element in views towards the hills
- Airlie Monument is located at the boundary of the 20km study area for the proposed wind cluster, and the ZTV indicates that the proposed wind cluster would have no theoretical visibility for a considerable distance around the monument. Consequently, it is considered that the proposal would not adversely affect the setting of the monument
- The proposed turbines would be visible from the summits of the Caterthuns, with Brown Caterthun being one of the key viewpoints used in establishing the detailed design layout of the

wind cluster, in terms of achieving a balance of visual composition of the turbines and in relating their layout and position to clearly defined land use patterns within this view, in order to minimise the level of visual impact – refer to Viewpoints 6 and 7 for a detailed visual impact assessment from the Caterthuns

- Views towards the Caterthuns from the south, where they are seen within a landscape setting against the backdrop of the higher hills to the north, would be unaffected, as the Caterthuns themselves act as visual screen to the turbines which are located on lower ground to the north below the level of the Caterthun ridgeline, and consequently the setting of the Caterthuns from the south would be unaffected
- The primary views from the Caterthuns, and particularly Brown Caterthun are looking away from the proposed turbines, to the east and south, over the lowland agricultural landscape towards the coast and Montrose Basin, and the proposed turbines would not appear within these views. This aspect of the wider setting of the Caterthuns would therefore be unaffected
- Views from the Caterthuns towards other hillforts such as Finavon and Turin Hill would be in directions away from the proposed turbines, which would not appear within these views, and therefore these views and the connections between these hillforts would be unaffected
- The turbines would be visible from the summit of Hill of Finavon, at a distance of c21km, where the turbines would form a very small part of the expansive panoramic view available, and where only a very small section of one turbine blade tip would be visible, and any visual impact would be negligible. Refer to Viewpoint 11 for a detailed visual impact assessment from Hill of Finavon
- The local setting of the Caterthuns can be characterised by open views, however, the Hill of Lundie to the east and the West Water Valley to the north form natural barriers which are important topographically in determining the extent of the local setting of the hills. A large-scale overhead transmission line which traverses the West Water Valley also acts in influencing the extent of the local setting of the Caterthuns. The proposed turbines lie beyond the West Water Valley, on the lower hillslope to north and outwith the local setting of the Caterthuns, although visible from areas within the local setting
- The wider scale setting of the Caterthuns links them to the higher hills to the north which act as a backdrop to the general Menmuir Ridgeline. By limiting the proposed turbines to two, which limits their lateral spread and allows a simple visual composition to be achieved, by locating the proposed turbines on the lower slopes of the higher hills to the north, and by adopting a 74m turbine height, the turbines are positioned well below and away from the skyline profiles of the

higher hills, such that the skyline would not be interrupted except in extremely close positions directly below the turbine locations, and consequently the wider scale setting of the Caterthuns to the north would be largely unaffected.

4.4.5 Given the above considerations, it is considered that the proposed wind cluster would be compatible with the guidance advice provided for the '*Highland Foothills'* landscape type.

4.5 Assessment of Effect on the Landscape Resource

Baseline Landscape Character

Landscape Context

4.5.1 The local authority area of Angus is located in eastern Scotland, between the Firth of Tay and Dundee to the south and the Grampian Mountains in the north. The landscape of Angus represents a transition from coastal landscapes in the south- east, progressing north-westwards through agricultural lowlands and lowland hills, to highland landscapes in the north-west. The bulk of the population lives in small towns and villages in the lowland area, through which the main transport routes pass.

4.5.2 The landscape of Angus and of the more extensive Tayside area is described in detail in the Tayside Landscape Character Assessment SNH, 1999 (TLCA), undertaken by Land Use Consultants 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 detailed landscape character types/areas throughout Angus and the wider Tayside area. 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 types/areas remains valid, being consistently used as the basis for the Angus Council Local Plan and in the preparation of associated guidance on wind energy development within Angus. The classification and geographic distribution of landscape character areas within the TLCA and the associated Angus Council documents has therefore been used as the basis for this assessment.

4.5.3 Angus can be divided in three main regional landscape areas:

- **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.

4.5.4 The Angus Local Plan Review 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 further developed in the '*Landscape Capacity and Cumulative Impacts Study'* undertaken by Ironside Farrar on behalf of Angus Council in 2008. This study primarily considered landscape capacity and cumulative impact in Angus at a strategic level, and for each of the TLCA character areas, it identified the 'Landscape Capacity for Windfarms' and 'Current Windfarm Character Type' throughout Angus, and which has subsequently being incorporated into Angus Council's '*Implementation Guide for Renewable Energy Proposals',* January 2012.

4.5.5 The Highland and Lowland and Hills 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 of the Mounth Highlands and the Angus Glens. To the south of the Boundary Fault lie the Tayside Lowlands.

4.5.6 The proposed site at Lower Cairny occupies an area wholly located within the *Highland* region, although located towards its south-eastern boundary close to the *Lowland and Hills* region. The *Highland* region comprises of 4 separate landscape types, each of which are further divided into more detailed sub-units.

4.5.7 The site of the proposed wind cluster is located within in the '*Highland Foothills*' landscape type, and specifically within the '*Edzell Foothills*' sub-unit, in the upper section of the sub-unit close to its junction with the '*Muckle Cairn/Hill of Glansie/Hill of Wirren*' sub-unit of the '*Highland Summits and Plateaux*' landscape type to the north. The '*West Water Valley*' sub-unit of the '*Mid Highland Glens*' landscape type lies immediately south of the proposal site. This detailed location places the site at a complex transitional area of 3 landscape types, and where these types are also merging at a broader scale between the lowland agricultural landscape to the immediate south and the upland landscape to the north.

4.5.8 In terms of SNH's Strategic Locational Guidance for Onshore Wind Farms, much of Angus is categorised as Zone 1 – Lowest Natural Heritage Sensitivity, which includes the southern part of the *Highland* landscape region. The proposed site is located within a hatched area of Zones 1 and 2

sensitivity, although it is noted that this sensitivity relates to sensitive bird issues, and not landscape and visual considerations.

Landscape Character (Figure 4.3)

Regional Types

Highland Region

4.5.9 The *Highland* region comprises of a large-scale upland plateau dissected by deep intervening glens and edged to its southern boundary by a transitional range of foothills along the Highland Boundary Fault, forming the junction with the adjacent lowlands. In overall terms, the *Highland* region forms the important and highly visible backdrop to the settled lowland areas of Angus, as well as being an important recreational resource of high scenic quality, with remote and wilderness qualities within its northern section. Part of the *Highland* region is a designated National Park. The region is divided into the following landscape types.

4.5.10 The *Highland Summits and Plateaux* forms the most extensive *Highland* landscape character type, separating the glens and merging into broader and higher mountain areas to the north of Angus. The northern parts of the area fall within the Cairngorms National Park, although this designation does not extend into the lower hills northeast of Glen Esk.

4.5.11 The *Upper* and *Mid Highland Glens* 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.

4.5.12 The transitional *Highland Foothills* landscape character type comprises areas of smaller scale complex topography and mixed arable and hill farming, separated by the mouths of the Angus Glens, and merging into the broad lowland agricultural landscape of Strathmore to the south of the Highland Boundary Fault.

4.5.13 Similar upland characteristics extend north-eastwards into Aberdeenshire with the '*Moorland Plateaux*' landscape type.

Lowland and Hills Region

4.5.14 This lowland landscape is dominated by arable agriculture and is generally 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,* which cover much of central lowland Angus through Strathmore. The *Dipslope Farmland* is on higher undulating ground with smaller settlements and more open aspects.

4.5.15 These 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 *Broad Valley Lowlands*. This lowland agricultural landscape extends north-eastwards into the *Agricultural Heartlands* of Aberdeenshire

Landscape Types

Highland Foothills

4.5.16 The Lower Cairny site is located within the *Highland Foothills* landscape type. The *Highland Foothills* are a distinctive and key transitional landscape located on the boundary between lowland Strathmore to the south and the upland hills and glens to the north. Within Angus, they are divided into three main sub units - *Kirriemuir Foothills, Menmuir Foothills* and *Edzell Foothills* - located in close proximity to each other but physically separated by the mouths of the Angus Glens. They comprise a varied and complex, small to medium scale landscape with an irregular but often steep topography of small hills and glens. In some locations, a high voltage electricity transmission line intrudes on the otherwise scenic landscape composition.

4.5.17 The site is specifically located within the '*Edzell Foothills'* unit, close to its intersection with one of the large areas of '*Highland Summits and Plateaux*' to the north and the '*West Water Glen*', which forms part of the '*Mid Highland Glens'* landscape type to the south.

4.5.18 Given the modest scale and complexity of this landscape type, together with a relative lack of development or infrastructure, it is considered to be of medium to high landscape character sensitivity. Visual sensitivity is varied, with a significant degree of screening and enclosure afforded by the landforms

of the character type and by the uplands to the north but a highly visible position when seen from the lowlands, settlements and transport routes to the south. Overall, it is considered that the landscape type has medium to high landscape sensitivity to the introduction of a proposed wind farm.

Highland Summits and Plateaux

4.5.19 The *Highland Summits and Plateaux* type lies to the immediate north of the Lower Cairny site, forming an extensive upland area north of the Highland Boundary Fault in Angus, rising to over 1000m AOD in places and divided by the deeply incised Angus Glens. These extensive areas of undulating, rolling uplands form the divisions between the principle glens of the area, comprising rounded smooth slopes with a series of spurs extending southwards which merge with the '*Highland Foothills*' type to the south.

4.5.20 These elevated areas are actively managed as open moorland of heather and grasslands for deer, grouse and sheep, and have little or no settlements, which gives them a remote and undeveloped character. From the upper areas, there are generally expansive views to the lowlands to the east and south across the simple and large-scale landscape, and the area forms the highly visible backdrop to lowland Angus.

4.5.21 The four sub-units within Angus include, from west to east, part of *Forest of Alyth; Caenlochan Forest/ Glendoll Forest; Muckle Cairn/ Hill of Glansie/ Hill of Wirren* and *Hills of Saughs/ Mount Battock.* The *'Muckle Cairn/Hill of Glansie/Hill of Wirren'* sub-unit of the '*Highland Summits and Plateaux'* landscape type lies to the immediate north of the proposal site.

4.5.22 The landforms and landcover patterns are large scale and simple, resulting in a low to medium landscape character sensitivity. The Mounth is a very open landscape and highly visible from the lowlands to the south and further mountains to the north, such that the visual sensitivity would be medium to high. Overall, it is considered that the landscape type has medium landscape sensitivity to the introduction of a proposed wind farm.

Mid Highland Glens

4.5.23 These middle sections of the *Highland Glens* are typified by the concentration of agricultural activity on the narrow valley floor, and by the predominance of rough grazing, bracken and heather moorland on the valley sides. In some areas, coniferous plantations are locally characteristic. The greater

diversity of land-use and landscape character distinguishes them from the upper and lower sections of the Highland Glens and the other surrounding landscape types. These relatively small-scale landscapes contain a scattering of agricultural farms and cottages, commonly associated with small woods and tree groups. The *West Water Valley* sub-unit lies to the immediate south of the proposal site.

4.5.24 The medium scale, landscape diversity and relatively undeveloped character of the *Mid Highland Glens* results in medium-high landscape character sensitivity. Due to their enclosed, short range or narrow views, visual sensitivity would be medium to high. Overall, it is considered that the landscape type has medium-high landscape sensitivity to the introduction of a proposed wind farm.

Broad Valley Lowlands

4.5.25 This landscape type is one of the key lowland features of Angus, not only as a broad valley and agricultural heartland but also as a population centre and communications corridor. It is also much emphasised by the Highland Boundary Fault and the backdrop of the Angus Glens and Mounth Highlands to the north, providing a foreground to that dramatic landscape. The type is divided into two connected areas: Strathmore in the west and the Lower South & North Esk River Valley in the east.

4.5.26 The landscape is generally of a medium scale, although some extensive views, particularly to the hills to the north, give it a larger feeling. The landform is predominantly gentle and undulating, and often flat on the valley floor. The predominant land use is agricultural with large rectilinear fields and it is a rich and settled landscape with numerous farms, dwellings and settlements together with some small towns. There is a strong landscape structure of tree belts and small woods which reinforce the field pattern.

4.5.27 The extent of tree cover and medium scale landform pattern results in medium landscape sensitivity. The visual sensitivity is medium as, although the A90 passes through this area and the towns of Brechin and Forfar are located within it, the considerable tree cover tends to restricts views. Overall, it is considered that the landscape type has medium landscape sensitivity to the introduction of a proposed wind farm.

Landscape Character of the Proposal Site

4.5.28 The site is located on a south-easterly hillslope of the Mounth Highlands rising above the valley of the West Water, and extending to the hill summit of Black Hill. The site encompasses a landscape

transition from improved pasture in the lower areas, rising through unimproved pasture to open moorland and grassland on the upper slopes. This landscape transition is reflected along much of the hill slope edge which flanks the Howe of the Mearns, and is a recognisable landscape pattern in longer distance views to these hill slopes from the south and east, predominantly due to the changing colours which rise up the hillsides associated with improved pasture, unimproved pasture and moorland transition. The landscape pattern is regular and ordered within the areas of the lower lying improved pastures, where rectilinear field patterns occasionally defined by geometric coniferous tree belts create a simple, organised layout.

4.5.29 The coniferous tree belts form a series of separate, distinctive geometric shapes across the lower hillsides, which act as individual features along the improved lower slope areas rather than forming an interconnected broader scale pattern, except when seen from greater distances where they tend to visually merge into a more continuous tree cover pattern. The site is located at the junction between the lower lying arable land and the improved grassland, which gives way to the unimproved pastures further up the hill slopes, and which lead to the diverse moorland and grassland mosaic of the upper slopes. Consequently, the site is located at the interface between the humanised lowland agricultural landscape of the Howe of the Mearns with the more natural yet managed upland moorland landscape to the north. At a local level, this interface can appear a complex landscape with views to both highland and lowland landscapes. Whilst the site acts as a landscape continuum between lowland and upland, it is located neither fully in either lowland or upland landscape.

4.5.30 The hill slopes comprise large scale rolling and rounded profiles which gradually merge into a series of broad ridgelines, spurs and hollows. Whilst very locally, the hill summits of Cairny Hill and Black Hill appear as skyline features, in the more prevalent mid - long distance views, these hill summits form subsidiary lower slopes to the higher, more prominent Hill of Wirren to the north. Hill of Wirren and its associated higher summits form a backcloth to the Lower Cairny site, with Cairny Hill forming a minor lower level feature of the overall hill massif, being located well below the higher hill summits of Hill of Wirren (678m) and its associated summits.

4.5.31 Given the modest scale of the proposal site, and that the site is part of a managed agricultural landscape, it is considered to be of medium landscape character sensitivity. Visual sensitivity is varied, with a significant degree of screening and enclosure afforded by adjacent ridgelines and by the uplands to

the north but visible as a small section of the lower part of a more extensive range of hills when seen from the lowlands, settlements and transport routes to the south and east. Overall, it is considered that the proposal site has medium landscape sensitivity to the introduction of a proposed wind farm.

Analysis of the Zone of Theoretical Visibility (ZTV) Mapping

4.5.32 Zone of Theoretical Visibility (ZTV) maps are determined by computer based visibility analysis software which identifies locations from which some part of the proposal would be theoretically visible. Where these ZTV maps utilise only 'bare ground' as their basis, they take no account of the potential screening influence of existing trees and buildings, and therefore represent a 'worst case' theoretical visibility scenario.

4.5.33 ZTV maps give a good indication of the broad areas from which wind turbines may be seen and are useful as a tool for informing the visual assessment process. However, they also possess a number of limitations as listed below that should be noted:

- A ZTV can only indicate potential theoretical visibility
- Areas of potential visibility identified on ZTV plans require site verification to establish if specific site features will limit or prevent visibility of the proposed development
- A ZTV's accuracy is limited by the data available and used to create it. Most importantly, the accuracy of this is limited by Digital Terrain Model (DTM) data, which cannot distinguish below a certain level of detail, and is limited by the need for software to 'interpolate' between the heights at survey points
- Correlation of areas of theoretical visibility with the likelihood of the presence of people is required to establish the likelihood of views being experienced from these areas
- A ZTV cannot indicate potential visual effects, nor the significance of these.

4.5.34 These limitations indicate that ZTV plans tend to overestimate the actual extent of visibility of a proposed development within a particular area. Consequently, they should be considered only as a tool to assist in assessing the actual visibility of a development and not a measure of its visual impact.

4.5.35 Computer generated ZTV mapping has been undertaken to assist in determining the likely extent of visibility of the proposed wind cluster within the Study Area, and to establish the selection of viewpoints for detailed visual assessment. ZTV mapping has been undertaken in accordance with the

guidance included within 'Visual Representation of Windfarms Good Practice Guidance' for the height of turbine proposed. ZTV mapping has been prepared as 'bare ground' as a worst case scenario, and as a 'with trees' version, taking account of the likely screening effect of existing woods, plantations and tree belts within the Study Area. Further details on the ZTV mapping process are included in the section of this assessment considering impacts on visual amenity.

4.5.36 As the ZTV mapping will be used within both the landscape and visual impact sections of this assessment, an analysis of the ZTV mapping is included here. Figure 4.4 shows the 'bare ground' blade tip ZTV superimposed on the 25km Study Area. This ZTV map has been prepared, using only existing landform data, to indicate the number of turbine blade tips which would be theoretically visible from particular locations, as indicated by the colour gradations. As such, this represents the worst-case scenario of theoretical visibility of the proposed wind cluster. Where no colour is shown, this indicates that no part of the wind turbines would be visible. The ZTV map gives no indication of the actual appearance of the proposed wind cluster, but simply identifies those locations from which some part of it would be theoretically visible. This information therefore provides a basis for more detailed assessment work verified through site assessment.

4.5.37 Figure 4.5 indicates the 'With Trees' ZTV to blade tip over a detailed Study Area, showing the additional screening effects of existing buildings and trees groups on the pattern of visibility. Tree cover within the Study Area is an important element of the landscape and visual character, and therefore plays an important role within the Study Area in terms of influencing the extent of actual visibility of the proposal, compared to the 'bare ground' worst-case scenario.

4.5.38 These ZTV maps indicate the likely spread of visibility of the proposed wind cluster and determine those sections of the Study Area where any potential effect of the proposed wind cluster might occur. No effect could occur in areas where the proposed wind cluster would not be visible.

4.5.39 Figure 4.4 indicates a limited overall spread of theoretical visibility within the Study Area, with a large proportion of the Study Area being unaffected by the proposed turbines. The pattern of theoretical visibility can be generally divided into two main areas:

- A fragmented band of theoretical visibility along the edge of the *Highland* landscape region, running north-east to south-west, with only occasional higher hilltops to the north indicating limited areas of theoretical visibility and including much of the West Water Valley
- A broader area of theoretical visibility to the east of the site, extending across the lowland agricultural landscape, contained by rising lowland hills to the east of Brechin and fragmented into two main areas by a wedge of no theoretical visibility east of Edzell and which extends towards Laurencekirk

4.5.40 Figure 4.5 indicates the extent of visibility taking account of the likely screening effect of trees and buildings. Trees have been modelled at a height of 15m and buildings at a height of 8m. An analysis of the ZTV spread and patterns of Figure 4.5 indicates the following, particularly in comparison those shown characteristics identified in Figure 4.4:

- The band of theoretical visibility along the edge of the Highland landscape region is further fragmented and reduced in extent, with some reduction in the detailed extent of theoretical visibility along the West Water Valley and its lower slopes due to the screening effect of individual tree belts
- A considerable reduction in the spread of theoretical visibility throughout the lowland agricultural landscape to the east, with Edzell indicating no theoretical visibility except along its western boundary, Laurencekirk and Fettercairn having virtually no theoretical visibility and with theoretical visibility along the A90 being fragmented by adjacent tree belts along the road
- A noticeable reduction in the spread of theoretical visibility throughout the lowland landscape, where the intricate pattern of woodlands, forests and tree groups, particularly Edzell Wood and the plantations to its east, the woodlands to the north of Edzell and around Fettercairn play an important role in limiting the spread of theoretical visibility of the proposed turbines
- All theoretical visibility along the lower section of Glen Esk is avoided, due to the screening effect of existing woods, tree belts and plantations along the valley sides and bottom.

4.5.41 The ZTV patterns clearly indicate that the site of the proposed wind cluster uses existing intervening topographic ridges to substantially limit its general spread of theoretical visibility throughout the wider landscape. The intervening ridge of the Caterthuns, Hill of Lundie and Edzell Hill all combine to restrict the spread of visibility of the turbines over much of the lowland landscape to the south and east of the site. Additionally, the location of most of the main settlements on lower ground, often in

topographic hollows, tends to limit the exposure of these settlements to any visual impact due to screening by intervening landform. Also, the extent of screening by tree cover, both close to the proposal site and throughout the wider landscape, further considerably reduces the extent of visibility of the proposed turbines, both at a local level but more notably throughout the wider lowland agricultural landscape.

Effect on Landscape Character

General

4.5.42 The site of the proposed wind cluster is located within in the '*Edzell Foothills*' unit, at its upper section close to its junction with the '*Muckle Cairn/Hill of Glansie/Hill of Wirren*' unit of the '*Highland Summits and Plateaux*' landscape type. The '*West Water Valley*' unit of the '*Mid Highland Glens*' landscape types lies immediately south of the proposal site. The proposal site therefore lies at the complex intersection of three landscape character types, and represents a transitional landscape from north - south, east – west and from valley floor to upland slopes.

4.5.43 Figure 4.6 indicates the 'bare ground' ZTV mapping overlaid onto the landscape character plan, to establish how the pattern of theoretical visibility relates to the distribution and pattern of landscape character types. Figure 4.7 indicates the 'with trees' ZTV overlaid onto the landscape character plan.

Highland Foothills

4.5.44 The siting of the proposed wind cluster within the '*Edzell Foothills'* unit of the '*Highland Foothills*' would result in considerable theoretical visibility throughout the unit, although this would be limited towards the east of the unit. Figure 4.7 indicates the clear screening effect that Hill of Edzell has on restricting visibility of the turbines within the east of the landscape unit. Sections of the '*Menmuir Foothills'* unit of the '*Highland Foothills*' landscape type indicate more limited theoretical visibility with the proposed wind cluster, predominantly at its north-eastern edge, with much of the landscape unit being unaffected. The '*Kirriemuir Foothills'* unit would be unaffected.

4.5.45 The '*Edzell Foothills'* unit represents a settled, working landscape of fields, tree belts, plantations, settlements and roads, with a distinctive 'grain' and pattern of land uses, where human modification and use of the landscape are key characteristics. Whilst being elevated above the wider lowland agricultural landscape to the south, this landscape unit displays the order and geometric pattern typical of the broad

agricultural landscape of the Lower Esk Valleys to the south, which it flanks. The detailed turbine positions have followed the land use division between improved and unimproved pasture, which is a defining characteristic not just of the Lower Cairny site but also of the wider foothills which flank the Howe of the Mearns. There would be no tree loss within the adjacent shelterbelts from the introduction of the proposed wind cluster, and the overall relationship between the tree belts and open land would remain intact and unaltered, and therefore the general landscape pattern of the area would be retained. This approach has ensured that the wind cluster layout directly responds to the landscape pattern of the '*Edzell Foothills'* landscape unit.

4.5.46 The transitional scale of the topography of this landscape unit means that the foothills are relatively modest in scale compared to the higher hills of the summits and plateaux to the north.

4.5.47 The selection of 74m high turbines, which are relatively small in overall terms compared to most commercial wind turbines, has ensured that the turbines would not appear dominating in terms of their scale compared to the scale of the foothills on which they are located. It is considered that the transitional scale of the topography of the landscape of the 'Edzell Foothills' is able to accommodate the scale of turbine proposed.

4.5.48 Whilst the proposed turbines would undoubtedly become prominent new features within much of this landscape, their compact design layout and simple composition would create a clearly legible image and clarity of visual composition of components which would be strongly related to the underlying simplicity of the landscape character of the area, as well as to the land use pattern of the site and the surrounding area. The small number of turbines would allow the wind cluster to appear as a small-scale, concentrated feature within the surrounding landscape of the landscape unit. The design approach of generally following a common contour line for the level of the turbines relates them well to the landscape pattern of the landscape unit.

4.5.49 The introduction of the proposed wind cluster into this landscape unit would inevitably result in considerable landscape change to the area and associated adverse landscape character impacts. However, the introduction of the proposed wind farm would not result in the landscape unit becoming a 'wind farm landscape', where turbines would be the dominant landscape element. The introduction of a small-scale wind cluster, positioned where it uses existing topographic screening within the landscape

unit to reduce the visibility throughout the landscape unit itself would be consistent with the 'acceptable future windfarm character' for the *'Highland Foothills'* landscape type, outlined in the IGREP, of 'Landscape with Occasional Windfarms', where the proposed wind cluster would not be of such a scale or extent, or where it would not be of such a contrast with the underlying landscape character, that it would become one of the key defining features of the landscape type.

Magnitude of Landscape Change: Medium

Sensitivity: Medium

Significance of Landscape Impact: Moderate Adverse

Highland Summits and Plateaux

4.5.50 Theoretical visibility of the proposed wind cluster would be restricted to the '*Muckle Cairn/Hill of Glansie/Hill of Wirren*' unit of the '*Highland Summits and Plateaux*' landscape type. The other units of the landscape type would be unaffected.

4.5.51 The proposed wind cluster would have very limited theoretical visibility throughout the '*Muckle Cairn/Hill of Glansie/Hill of Wirren*' landscape unit, which would be limited to its southern fringe to the immediate north of the proposal site, and to a small area of east facing slopes to the west of the West Water Valley. The very large majority of the landscape unit would be unaffected. This limited visibility would ensure that the upland character which typifies this landscape unit, which is generally devoid of development, would be retained, and the remote and wilderness character would be unaffected. Any impact on the recreational use of the landscape unit would be negligible. The hills which typify this landscape unit would remain the dominant characteristic.

Magnitude of Landscape Change: Negligible

Sensitivity: Medium

Significance of Landscape Impact: Slight Adverse

Mid Highland Glens

4.5.52 Theoretical visibility of the proposed wind cluster would be restricted to the *West Water Valley* unit, predominantly to the immediate south and south-west of the proposal site. Much of the upper northern section of the *West Water Valley* would be unaffected. The other *Mid Highland Glens* units would be unaffected.

4.5.53 The *Mid Highland Glens* generally comprise of a settled, working landscape with strong patterns of fields, shelterbelts, forests and roads, where human modification and development is already a defining characteristic of the landscape type. The *West Water Valley* unit is particularly characterised by a large-scale overhead transmission line which traverses the landscape unit. The introduction of the proposed wind cluster would be on the lower section of a hill slope of an adjacent landscape unit which flanks and physically contains the West Water Valley, where the turbines would form prominent new features from within the lower section of the landscape unit, although not they would not be physically located within the West Water Valley itself. The enclosed, short range nature of the views available from within the unit would result in the turbines forming prominent elements on the enclosing hill slopes.

Magnitude of Landscape Change: Medium

Sensitivity: Medium - High

Significance of Landscape Impact: Moderate Adverse

Broad Valley Lowland

4.5.54 Theoretical visibility of the proposed wind cluster would be limited to the eastern section of the *Lower South and North Esk River Valley* landscape unit, to the north-east of Brechin, with much of the unit being unaffected due to the screening effect of the Menmuir Foothills. The 'With Trees' ZTV (Figure 4.7) indicates the considerable screening effect which the existing tree pattern of the landscape unit has on reducing the overall theoretical visibility pattern throughout the eastern section of the unit. The *Strathmore* unit would be unaffected.

The proposed wind cluster would be seen in views from within the landscape unit as a small-scale feature set within the lower slopes of the higher and more extensive hill backdrop to the lowlands. The proposed turbines would not be located close to the skyline profile of this backdrop of hills, and would not compromise the visual prominence of Hill of Wirren and its associated summits. The main settlements throughout the area would have no theoretical visibility with the proposed turbines and would be unaffected. It would be clear that the proposed wind cluster is located within a different landscape unit, and not within the *Broad Valley Lowland.* The strong agricultural character of the landscape unit would be retained.

Magnitude of Landscape Change: Low

Sensitivity: Medium

Significance of Landscape Impact: Slight Adverse

Landscape of the Proposal Site

4.5.55 The proposed turbine layout has directly responded to the detailed landscape pattern of the site by following the land use division between improved and unimproved pasture, which is a defining characteristic of the Lower Cairny site. There would be no tree loss within the adjacent shelterbelts from the introduction of the proposed wind cluster, and the overall relationship between the tree belts and open land would remain intact and unaltered, and therefore the general landscape pattern of the area would be retained. The design approach of generally following a common contour line for the level of the turbines would relate them well to the topographic pattern of the site. Additionally, the selection of 74m high turbines, which are relatively small in overall terms compared to most commercial wind turbines, would ensure that the turbines would not appear dominating in terms of their scale compared to the scale of the foothills on which they are located. A small meter building would be introduced adjacent to the field boundary where it would relate to the landscape pattern of the site.

4.5.56 The agricultural improved and unimproved grassland character of the site would not be affected by the introduction of the two proposed turbines, and only a very limited extent of new access track would be required, as an extension of the existing track already linking the site to the nearby minor road to the south. Consequently, physical changes to the landscape character of the site would be limited, although the introduction of the turbines themselves would substantially change the visual character of the site.

Magnitude of Landscape Change: High

Sensitivity: Medium

Significance of Landscape Impact: Moderate Adverse

Summary

4.5.57 Whilst there would be a moderate adverse impact on the landscape character of the proposal site and its immediate surroundings, the introduction of the proposed wind cluster would not result in the wider '*Highland Foothills*' landscape type within which it would be located becoming a 'wind farm landscape', as the small scale of the proposal would not physically or visually form the dominant characteristic of the landscape type. However, local landscape character impacts on this landscape type would still be considered to be moderate adverse. A moderate adverse impact would also occur on the '*West Water Valley'* unit of the '*Mid Highland Glens*' landscape type immediately to the south of the

proposal site, due primarily to its close proximity, short range views and the elevated location of the turbines on the adjacent hill slope above the landscape type. Other surrounding landscape types would be largely unaffected by the introduction of the proposed wind cluster, and the wider underlying landscape character of the Study Area would not be compromised by the introduction of the proposed wind cluster.

Effect on Designated Landscapes

National Designations

4.5.58 The only areas of national landscape designation within Angus are:

- The Deeside and Lochnagar National Scenic Area (NSA), the southern section of which lies in the north-western part of Angus, including the highest mountains and Glen Doll at the head of Glen Clova
- The Cairngorms National Park is located in the north of Angus and extends beyond into Aberdeenshire. It includes the NSA within its boundaries. The National Park area includes the northern parts of the *Highland Summits and Plateaux* and *Upper Highland Glens* areas.

4.5.59 The Deeside and Lochnagar NSA lies outwith the 20km Study Area boundary and is therefore not considered further in this assessment.

4.5.60 A small section of the south-eastern part of the National Park lies just within the north-west of the 20km Study Area. The design strategy for Lower Cairny has located relatively small-scale turbines at a low elevation on the east facing slope of the *Highland* landscape region to avoid any visibility within the National Park to the north and north-west. The 'bare ground' ZTV for the proposed Lower Cairny Wind Cluster does not indicate any areas of theoretical visibility within the National Park, and therefore the proposal would have no impact on its landscape and scenic qualities. Consequently, the National Park is not considered further in this report.

Local and Regional Designations

4.5.61 There are no local landscape designations such as AGLVs within Angus. The protection of landscape character outside the National Park is based on local plan policy which is informed by the TLCA.

Other Designations

Historic Gardens and Designed Landscapes

General

4.5.62 An Inventory of Gardens and Designed Landscapes (GDLs) in Scotland identifies, in five volumes, specific gardens and designed landscapes of importance in terms of their artistic, historical, architectural, scenic and nature conservation value. Additional volumes identify Candidate Sites, which are considered worthy of inclusion in the Inventory. Planning policies generally provide a framework for the continued protection, conservation and use of these areas that does not prejudice their scenic or cultural value in accordance with national policy.

Historic Scotland also provide a wide range of information on these sites on their website which has been used to establish the current baseline information on which to undertake the assessment of impact.

4.5.63 Reference to the Inventory indicates various sites are located within the 20km Study Area. Figure 4.8 shows these GDLs in the general context of the 20km Study Area, with the 'bare ground' ZTV mapping overlaid. Consideration of Figure 4.8 indicates that the following GDLs would have theoretical visibility with the proposed wind cluster, and are therefore considered further within this assessment. The remaining GDLs would have no theoretical visibility with the proposed wind cluster, and would be unaffected by its introduction, and therefore are not considered further:

- Edzell Castle
- Fasque House
- The Burn
- Kinnaird Castle

Assessment Tables

Table 4.1 Likely Impact on Gardens and Designed Landscapes			
Comments from Inventory	**Sensitivity**	**Extent of Visibility**	**Likely Impact**
Edzell Castle – c2km to east			
The late 16th century pleasance garden is one of the most historically valuable gardens in Scotland. The Castle lies in the lee of a heavily wooded hill immediately to its west, which restricts all views westwards to the wider landscape. The Hill of Edzell to the north also tends to limit views northwards to the Grampian Hills. Views from the Castle Tower to the south over the open agricultural landscape are important. Views from within the Garden itself are strongly limited by the boundary walls, the flat nature of the landscape to the south and the screening influence of the wooded hill to the immediate west.	High	GDL indicated as being on edge of visibility pattern. Views westwards from the car park and the Castle garden are likely to be fully screened by an unnamed heavily wooded hill, which is located immediately west of the GDL, and the boundary walls to the Garden also restrict views outwards. The important views from the Tower are southwards away from the direction of the proposal. The 'With Trees' ZTV indicates no theoretical visibility with the proposal.	*Effect – Negligible/No Impact*

Fasque House – c9km to the east			
A large landscaped park developed in the 18th and 19th centuries, attached to an important country house. The walls, policy woodland and parkland make a major contribution to the surrounding scenery, and are highly visible from the nearby roads. There are views from the house of Strathmore to the south and The Mearns to the east.	Medium	Some theoretical visibility is indicated around the periphery of the GDL. The 'With Trees' ZTV indicates a considerable reduction in the extent of theoretical visibility, limited to a small area at the south-western periphery. Boundary tree belts are likely to fully screen any views towards the proposal site. The key views from the house are away from the direction of the proposal site.	*Effect – Negligible/No Impact*
The Burn – c 4km to the east			
The Burn has some scenic value within the wider landscape. The River North Esk on the west boundary is an important feature from within the landscape; magnificent views can be gained from the woodland walk along the edge above the river. The forestry belts, which enclose the policies, restrict views into the site and also serve to generally restrict views out to the wider surrounding landscape.	Medium	The ZTV indicates virtually no theoretical visibility within the GDL. Tree cover is likely to fully restrict all views of the proposed turbines.	*Effect – Negligible/No Impact*

Kinnaird Castle – c 13.5km to the south-south-east			
The GDL has outstanding scenic value by virtue of its size and impact on the surrounding area. The driveway to the west of the loch is on higher ground and permits extensive views across the loch and the park. Fine views are afforded from the park.	Medium	The ZTV indicates a fragmented pattern of theoretical visibility within the GDL, predominantly in the central core. Any views of the proposed turbines would be at a considerable distance where they would be seen against a backcloth of higher ground behind, and where their perceptibility would be limited. Views from the driveway across the loch would be away from the direction of the proposal site.	*Effect – Slight Adverse*

Summary

4.5.64 The proposed wind cluster would have no impact on areas of national designation.

4.5.65 The proposed wind cluster would have either no or a negligible impact on the large majority of GDLs within the Study Area. The proposed wind cluster would be partially visible from within part of the grounds of Kinnaird Castle, at a distance of c13.5km, and therefore any impact on the essential qualities, character and integrity of the GDL is considered to be slight. In overall terms, the proposed wind cluster would have a slight adverse impact on GDLs within the Study Area, which would be not significant.

4.6 Assessment of Impact on Visual Amenity

Influences on General Visibility

4.6.1 Research on the visibility of various operational wind farms, the majority of which had overall turbine heights between 53.5 and 65.5m, undertaken by the University of Newcastle on behalf of SNH (Visual Assessment of Wind Farms: Best Practice), concluded that the inter-related issues of visibility and perceptibility of wind farms in the landscape is a complex and variable subject, and is dependent upon a

range of circumstances including weather and light conditions, human responses and physical issues of distance, scale, grouping and proportion of turbines to their visual context.

4.6.2 This visual assessment has been undertaken by assessors, trained in visual assessment and specifically looking for the site of the proposal within selected views, and in conditions of good visibility, which is defined by The Metrological Office as equating to when an observer can see further than 9.26km. The assessments are therefore intended to represent a 'worst case' scenario of the likely effect of the proposal on visual amenity.

Visual Characteristics of the Proposed Wind Cluster

4.6.3 Predominantly, guidance on wind farm development indicates that they are not expected to be considered as enhancements to the visual environment, particularly in rural and coastal areas, and that consequently, their addition to the visual environment is most likely to lead to adverse visual impacts. National guidance indicates that adverse visual impacts are almost certain to occur.

4.6.4 The proposal would introduce a series of elements into the visual environment of the Study Area. Some of these would be seen as isolated visual elements or features, whilst others may individually or collectively appear to change the overall intrinsic character of the visual resource and the overall quality of the general visual amenity. The key visual elements of the proposed wind cluster would be:

- The two wind turbines, seen collectively as prominent contemporary industrial visual elements, simple but striking in their visual form due to the vertical form of the towers and the radial positions of the turbine blades and movement of the blades.
- Additionally, the turbines would be positioned and aligned with a clearly defined relationship to the existing field boundary , within a predominantly open but simple landscape;
- The new access track leading to the locations of the proposed turbines, following the contour across the site and seen as an extension of the existing agricultural access track linking the turbine site to the minor road below;
- A small meter building located adjacent to the existing field boundary division between improved and unimproved pasture.

Zone of Theoretical Visibility Mapping

4.6.4 An analysis of the spread and pattern of theoretical visibility of the proposed wind cluster shown on Figures 4.4 and 4.5 is described above under the heading '*Analysis of the Zone of Theoretical Visibility (ZTV) Mapping'.*

Selection of Viewpoints

4.6.5 Based on locations indicted within the ZTV mapping as having theoretical visibility with the proposed wind cluster, a series of viewpoints have been identified for detailed visual assessment purposes which are considered to be representative of the full range of visual receptors and view types relevant to this proposal, as well as being located at varying distances, elevations and orientations from the proposal site. The selected viewpoints concentrate on nearby settlements, locations on the public road and footpath network and recognised outdoor recreational areas and important historical features. The final selection of viewpoints for assessment within the LVIA was agreed with Angus Council, and is shown in the table below.

Table 4.2 Selected Viewpoints for Visual Assessment					
Number	**Location**	**Approx. Original Grid Ref.**	**Final Grid Ref.**	**Elevation**	**Comments**
1	Pirner's Brig picnic site car park	NO 58243 68769	NO 57821 68931	77m	No visibility from Edzell cemetery, picnic site chosen as alternative
2	Edzell Castle Gardens	NO 58553 69169	NO 58442 69101	75m	Designed landscape and historic site
3	Edzell – western edge	NO 59793 68839	NO 59750 68826	62m	Local community and core path
4	Inchbare – western edge	NO 60603 65589	NO 60481 65575	55m	Local community
5	Minor road SW of Edzell, at junction with path	NO 59583 68209	NO 59575 68194	59m	Typical view from SE and core path
6	Brown Caterthun summit	NO 55583 66829	NO 55547 66906	292m	Scheduled Ancient Monument (SAM)
7	White Caterthun summit	NO 54763 66049	NO 54816 66090	300m	Scheduled Ancient Monument (SAM)
8	A90 Layby	NO 61473 63759	NO 61461 63760	84m	Major road layby on westbound carriageway
9	A90 junction	NO 65292 66379	NO 65238 66426	36m	Minor road junction close to the A90
10	South of Fettercairn	NO 65512 72759	NO 65487 72809	64m	Local community/ road to E of site
11	Hill of Finavon fort	NO 50723 55709	NO 50760 55698	206m	SAM to SW of site, Fort used rather than summit to SW to ensure full view of windfarm
12	Bridgend road junction	NO 53573 68029	NO 53583 68005	154m	Local community to W of site
13	Minor road west of Caterthuns – Tullo Farm	NO 53763 66889	NO 53743 66863	177m	Local road to SW of site

Assessment of Effects on Visual Amenity at Selected Viewpoints

4.6.6 This section considers the likely effect on visual amenity at the selected viewpoints indicated in Table 4.2, through a consideration of the following:

- Information regarding the viewpoint location and the people using it;
- The existing visual amenity at the viewpoint;
- The change to visual amenity resulting from the introduction of the proposed wind cluster.

These considerations are outlined in more detail in Appendix 4. It should be noted that not all considerations are always relevant for every viewpoint.

4.6.7 In the associated figures, each selected viewpoint is presented as an existing photograph, a computer generated wireline of the proposed wind cluster and a photomontage or photowireline visualisation dependant on the extent of visibility of the proposed wind cluster.

The following Tables 4.3 to 4.15 include the Assessment of Visual Impact at Selected Viewpoints.

Table 4.3			
Viewpoint: 1	Pirner's Brig picnic site car park		
Figure:	4.9	Distance / bearing to nearest turbine	2.47km / 295°
Grid Reference	NO 57821 68931	Elev. of viewpoint	77m +/- 6m acc.
Viewpoint and Users The viewpoint is located at the western edge of a small car park serving the local picnic spot at Pirner's Brig. Pirner's Brig is a bridge crossing the West Water, approached by a path that runs from the car park and picnic site along the top of a deep gorge to the bridge. Picnic tables are located behind the car park in a grassy area behind trees, with another popular picnic spot nearer to the river and bridge, but which would have no visibility of the proposed turbines. Therefore the car park was selected to provide maximum potential visibility from this viewpoint. Visitors to viewpoint would be local residents who use the picnic site or the occasional passing tourist. *This viewpoint is an alternative to Edzell cemetery, the originally proposed viewpoint, which because of intervening vegetation and local topography would have no inter-visibility with the proposed turbines.* The viewpoint is not located within a designated area.			
Description of Existing Visual Amenity The foreground view consists of flat, improved grassland fields, rising up to a backdrop skyline formed by the Hill of Formal, Craig Narb, Cairny Hill and a coniferous plantation on the southern slopes of the Hill of Edzell. Other areas of mixed woodland can be seen throughout the view, with a woodland belt to the west visually dividing the flat grass fields with the rising ground beyond. An overhead transmission line crosses the view, with two pylons clearly visible, backclothed against the sky and ground. In the immediate vicinity of the car park, fences and a large rubbish bin form the visual elements, whilst behind the viewer riparian woodland forms the predominant feature, with the picnic tables seen in the clearing.			
Sensitivity The sensitivity of the visual resource is considered to be **high**.			
Change to the Visual Amenity The proposed development would introduce one turbine into the view, seen to almost full height predominantly against a backdrop of ground, with only a small section of the blade tip being skylined. The other turbine would be fully screened by an intervening dense block of woodland. The turbine would appear as part of the lowland character of view, being separate from the upper moorland hills in the distance and seen as part of the valley landscape. The turbine would appear as a small scale object within a larger scale landscape, where the scale of the existing landscape would be retained and not overwhelmed. Movement of the turbine blades would be visible.			

Magnitude of Change
The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

ssessment of Impact
The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 2.47km;
- The sensitivity of the viewpoint is medium;
- The magnitude of change is considered to be low;
- The proposed turbine would form a new small-scale element within the view and would not be out of scale with the wider landscape;
- The existing skyline profile of the view would be predominantly unaffected.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse** visual impact at Viewpoint 1, as the introduction of the proposed wind cluster would be visible but as a minor feature within the view, and with the visual resource predominantly remaining as defined by the baseline conditions.

Table 4.4			
Viewpoint: 2	Edzell Castle Gardens		
Figure:	4.10	Distance / bearing to nearest turbine	2.98km / 287°
Grid Reference	NO 58442 69101	Elev. of viewpoint	75m +/- 10m acc

Viewpoint and Users
The viewpoint is located outside the original main castle entrance, on the western elevation of the castle. The Castle grounds are listed within the Inventory of Gardens and Designed Landscapes and visitors are typically tourists, other visiting groups such as school groups or residents from the surrounding area.

Description of Existing Visual Amenity
The views consist of a large beech hedge within the castle grounds and beyond the hedge a heavily wooded hill immediately to the west, which restricts all views westwards to the wider landscape. The Hill of Edzell to the north also limits views northwards. There would be no views from within the walled pleasance garden towards the proposed turbines. Views from within the Castle Tower are generally towards the south over the open agricultural landscape, with only a very oblique view towards the north-west and the proposed development site obtained by leaning out from a western facing window. It is considered that the primary view from the Castle Tower would be of the walled pleasance garden.

Sensitivity The sensitivity of the visual resource is considered to be **high**.

Change to the Visual Amenity
There would be no change to the existing view, as the proposed turbines would be fully screened from view by intervening topography and vegetation.

Magnitude of Change
The magnitude of change to the visual resource is considered to be **none**, as there would be no change to the visual resource.

Assessment of Impact
As the proposed turbines would not be visible and the magnitude of change would therefore be none, it is concluded that the introduction of the turbines would have **no effect** on the visual amenity of Viewpoint 2.

Table 4.5			
Viewpoint: 3	Edzell – western edge		
Figure:	4.11	Distance / bearing to nearest turbine	4.30km / 285°
Grid Reference	NO 59750 68826	Elev. of viewpoint	62m +/- 5m acc

Viewpoint and Users

The viewpoint is located at the western edge of Edzell, along a section of the Angus Council core path network (*Route 13, Lethnot Road to the Glebe).* The viewpoint is located slightly off the footpath itself, at the boundary hedge. Users of the footpath would be mainly local residents. The viewpoint is also representative of views obtained from local houses with views facing west. The viewpoint is not located within a designated area.

Description of Existing Visual Amenity

The foreground view consists of flat, arable fields, rising up to a backdrop skyline formed by the Hill of Lundie, Hill of Edzell and Cairny Hill. Shelterbelts, blocks and pockets of woodland - both coniferous plantations and mixed woodland - appear throughout the scene, forming a main component of the view. Farm buildings, cottages and housing and wooden pole overhead power lines complete the agricultural character of the view. Behind the viewer are houses which are part of the western edge of Edzell, some with upper-story views towards the west although recent woodland planting along the village boundary would be likely to obscure most views out to the open landscape in the long term. An overhead wood pole line forms a prominent feature in the foreground.

Sensitivity

The sensitivity of the visual resource is considered to be **high**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view, seen predominantly as blades only above an intervening forested ridgeline. The turbine blades would be backclothed by higher ground behind, with only a very small part of one turbine blade breaking the skyline, although this would not alter or compete with the existing skyline profile. The proposed turbines would appear as small-scale features within the broad sweep of the view, and the overall character of the view would be largely unaltered. The position of the proposed turbines would visually separate them from the open moorland hills which from the backdrop to the view, and they would appear to be set down within the landscape rather be located within the more elevated and exposed hills which form the backdrop of the view.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 4.3km;
- The sensitivity of the viewpoint is medium;
- The magnitude of change is considered to be low;
- The proposed turbines would form new small-scale elements within the view and would not be out of scale with the wider landscape;
- The existing skyline profile of the view would be predominantly unaffected.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse** visual impact at Viewpoint 3, as the introduction of the proposed wind cluster would be visible but as a minor feature within the view, and with the visual resource predominantly remaining as defined by the baseline conditions.

Table 4.6			
Viewpoint: 4	Inchbare – western edge		
Figure:	4.12	Distance / bearing to nearest turbine	6.59km / 312°
Grid Reference	NO 60481 65575	Elev. of viewpoint	55m +/- 8m acc

Viewpoint and Users

This roadside viewpoint is located at the western edge of Inchbare, a small village south of Edzell. People travelling in a westerly direction will experience this view; it is also representative of views for the local community. The viewpoint is not located within a designated area.

Description of Existing Visual Amenity

The view is primarily an agricultural scene, with the foreground consisting of flat arable and improved grassland fields, which rise up to a backdrop skyline formed by the Hill of Wirren massif. Shelterbelts and other areas of mixed woodland can be seen throughout the view, with strong geometric shapes formed by blocks of coniferous plantations on the lower slopes of the hills. A number of wooden pole overhead lines cross the view, with a farm and a number of houses also nearby. The predominant visual feature in the view is the summit of Hill of Wirren massif.

Sensitivity

The sensitivity of the visual resource is considered to be **high**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view, seen above a low-lying wooded ridgeline and fully backclothed against the higher hills beyond. One turbine would be seen almost to full height with the other only being visible as a blade above the wooded ridge. The proposed turbines would appear as very small features within the overall view, and the visual prominence of the Hill of Wirren massif in the view would not be compromised. The proposed turbines would be located within the view where they would be associated more with the low-lying hills and ridges which edge the lowland agricultural landscape than with the higher open moorland hills beyond which typify the edge of the Mounth. The overall scale and rural character of the view, and the visual character of the existing skyline profile, would not be affected.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 6.59km;
- The sensitivity of the viewpoint is medium;
- The magnitude of change is considered to be low;
- The proposed turbines would form new small-scale elements within the view and would not be out of scale with the wider landscape;
- The proposed turbines would be fully backclothed and would be seen more in proximity to the lowland agricultural landscape than the higher moorland hills beyond;
- The existing skyline profile of the view would not be unaffected, and the Hill of Wirren would remain as the most prominent visual feature within the view.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse** visual impact at Viewpoint 4, as the introduction of the proposed wind cluster would be visible but as a minor feature within the view, and with the visual resource predominantly remaining as defined by the baseline conditions.

Table 4.7			
Viewpoint: 5	Minor road SW of Edzell, at junction with path		
Figure:	4.13	Distance / bearing to nearest turbine	4.37km / 294°
Grid Reference	NO 59575 68194	Elev. of viewpoint	59m +/- 5m acc

Viewpoint and Users

The viewpoint is located on a junction with the core path to Bonhard (No.015) and the minor road just beyond the south-western edge of Edzell. It is opposite the entrance and car park to Edzell Golf Club. The view would be experienced predominantly by visitors and residents leaving Edzell heading west or arriving at the golf course. The viewpoint is not located within any designated areas.

Description of Existing Visual Amenity

The foreground view consists of flat, agricultural fields, rising up to a backdrop skyline formed by the Hill of Formal, Craig Narb, Cairny Hill and a coniferous plantation on the southern slopes of the Hill of Edzell. Other areas of mixed woodland can be seen throughout the view, including the woodland on the outskirts of Edzell. In the middle distance, farm buildings can be seen, with a wood pole power line crossing the view, and further to the north-east, a steel pylon power line can also be seen. The overall character of the view is of a low-lying agricultural landscape just at the transition to the higher open moorland hills beyond.

Sensitivity

The sensitivity of the visual resource is considered to be **medium**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view, seen almost to full height and fully backclothed against higher ground beyond. The proposed turbines would appear to be set down within the landscape, and would not alter the existing skyline profile of the view.

The proposed turbines would appear as small features within the overall view, and the visual prominence of the Hill of Wirren massif in the view would not be compromised. The proposed turbines would be located within the view where they would be associated more with the low-lying hills and ridges which edge the lowland agricultural landscape than with the higher open moorland hills beyond which typify the edge of the Mounth. The overall scale and rural character of the view, and the visual character of the existing skyline profile, would not be affected.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 4.37km;
- The sensitivity of the viewpoint is medium;
- The magnitude of change is considered to be low;
- The proposed turbines would form new small-scale elements within the view and would not be out of scale with the wider landscape;
- The proposed turbines would be fully backclothed and would be seen more in proximity to the lowland agricultural landscape than the higher moorland hills beyond;
- The existing skyline profile of the view would be unaffected, and the Hill of Wirren would remain as the most prominent visual feature within the view.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse** visual impact at Viewpoint 5, as the introduction of the proposed wind cluster would be visible but as a minor feature within the view, and with the visual resource predominantly remaining as defined by the baseline conditions.

Table 4.8

Viewpoint: 6	Brown Caterthun summit		
Figure:	4.14	Distance / bearing to nearest turbine	3.07km / 356°
Grid Reference	NO 55547 66906	Elev. of viewpoint	292m +/- 5m acc

Viewpoint and Users

The Brown and White Caterthuns are two large Iron Age hill-forts on two neighbouring hilltops on the fringe of the Angus Glens. They can both be visited by short walks from a lay-by on a road between the two, and they offer fine views both towards the glens and over Strathmore. There is a small picnic area at the lay-by. Visitors often visit both summits and spend time walking around the remains of the ramparts. Visitors would probably be likely to be either from the local area and use the hills for a regular walk and enjoy the views, or those who have travelled specifically to investigate the historical nature of the site. There is a rough heather track to the Brown Caterthun summit; and a good path for the short climb to the White Caterthun summit. Both the Brown and White Caterthun hill forts are Scheduled Ancient Monuments.

Description of Existing Visual Amenity

It is considered that the primary views are directed out over Strathmore and towards the coast, where Montrose and the Montrose Basin can be readily identified. The hills forming the Angus Glens comprise

the visual backdrop, particularly the Hill of Wirren massif, with the moorland and grassland slopes distinctly different to the agricultural pattern of the lowland areas. The nearby flat-topped, rocky summit of White Caterthun also forms a key element within the view to the south-west. The immediate foreground views consist of the heather clad slopes of the hill, and below, towards the proposed development site, an overhead power line can be seen skirting around the base of the Hill of Edzell.

Sensitivity

The sensitivity of the visual resource is considered to be **high**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view. These would be seen to full height against the backdrop of the higher rising ground beyond. The proposed turbines would be set low down on the opposite hillside of the valley, where they would be visually separate from the skyline profile and from the main outline of the Hill of Wirren massif, which would remain the prominent visual feature within the view. The proposed position of the turbines would be well related to the landscape pattern on the hillside, responding to the change between improved and unimproved pasture. The proposed turbines would also follow the contour across the hill slope, ensuring a balanced, ordered and simple visual composition. Blade movement would be visible.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 3km;
- The sensitivity of the viewpoint is high;
- The magnitude of change is considered to be medium;
- The proposed turbines would not compete with the scale and mass of the Hill of Wirren within the view;
- The proposed turbines would be fully backclothed and would not compete with the skyline profile;
- The key view direction is considered to be towards Strathmore and the coast, and not towards the location of the proposed development;
- The proposed turbines would appear as a simple, visually balanced composition and would be well related to the landscape pattern of the valley hillside.

Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse** visual impact at Viewpoint 6, as the introduction of the proposed wind cluster would be a new prominent visual feature within the view, although the visual resource would predominantly remain as defined by the baseline conditions and the proposed development would not be located within the primary view direction from the viewpoint.

Table 4.9			
Viewpoint: 7	White Caterthun summit		
Figure:	4.15	Distance / bearing to nearest turbine	3.92km / 7°
Grid Reference	NO 54816 66090	Elev. of viewpoint	300m +/- 5m acc.

Viewpoint and Users

The White and Brown Caterthuns are two large Iron Age hill-forts on two neighbouring hilltops on the fringe of the Angus Glens. They can both be visited by short walks from a lay-by on a road between the two, and they offer fine views both towards the glens and over Strathmore. There is a small picnic area at the lay-by. Visitors often visit both summits and spend time walking around the remains of the ramparts. Visitors would probably be likely to be either from the local area and use the hills for a regular walk and enjoy the views, or those who have travelled specifically to investigate the historical nature of the site. There is a rough heather track to the Brown Caterthun summit; and a good path for the short climb to the White Caterthun summit. Both the Brown and White Caterthun hill forts are Scheduled Ancient Monuments.

Description of Existing Visual Amenity

Like Brown Caterthun, it is considered that the primary views are directed out over Strathmore and towards the coast, where Montrose and the Montrose Basin can be readily identified. The hills forming the Angus Glens comprise the visual backdrop, with the moorland and grassland areas distinctly different to the agricultural pattern of the lowland areas. Geometric patterns, evidence of heather management and burning, are clearly seen on the slopes of Brown Caterthun. The nearby summit of Brown Caterthun also forms a key element within the view. The immediate foreground view consists of the rocky, flat summit area of the former Iron Age fort. Below, looking towards the proposed development site, an overhead power line can be seen skirting around the base of Brown Caterthun and then beyond the Hill of Edzell.

Sensitivity

The sensitivity of the visual resource is considered to be **high**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view. These would be seen to full height against the backdrop of the higher rising ground beyond. The proposed turbines would be set low down on the opposite hillside of the valley, where they would be visually separate from the skyline profile and from the main outline of the Hill of Wirren massif, which would remain the prominent visual feature within the view. The proposed turbines would appear more related to the lower valley agricultural slopes than with the higher open moorland hills above. The proposed position of the turbines would be well related to the landscape pattern on the hillside, responding to the change between improved and unimproved pasture. The proposed turbines would also follow the contour across the hill slope, ensuring a balanced, ordered and simple visual composition. Blade movement would be visible.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 3.9km;
- The sensitivity of the viewpoint is high;
- The magnitude of change is considered to be medium;
- The proposed turbines would not compete with the scale and mass of the Hill of Wirren within the view;
- The proposed turbines would be fully backclothed and would not compete with the skyline profile;
- The key view direction is considered to be towards Strathmore and the coast, and not towards the location of the proposed development;
- The proposed turbines would appear as a simple, visually balanced composition and would be well related to the landscape pattern of the valley hillside.

Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse** visual impact at Viewpoint 7, as the introduction of the proposed wind cluster would be a new prominent visual feature within the view, although the visual resource would predominantly remain as defined by the baseline conditions and the proposed development would not be located within the primary view direction from the viewpoint.

Table 4.10			
Viewpoint: 8	A90 Lay-by		
Figure:	4.16	Distance / bearing to nearest turbine	8.56km / 316°
Grid Reference	NO 61461 63760	Elev. of viewpoint	84m +/- 5m acc

Viewpoint and Users

The viewpoint is located in a lay-by along the southbound carriageway of the A90, the major road route to Aberdeen from the south. Views towards the proposed development from much of the A90 in this part of the study area are screened by roadside vegetation and this stretch of road provides an infrequent opportunity where the proposed development site would be visible. The clear views afforded towards the north along this section of the A90 would be experienced by many passing motorists and passengers, although, because of the fast road speeds, the duration of views would be relatively brief. Additionally, those heading north would have oblique views to their left hand side. The viewpoint is not located within a designated area.

Description of Existing Visual Amenity

Beyond the immediate foreground infrastructure of the A90 dual carriageway, there are clear views out across to the Hill of Wirren massif and surrounding countryside. Undulating arable land, grassy hills, shelterbelts formed by deciduous trees, areas of mixed woodland and coniferous plantations are the predominant features within the middle distance of the view. The skyline is formed by the moorland covered Hill of Wirren and the hills that form the Angus Glens. A few individual small settlements and farm buildings with related structures can be seen, and the overall impression is generally of a working rural landscape. Behind the viewer, the ground rises up steeply and views to the south are curtailed.

Sensitivity

The sensitivity of the visual resource is considered to be **low**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view, seen fully backclothed against the higher hillsides beyond. One turbine would be seen virtually to full height, with the other been seen from part way up the tower. The location of the proposed turbines would be set well below the skyline profile, and they would be seen as being on the edge of the lowland landscape of the fore and mid-ground in the view, rather than being part of the open moorland hills which form the visually important backdrop to the agricultural landscape of Strathmore. The proposed turbines would form very small-scale new features within a large scale landscape composition, which would be largely unaffected.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 8.56km;
- The sensitivity of the viewpoint is low;
- The magnitude of change is considered to be low;
- The proposed turbines would form new small-scale elements within the view and would not be out of scale with the wider landscape;
- The proposed turbines would be fully backclothed and would be seen more in proximity to the lowland agricultural landscape than the higher moorland hills beyond;
- The existing skyline profile of the view would be unaffected, and the Hill of Wirren would remain as the most prominent visual feature within the view;
- The view would comprise a short duration oblique view for most passing motorists.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse** visual impact at Viewpoint 8, as the introduction of the proposed wind cluster would be visible but as a minor feature within the view, and with the visual resource predominantly remaining as defined by the baseline conditions.

Table 4.11			
Viewpoint: 9	A90 junction		
Figure:	4.17	Distance / bearing to nearest turbine	10.26km / 290°
Grid Reference	NO 65238 66426	Elev. of viewpoint	36m +/- 5m acc

Viewpoint and Users

This viewpoint is located along a minor road, close to the Edzell & Fettercairn junction with the A90. The view would be experienced by users of the local road and visitors to the nearby Dovecot Caravan Park. Drivers and passengers heading southbound on the A90 may also experience some of the view. The viewpoint is not located in a designated area.

Description of Existing Visual Amenity

The view towards the proposed development is across a large open, arable field lined by a deciduous tree belt, behind which is a Forestry Commission plantation. In the north eastern corner of the field, a derelict water tower can be seen, along with some houses and workshop sheds. The distant skyline is formed by the Hill of Wirren. Large steel overhead transmission pylons and smaller wooden pole overhead power line lines are clearly visible in all directions and it is considered that they contribute greatly to the reduced value and sensitivity of this viewpoint. Looking in the opposite direction, to the

north-east, turbines from the Tullo windfarm can be seen on the ridge and skyline.
Sensitivity The sensitivity of the visual resource is considered to be **low**.
Change to the Visual Amenity There would be no change to the existing visual amenity of the view, as the proposed turbines would be fully screened by intervening vegetation and would not be visible.
Magnitude of Change The magnitude of change to the visual resource is considered to be **none**, as there would be no change to the visual resource.
Assessment of Impact As the proposed turbines would not be visible and the magnitude of change would therefore be none, it is concluded that the introduction of the turbines would have **no effect** on the visual amenity of Viewpoint 9.

Table 4.12			
Viewpoint: 10	South of Fettercairn		
Figure:	4.18	Distance / bearing to nearest turbine	10.25km / 254°
Grid Reference	NO 65487 72809	Elev. of viewpoint	64m +/- 7m acc
Viewpoint and Users The viewpoint is located along a minor road just to the south of the village of Fettercairn. This viewpoint would be passed by local residents and visitors to Fettercairn, although the view would be an oblique view to those travelling in both directions along the road. The viewpoint is not located in a designated area.			
Description of Existing Visual Amenity Looking towards the proposed development site, the view extends across a series of very open, flat and expansive grass fields, bounded by groups of trees in the middle distance. The skyline is formed by the distant Hill of Wirren and the nearer Sturdy Hill to the north-west, where overhead transmission steel pylons can be seen crossing the lower slopes. The geometric patterns of coniferous plantations are seen throughout the view. Closer to the viewer, and in the periphery of the view, are the typical elements to be found within a rural scene near to a village – telegraph poles, fences, signs, houses and hedges. Looking in the opposite direction, to the north-east, turbines from the Tullo windfarm can be seen.			
Sensitivity The sensitivity of the visual resource is considered to be **low**.			
Change to the Visual Amenity The proposed development would appear as a very small section of a single turbine blade tip above an intervening wooded ridgeline. Given the extent of turbine blade which would be visible, and its distance from the viewpoint, it would be barely perceptible.			
Magnitude of Change The magnitude of change to the visual resource is considered to be **negligible**, as there would be a discernible change to the characteristics of the view.			

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 10.25km;
- The sensitivity of the viewpoint is low;
- The magnitude of change is considered to be negligible;
- Only a very short section of turbine blade tip would be visible, which at 10km distance would be barely perceptible.

Considering the above factors, it is concluded that the introduction of the turbines would have **no effect** at Viewpoint 10, as there would only be a negligible change to the visual character of the view which would be barely perceptible from a viewpoint classed as low sensitivity.

Table 4.13			
Viewpoint: 11	Hill of Finavon fort		
Figure:	4.19	Distance / bearing to nearest turbine	14.98km / 17°
Grid Reference	NO 50760 55698	Elev. of viewpoint	206m +/- 5m acc

Viewpoint and Users

The viewpoint is located on the northern edge of the Iron-Age Finavon hill fort. This roughly rectangular fort is situated on an isolated summit towards the north-east end of Hill of Finavon. It was chosen to be representative of views from the south-west, and unlike the wooded summit on the Hill of Finavon, it offers open views towards the proposed development site. The fort is a Scheduled Ancient Monument. There are unlikely to be many visitors to the site - it is not signposted and there are no paths to the summit. As a high fence completely encircles the fill fort summit, the only access is through an awkward gate, along what appears to be a private track.

Description of Existing Visual Amenity

From this commanding viewpoint, there are good distant views to the north-west through to the north and the east. The main direction of the view is looking northwards, where the two main distinctive landscape character types of the Angus Glens and the Lowland and Hills can be clearly seen. In the foreground, the rich tapestry of undulating, arable farmland can be seen stretching out to the backdrop formed by the unimproved moorland hills. Glimpses of the River South Esk can be seen through the riparian woodlands along its banks, whilst the A90 corridor can be clearly seen cutting through the view. Items of specific visual interest include the stately home of Finavon Castle, nestled in woodlands near the A90 and almost due north is a single turbine in the middle distance on the foothills to the Glens. Behind the viewer, about 500m away, steel pylons and cables for an overhead power line can be clearly seen and nearby, partially screened by intervening trees, is a telecommunications mast. Long distance views to the south and south-west are generally curtailed by intervening topography.

Sensitivity

The sensitivity of the visual resource is considered to be **medium**.

Change to the Visual Amenity

The proposed development would introduce a very small section of a single blade tip into the view, above an intervening ridgeline. The distance of the viewpoint from the proposed development site and the limited extent of turbine blade which would be visible would result in the proposed development being barely perceptible, and the change to the visual character of the view would be negligible.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **negligible**, as there would be a

discernible change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 14.98km;
- The sensitivity of the viewpoint is high;
- The magnitude of change is considered to be negligible;
- Only a very short section of turbine blade tip would be visible, which at almost 15km distance would be barely perceptible.

Considering the above factors, it is concluded that the introduction of the turbines would have **no effect** at Viewpoint 11, as there would only be a negligible change to the visual character of the view which would be barely perceptible.

Table 4.14			
Viewpoint: 12	Bridgend road junction		
Figure:	4.20	Distance / bearing to nearest turbine	2.65km / 41°
Grid Reference	NO 53583 68005	Elev. of viewpoint	154m +/- 5m acc

Viewpoint and Users

The viewpoint in located at the junction between two minor roads to the west of the proposed development site. Views from this viewpoint would be experienced primarily by local residents, heading east towards Bridgend village and school, which is situated in the valley below. The viewpoint is not located in a designated area.

Description of Existing Visual Amenity

Looking eastwards, the view is across the wooded valley of the West Water, framed by local hills such as the Brown and White Caterthuns to the south and the Hill of Formal to the north rising gently up from the valley floor. An overhead transmission line runs east-west along the valley floor. Nearby farmsteads and isolated houses, blocks of coniferous trees, fences and farm outbuildings all contribute to the general rural nature of the scene.

Sensitivity

The sensitivity of the visual resource is considered to be **high**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view, seen as new skyline features above a grouping of small woods and tree belts. The proposed turbines would appear as a small-scale, simple grouping, with no overlapping of turbine blades. The proposed turbines would be visible on and above the lower hill slopes, and would appear to be more related to the improved pastures of the lower valley sides within the view, rather than the higher more open moorland hills above. Blade movement would be visible, and would be likely to result in the turbines becoming a new visual focus in the view. The proposed turbines would appear as new industrial objects on a currently undeveloped rural skyline.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 2.65km;
- The sensitivity of the viewpoint is medium;
- The magnitude of change is considered to be medium;
- The proposed turbines would appear as skylined features, and would be likely to become a new visual focus in the view.

Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse** visual impact at Viewpoint 12, as the proposed wind cluster would be likely to become a new visual focus within the view.

Table 4.15			
Viewpoint: 13	Minor road west of Caterthuns – Tullo Farm		
Figure:	4.21	Distance / bearing to nearest turbine	3.5km / 27°
Grid Reference	NO 53743 66863	Elev. of viewpoint	177m +/- 6m acc

Viewpoint and Users

The viewpoint is located along a steep minor road to the south-west of the proposed development site. Views from this viewpoint would be experienced primarily by local residents, heading north-east towards Bridgend, or possibly by visitors to the Brown and White Caterthuns. The viewpoint is not located in a designated area.

Description of Existing Visual Amenity

The relatively elevated viewpoint provides good open views along the Paphrie Burn and West Water valleys, where the distinctive landscape pattern of tree belts and improved grasslands provide a strong contrast to the tree-less moorland and unimproved grassy slopes of the Hill of Wirren massif which forms the backdrop to the view. Isolated houses, tracks and fences add to the general rural character of the view, although an overhead transmission line which runs along the West Water valley and crosses the mid-ground of the view detracts from the overall quality of the view. Behind the viewer, looking south, views are curtailed by the steepness of the road, although to the east and south-east, the summits of Brown and White Caterthuns are both clearly seen.

Sensitivity

The sensitivity of the visual resource is considered to be **medium**.

Change to the Visual Amenity

The proposed development would introduce two turbines into the view, seen to full height against a backcloth of higher ground beyond.

The proposed turbines would be set low down on the side of the valley, where they would be visually separate from the skyline profile and from the main outline of the Hill of Wirren massif. The proposed turbines would appear more related to the lower valley agricultural slopes than with the higher open moorland hills above. The proposed position of the turbines would be well related to the landscape pattern of tree belts and improved pastures on the lower hillsides, clearly appearing as part of this pattern rather than of the open moorland hills above. The proposed turbines would also follow the contour across the hill slope, ensuring a balanced, ordered and simple visual composition. Blade movement would be visible.

Magnitude of Change

The magnitude of change to the visual resource is considered to be **medium**, as there would be a

considerable change to the characteristics of the view.

Assessment of Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The distance to the proposed visible turbine would be 3.5km;
- The sensitivity of the viewpoint is medium;
- The magnitude of change is considered to be medium;
- The proposed turbines would not compete with the scale and mass of the Hill of Wirren within the view;
- The proposed turbines would be fully backclothed and would not compete with the skyline profile;
- The proposed turbines would appear as a simple, visually balanced composition and would be well related to the landscape pattern of the valley hillside.

Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse** visual impact at Viewpoint 13, as the introduction of the proposed wind cluster would be a new prominent visual feature within the view, although the visual resource would predominantly remain as defined by the baseline conditions.

Summary Table

4.6.8 A summary of the visual impact of the proposal on the selected viewpoints is presented in Table 4.16 below. Note that Moderate and Substantial Effects are considered to be significant.

Table 4.16: Summary of Visual Impact at Selected Viewpoints

VP No	Location	Sensitivity	Magnitude of Change	Assessment of Impact
1	Pirner's Brig picnic site car park	High	Low	Slight Adverse
2	Edzell Castle Gardens	High	None	No Effect
3	Edzell – western edge	High	Low	Slight Adverse
4	Inchbare – western edge	High	Low	Slight Adverse
5	Minor road SW of Edzell, at junction with path	Medium	Low	Slight Adverse
6	Brown Caterthun summit	High	Medium	Moderate Adverse
7	White Caterthun summit	High	Medium	Moderate Adverse
8	A90 Lay-by	Low	Low	Slight Adverse
9	A90 junction	Low	None	No Effect
10	South of Fettercairn	Low	Negligible	No Effect
11	Hill of Finavon fort	Medium	Negligible	No Effect
12	Bridgend road junction	High	Medium	Moderate Adverse
13	Minor road west of Caterthuns – Tullo Farm	Medium	Medium	Moderate Adverse

Visual Impact on Settlements

4.6.9 The ZTV plans indicate that the main settlements of Edzell, Brechin and Laurencekirk within the 20km Study Area would be predominantly unaffected by the introduction of the proposed wind cluster. Brechin would have no theoretical visibility with the proposal and would be unaffected. Existing tree groups would limited views form Edzell to the western periphery – refer to Viewpoint 3 for a detailed visual impact assessment. Theoretical visibility at Laurencekirk would be limited to a small section of one turbine blade, although intervening tree groups would tend to substantially screen this, resulting in virtually no theoretical visibility.

4.6.10 Smaller settlements such as Inchbare and Luthermuir would have very limited theoretical visibility with the proposal, due to the screening effect of intervening tree groups.

4.6.11 Any visual impacts on settlements within the Study Area are considered to be slight-negligible, and not significant.

Visual Impact on Individual Local Properties

4.6.12 A detailed assessment of the visual impact of the proposal on local residential properties within 2km is presented in the report on Impact on Residential Amenity. The large majority of properties face away from the direction of the proposal, and would not have direct views from principle rooms towards the proposal. Intervening boundary plantings and other buildings tend to screen views from the curtilage of properties.

Sequential Assessment

4.6.13 Road users are the most likely receptor type to experience visual impacts of windfarm developments, predominantly as sequential impacts, experienced whilst travelling through the landscape. Whilst cyclists may be considered more sensitive to landscape than most vehicle drivers, it is the latter that represent the highest number of receptors and experience the widest areas in the shortest period of time. This assessment therefore concentrates on vehicle drivers.

A90 Trunk Route (Dundee to Aberdeen)

4.6.14 The principal trunk route passing through Angus is the A90, linking Dundee with Aberdeen. This road passes inland north from Dundee, passing Forfar and Brechin and continuing along the Lower Esk Valley and then north-eastwards into Aberdeenshire.

4.6.15 Theoretical visibility of the proposed wind cluster would be limited to the section of the A90 north-east of Brechin, extending to the 20km Study Area boundary. Theoretical visibility beyond the 20km boundary quickly becomes fragmented before disappearing completely. Figure 4.5 indicates that existing tree cover would partially fragment the extent of theoretical visibility along the route, although there would be reasonably long periods of visibility. For a detailed visual impact assessment from the A90, refer to Viewpoints 8 and 9.

4.6.16 Currently along the A90, views of existing windfarms are limited. In the vicinity of Forfar, Mid Hill Windfarm is visible peripherally and at distance to the north-west. North and east of Forfar the A90 passes through the broad Lower Esk Valley, and whilst there is extensive east-west visibility and visibility of the uplands to the north and west, this is often limited by roadside trees. A single turbine development on the south-east side of the Menmuir Ridge is occasionally visible peripherally but does not form a prominent feature. Tullo Windfarm in Aberdeenshire is visible to the east from in the vicinity of Laurencekirk, at distances of c3-8km.

4.6.17 Travelling northwards, the first available views of the proposed wind cluster would be from just north of Brechin, where the turbines would be visible peripherally at distances in excess of 8km as small-scale features seen against the backdrop of the higher hills to the north. As the traveller progresses northwards, the turbines would become progressively behind the direction of travel and would not be seen in the main direction of travel. Any visual impacts would be slight adverse –negligible, and not significant.

4.6.18 When travelling southwards, the proposed turbines would be theoretically visible in the vicinity of Laurencekirk, although the combination of trees and buildings screens most views from the A90 in this area. South of Laurencekirk, sections of visibility would alternate with areas screened by intervening tree groups. Where visible, the proposed turbines would be peripheral to the main direction of travel, seen as

a small group set against the larger scale and higher backdrop of the Hill of Wirren. The introduction of the proposed turbines would not compromise the skyline profile of the Hill of Wirren, as they would be set low down well below the skyline profile, where they would not form prominent features. Any visual impacts would be slight adverse, and not significant.

4.6.19 When travelling along the A90 through Angus, visibility of windfarms would be intermittent and mostly distant, with existing developments and the proposed wind cluster separated by reasonable distances along the route. The introduction of the proposed wind cluster would not form a major new visual feature of the character of the route, appearing only as a discrete small-scale element within broader distant views, and travellers on the A90 would only experience a *'Landscape with Occasional Windfarms'* character.

B966 – Brechin to Edzell

4.6.20 The B966 forms the main route between Brechin and Edzell and which falls within the theoretical visibility spread of the proposed wind cluster. Currently, there are no views of windfarms along this route. Whilst there would be no theoretical visibility of the proposed turbines from within and beyond the northern edge of Brechin, theoretical visibility is indicated along most of the route towards Edzell. Figure 4.5 indicates that this pattern of theoretical visibility would be considerably fragmented by existing tree cover.

4.6.21 When travelling northwards, visibility would be fragmented by agricultural tree belts and small woods, with views northwestwards across fields to the turbines which would generally appear as blade tips above the intervening Hill of Lundie ridgeline. The skyline profiles of the higher hills to the north would not be affected. Edzell Wood then provides full screening of the proposed wind cluster on the approach into Edzell. Any visual impacts would be slight adverse, and not significant.

4.6.22 When travelling southwards from Edzell, the proposed wind cluster would be entirely behind the direction of travel and would not be visible, and consequently, there would be no visual impacts.

National Cycle Route 1

4.6.23 NCR 1 lies at the very eastern periphery of the 20km Study Area where it passes through Montrose, and is indicated as having no theoretical visibility with the proposed turbines. It would therefore be unaffected.

Core Paths

4.6.24 The Core Path which extends along the River North Esk would be unaffected due to the intervening screening of landform and vegetation.

4.6.25 Core Paths on the western side of Edzell would have theoretical visibility with the proposed turbines, although field boundary tree cover would tend to considerably limit the availability of views – see Viewpoints 3 and 5 for detailed impact assessments. Core Paths on the eastern and southern side of Edzell would be unaffected due to the intervening screening of landform and vegetation, particularly Edzell Wood.

4.6.26 Core Paths around Brechin would either have no theoretical visibility with the proposed turbines, or existing tree cover would considerably limit the extent of turbines which would be visible, such that any impact would be slight or negligible.

4.7 Scope for and Mitigation Measures

4.7.1 A comprehensive design development process has accompanied the preparation of the layout of the proposed Lower Cairny Wind Cluster. This process has from the outset aimed to prevent, reduce and, where possible, offset any significant adverse effects on the landscape resource and visual amenity, through consideration of the general siting and layout of the development, turbine size and arrangement and their visual composition from key viewpoints.

4.7.2 The introduction of the proposed wind cluster into the '*Highland Foothills*' landscape type would inevitably result in considerable landscape and visual change to the area and some associated significant adverse impacts on landscape character and visual amenity. Whilst some of these significant impacts relate to the development site itself, its immediate setting and the landscape character area in which it is located, others specifically relate to the '*West Water Valley'* landscape unit of the '*Mid Highland Glens*'

landscape type, due to its close proximity of the wind cluster and the enclosed nature of the valley topography, where visibility of the proposed wind cluster could not be avoided or reduced. Therefore, in order to minimise any potential adverse visual impacts, a design process was undertaken which aimed to achieve a clarity and simplicity of visual image and balance of compositional layout from a range of selected viewpoints, both in terms of the overall layout and the detailed arrangement of turbines, the selection of turbine height to relate to the scale of the receiving landscape, whilst seeking to keep the turbines as low as possible on the site to avoid any compromising of the skyline of the hills to the north when seen from the wider lowland agricultural landscape to the south and east. This process has ensured that the proposal has achieved the best design integration with the visual character and amenity of the site, its surroundings and the Study Area.

4.7.3 Four of the selected viewpoints for visual assessment have been identified as having moderate adverse impacts on visual amenity resulting from the introduction of the proposed development, and which are considered to be significant, predominantly due to their close proximity to the development site and the high sensitivity of viewers. It is not considered that any further modifications to the turbine layout and appearance of the proposed development could reduce these impacts to a level which is considered to be not significant. Consequently, the residual impacts on the visual amenity of selected viewpoints are as outlined in Table 4.16.

4.7.4 Despite identifying an overall limited number of significant landscape and visual impacts as a result of the introduction of the proposed wind farm, it is considered that there are no further mitigation measures that would be practical and achievable to reduce these impacts to a level which would be considered as not significant, whilst ensuring that the project remained economically viable.

4.8 Assessment of Cumulative Landscape and Visual Impact

Introduction and Scope

4.8.1 This section considers the potential for cumulative landscape and visual impacts resulting from the introduction of the proposed wind energy cluster, in association with other known wind energy proposals as of October 2012.

4.8.2 The underlying premise of the cumulative assessment is to consider the additional cumulative landscape and visual impact which the introduction of the proposal would have on a range of landscape and visual considerations, assuming that all other wind farm projects were to be realised. In this respect, it therefore focuses on the additional areas of theoretical visibility which would occur from the introduction of the proposal outwith the extent of the cumulative visibility pattern of other projects, together with any areas of combined theoretical visibility which would occur from the proposed development with these other projects. It therefore follows that no cumulative impact could occur from the proposal in areas where it would not be theoretically visible in its own right, and this determines the nature and scope of the cumulative assessment.

4.8.3 Cumulative impact assessment guidance recommends that the cumulative assessment should concentrate on the developments which are considered most likely to cause significant cumulative impacts with the proposal. Consequently, the cumulative assessment only considers other wind farm projects within a 50km radius of the proposed wind farm, which is twice the radius of the 25km study area for the proposed development in isolation. This study area radius is considered appropriate to determine the likelihood of any significant cumulative impacts which might arise from the introduction of the proposed development. Consideration has been given within the cumulative assessment to other projects which are operational, consented and proposed projects for which a formal planning application has been submitted, in accordance with accepted guidance.

4.8.4 The cumulative landscape and visual impact assessment will consider the following issues:

- Establishing the cumulative baseline conditions of wind farm development within a radius of 50km of the proposal site for projects comprising of turbine heights of 50m and above. These wind farms are indicated on Figure 4.22, together with their status;
- Establishing the cumulative baseline conditions of wind farm development within a radius of 25km of the proposal site for projects comprising of turbine heights of 25-50m. These wind farms are indicated on Figures 4.23 and 4.24, together with their status. This assessment will concentrate on those projects within the 25km radius as being those most likely to give rise to cumulative impacts in combination with the proposal;
- Specific consideration will be given to any projects of less than 50m turbine height where they are located within 5km of the proposal site, although it is considered that it is unlikely that the

introduction of the proposal would be likely to result in significant impacts with turbines of that height;

- Consideration of the scale, pattern and spatial distribution of operational, consented and planning application proposals of 50m turbine heights and above, to determine the scope and extent of the cumulative assessment;
- Determining the cumulative magnitude of change to the landscape resource and visual amenity baseline conditions resulting from the introduction of the proposal, in relation to the scale, pattern and extent of other wind farm development within the Study Area;
- Determining the nature and significance of any likely cumulative effects on the landscape resource and visual amenity baseline conditions, resulting from the changes identified.

4.8.5 Considering the geographic distribution of wind energy developments of 50m turbine height and above within the 50km Study Area boundary, as shown on Figure 4.22, a distinct pattern of 'clustering' of separate developments within generalised geographic areas can be determined, and this geographic pattern will be used to consider the likely cumulative impact of the proposal in association with each of these separate geographic clusters. The various geographic clusters can be defined as:

- A cluster to the west and south-west of Stonehaven – reference Cluster 1
- A cluster in the vicinity of Laurencekirk – reference Cluster 2
- A cluster to the west and east of Brechin – reference Cluster 3
- A cluster generally equidistant from Forfar, Montrose and Arbroath – reference Cluster 4
- A cluster to the south of Forfar – reference Cluster 5
- The Nathro Hill proposal, which, due to its scale and close proximity to the proposal site, will be considered as an individual project.

4.8.6 For each of these clusters, for simplicity of preparing and interpreting cumulative ZTV plans, the constituent projects within each cluster will be combined as a single development proposal, rather than represented as individual projects, to determine their collective spread of theoretical visibility. These composite ZTVs, prepared using information on turbine heights and layouts for the wind farms involved, will be combined with that of the proposal.

4.8.7 These cumulative ZTVs will use as their basis only the theoretical visibility of any wind turbines within the wind farm, rather than an indication of how many turbines would be theoretically visible. The

overlap of these ZTVs reveal patterns of theoretical visibility that enable the identification of locations from where the proposal may be seen in combination with other existing, consented or proposed development, or where the proposal introduces additional areas of theoretical visibility of wind turbines within the study area. Consequently, where combined theoretical visibility is indicated, this means that a viewer at that location would theoretically be able to see some part of both the proposed wind energy cluster and some of the other identified wind farms. However, this information does not indicate how many turbines from each wind farm would be theoretically visible, nor the visible extent of the turbines or their appearance, and therefore represents a 'worst case' scenario regarding the extent of cumulative visibility.

4.8.8 Given the considerable number of projects of 25-50m turbine height within a 25km radius of the proposal site, these projects will be plotted as a single ZTV, where the number of turbines visible at any point will be grouped into different bands i.e. 1-4 turbines, 5-8 turbines etc. The ZTV of the proposal will be overlaid onto this composite ZTV as a hatch to identify those locations where the proposal would introduce additional levels of turbine visibility. This assessment will concentrate on a 15km detailed Study Area where it is considered that significant impacts would be most likely to occur.

4.8.9 The ZTVs produced for the cumulative assessment do not take into account the potential screening effect of buildings, trees or other surface obstacles. Additionally, the ZTVs produced represent the theoretical visibility of the turbine tips only. In these respects, they represent the worst-case scenario of cumulative visibility.

Analysis of Cumulative ZTV Plans

In Combination with Cluster 1 (Figure 4.25)

4.8.10 The cluster to the south-west of Stonehaven has an extensive although fragmented ZTV spread which covers large parts of the lowland area of Angus. The addition of Lower Cairny would result in limited additional areas of theoretical visibility being added to the overall ZTV pattern, limited mostly to the immediate area around the proposal site in the West Water Valley and sections along the Highland Boundary Fault to the north-east, along with very limited areas within the lowlands of Angus. The addition of Lower Cairny would lead to some further intensification of the visibility of turbines from areas predominantly within the lowlands of Angus which would have visibility with the Cluster 1 windfarms.

4.8.11 Given the above, it is considered that the proposed wind cluster would have a negligible cumulative change to the theoretical visibility spread and that any cumulative impact would be slight adverse at most in combination with the Cluster 1 windfarms to the south-west of Stonehaven.

In Combination with Cluster 2 (Figure 4.26)

4.8.12 The cluster in the vicinity of Laurencekirk has an extensive ZTV spread which covers much of lowland Angus and is predominantly contained by the Highland Boundary Fault line to the north. The addition of Lower Cairny would result in limited additional areas of theoretical visibility being added to the overall ZTV pattern, limited mostly to the immediate area around the proposal site in the West Water Valley and sections along the Highland Boundary Fault to the north-east, along with very limited areas within the lowlands of Angus. The addition of Lower Cairny would lead to some further intensification of the visibility of turbines from areas predominantly within the lowlands of Angus with the Cluster 2 windfarms.

4.8.13 Given the above, it is considered that the proposed wind cluster would have a negligible cumulative change to the theoretical visibility spread and that any cumulative impact would be slight adverse at most in combination with the Cluster 2 windfarms in the vicinity of Laurencekirk.

In Combination with Cluster 3 (Figure 4.27)

4.8.14 The cluster to the west and east of Brechin has an extensive ZTV pattern which covers much of lowland Angus and is generally contained by the Highland Boundary Fault to the north and north-west. The addition of Lower Cairny would add some limited additional areas of theoretical visibility, predominantly in the West Water Valley close to the proposed site and in the area to the north of Logie Pert. The addition of Lower Cairny would lead to some further intensification of the visibility of turbines from areas predominantly within the lowlands of Angus with the Cluster 3 windfarms.

4.8.15 Given the above, it is considered that the proposed wind cluster would have a low cumulative change to the theoretical visibility spread and that any cumulative impact would be slight adverse in combination with the Cluster 3 windfarms to the west and east of Brechin.

In Combination with Cluster 4 (Figure 4.28)

4.8.16 The cluster generally equidistant from Forfar, Montrose and Arbroath has a generally fragmented pattern of theoretical visibility, which extends through much of the Study Area. The addition of Lower Cairny would extend the pattern of theoretical visibility of turbines within the Study Area, particularly in the West Water Valley, the central lowland area between Brechin and Laurencekirk and along the A90 corridor north of Laurencekirk. The addition of Lower Cairny would lead to limited intensification of the visibility of turbines from areas predominantly within the lowlands of Angus and along the Highland Boundary Fault with the Cluster 4 windfarms.

4.8.17 Given the above, it is considered that the proposed wind cluster would have a low cumulative change to the theoretical visibility spread and that any cumulative impact would be slight adverse in combination with the Cluster 4 windfarms in the vicinity of Forfar, Montrose and Arbroath.

In Combination with Cluster 5 (Figure 4.29)

4.8.18 The cluster to the south of Forfar has an extensive spread of theoretical visibility through much of the southern and central section of the Study Area. The addition of Lower Cairny would extend the pattern of theoretical visibility within the Study Area, particularly in the West Water Valley, the central lowland area north of Brechin, an area south of Montrose and to the north of Arbroath near Leysmill. The addition of Lower Cairny would lead to limited intensification of the visibility of turbines predominantly from areas in the vicinity of Laurencekirk and Fettercairn with the Cluster 5 windfarms.

In Combination with Nathro Hill (Figure 4.30)

4.8.19 Nathro Hill indicates a very extensive spread of theoretical visibility throughout the Study Area, with almost complete coverage of the lowland area of Angus and extending northwards into the higher remoter areas of the Highland region of Angus. The addition of Lower Cairny would result in a very limited increase in area where turbines would be visible, limited to small areas in the local vicinity of the proposal site. The addition of Lower Cairny would lead to some intensification of the visibility of turbines within the lowland area of Angus and in areas along the Highland Boundary Fault.

4.8.20 Given the above, it is considered that the proposed wind cluster would have a negligible cumulative change to the theoretical visibility spread and that any cumulative impact would be slight adverse at most in combination with the Nathro Hill proposal.

In Combination with Turbine Heights of 25-50m (Figures 4.31 and 4.32)

4.8.21 Figure 4.31 indicates the ZTV pattern of the approved projects/turbines throughout the 15km detailed Study Area, with the ZTV pattern of Lower Cairny overlaid. This indicates the extensive spread of theoretical visibility of approved turbines throughout the south-eastern section of the detailed Study Area, with the large majority of lowland Angus indicating theoretical visibility with various numbers of turbines and with few areas having no theoretical visibility of turbines, and with more limited theoretical visibility throughout the north-eastern section. The addition of Lower Cairny would lead to a very slight increase in the overall extent of area of theoretical visibility of turbines throughout the detailed Study Area. Most of the area of the ZTV pattern of Lower Cairny would have theoretical visibility with varying numbers of turbines, predominantly in the range of 1-8 turbines visible.

4.8.22 Figure 4.32 indicates the ZTV pattern of the approved and application projects/turbines throughout the 15km detailed Study Area, with the ZTV pattern of Lower Cairny overlaid. This indicates a similar overall spread of theoretical visibility throughout the detailed Study Area to that of Figure 4.31, but with greater numbers of turbines being visible. The addition of Lower Cairny would lead to a very slight increase in the overall extent of area of theoretical visibility of turbines throughout the detailed Study Area. Most of the area of the ZTV pattern of Lower Cairny would have theoretical visibility with varying numbers of turbines, predominantly in the range of 9-16 turbines visible.

4.8.23 Given the above, it is considered that the proposed wind cluster would have a negligible cumulative change to the theoretical visibility spread and that any cumulative impact would be slight adverse at most in combination with the 25-50m approved and application projects/turbines.

In Combination with Turbine Heights of 25-50m within 5km

4.8.24 Within 5km of the Lower Cairny site, there would be two proposed projects, comprising a single 46m turbine at Chapleton of Menmuir and another single 46m turbine at Balrennie Farm. These would lie on the southern side of the Menmuir ridge and would therefore be physically and predominantly visually separate from Lower Cairny which lies to the north on the lower slopes of Hill of Wirren, although there would be some inter-visibility of both developments from locations along the intervening Menmuir ridge and from areas to the east of Edzell. However, it is considered that wind turbines would not become a prominent characteristic of the local area within 5km of the Lower Cairny site following is introduction

and that any cumulative impact of these separate developments on the local landscape and visual character would be slight adverse at most. Opportunities to see both the proposal and the two single turbines simultaneously from local residential properties would be very limited and it is likely that intervening tree groups would restrict this further, such that any impact on residential amenity would be negligible. Whilst Lower Cairny and the two single turbines would be visible from the Caterthuns, they would be seen in different directions and not within the same arc of view. In views towards the Caterthuns, there would be limited opportunities to see the different developments within the same view, and given the relative heights and distances of the turbines from the hillforts, it is considered that the Caterthuns will remain a dominant element in the landscape.

Summary

4.8.25 Consideration has been given to the combination of the proposed wind energy cluster with other wind farm projects and individual turbines within the surrounding area, in order to assess levels of cumulative impact throughout the Study Area. Generally this assessment has concluded that the introduction of the proposed wind energy project would have limited areas of cumulative theoretical visibility with these other proposals, or would contribute little to the further increase in the extent and pattern visibility of wind turbines throughout the Study Area.

Cumulative Landscape Character Impacts

4.8.26 The proposed Lower Cairny Wind Energy Cluster would not be located within the same landscape character unit as any other existing, consented or application projects, and therefore the issue of potential cumulative landscape character impacts on the 'Edzell Foothills' landscape unit would not arise. Consequently, in spatial design terms, in relation to existing wind energy development within the Study Area, the proposed site occupies a site which is generally physically and visually separate from other operational and consented wind farm developments. This spatial arrangement would allow the proposed wind energy cluster to be adequately differentiated as a clearly separate wind energy development from existing operational and consented wind farms within the Study Area.

4.8.27 The proposed Nathro Hill wind farm would be located within the '*Muckle Cairn/Hill of Glansie/Hill of Wirren'* unit of the Highland Summit and Plateaux landscape type, in the area to the west of the '*West Water Valley*' unit of the Mid Highland Glens landscape type. The scale of the Nathro Hill proposal, comprising of 17 turbines at 134m blade tip height, represents a considerable wind energy development,

where it would be likely to have extensive and adverse landscape character impacts on not only the landscape unit in which it is located but also on adjacent, smaller scale landscape units such as the '*West Water Valley'*. It is considered that the addition of Lower Cairny to the Nathro Hill proposal would result in a negligible cumulative change to the '*Muckle Cairn/Hill of Glansie/Hill of Wirren*' unit of the Highland Summit and Plateaux landscape type, and a low cumulative change on the '*West Water Valley'* landscape unit, and therefore any cumulative impact on these landscape units resulting from the introduction of Lower Cairny would be slight adverse in combination with Nathro Hill.

4.8.28 Given the extensive number and visibility spread of operational, consented and application projects throughout the Study Area, the addition of Lower Cairny would have a negligible cumulative change to the landscape character units throughout the Study Area, and any cumulative impact on landscape character would be slight adverse at most.

Cumulative Visual Impact at Selected Viewpoints

4.8.29 The selected viewpoints used in the visual assessment as identified in Table 4.2 above were also considered in relation to cumulative visual impacts, by considering their location in relation to the patterns of cumulative visibility indicated on the cumulative ZTV maps. These cumulative ZTV maps indicate that all of the originally selected viewpoints for visual assessment would have some degree of cumulative theoretical visibility with other projects included in the cumulative assessment, and therefore would be likely to be subject to cumulative impacts resulting from the introduction of the proposed wind energy cluster.

4.8.30 360° cumulative wireline visualisations were generated for the selected viewpoints. These wirelines assisted in identifying the number and extent of wind farms/turbines that would be theoretically visible from each viewpoint. It should be noted that for each of these viewpoints, their location, baseline conditions and sensitivity of the resource is as previously described within the visual impact assessment for the individual proposed wind energy cluster. The assessments assume that the other existing, consented and proposed wind farms/turbines are all present, and the cumulative change to visual amenity results from the introduction of the Lower Cairny Wind Energy Cluster. Where the assessment of impact of Lower Cairny in isolation has previously concluded that there would be no impact, the proposed development could therefore have no cumulative impact and therefore cumulative

wirelines are not presented for these viewpoints, although an assessment of cumulative impact is included for completeness.

4.8.31 Tables 4.17 to 4.29 below identify the cumulative impacts from each of the selected cumulative viewpoints.

Table 4.17			
Viewpoint: 1	Pirner's Brig picnic site car park		
Figure:	4.33	Distance / bearing to nearest turbine	2.47km / 295°
Grid Reference	NO 57821 68931	Elev. of viewpoint	77m +/- 6m acc.
Cumulative Change to the Visual Amenity From this viewpoint, several of the proposed Nathro Hill turbines would be visible, seen predominantly as blades above the skyline horizon, where they would be seen appearing and disappearing above the skyline, and tending to draw the eye towards them. The single Lower Cairny turbine which would be visible from the viewpoint would be seen within the same general arc of view as the Nathro Hill turbines, and, due to its closer location to the viewpoint, would appear as a separate wind energy development. The combination of the two wind energy developments would not dominate the view and wind turbines would not become a key characteristic of the view. A small section of a turbine blade tip is indicated to the south-west of the Menmuir Ridge but would be likely to be fully screened by intervening vegetation and would not contribute to any potential cumulative impact.			
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.			
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • The Nathro Hill turbines would not form a key characteristic of the view; • The addition of the Lower Cairny turbines would not result in turbines becoming a key characteristic of the view; • Whilst the two wind energy developments would be seen in visual combination, they would not dominate the view; • The sensitivity of the viewpoint is medium; • The magnitude of cumulative change is considered to be low. Considering the above factors, it is concluded that the introduction of Lower Cairny would have a **slight adverse cumulative** visual impact at Viewpoint 1.			

Table 4.18			
Viewpoint: 2	Edzell Castle Gardens		
Figure:	N/A	Distance / bearing to nearest turbine	2.98km / 287°
Grid Reference	NO 58442 69101	Elev. of viewpoint	75m +/- 10m acc
Cumulative Change to the Visual Amenity			

Only a few very small turbine blade tips would be visible from the viewpoint at considerable distances, where they would not form a key characteristic of the view. The introduction of Lower Cairny would not change the existing view, as the proposed turbines would be fully screened from view by intervening topography and vegetation.
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **none**, as there would be no additional change to the visual resource resulting from the introduction of Lower Cairny.
Assessment of Cumulative Impact As the proposed turbines of Lower Cairny would not be visible, it is concluded that the introduction of the turbines would have **no cumulative effect** on the visual amenity of Viewpoint 2.

Table 4.19			
Viewpoint: 3	Edzell – western edge		
Figure:	4.34	Distance / bearing to nearest turbine	4.30km / 285°
Grid Reference	NO 59750 68826	Elev. of viewpoint	62m +/- 5m acc
Cumulative Change to the Visual Amenity Nathro Hill would form a visually dominant feature within the view, with its large number of turbines appearing as a large-scale skyline feature of visual complexity. Several small-scale single wind turbines would appear to the immediate south of the Menmuir Ridge and which would break the skyline to varying degrees, although they are likely to be predominantly screened by intervening tree cover and would be associated with the lowland landscape to the south. Other windfarm developments would be visible at distance as small-scale skyline features to the north-east, where they would not form prominent features within the view. Several other turbines would appear at considerable distances to the south and south-west as very small sections of blade tips above the distant horizon, where they would not form a key characteristic of the view. Whilst Lower Cairny would be seen in visual combination with Nathro Hill, its reduced level of visibility due to intervening forestry would result in limited changes to the character of the view.			
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.			
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • The Nathro Hill windfarm would form a dominant visual feature within the view and wind turbines would be a key characteristic of the existing view; • Other wind turbines would be visible to varying degrees in different directions • The addition of Lower Cairny would result in limited change to the character of the view. Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse cumulative** visual impact at Viewpoint 3.			

Table 4.20			
Viewpoint: 4	Inchbare – western edge		
Figure:	4.35	Distance / bearing to nearest turbine	6.59km / 312°

Grid Reference	NO 60481 65575	Elev. of viewpoint	55m +/- 8m acc

Cumulative Change to the Visual Amenity

A grouping of windfarms and individual turbines would be visible to the north-east, with the existing Tullo Farm development forming a noticeable skyline feature, although they collectively would not form a prominent feature of the existing view. The Nathro Hill windfarm would form a prominent skyline cluster of turbines which would tend to draw the eye towards them as a visual focus, as they interrupt the overall skyline profile as it descends from the Hill of Wirren massif to the lowlands. Two other small scale wind turbines would be visible within the same arc of view as Nathro Hill and would form locally prominent features due to their close proximity. Several other turbines would be visible to the south-west but they would form small-scale features within the view. Lower Cairny would be likely to be seen in the same arc of view as Nathro Hill and the small scale turbines at Cairndrum Farm, Balrennie Farm and Chapelton, but would be located low against the backdrop of the higher hills beyond, partially screened by intervening topography and tree cover and being fully backclothed would result in limited change to the character of the view. Nathro Hill would continue to form the key visual feature within the view.

Cumulative Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

Assessment of Cumulative Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- The Nathro Hill windfarm would form a prominent skyline feature within the existing view and would act as a visual focus;
- Small-scale wind turbines would form a locally prominent characteristic of the view;
- The addition of Lower Cairny would result in limited change to the character of the view and would not add to the number of turbines on the skyline profile.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse cumulative** visual impact at Viewpoint 4.

Table 4.21			
Viewpoint: 5	Minor road SW of Edzell, at junction with path		
Figure:	4.36	Distance / bearing to nearest turbine	4.37km / 294°
Grid Reference	NO 59575 68194	Elev. of viewpoint	59m +/- 5m acc

Cumulative Change to the Visual Amenity

Tullo Farm windfarm would be visible to the north-east as a skyline feature, although it would not form a prominent feature of the view. Nathro Hill windfarm would appear as a prominent skyline feature, due to the dense complex clustering of its turbines and its elevated location. Several small-scale single wind turbines would appear to the immediate south of the Menmuir Ridge and which would break the skyline to varying degrees, although they are likely to be predominantly screened by intervening tree cover and would be associated with the lowland landscape to the south. And they would be unlikely to be seen within the same arc of view as Lower Cairny. Lower Cairny would be seen in the same arc of view as Nathro Hill, but would be set low down from the skyline and fully backclothed, and would appear as a clearly separate wind energy development.

Cumulative Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • The Nathro Hill windfarm would form a prominent skyline feature within the existing view and would act as a visual focus; • The addition of Lower Cairny would result in limited change to the character of the view and would not add to the number of turbines on the skyline profile. Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse cumulative** visual impact at Viewpoint 5.

Table 4.22			
Viewpoint: 6	Brown Caterthun summit		
Figure:	4.37	Distance / bearing to nearest turbine	3.07km / 356°
Grid Reference	NO 55547 66906	Elev. of viewpoint	292m +/- 5m acc
Cumulative Change to the Visual Amenity Operational and other application projects would be seen in various directions and at various distances from the viewpoint. Nathro Hill would form a prominent skyline feature to the north-west, whilst to the west two windfarms at Kilcaldrum and Lumleyden would be visible as dispersed skyline features. Tullo Farm would be visible as a skyline feature to the north-east and a few individual small-scale turbines would be visible throughout the lowland agricultural landscape to the south-east and south, several being located within 2km to the east in the vicinity of Balrennie and Chapelton of Menmuir. Wind turbines would be a characteristic of the existing view, although the Nathro Hill windfarm would form the most prominent feature within the view due to its proximity and skyline location, and where it would compete with the visual prominence of the Hill of Wirren skyline. Lower Cairny would not be seen in the same arc of view as the other wind energy developments within the view, and would introduce wind turbines into a part of the view where they are not currently present.			
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.			
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • Wind turbines would form a characteristic of the existing view, and would be visible in various directions; • Nathro Hill windfarm would form a prominent skyline feature within the existing view; • Lower Cairny would add further turbines into the view, in a location where turbines would not be present. Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse cumulative** visual impact at Viewpoint 6.			

Table 4.23			
Viewpoint: 7	White Caterthun summit		
Figure:	4.38	Distance / bearing to nearest turbine	3.92km / 7°
Grid Reference	NO 54816 66090	Elev. of viewpoint	300m +/- 5m acc.

Cumulative Change to the Visual Amenity

Operational and other application projects would be seen in various directions and at various distances from the viewpoint. Nathro Hill would form a prominent skyline feature to the north-west, whilst to the west two windfarms at Kilcaldrum and Lumleyden would be visible as dispersed skyline features. Tullo Farm would be visible as a skyline feature to the north-east and a few individual small-scale turbines would be visible throughout the lowland agricultural landscape to the south-east and south, several being located within 2km to the east in the vicinity of Balrennie and Chapelton of Menmuir. Wind turbines would be a characteristic of the existing view, although the Nathro Hill windfarm would form the most prominent feature within the view due to its proximity and skyline location, and where it would compete with the visual prominence of the Hill of Wirren skyline. Lower Cairny would not be seen in the same arc of view as the other wind energy developments within the view, and would introduce wind turbines into a part of the view where they are not currently present.

Cumulative Magnitude of Change

The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.

Assessment of Cumulative Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- Wind turbines would form a characteristic of the existing view, and would be visible in various directions;
- Nathro Hill windfarm would form a prominent skyline feature within the existing view;
- Lower Cairny would add further turbines into the view, in a location where turbines would not be present.

Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse cumulative** visual impact at Viewpoint 7.

Table 4.24			
Viewpoint: 8	A90 Lay-by		
Figure:	4.39	Distance / bearing to nearest turbine	8.56km / 316°
Grid Reference	NO 61461 63760	Elev. of viewpoint	84m +/- 5m acc

Cumulative Change to the Visual Amenity

There would be a grouping of wind energy developments to the north-east, most of which would appear skylined, with Tullo Farm being locally prominent. Nathro Hill would form a densely grouped, complex arrangement of turbines on the skyline to the west. There would be several other turbines visible to the south-west, although these would be of limited prominence. A random grouping of individual small-scale turbines would be visible between the viewpoint and the Lower Cairny site, and Lower Cairny would be seen in the same arc of view as these, although their overall combination would not result in wind turbines becoming a key characteristic of the view, due to the combination of distance, intervening topography and vegetation and being set down low within the landscape avoiding prominent skyline locations. Lower Cairny would not be seen in combination with the other wind energy developments within the view. However, the proposed turbines would form a very small-scale addition to the existing

view, such that it would be largely unaffected.

Cumulative Magnitude of Change

The magnitude of change to the visual resource is considered to be **low**, as there would be a noticeable change to the characteristics of the view.

Assessment of Cumulative Impact

The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint:

- Wind turbines would be visible in various directions from the viewpoint;
- Nathro Hill and Tullo Farm would form locally prominent features within the view;
- Lower Cairny would add further turbines into the view;
- Lower Cairny would comprise a small-scale addition to the existing view;
- Lower Cairny would not add further turbines onto the existing skyline profile.

Considering the above factors, it is concluded that the introduction of the turbines would have a **slight adverse cumulative** visual impact at Viewpoint 8.

Table 4.25			
Viewpoint: 9	A90 junction		
Figure:	N/A	Distance / bearing to nearest turbine	10.26km / 290°
Grid Reference	NO 65238 66426	Elev. of viewpoint	36m +/- 5m acc

Cumulative Change to the Visual Amenity

Various turbines would be visible to the north-east, seen predominantly as skyline features. Nathro Hill would form a densely grouped cluster of turbines, predominantly skylined to the west, where they would create a complex visual image. The introduction of Lower Cairny would not change the existing view, as the proposed turbines would be fully screened from view by intervening topography and vegetation.

Cumulative Magnitude of Change

The magnitude of change to the visual resource is considered to be **none**, as there would be no change to the visual resource.

Assessment of Cumulative Impact

As the proposed turbines would not be visible and the magnitude of change would therefore be none, it is concluded that the introduction of the turbines would have **no effect** on the visual amenity of Viewpoint 9.

Table 4.26			
Viewpoint: 10	South of Fettercairn		
Figure:	4.40	Distance / bearing to nearest turbine	10.25km / 254°
Grid Reference	NO 65487 72809	Elev. of viewpoint	64m +/- 7m acc

Cumulative Change to the Visual Amenity

Nathro Hill would form an extensive arrangement of turbines predominantly skylined, where they would form a prominent feature of the view and would visually compete with the prominence of the Hill of Wirren massif. A single turbine near Laurencekirk and two small-scale turbines would be locally prominent and Tullo Farm would be skylined to the east. Lower Cairny would appear below the Nathro Hill windfarm in the same arc of view, although its very limited visibility of a single blade tip would make

it barely perceptible, and would have minimal if any change on the character of the view.
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **negligible**, as there would be a discernible change to the characteristics of the view.
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • Nathro Hill would form a prominent feature of the existing view; • Lower Cairny would appear within the same arc of view as Nathro Hill, although only a very short section of a single turbine blade tip of Lower Cairny would be visible, which at 10km distance would be barely perceptible. Considering the above factors, it is concluded that the introduction of the turbines would have **no effect** at Viewpoint 10, as there would only be a negligible change to the visual character of the view which would be barely perceptible from a viewpoint classed as low sensitivity.

Table 4.27			
Viewpoint: 11	Hill of Finavon fort		
Figure:	4.41	Distance / bearing to nearest turbine	14.98km / 17°
Grid Reference	NO 50760 55698	Elev. of viewpoint	206m +/- 5m acc
Cumulative Change to the Visual Amenity The Hill of Finavon turbines would be locally dominant due to their close proximity to the viewpoint and would be seen in combination with other turbine groups to the south-west. Nathro Hill would form an extensive arrangement of turbines along the skyline profile, and would form a prominent visual feature within the view. Lower Cairny would introduce a very small section of a single blade tip into the view, above an intervening ridgeline, and given the distance involved would be barely perceptible.			
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **negligible**, as there would be a discernible change to the characteristics of the view.			
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • The combination of Hill of Finavon and Nathro Hill windfarms, together with other wind energy developments would result in wind turbines being a characteristic of the existing view; • Only a very short section of one of the Lower Cairny turbine blade tips would be visible, which at almost 15km distance would be barely perceptible. Considering the above factors, it is concluded that the introduction of the turbines would have **no effect** at Viewpoint 11.			

Table 4.28			
Viewpoint: 12	Bridgend road junction		
Figure:	4.42	Distance / bearing to nearest turbine	2.65km / 41°
Grid Reference	NO 53583 68005	Elev. of viewpoint	154m +/- 5m acc
Cumulative Change to the Visual Amenity			

Only part of one turbine blade of Nathro Hill would be visible above the skyline. Tullo Farm would be visible looking along the West Water Valley, but would be located c20km from the viewpoint where it would not be prominent. Turbines would not form a key characteristic of the view. The addition of Lower Cairny would introduce turbines as new skyline features where they would be likely to become a new visual focus within the view.
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • Turbines would not be a characteristic of the existing view • Lower Cairny would become a new visual focus within the view, given their skyline location. Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse cumulative** visual impact at Viewpoint 12.

Table 4.29			
Viewpoint: 13	Minor road west of Caterthuns – Tullo Farm		
Figure:	4.43	Distance / bearing to nearest turbine	3.5km / 27°
Grid Reference	NO 53743 66863	Elev. of viewpoint	177m +/- 6m acc
Cumulative Change to the Visual Amenity Nathro Hill would be seen as a small group of turbines set above and beyond the skyline profile, with turbines being visible to varying extents above the horizon. Given the small extent of turbines visible, they would not form a prominent feature of the view. No other turbines would be visible. The addition of Lower Cairny would introduce turbines into the view, backclothed by higher topography although their close proximity would result in them becoming a new prominent visual feature within the view.			
Cumulative Magnitude of Change The magnitude of change to the visual resource is considered to be **medium**, as there would be a considerable change to the characteristics of the view.			
Assessment of Cumulative Impact The following considerations have been taken into account in determining the impact of the proposed changes on the viewpoint: • Although visible, turbines would not be a characteristic of the view; • Lower Cairny would be likely to become a new visual focus within the view. Considering the above factors, it is concluded that the introduction of the turbines would have a **moderate adverse cumulative** visual impact at Viewpoint 13.			

Summary Table

4.8.32 A summary of the cumulative visual impact of the proposal on the selected viewpoints is presented in Table 4.30 below. Note that Moderate and Substantial Effects are considered to be significant.

Table 4.30: Summary of Cumulative Visual Impact at Selected Viewpoints				
VP No	**Location**	**Sensitivity**	**Magnitude of Cumulative Change**	**Assessment of Cumulative Impact**
1	Pirner's Brig picnic site car park	High	Low	Slight Adverse
2	Edzell Castle Gardens	High	None	No Effect
3	Edzell – western edge	High	Low	Slight Adverse
4	Inchbare – western edge	High	Low	Slight Adverse
5	Minor road SW of Edzell, at junction with path	Medium	Low	Slight Adverse
6	Brown Caterthun summit	High	Medium	Moderate Adverse
7	White Caterthun summit	High	Medium	Moderate Adverse
8	A90 Lay-by	Low	Low	Slight Adverse
9	A90 junction	Low	None	No Effect
10	South of Fettercairn	Low	Negligible	No Effect
11	Hill of Finavon fort	Medium	Negligible	No Effect
12	Bridgend road junction	High	Medium	Moderate Adverse
13	Minor road west of Caterthuns – Tullo Farm	Medium	Medium	Moderate Adverse

4.9 Review of Strategic Landscape Capacity Assessment for Wind Energy in Angus – Ironside Farrar, Final Report, March 2014

4.9.1 Introduction

This section considers the '*Strategic Landscape Capacity Assessment for Wind Energy in Angus*' (SLCAWEA) report, and considers a range of issues included in the SLCAWEA which are relevant to the Lower Cairny proposal. It also outlines detailed comments in relation to particular landscape capacity and design related issues.

The key purpose of the SLCAWEA, undertaken as part of a joint study with neighbouring Aberdeenshire to the north, is to provide strategic guidance on the capacity of the landscape across both areas to accommodate wind turbine development, and to inform the review of the Angus Development Plans' spatial framework and supplementary planning guidance, in line with Scottish Planning Policy. SPP and Scottish Government guidance identifies cumulative impacts and landscape capacity as being critical to the identification of areas of search as part of spatial frameworks, and the assessment has thus been prepared to inform the Council on the issues of landscape capacity and cumulative impact.

The SLCAWEA is based on the premise that, given current renewable energy targets, it is accepted that there will be a degree of landscape change and effects on visual amenity resulting from wind energy development, and that these will require careful management in relation to the perceived significance and acceptability of cumulative changes caused by multiple wind energy developments in the landscape.

The study recognises that landscape capacity is only one consideration and a range of other environmental and technical issues also require to be considered in drawing up spatial frameworks and Supplementary Planning Guidance (SPG) for wind farm development throughout Angus.

The assessment considered the sensitivity of landscape character types throughout Angus, considering key sensitivities of landscape character, visual amenity and the value placed on the landscape in the form of scenic designations and other recognised interests. The sensitivity assessment also considered potential cumulative issues associated with existing and consented wind farm developments. It therefore represents a strategic study which identifies broad landscape and visual constraints and opportunities for a range of wind energy development scenarios. The assessment recognises that individual wind farm applications will need to be considered on a case-by-case basis, with Environmental Impact Assessment (EIA) studies, where relevant, providing more detailed information on landscape and visual issues.

In relation to the proposed development at Lower Cairny, a comprehensive detailed landscape capacity study and associated design development process has been undertaken in relation to the scale of development proposed, which has been directly informed by an appreciation of the landscape and visual characteristics of the site and its surroundings. In addition, a full LVIA, which considers in detail the likely landscape and visual impacts of the proposed wind cluster which would result, has been undertaken.

It should be recognised that the SLCAWEA, in considering issues of sensitivity at a regional scale, is unable to take account of site-specific detailed design strategies which individual developments may adopt in direct response to the specific sensitivities of particular sites, and in relation to the general issue of 'capacity'. The role of design, in as much as it determines the visual appearance of a wind farm within the landscape, and how the layout of a wind farm relates to particular characteristics, patterns and features of the landscape, is considered fundamental to a detailed consideration of 'landscape capacity' in relation to individual developments – how a wind farm looks within, and relates to, the landscape is equally, if not more, important than whether it can be seen, given that it is widely acknowledged that any wind farm development will become a new visual feature within a landscape. This approach is consistent with the guidance contained within SNH's document 'Siting and Designing Windfarms in the Landscape, 2014, which reinforces the role and importance of design in the strategic siting and detailed layout of wind farm developments.

The site of the proposed wind cluster is located within the '*Highland Foothills*' landscape character type (LCT), and specifically within the '*Edzell Foothills*' landscape character area (LCA) used within the SLCAWEA. Consequently, the elements of the assessment which refer to this character type/area have been used as a basis for reviewing the proposed wind cluster in relation to issues of landscape and visual sensitivity, and capacity, included within the assessment.

In considering the proposed development in relation to the SLCAWEA and its findings, specific statements included within the assessment have been reviewed in relation to the proposed wind cluster, and the more detailed summary table for the '*Highland Foothills'* LCT has been used to provide a related commentary in response to statements made regarding landscape analysis and associated issues. It should be noted that much of the commentary within this review is derived from the more detailed landscape capacity study, design development and landscape and visual impact assessment work included within the Lower Cairny Environmental Statement.

4.9.2 Consideration of General Issues Raised in the SLCWEA

This section considers the proposed development in relation to a series of general issues related to sensitivity and capacity which are contained within the SLCAWEA. Comments are provided in relation to these, concerning matters of geographic location, specific detailed characteristics of the Lower Cairny landscape or aspects of the development's design strategy in response to particular characteristics or sensitivities.

SLCAWEA Report Statements	**Comments**
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.	The landscape and visual sensitivity of the proposed site location as part of a complex transitional landscape has been recognized in the detailed landscape capacity and design work undertaken in developing the proposal. Generally, the proposal site does not comprise a prominent feature within the overall landscape but forms a small part of a more extensive, both horizontally and vertically, area of hills which form the important visual backdrop to the settled lowlands of the Howe of the Mearns. Detailed consideration of the turbine height, layout and elevation has sought to minimise any adverse impacts on the Highland Boundary Fault, in order to protect the visual integrity of the central 'core' area of higher hill summits and the wider skyline profile of hill slopes along the fringe of the *Highland* landscape region when viewed from Strathmore. As such, it is considered that the proposal site has the landscape capacity to accommodate the scale of development proposed.
Areas of No Capacity *Some upper parts of Highland Glens and Highland Foothills which extend into the*	The *Edzell Foothills* LCA is geographically separate from the Core Area of Wild Land and, due to the low elevation of the proposed

Lochanagar and Mount Keen draft Core Area of Wild Land and are contiguous with the Highland Summits and Plateaux.	turbines, there would be no visibility of the proposal in this area. The adjacent relationship of the *Edzell Foothills* with the *Highland Summits and Plateaux* ensures that the proposed turbines would be fully backclothed by higher ground when viewed from the lowlands of Strathmore, and the visual separation of the proposed turbines from the important skyline profile would ensure that the visual integrity of this would be retained.
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.	The design approach of siting the proposed turbines at a low elevation, where they would be more directly related to the surrounding agricultural landscape rather than to the upland moorland, and where they would avoid compromising the important skyline profile of the Highland Boundary Fault, has been a key factor in establishing a layout of an appropriate scale to its landscape and visual context, and demonstrates that some limited and considered wind energy development can be accommodated with the *Edzell Foothills* LCA.
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.	A comprehensive and site-specific design strategy has informed the layout and scale of the proposed wind cluster, based on a detailed appreciation of the landscape and visual characteristics of the site and its surroundings, and which has demonstrated that the area has capacity to accept the scale of development proposed. A full LVIA and cumulative landscape and visual impact assessment has been undertaken in support of the application.

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 proposed turbines would not affect the 'striking contrast' between highlands and lowlands. They would appear as a small-scale element located low on the hill slopes of the Highland Boundary Fault, subservient to the larger scale and visual prominence of the hills. The visual separation between the proposed turbines and the skyline profile would ensure that the important skyline remains intact and undeveloped.
…the potential sensitivity of the highland landscapes as a backdrop to Angus and proximity to the Cairngorms National Park.	Previous commentary has discussed the relationship of the proposed turbines to the highland backdrop to Angus. The proposal site is remote from the Cairngorms National Park and would have no effect on this designated landscape.
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.	The proposed wind cluster comprises of two turbines and therefore is categorized as a small development. Although the proposed turbines fall within the medium/large scale category, the proposed development is not considered to constitute a significant development. Location on the 'prominently visible backdrop to the lowlands' does not necessarily result in a very significant or significant (landscape and visual) effect. Assessment of selected viewpoints within the surrounding lowlands indicates that the proposed turbines would have limited overall visual impact on these, and where any impacts would be of a minor, and not significant, nature.
The consented developments in highland areas have single or low numbers of turbines of a	The proposal for two turbines continues the current size pattern of wind energy

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.	developments in the highland areas, although they would be of a medium/large scale. Detailed landscape capacity work indicates that the proposal site and its surroundings have the capacity to accept the scale of turbines proposed. The proposal site is not located in the highest area of the Highland landscape area, but on the much lower lying periphery close to the boundary with the adjacent lowland agricultural landscape.

4.9.3 Consideration of Specific Issues of the 'Highland Foothills' LCT

This section considers the proposed development in relation to the specific issues identified within the detailed section of the SLCAWEA relating to the '*Highland Foothills*' LCT in which the proposed development would be located, and particularly in relation to the section relating to the '*Edzell Foothills'* LCA.

SLCAWEA Report Description	**Comments**
(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.*	The small geographic extent of the LCA obviously limits the overall topographic range which occurs within the *Edzell Foothills,* specifically as the LCA predominantly comprises of Hill of Edzell. The design development of the proposal has given consideration to the wider topographic context within which the *Edzell Foothills* are experienced in determining an appropriate scale of turbine for the site and its surroundings. Consequently, it is considered that the proposed turbines do not 'visually dominate or overwhelm' the scale of the hill slopes on which they are located and which are seen within the context of the higher adjacent hills to the north.

	The report clearly recognises the inter-relationship between the LCA and the surrounding LCTs/LCAs, such that the LCA is not seen in isolation but as part of a wider and more extensive landscape continuum extending from the lowland agricultural landscape of Strathmore to the open upland summits. The LCA is seen in visual combination with these larger scale surrounding LCTs, with the *Highland Summits and Plateaux* forming a higher and more extensive backdrop to the lower, smaller scale foothills. Consequently, the proposed turbines would not be seen purely in visual relationship with the LCA but within part of a wider landscape context, where their scale would be more readily absorbed in relation to the surrounding larger scale landscapes.
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.	The proposal avoids a location on the more visually sensitive and prominent Hill of Edzell, being located further west within the LCA, where the foothill slopes merge into the higher slopes leading to the upland summits to the north and the individual foothill summits are less pronounced. A detailed design approach to the project has been adopted which, through the combination of turbine height, elevation and location, uses Hill of Edzell to screen views of the proposed turbines from the village and the Castle.
Landscape Analysis: *Smallest of the LCAs. Predominantly a single hill above Strathmore with lower slopes of*	This recognises the visual inter-relationship between the *Edzell Foothills* LCA and the adjacent higher *Highland Summits and Plateaux* LCT,

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.	which forms the key background feature in most views towards the *Edzell Foothills*. Due to their small geographic extent, the *Edzell Foothills* are not seen in visual isolation, except in very close views from their lower slopes, but in combination with the higher upland landscape to the north as a backdrop and with the extensive lowland landscape of Strathmore to the south
Comments on Consented and Proposed Turbines: *Current consented development remains well within* *capacity.*	The report recognises that given the current very limited extent of consented wind energy development within the Edzell Foothills, there remains further capacity for wind energy development within the LCA. The detailed siting and design work undertaken in developing the Lower Cairny proposal has been led by an appreciation of the detailed landscape and visual characteristic of the development site and its surroundings and demonstrates that the area has the landscape capacity to absorb the scale of development proposed.
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.	The proposal site does not form a prominent visual feature within the overall landscape, and is largely seen as a small part of the more extensive, range of hills which form the backdrop to the settled lowlands of Angus. Cairny Hill forms a minor lower level feature of the overall hill massif, being located below the higher hill summits of Hill of Wirren (678m) and its associated summits. This backdrop has an extensive horizontal and vertical scale, and the location of the proposed turbines within views towards these hills, set down on the lower slopes

	away from prominent skyline features, and occupying a very small part of the overall horizontal extent of the hill range indicates that the scale of the turbines would not appear overly large within the context of these views. The avoidance of any visibility of the proposed turbines from Edzell Castle and Edzell village has been a major design layout objective, and has been achieved through careful consideration of turbine height and their detailed positioning in terms of elevation and location.
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.	Refer to previous comments related to the role of the higher backdrop of hills in limiting effects of the proposed turbines. There would be some visibility of the proposed turbines within the West Water Valley, although they would not be visible within the other Angus Glens.
Detailed Guidance for Highland Foothills LCT *Locate turbines in the enclosed farmland or on lower slopes of the hills, avoiding skylines and reducing inter-visibility between turbines groups.*	The design approach has located the proposed turbines on the lower slope areas within the LCT, where they relate directly to the local landscape pattern of the improved and unimproved agricultural fields rather than the more open moorland upper slope area. This approach also ensures that the proposed turbines would not appear as skyline features except in views from within very close proximity, and they would be considerable visual separation between the turbines and the skyline of hills which forms the backdrop to much of Angus. Siting the turbines low down also assists in reducing inter-visibility with other wind energy projects, although these

	are currently limited within the immediate surrounding area.

4.10 Conclusion

4.10.1 This chapter has considered the effects of the proposed Lower Cairny Wind Cluster on the landscape resource and visual amenity of a 20km Study Area around the proposal site. In addition to issues directly related to landscape resource and visual amenity impacts, consideration has also been given to potential impacts on nationally designated landscapes and other designations, to provide a comprehensive assessment of the likely effects of the introduction of the proposed wind cluster throughout the whole of the Study Area.

4.10.2 In a strategic context, the siting of the proposed wind cluster:

- Would not affect the Cairngorms National Park
- Would not affect the Deeside and Lochnagar National Scenic Area
- Would not be located within a landscape character type with a high sensitivity to wind farm development, as defined in the Angus Windfarms, Landscape Capacity and Cumulative Impacts Study.

The proposed site can therefore be considered to be sensitively sited in relation to the key landscape elements of the natural heritage of the Study Area.

4.10.3 Given the scale of development proposed, in terms of turbine numbers and heights, and its proposed layout, the landscape of the proposed wind cluster can be judged to have reasonable capacity to accommodate wind energy development.

4.10.4 Through the adoption of a specific design approach to the scale and height of turbine selected and the design layout generated, adverse landscape and visual impacts have either been avoided or minimised.

4.10.5 Whilst there would be a moderate adverse impact on the landscape character of the proposal site and its immediate surroundings, the introduction of the proposed wind cluster would not result in the wider '*Highland Foothills*' landscape type within which it would be located becoming a 'wind farm landscape', as the small scale of the proposal would not physically or visually form the dominant

characteristic of the landscape. However, local landscape character impacts on this landscape type would still be considered to be moderate adverse. A moderate adverse impact would also occur on the '*West Water Valley'* unit of the '*Mid Highland Glens*' landscape type immediately to the south of the proposal site, due primarily to its close proximity, short range views and the elevated location of the turbines on the adjacent hill slope above the landscape type. Other surrounding landscape types would be largely unaffected by the introduction of the proposed wind cluster, and the wider underlying landscape character of the Study Area would not be compromised by the introduction of the proposed wind cluster.

4.10.6 The large majority of the limited number of designated gardens and designed landscapes within the Study Area would have no visibility with the proposal and would be unaffected. Where visibility would be available, any impacts would be limited and not significant.

4.10.7 The proposed wind farm would not be seen from the main settlements in Angus. Brechin would have no visibility with the proposed wind cluster, and the nearest settlement at Edzell would equally have no visibility due to screening by intervening topography and tree belts, except at its western edge, where any impact would be slight.

4.10.8 The proposed turbines would not be visually prominent when seen from the main roads through Angus, appearing mostly as a small-scale feature in peripheral views, and backclothed by larger and higher hills to the north. Any impacts would be slight-negligible, and not significant.

4.10.9 A number of individual residential properties are located within 2km of the proposal site and have been assessed in terms of visual impact as part of the consideration of the wider impact on residential amenity. All predominantly face west or south, away from the direction of the proposed wind cluster, and associated buildings and/or boundary vegetation often limits views towards the wind cluster site. Any visual impacts on these properties would be slight or no effect, with their primary views being unaffected, and their overall visual amenity would not be significantly affected.

4.10.10 Considering cumulative landscape and visual impacts, no existing, consented or proposed wind farm developments would be located within the same landscape character area as the proposal, and therefore no potential cumulative landscape impacts on the 'Edzell Foothills' would arise. The addition of

Lower Cairny would have limited cumulative impact on other landscape character areas in the vicinity, as it would add little additional level of impact to the proposed Nathro Hill development.

4.10.11 Consideration of the cumulative visual impact of the proposed wind energy cluster on selected viewpoints in addition to existing, consented and application projects indicates predominantly that the introduction of Lower Cairny would add little to the levels of cumulative impact which would occur. Given the close location, scale and elevation of the Nathro Hill proposal, this project would be likely to result in considerable landscape and visual impacts, often appearing as a visually dominant or prominent feature, and the addition of the lower lying, smaller scale Lower Cairny would result in limited additional cumulative impact. Where the proposed wind energy cluster would be seen in association with other projects, predominantly these would be seen in different view directions at considerable distances, and any cumulative visual impact would be slight at most.

4.10.12 In terms of the siting of the proposed wind cluster, the following comments can be made:

- The proposed site is not located in proximity to key tourist features, would not be visible from the nearby Edzell Castle Garden and Designed Landscape and would not affect any visitor centres, hotels or 'beauty spots'
- No golf courses or activity centres would be adversely affected
- National Cycle Route 1 lies to the very eastern periphery of the 20km Study Area and would have no views of the proposed turbines
- Core Paths in the Study Area would be largely unaffected, and any impacts would be slight or negligible
- No ancient woodland or forestry would be affected and no changes to the existing shelterbelt pattern of the proposal site and its surroundings would be required
- The proposal site would be located away from areas valued for their tranquility and remoteness
- No designated tourist routes and viewpoints would be adversely affected.

4.10.13 The small geographic extent of the LCA obviously limits the overall topographic range which occurs within the *Edzell Foothills,* specifically as the LCA predominantly comprises of Hill of Edzell. The design development of the proposal has given consideration to the wider topographic context within which the *Edzell Foothills* are experienced in determining an appropriate scale of turbine for the site and its surroundings. Consequently, it is considered that the proposed turbines do not 'visually dominate or

overwhelm' the scale of the hill slopes on which they are located and which are seen within the context of the higher adjacent hills to the north.

The report clearly recognises the inter-relationship between the LCA and the surrounding LCTs/LCAs, such that the LCA is not seen in isolation but as part of a wider and more extensive landscape continuum extending from the lowland agricultural landscape of Strathmore to the open upland summits. The LCA is seen in visual combination with these larger scale surrounding LCTs, with the *Highland Summits and Plateaux* forming a higher and more extensive backdrop to the lower, smaller scale foothills. Consequently, the proposed turbines would not be seen purely in visual relationship with the LCA but within part of a wider landscape context, where their scale would be more readily absorbed in relation to the surrounding larger scale landscapes.

4.10.14 The site selection and design approach adopted for the project has sought to actively avoid or minimise adverse landscape and visual impacts where possible. Generally with wind farm developments, some significant adverse impacts are inevitably likely to occur, as recognised in national guidance on wind farm development, and this proposal gives rise to some significant localised adverse impacts which are incapable of being mitigated further, although despite these localised and limited significant adverse impacts, the proposal has predominantly avoided or limited its overall landscape and visual impacts through appropriate siting and design. When considering all the relevant issues, it is concluded that the proposed wind cluster would have a slight adverse landscape and visual impact on the overall Study Area, which is considered not significant.

5. ECOLOGY

Wind farms can affect habitats and species directly, for example through habitat loss or indirectly, for example through disturbance. The applicant recognises the importance of early baseline studies to identify the extent of potential conflicts with nature conservation interests on the proposed development site.

5.1 Background and Purpose of the Report

A breeding bird survey and a bat survey was commissioned on behalf of the landowners to inform the environmental Report of the site.

5.2 Objectives

The breeding bird survey was commissioned to establish the species composition and distribution of breeding birds, and to identify any avian ecological issues in relation to the proposed turbine.

The bat survey was undertaken to establish which species were present, their use of the site, and to assess the potential impacts of the proposed turbines on bat populations.

5.3 Species Protection Status

5.3.1 Birds

Birds, their nests, eggs and young are protected from deliberate or reckless killing or injury by virtue of the *Wildlife and Countryside Act 1981* as modified by the *Nature Conservation (Scotland) Act 2004*. In addition some species listed on schedule 1 of the *Wildlife and Countryside Act 1981* are protected from disturbance during the breeding season.

5.3.2 Bats

Bats are protected under *Annex IIa* and *IVa* of the *EC Habitats Directive (92/43/EC)* as applied in Scotland under the *Conservation (Natural Habitats &c.) Regulations 1994,* as amended by the *Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations* of *2004, 2007* and *2009*. This creates a series of criminal offences that can result in substantial fines and/or imprisonment. These offences are listed below and make it illegal;

- To deliberately or recklessly capture, injure or kill bats
- To deliberately or recklessly harass a bat or group of bats
- To deliberately or recklessly disturb a bat wherever they occur in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young
- To deliberately or recklessly disturb a bat while it is hibernating or migrating

- To deliberately or recklessly disturb a bat in a manner that is, or is likely to significantly affect the local distribution or abundance of the species to which it belongs
- To deliberately or recklessly disturb a bat while it is rearing or otherwise caring for its young
- To deliberately or recklessly disturb a bat while it is occupying a structure or place which it used for shelter or protection
- To deliberately or recklessly obstruct access to a breeding site or resting place of a bat, or otherwise deny the animal use of the breeding site or resting place (note that this protection exists even when the bat is not in occupation)
- To damage or destroy a breeding site or resting place (Note this is a strict liability offence and the prosecution do not have to prove deliberate or reckless intent, merely that the roost was damaged or destroyed).
- To possess or control or transport any live or dead bat which has been taken from the wild or anything derived from a bat or any such part of a bat

5.4 The Site

The survey area comprises a 500 metre buffer around the proposed turbine location as illustrated in *Figure 5.1*.

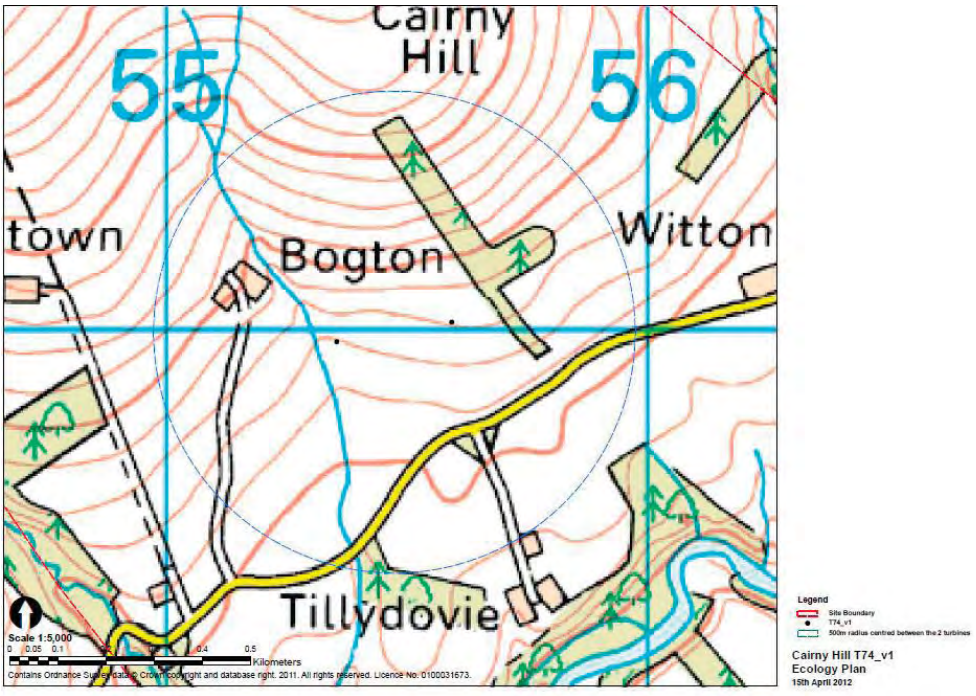


Figure 5.1 *Site Location and Survey Boundary*

The turbines are located on the edge of the more intensively managed land, most of which is used for arable or improved grassland and upland semi-improved grazing to the north of the proposed turbine location. The farm is primarily livestock, both cattle and sheep, although there is arable and silage on the flatter ground in the valley.

Principle features in the landscape are the disused steading at Bogton, some 250m north west of the nearest turbine, the burn that runs close to it and the conifer plantation to the west. There are also areas of woodland on the periphery of the 500m survey area. Most of the land is well drained but north of Bogton steading the drainage of the ground to the west of the burn is poorer and contains areas of marshy grassland and a small shooting pond. The site contains few hedges and dykes, and those that do exist are in very poor condition.

The steading contains a large disused farmhouse and a number of outbuildings surrounded by scrub, overgrown garden and areas of semi-mature woodland. This includes stands of larger deciduous trees and some conifers.

Figure 5.2 Bogton Steading from South East (Note trees along line of burn)

The main burn runs immediately to the east of the steading, and has scrub including gorse, rowan and more mature trees as it passes the steading. It flows beyond the southern survey boundary and joins the West Water river. As it passes through the low ground south of the steading it flows through an

improved grassland field but areas along the western edge of the burn are wetter and support marshy grassland.

The large conifer block in the east of the site is smaller than shown on ordnance survey maps, and much of the northern area is now improved grass with a small area of rough grass enclosed by remnant dykes and barbed wire fences.

Figure 5.3 Eastern Conifer Wood from North

To the north of the survey boundary the wider landscape becomes hillier and is given over to managed grouse moor. To the south it is dominated by gentler rolling agriculture with both improved grass and arable crops, and frequent small scale conifer shelter belts and woodlands.

5.5 Methodology

5.5.1 Breeding birds

Three surveys within the 500m boundary were undertaken between June and July using modified Common Bird Census (CBC) techniques[1] with coverage within 50m of all wooded areas and burns, ditches and dykes, and 100m or less for large open fields.

All species were mapped using British Trust for Ornithology (BTO) two letter codes to establish their location (see Appendix 5) and any details of numbers and behaviour were noted.

Analysis was undertaken using CBC territory mapping and lowland wader analysis (O'Brian & Smith 1992 in Gilbert et al 1998).

5.5.2 Bats

Surveys were informed by the most recent guidance[2] and comprised a mixture of transects, emergence/ commuting counts and automated detector surveys. Given the open nature of the turbine locations and the low diversity of bat species known from the area two transect periods were adopted; an early period to survey breeding activity, and a late period to sample dispersing bats. The early survey was undertaken in July and the late survey in September. Surveys were undertaken by two experienced batworkers, one of whom holds licences for roost visits, ringing and research.

Prior to transect surveys beginning key features of the site were monitored from 15 minutes prior to sunset for 1-1.5 hours to check for roost usage or potential commuting routes in and out of the site. During the early visit the emergence count was supplemented with an Anabat detector near potential commuting routes from the roost area.

A transect route was set up during the daytime and point counts geo-referenced onto a GPS unit based on proximity to features that were likely to be used by bats or were relevant to the potential turbine locations. At each point a three minute sample of activity was taken. A new track was then started for the walked transect to the next point. The entire transect was walked twice during each visit. The methodology is similar to that used in the national nathusius pipistrelle surveys.[3]

(1) Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. 2000. Bird Census Techniques (2nd Edition). Academic Press.

(2) Hundt, L (2012). Bat Surveys: Good Practice Guidelines, 2nd edition. Bat Conservation Trust

(3) http://www.bats.org.uk/pages/nathusius_pipistrelle_survey.html

During the transect setup the potential roost sites were checked, particularly at Bogton steading, around bridges, and within the main conifer wood.

Batbox Duet frequency division detectors linked to Edirol solid state recording devices were used for emergence/commuting surveys, and transect and point count surveys. All data was analysed using BatSound software.

In addition two Anabat detectors were left in position near potential bat feeding and commuting areas close to the proposed turbine locations. These were left in situ for eight nights during July and five nights in September. All data was analysed using Analook software, with the count unit being the number of files that contained one or more bat contacts.

A desktop study of local and National Biodiversity Network (NBN) records was undertaken.

5.6 Survey Findings

5.6.1 Breeding Birds

Details of the surveys and survey conditions are given in *Table 1* below;

Table 1 Survey Dates and Weather Conditions

Date	Temp	Weather	Cloud	Wind	Time
01/06/2012	9	dry	4-6	0-3 NE	0545-0830
25/06/2012	11	dry	5-6	2-3 N	0610-0850
08/07/2012	11	dry	6-7	4-5 NW	0605-0840

Times are in BST, temperature is in degrees centigrade, wind is measured on the Beaufort scale and cloud is in eighths.

Survey conditions were suitable for detecting bird song and behaviour being dry with light winds and no rain, although conditions on the final visit (8/7/12) deteriorated and became quite breezy as the morning progressed. Due to very poor weather in May the earliest survey was not until 1st June. All counts were completed before 12 noon and began sufficiently late to survey waders effectively.

5.6.2 Bats

Table 2 provides information on weather conditions during the bat surveys.

Table 2 Survey Dates and Weather Conditions

Date	Task	Temp	Humidity %	Precip	Cloud	Wind	Time	Sunset/ sunrise
25/06/2012	Set up transect & check roost potential	11		dry	6 /8-7/8	3 N	0850-1100	
12/07/2012	Emergence & commuting start	13	80	dry	8/8	0	2050	2155
12/07/2012	Emergence & commuting finish	10.5	86	dry	8/8	0-1 NE	2315	
12-13/7/12	Transect	8.5	97	Short period of v.l drizzle	8/8	1-2 NE	2335-0215	
16/09/2012	emergence & commuting start	9	78	dry	3/8	3-4 NW	1900	1928
16/09/2012	Emergence finish/ transect start	9	81	dry	1/8	3-4 NW	2030	
16/09/2012	Transect finish	7	90	dry	0/8-1/8	3 NW	2310	

Weather conditions were good for surveys, and with the exception of a short period of drizzle on the 12th July were dry, mild and calm, although wind speeds were higher during the September visit but still within acceptable limits.

Anabats were deployed from the 12th July-21st July 2012 and again from 16th September-20th September inclusive. A summary of weather during each period is given below. This weather is derived from the Weather Underground website[4];

Table 3 Summary of Weather during Anabat Deployment

July	**Min**	**Max**	**Ave**	**Total**	**Notes**
Mean Temp	11	13	12		
Precipitation	0	15	2.3	23.37	It was dry on the 17th but otherwise small amounts of rain fell on other days. Wet days were 15th (6.1mm) and 18th (14.99mm)
Mean Wind	0	29	12		It was windy on 12th and 19th.
September	**Min**	**Max**	**Ave**	**Total**	**Notes**
Mean Temp	8	12	10		
Precipitation	0.2	0.8	0.6	3.04	Rained every day but only in small amounts (<1mm)
Mean Wind	0	39	13		Windy days were 18th & 19th with gusts of 60kph on 18th.

Data for temperature is in centigrade, for precipitation in mm, and wind in kilometres per hour (kph).

Overall the weather was good during the July deployment except on the 15th and 19th when heavy rain (>5mm) was experienced. There was no rain on the 17th. It was very windy (>15kph) on the 12th and 19th.

The September deployment was marked by more even weather, with slightly lower temperatures and though it rained every day it did so in small amounts (never more than 0.76mm). Light winds at the

(1) http://www.wunderground.com/history/airport/EGPD/2012/9/16/CustomHistory.html?dayend=20&monthend=9&yearend=2012&req_city=NA&req_state=NA&req_statename=NA&MR=1

beginning of the week gave way to gusty weather on the 18th and 19th, with gusts of up to 60 kph recorded on the 18th.

5.7 Field survey

5.7.1 Breeding Birds

A total of 44 species were encountered during the three surveys of which 35 were recorded as breeding. Of these nine were regarded as possibly breeding, eleven as probably breeding, and fifteen species were confirmed as breeding. This status was derived using the standard codes used for the national bird atlas project.[5]

Table 4 lists all the species recorded, the number of estimated territories present within the study area, the breeding status (Po=Possible breeding, Pr=Probable breeding, and C=Confirmed breeding). Data on non-breeding flocks were relevant is given, as are notes that indicate habitat associations or other relevant details. A P indicates that a species was present but was not believed to be breeding (e.g. it may have been on passage or foraging over the site but not breeding in it); NC means not counted i.e. the species may have been breeding but was not assessed. This was the case for both pheasant (a commonly released game species) and feral pigeon.

Table 4 Summary of Species Recorded

Species	Species Code	No. of Territories	Breeding Status	Max. Flock Counts	Notes	UKBAP
Blackbird	B.	5	C		Bogton steading and wood	
Blackcap	BC	1	Po		Bogton wood	
Blue Tit	BT	1	Pr		By steading	
Bullfinch	BF	P			Passing through south of site	
Buzzard	BZ	1-2	C		Nest in Bogton wood. Recently fledged juv in trees around steading.	

(1) http://www.bto.org/volunteer-surveys/birdatlas/taking-part/breeding-evidence

Species	Species Code	No. of Territories	Breeding Status	Max. Flock Counts	Notes	UKBAP
Carrion crow	C.	P			Possibly bred but no evidence of nesting or young. Keepered site	
Chaffinch	CH	12	C		Steading, Bogton wood, Tillydovie, hedgerows and scrub	
Coal tit	CT	2	C		Bogton wood	
Collared Dove	CD	P			no sign of breeding	
Common gull	CM	P			no sign of breeding	
Crossbill	CR	P		18	flock of 18 passing through site on 1st June	
Curlew	CU	1-2	Pr		On northern periphery of 500m buffer	**Yes**
Dunnock	D.	5	C		Bogton steading, burn above steading and Bogton wood	**Yes**
Feral Pigeon	FP	NC			Breeds at steading	
Goldcrest	GC	4	C		Bogton wood	
Goldfinch	GO	1-2	Pr		Bogton steading	
Great spotted	GS	1	Po		Bogton wood	

Species	Species Code	No. of Territories	Breeding Status	Max. Flock Counts	Notes	UKBAP
woodpecker						
Great tit	GT	2	C		Steading & Bogton wood	
Greenfinch	GR	1	Po		Bogton steading	
Jackdaw	JD	3	C	40	Family parties seen Bogton wood but evidence of breeding at steading. Minimum of 3 nesting pairs.	
Lapwing	L.	4	C	6	Breeding to NW of steading, family party on cut field in July to W of main burn. Another pair (not counted) just beyond 500m buffer on Cairny hill	**Yes**
Redpoll	LR	1	Po	1	1 flying near turbines 1st June. Not seen subsequently	
Mallard	MA	1	C		family party on pond to N of steading	
Meadow Pipit	MP	3	Pr		North of site	
Mistle Thrush	M.	1	Po		Between steading and top	

Species	Species Code	No. of Territories	Breeding Status	Max. Flock Counts	Notes	UKBAP
					of Bogton wood	
Oystercatcher	OC	11	Co	24	Most widespread wader, but mainly concentrated to west of burn.	
Pheasant	PH	NC				
Pied Wagtail	PW	2	Pr		East of wood and at steading	
Reed Bunting	RB	1	Pr		Pond north of Bogton steading	**Yes**
Robin	R.	7	C		Bogton steading and wood	
Skylark	S.	1	Pr		NE perimeter of survey boundary	
Snipe	SN	1	Pr		N of steading	
Song Thrush	ST	3	Po		steading, Bogton and Tillydovie	**Yes**
Sparrowhawk	SH	P			1 hunting Bogton steading 25/6/12	
Spotted Flycatcher	SF	2	Po		One at Bogton steading & one in wood. Both only seen 1st June so may have been late passage birds	**Yes**
Starling	SG	2	Po	17	Min count. Probably bred in	**Yes**

Species	Species Code	No. of Territories	Breeding Status	Max. Flock Counts	Notes	UKBAP
					Bogton steading buildings	
Swallow	SL	2	C		Min 2 nests at steading	
Siskin	SK	1	Pr		Minimum count. Bogton wood	
Wheatear	W.	1	C		North of site	
Whitethroat	WH	2	Po		hedge between fields and scrub at Tillydovie	
Willow Warbler	WW	13	C		Concentrated around steading and wood. Possible that some territories with single registrations from 1st June are passage birds	
Wood Pigeon	WP	4	Pr		Bogton wood and Tillydovie	
Wren	WR	4	Pr		Along burns and in Bogton wood	
Yellowhammer	Y.	3	C		Along main road and immediately S of steading	**Yes**

* Species in red or amber are on the BoCC list (Birds of Conservation Concern due to either declines in populations or restricted ranges)[6]. UKBAP species are those where declines have prompted national

(1) Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 102, pp296-341.

species action plans to be developed. The only schedule 1 species with special protection under the *Wildlife and Countryside Act 1981* as amended by the *Nature Conservation (Scotland) Act 2004* was crossbill. This was not breeding on the site.

As can be seen from *Table 4* a total of seven red list species were recorded (five of them UKBAP species). All seven of these red list species were recorded as breeding although it is possible that spotted flycatcher may have been passage only. Red listed species are those that have experienced a sharp population decline or range contraction of over 50% in the last 25 years.

Ten amber listed species (three of them UKBAP species) were recorded, all of which were recorded as breeding. Amber listed species have experienced moderate range or population declines of 25%-49% in the last 25 years.

Wader densities were high, and concentrated primarily in the west and north west of the survey area, mainly in the wetter areas. Oystercatcher did occur in the improved lowland fields, but generally close to ditches or wetter areas.

Almost all other species were associated with woodland and scrub around Bogton steading, including the upper reaches of the burn that have tree or scrub cover; and the conifer woodland at Bogton. A small number of birds were associated with patches of scrub and woodland near the main road, or occasionally remnant hedgerows (e.g. whitethroat).

At least one pair of buzzards bred in Bogton (nest found) and the presence of barely fledged juveniles at Bogton steading on the 8th July 2012 whilst fledged juveniles were present simultaneously at the conifer wood indicated a second pair at the steading.

Figure 5.4 gives the approximate location of wader territories, whilst F*igures 5.5* and 5.*6* show the distribution of red listed and amber listed species.

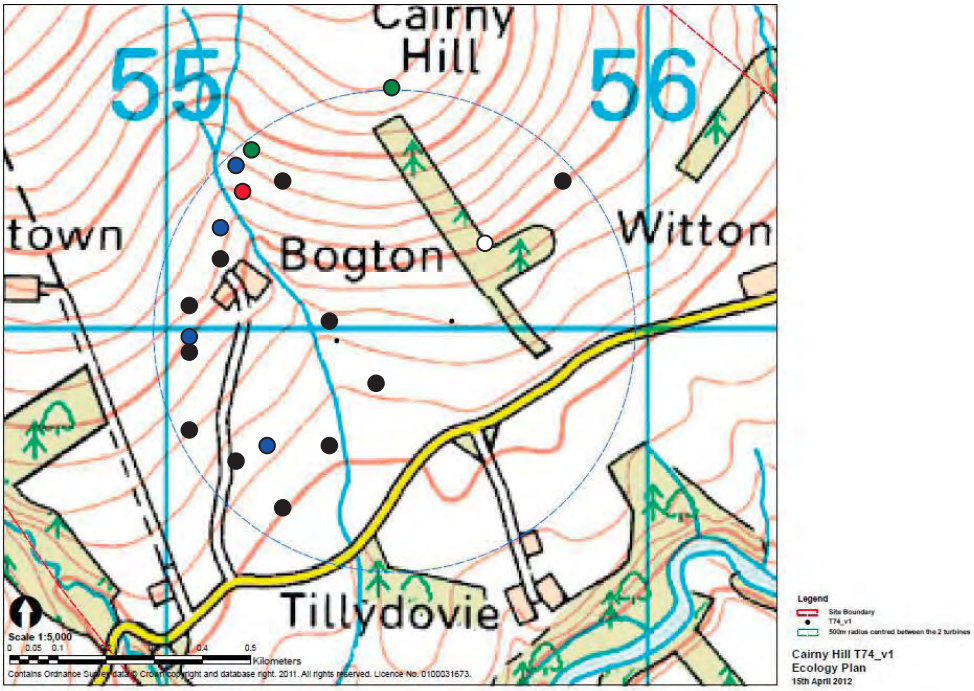


Figure 5.4 Approximate Location of Wader Territories

Blue=Lapwing; Red=Snipe; Green=Curlew; Black=Oystercatcher. White=buzzard nest

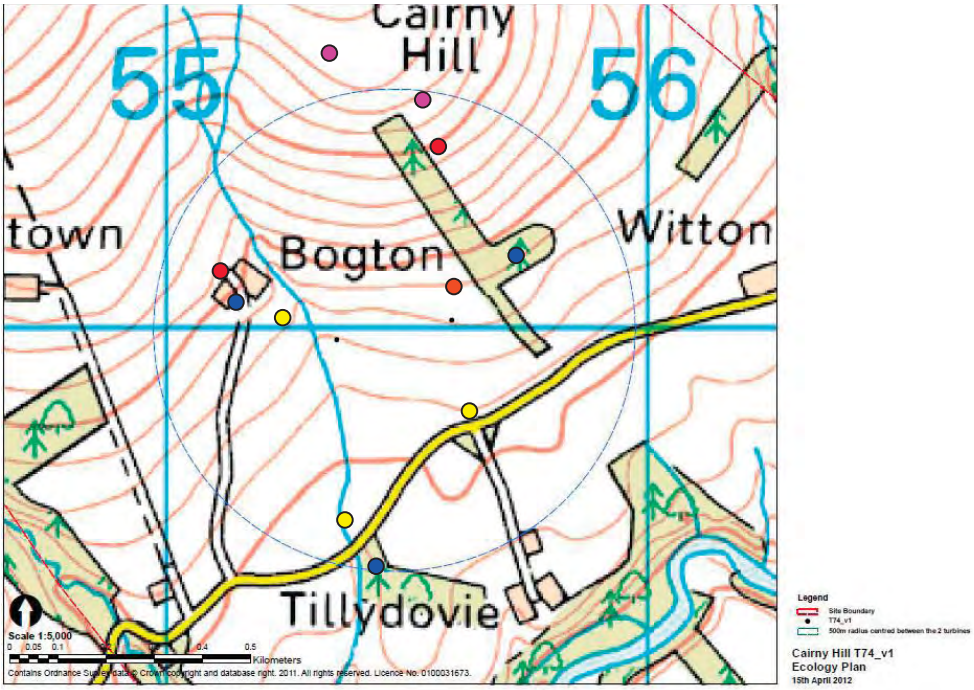


Figure 5.5 BoCC Red List Passerine Distribution Red=spotted flycatcher; Pink= skylark; Orange= lesser redpoll; Blue= song thrush; Yellow=yellowhammer

Starling is omitted from *Figure 5* as breeding had completed and groups were regularly encountered feeding on grassland around Bogton steading and, post silage cut, on fields below Bogton and west of the burn. It is presumed the birds bred in the steading and associated outbuildings given the cluster of records from this area.

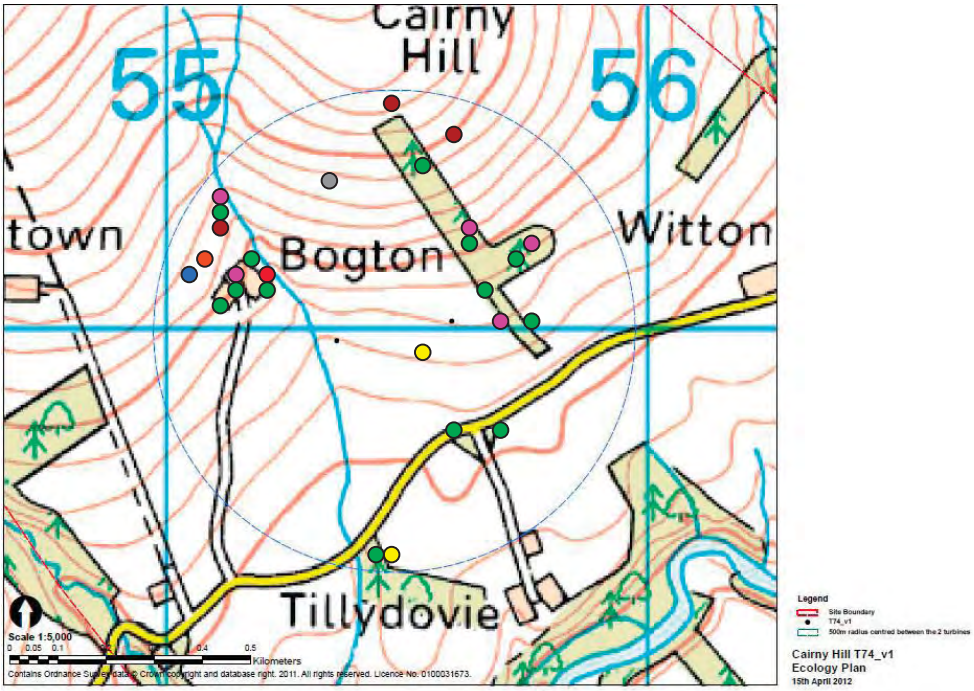


Figure 5.6 BoCC Amber Listed Species

Red= Swallow (min. 2 nests); Brown=meadow pipit; Orange=mallard; Pink= dunnock; Yellow=whitethroat; Green=willow warbler; Blue=reed bunting; Grey=mistle thrush

Outwith the breeding bird surveys two other species were detected during the bat surveys on 12th July. A tawny owl was calling from the south end of the conifer plantation and a small party of golden plover were heard calling from high up (>150m) to the north of Bogton steading over the upland ground.

5.7.2 Bats

Emergence Surveys

Potential roost sites were identified at Bogton steading, an isolated Scots pine north of the western turbine (WT), a batbox in the woodland on the south west periphery of the 500m survey buffer, and potential commuting routes from Tillydovie were also identified.

Examination of the batbox found no evidence of usage but a survey point was allocated to it for the transect survey.

Due to its size two observers plus an Anabat detector were deployed at Bogton steading on the 12th July, with the Anabat continuing to record till 0212 hours.

It rapidly became clear that there was a mixed pipistrelle roost associated with the farmhouse, with the first bat, a soprano pipistrelle, recorded at 2148. After 2200 the dominant contacts were common pipistrelle with bats returning early to the roost. In total a minimum of 20+ mixed soprano and common pipistrelle were present, the majority being common pipistrelle, these being the bats most likely to re-enter the roost early. This behaviour would be consistent with a small maternity colony of common pipistrelles. Soprano activity may have been linked to either small numbers of non-breeding bats in the house or possibly a small maternity colony (although given the number of contacts this is latter explanation is unlikely).

Pipistrelles of both species tended to feed locally, with most dispersing north to the pond area, south along the mature tree line or feeding in and above the canopy around the barn to the east.

At least two *Myotis* bats were present near the barn, with at least one emerging within it and flying around internally before leaving. This was subsequently detected by the Anabat between the barn and the burn to the east. This behaviour is suggestive of but not conclusive that the bats may have been Daubenton's bats.

It is likely the house contained a small roost of brown long-eared bats, as one was detected in thick cover by the gate to the north of the house that opens onto the open hill.

Figure 5.7 Summary of Emergence Survey Activity 12th July 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Brown long-eared bat	
Myotis sp.	
Flightlines	
Observers	
Anabat Detector (Remote Sensor)	

The Anabat data indicated a low level of contacts initially dominated by common pipistrelle but this declined and there was a peak of activity by soprano pipistrelle between midnight and 0225. These latter contacts, which included very occasional social calls, are more likely to represent 1-2 individuals using the area repeatedly.

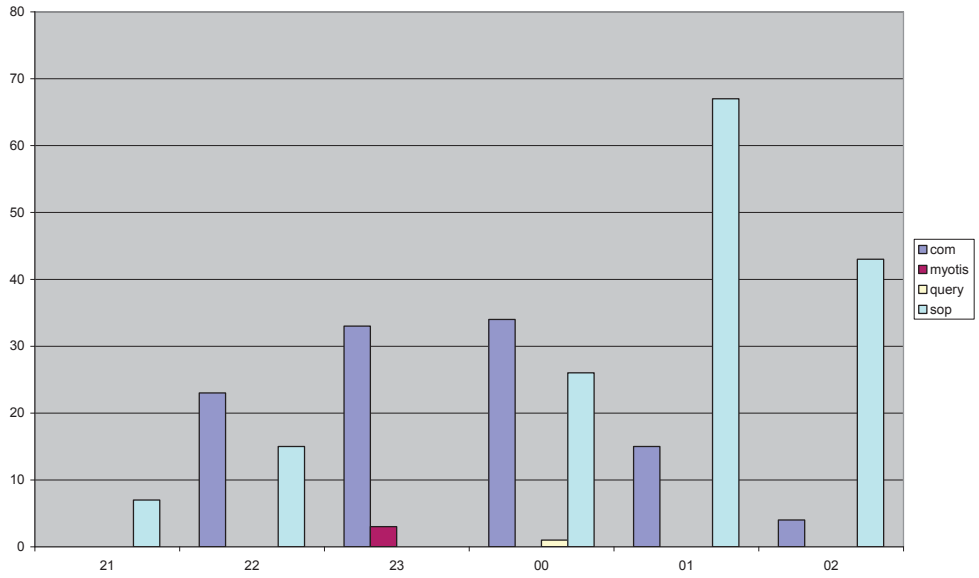


Figure 5.8 Anabat Files per Hour and Species at Bogton 12th July 2012

Figure 5.9 View of Abandonded House from South (Bats present in both buildings)

Emergence surveys on the 16th September 2012 focused on potential commuting routes out of Tillydovie farm towards the turbines, and potential roost sites in an isolated Scots pine close to the Western Turbine (WT) location.

The observer placed at the road junction at the main road entrance to Tillydovie found no evidence of any commuting from the farm, with only three faint soprano pipistrelle contacts between 2004-2009. These were consistent with bats foraging in scrub to the south of the main road.

The isolated Scots pine had a single faint soprano pipistrelle contact at 2004, a common pipistrelle pass at 2009. At 2017 there was another common pipistrelle contact and at 2018 a common pipistrelle was seen coming from the east, flew around the tree once, and then followed the ditch and burn up towards Bogton. This behaviour was repeated at 2023 by another common pipistrelle from the east, but the bat appeared to return eastwards after briefly songflighting around the tree. A soprano pipistrelle fed briefly at the tree having come from the east at 2025, after which time recording finished. At no time was there any evidence of bats entering or exiting the tree. Physical examination from the ground with binoculars found no obvious indication of suitable cavities.

Figure 5.10 Emergence & Commuting Survey Summary 16th September 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Flightlines	
Observers	

Transect Surveys

The transect routes were broadly similar on both the 12th July and 16th September 2012 with the exception that on the latter date four additional points were added mainly to sample the open semi-improved grassland to the north of the turbines. Transects were also walked in a different order in September to avoid temporal bias.

The July transect started and finished at Bogton steading and overlapped with the emergence survey described above. Activity was therefore high at this point and southwards towards E2, and included both pipistrelles and a *Myotis* near the barn.

Activity was also detected along the burn and ditch system at E4, E5 and E6, with possible *Myotis* (probably Daubenton's given the association with the water) at E4 and the bridge at E5, plus both species of pipistrelle. All activity involved one or occasionally possibly two bats.

There were a cluster of mainly common pipistrelle records along the woodland edge E8-E10, with a minimum of two common pipistrelles feeding in the sheltered area at E10.

Figure 5.11 Summary of Walked Transect 12th July 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Myotis sp.	
Flightlines	
Anabat Detector (Remote Sensor)	

As can be seen from the above the most widespread species was common pipistrelle, but activity for all species was low and involved only 1-2 bats at any one location with the exception of the steading at Bogton. The *Myotis* contacts were strongly linked to the burn flowing south from the steading. There was isolated activity at woodland sites at E5 and E6 but little evidence of commuting between these points; although a soprano pipistrelle was seen flying along the road eastwards towards E10.

There was no sign of bats moving along the ditch system between E3 and E7-E8, or north south along the ditch and remnant hedgerow between E6 and E7.

The late season transect on 16th September 2012 found far fewer bats and these were restricted to the area around Bogton steading, a single soprano pipistrelle flying along the burn at E3 and both species feeding around the sheltered area at E10. There was single very faint and unidentifiable pipistrelle sp. call to the south of the bridge at E5 (not included in the figure below).

Additional points to sample activity on the open hill to the north were included, including a sample point at the isolated Scots pine (EX1) covered during the emergence survey. These points were added as the surveyors previous wind farm experience has shown that bats may forage in more open upland habitats late in the season.

The only additional point to record activity during the transect was EX1 with both a single common and soprano pipistrelle rapid pass recorded between 2152 and 2158. No other EX point recorded contacts.

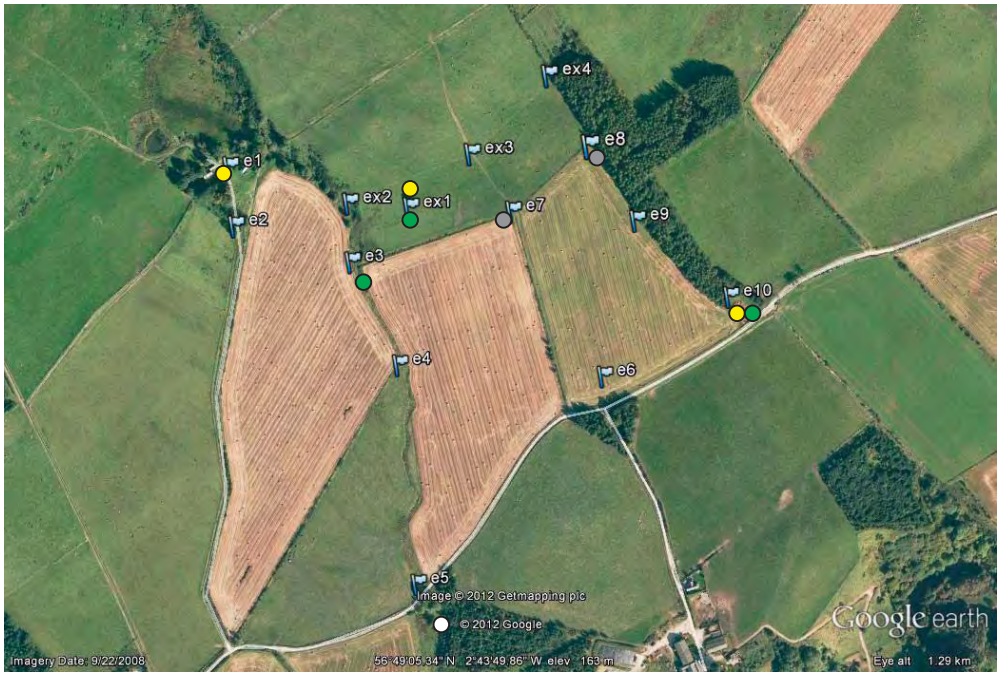


Figure 5.12 Summary of Walked Transect 16th September 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Unidentified pipistrelle	
Flightlines	
Anabat Detector (Remote Sensor)	

Activity was highest around the steading, with lots of social calling by common pipistrelles, although the total number of bats involved may well have been in single figures.

Anabat Survey Data

Details of the Anabat locations are provided in *Figure 11* (July) and *Figure 12* (September). On both occasions an Anabat was located at E7, the crossroads of two ditches, one running east-west between the conifer woodland and the burn at Bogton, the other running north-south to the small woodland at Tillydovie.

In July the other Anabat was located at E9 to sample activity along the edge of the conifer woodland. In September this was moved north to E8 to increase the likelihood of detecting any movement between E7 and E8 in the woodland.

A nightly summary of data for E7 and E9 during the period 12th to 20th July 2012 is given below. It should be noted that whilst Anabats provide the advantage of allowing a long time series of data to be collected they are incapable of differentiating between one bats passing ten times and ten bats passing once. Activity is therefore recorded on the basis of the number of files containing at least one pass of a species.

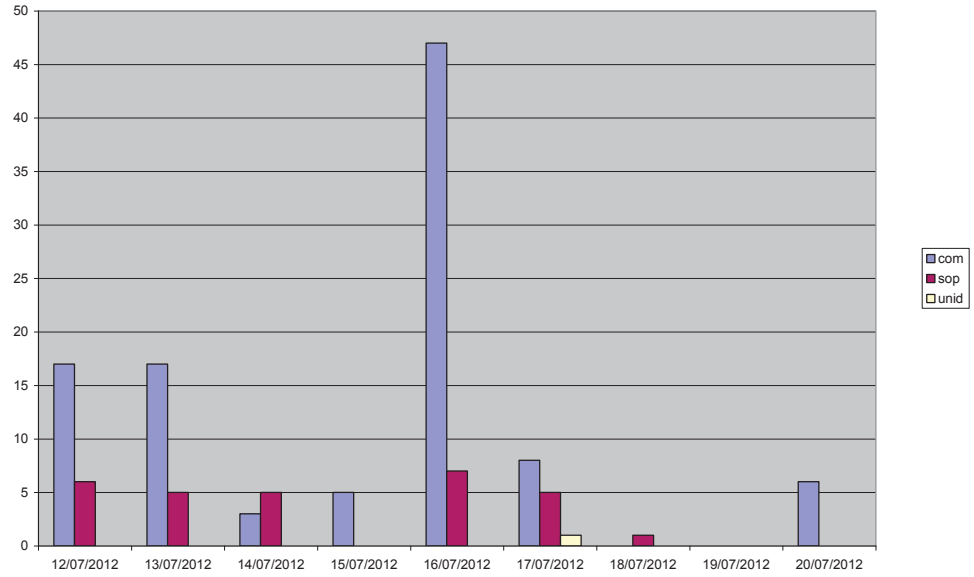


Figure 5.13 Anabat Files per Night and Species at E7 (Ditch Crossroads) July 2012

Low numbers of passes on the 15th, 18th and 19th are probably weather related, as the 15th and 18th were wet and the 19th windy. As can be seen the majority of records are common pipistrelle, and activity is low, with the peak being 47 files on the 16th July.

At E9 (woodland edge) common pipistrelle was also the dominant species and the number of contacts was four times that at E7, with the peak being 202 common pipistrelle on the 16th. The peak of soprano pipistrelle contacts was also on the 16th with 56 files recorded. There was a single *Myotis* contact on the 14th and a poor quality sonogram that could not be identified.

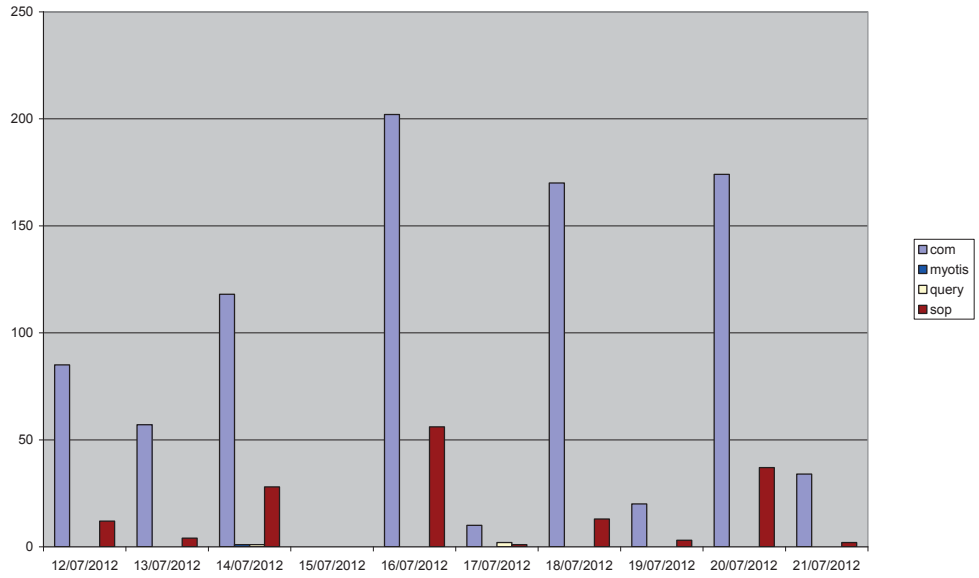


Figure 5.14 Anabat Files per Night and Species at E9 (Woodland Edge) July 2012

In September no bats were recorded at E7 during the entire period 16th-20th September (including during the emergence and transect surveys when bats were noted by observers at EX1-the isolated Scots pine).

Activity at E8 at the northern edge of the conifer woodland was initially low, and was entirely absent on the 18th when gusts of up to 60 kph were recorded. Towards the end of the week activity increased, although peak activity was approximately half that noted in July, and the proportion of soprano pipistrelle contacts was higher. The peak count on the 20th was 98 common and 63 soprano pipistrelles contacts.

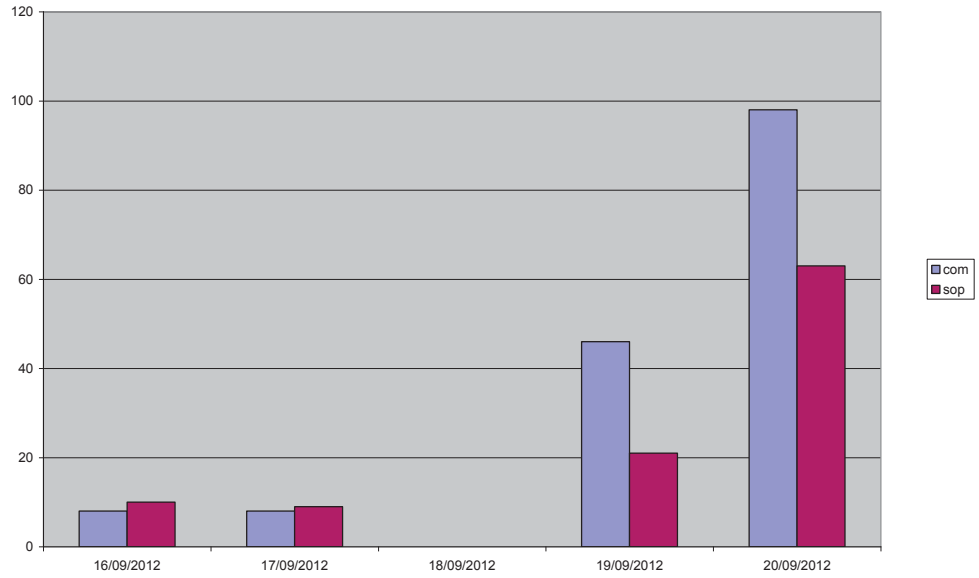


Figure 5.15 Anabat Files per Night and Species at E8 (Woodland Edge) Sept. 2012

Local and National Biodiversity Network bat records indicate the nearest bats are pipistrelle sp. reported from Milden Lodge, Bridgend and Edzell; with common pipistrelle reported from Balfield.

5.8 Discussion

5.8.1 Breeding birds

The data indicates that the turbine locations are in areas least used by birds, and there is a strong correlation between bird density and the wooded areas associated with the Bogton steading and the large conifer wood. The site supports a reasonably diverse bird community dominated by woodland and scrub passerines and nesting waders.

Lowland waders such as lapwing and oystercatcher were recorded nesting in high densities but are clearly concentrated either on wetter upland ground to the north or in fields to the south of Bogton and mainly west of the burn rather than the arable fields in close proximity to the conifer woodland or turbine sites.

Raptor densities were noticeably lower than those recorded on the upland areas to the north[7], where the abundant rabbit population was thought to be a significant factor. A nesting buzzard was confirmed in Bogton wood, and it is probable that another family was reared in the woodland around the steading. A tawny owl was recorded during the bat surveys in the south of the conifer woodland, but this species is a woodland specialist and is highly unlikely to come into conflict with turbines due to its foraging behaviour (mainly within woods) and low level flight.

(1) Eden Ecology Ltd (2011). Breeding Bird Survey for Proposed Single Turbine, Witton Farm, Edzell, Angus.

5.8.2 Bats

The evidence indicates a common pipistrelle roost, probably a small maternity colony, in buildings at Bogton. These buildings are shared with smaller numbers of soprano pipistrelle, and it is probable that these are non-breeders. This assumption is made on the basis of the low number of soprano pipistrelles present and the likely roost conditions within the building. Soprano pipistrelles tend to form larger roosts and appear to prefer warmer roost conditions than common pipistrelle.[8] Small numbers of both *Myotis* and brown long-eared bat were also present at Bogton, with evidence of the former commuting along the burn to the south, possibly indicating Daubenton's bat.

Pipistrelle and brown long-eared bats associated with Bogton appeared to feed largely within the surrounding woodland and nearby pond. There appeared to be some evidence of limited movement between Bogton and the conifer wood to the east by both pipistrelle species, but only during July and not in September. The total number of individuals appeared to be small (<5).

There was evidence of bats feeding along the edge of the conifer woodland, and particularly at the southern edge. The total number of bats involved appears to be small (never more than 2 individuals at any one time). Potential sources for these bats may be from Bogton (the most likely explanation), within the woodland itself, or possibly commuting along the road from Tillydovie. With the exception of the line of semi-mature deciduous trees running from the edge of the conifer woodland to the roadside, the trees within the wood were generally rather young to be effective bat roosts.

No evidence of roosting in the isolated Scots pine was noted, but the tree appeared to be a significant landscape feature for bats and was regularly visited by apparently commuting or feeding single pipistrelles (both species).

5.9 Impacts

5.9.1 Breeding birds

The main impacts on breeding species that may arise from the placement of the turbines are;

- Disturbance during construction.
- Habitat loss due to infrastructure (including indirect effects on drainage and vegetation).
- Increased mortality through collision risk.
- Displacement of breeding territories through operation.

Disturbance during construction is likely to be limited as few birds breed within the immediate vicinity of the proposed turbines or the likely access route. The species most likely to be affected would be more disturbance sensitive species such as buzzard breeding in the main conifer wood, or whitethroat (one

(2) Altringham, J. 2003. British Bats. The New Naturalist. HarperCollins

territory) on the likely access corridor. Avoiding construction during the breeding season would reduce such impacts to a negligible level.

Use of existing tracks over much of the route would minimise land take and the potential for interfering with drainage. Using the existing tractor access between survey points E6 and E7 would minimise disturbance to nesting waders. Little reduction in passerine activity would be anticipated.

Given the low number and diversity of raptors present and the concentration of activity around the steading and conifer woodland the overall risk of collision is relatively low, although some hazard to dispersing recently fledged buzzards may arise. Recent work on avoidance rates by a variety of species including raptors and geese, indicate avoidance rates around 99%[9].

Work by Deveraux[10] has indicated that displacement by wind farms of farmland birds is minimal, and as most species are concentrated around the steading and within the conifer woodland displacement effects from the turbines are unlikely. The work of Pearce-Higgins et al[11], which was based on large scale wind farms in remote areas where birdlife was unhabituated to disturbance, identified snipe, curlew, meadow pipit and wheatear as potentially being affected by turbine displacement. For many species such as lapwing Pearce-Higgins et al could find no obvious effect.

Applying the predictions to current populations on site, and assuming a worst case scenario that birds in regularly worked mixed farmland are equally sensitive to disturbance as those in remote peatland, would indicate the following reductions in density might occur (see over).

(1) Ruddock, M. & Whitfield D.P.2007 A Review of Disturbance Distances in Selected Bird Species. Natural Research (Projects) Ltd/ Scottish Natural Heritage

(2) Devereux, C.L., Denny, M.J.H. & Whittingham, M.J (2008). Minimal effects of wind turbines on the distribution of wintering farmland birds. *Journal of Applied Ecology 45, 1689–1694*

(3) Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. and Bulman, R. 2009. The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology* 46, 1323-1331

Table 5 Application of Pearce-Higgins Modelling Within 500m of Proposed Turbine

Species	Existing Pairs	Predicted % Decline	Displaced territories	Residual population
Snipe	1	47.5	0-1	0-1
Curlew	1-2	42.4	1	0-1
Meadow Pipit	3	14.7	0-1	2-3
Wheatear	1	44.4	0-1	0-1

As can be seen from the above if the Pearce-Higgins modelling is correct snipe and curlew would decline to 0-1 pairs each within 500m of the turbine, meadow pipit would lose 0-1 pairs and wheatear 0-1 pairs. However displacement is unlikely to be significant for any of these species as all are on the periphery of the 500m buffer. As a consequence, even assuming full sensitivity, displacement effects are on the margin of existing territories and unlikely to lead to complete loss.

The Pearce-Higgins model indicates a reduction of flight activity by buzzard of 41.4%. This may lead to the loss or displacement of the buzzard nest site within the conifer woodland, particularly given the proximity of the eastern turbine. As this is a commercial plantation that may be subject to harvesting the long term future of the nest site is uncertain even in the absence of the proposed turbines.

Overall therefore impacts arising from the construction and operation of the turbines are likely to be insignificant for breeding birds, with at most, marginal declines in wader and passerine breeding territories. It is likely that one territory of buzzards will be displaced and a small risk of collision exists. Buzzards have expanded rapidly with a 10% increase in occupied squares in Scotland between 1968-77 and 1988-91, and early indications from the 2007-2011 atlas[12] that a further 14% range increase has occurred. Any losses associated with the proposal will therefore have no discernible effect on the favourable conservation status of this rapidly expanding species.

(1) Gillings, S., Swann, B., Balmer, D. and Wernham C. (2011). Bird Atlas 2007-11: Measuring Change in Bird Distribution and Abundance – *The Changing Nature of Scotland*, eds. S.J. Marrs, S. Foster, C. Hendrie, E.C. Mackey, D.B.A. Thompson. TSO Scotland, Edinburgh, pp 67-72

5.9.2 Bats

No known roost sites will be lost in the construction of the turbines and access is likely to be along tracks with little evidence of significant commuting and where ditches will remain intact. There is a possibility that the isolated Scots Pine at EX1 (see *Figure 12)* may need to be removed. This tree does attract small numbers of foraging and commuting bats. Impacts on bats are therefore most likely to arise from the operation of turbines.

Bats are known to be at risk from collisions with turbines and from bariotrauma effects of proximity to blade tips[13], and appear to show little avoidance behaviour[14].

The species found using features in proximity to the proposed turbine locations are common and soprano pipistrelles. These features are the isolated Scots pine tree, potential commuting routes east-west between Bogton and the conifer wood, and the western edge of the conifer wood itself.

Both species are regarded as having a moderate risk of collision in various guidance documents, most notably the recent Natural England Technical Information Note[15]. Due to the large and widespread populations of both species the same Technical Note regards both as low risk in terms of population level effects from wind farms.

Evidence indicates that moving turbine tips a minimum of 50m from woodland edges and potential commuting routes in line with the formula stipulated in the Natural England guidance note significantly reduces the likelihood of harm occurring to bats.

Effects on bats are likely to be insignificant at the population level, but may have a local effect on the small maternity colony of common pipistrelles at Bogton through loss of individuals during commuting and foraging. Some minor locally adverse effect on soprano pipistrelles may also result. The application of mitigation as suggested in TIN51 would reduce effects to negligible levels.

5.10 Mitigation and enhancement

Overall the impacts of the proposed turbines are unlikely to have population level impacts, or to be significant at anything other than the local scale. Mitigation to reduce the likelihood of impacts will be incorporated into the Site Environmental Management Plan. The mitigation measures will specifically include the following aspects:

---

(1) Baerwald, E. F., D'Amours, G. H., Klug, B. J. & Barclay, R. M. R. 2008. *Bariotrauma Is A Significant Cause Of Mortality At Wind Farms.* Current Biology 18 (16)

(2) Horn, J. W, Arnett, E. B, & Kunz, T. H. 2008. Behavioural Responses of Bats to Operating Wind Turbines. *Journal of Wildlife Management 72(1):123-132*

(3) Mitchell-Jones, T. & Carlin, C. 2012. *Bats and onshore wind turbines Interim guidance.* Technical Information Note 051. 2nd Edition. Natural England

- Minimising land take for infrastructure by utilising existing tracks.
- Avoiding the breeding bird season for construction to reduce disturbance to breeding birds.
- Avoiding lighting of bat commuting routes and feeding areas (E3-E7-E8 and EX1) during construction.
- Ensuring that all turbines are a minimum of 50m from turbine tip to the following features;
    - Commuting route E3-E7-E8
    - The western edge of the conifer wood
    - The isolated Scots pine at EX1
- Note: the formula for calculating the distance of the turbine tip from these features is as specified in Natural England Technical Information Note TIN051Bats and onshore wind. *Interim guidance* (page 2), Second edition 29 February 2012
- If it is determined that the isolated Scots pine at EX1 requires to be removed a further survey to establish if the tree is used as a roost site will be undertaken. If a bat roost is found then a licence will be applied for supported by suitable mitigation.
- Irrespective of whether the tree is a roost site, if it is to be removed a minimum of three Scots pines will be planted in the same field but further north and closer to the woodland associated with the burn flowing through Bogton. These will be protected from sheep and cattle with appropriate fencing until fully established.

Current land management is generally positive for both birds and bats. Enhancement will include preserving and expanding to a small degree the area of marshy grassland between E4-E5 and creating a shallow scrape in the same area to improve wader chick feeding opportunities and thus creating additional feeding resource away from the turbine locations.

5.11 Conclusion

The area contains good populations of BoCC and UKBAP wading and farmland birds, and supports at least four species of bats including a probable common pipistrelle maternity colony as well as roosting *Myotis* and brown long-eared bats.

The turbine locations are in areas with the least biodiversity and impacts are therefore predicted to be minor adverse. With the application of mitigation, primarily avoiding the bird breeding season and ensuring a sufficient stand-off distance of the turbines from bat commuting and foraging areas, residual impacts will be insignificant.

6 SITE GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

6.1 Geology

The turbine cluster site lies on a gentle slope at the junction between the lowland and Highland foothills of the Grampian Highlands. Geologically, this boundary is represented by the Highland Boundary Fault which runs south west to north east across this part of Angus. The lowland of the Strathmore Valley is composed of Devonian sediments consisting locally of the Edzell Sandstones and the Edzell Mudstones. In this area, these occupy the core of the Strathmore Syncline to a combined thickness of over 1,800m. On the north west side of Edzell, a thick group of conglomerate sediments called the Gannochy Formation intervenes between the local sandstone and mudstone formations and largely replaces them. The area of the Highland Foothills is composed of strata belonging to the Upper Dalradian. The sequence consists of quartz mica schist, grit, slate and phyllite strata.

The superficial deposits in the area consist of glacial till of Quaternary age and glacial outwash deposits of sand and gravel which become coarser near to the Highland Boundary Fault (cobbles, cobble gravel) and passing into sands and finer sands as you travel further away from the higher ground. There is no peat present on the site. The surface topography is that of gently rising ground that is semi-improved grassland with good permeability.

6.2 Hydrology and Hydrogeology

The site at Lower Cairny is relatively elevated and despite being adjacent to a small watercourse (The Taidy Burn), it is not subject to flooding. This is confirmed by the SEPA Flood map which highlights localised flooding in the area of the West Water only.

The development has applied a minimum buffer of 45m from the nearest watercourse, the Taidy Burn. In addition, a number of mitigation measures will be put in place to avoid surface water and groundwater pollution and any associated negative impacts. These measures are described at section 6.3.

There are no private water supplies on the site or in the immediate environs of the site. There is therefore no risk to pollution of potable water supplies.

In terms of hydrogeology, the risk to groundwater is minimal. The underlying Dalradian bedrock is largely impermeable, offering little potential for groundwater storage and transport except in cracks and joints associated with the natural jointing of the rock or near surface weathering. There are no abstractions of groundwater on the site or in the immediate environs of the site. There are no Groundwater Dependent Terrestrial Ecosystems on the site or nearby.

6.3 Mitigation Measures

In considering the necessary mitigation measures, strict attention has been given to the legislation and rules that relate to surface and groundwater resources management. This includes the following items:

- Attention will also be paid to the SEPA General Binding Rules 10 and 11 that relate to the discharge of surface water from a construction site as well as the relevant statutory instruments relating to surface and groundwater resources;
- The Water Environment (Diffuse Pollution) (Scotland) Regulations 2008;
- Good practice during windfarm construction, joint publication by Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland;
- SEPA Land Use Planning System, Guidance Note 4, Planning guidance on windfarm developments;
- SEPA Land Use Planning System, Guidance Note 8, SEAP standing advice for planning authorities on small scale local development management consultations, Planning guidance on windfarm developments;
- Planning Advice Note 50: Controlling the environmental effects of surface mineral workings.

A number of mitigation measures have been developed and will be employed as part of a site Environment Plan that details the specific response mechanisms that will deal with issue of surface and groundwater quality. This plan and the procedures and processes described within it will help to remove the risk of pollution to surface and groundwater resources.

6.3.1 Soil and Rock Impact

Detailed site investigation work will be undertaken in the area of the turbine foundations to assess the geotechnical ground conditions. The information collected by this analysis will inform the detailed foundation design and the resultant mitigation measures that will be employed on site. Soil and rock excavated during the construction and decommissioning processes will be carefully segregated and stored separately for re-use elsewhere on the farm unit.

6.3.2 Construction Impact

Site Construction Operations will be strictly controlled by the Principal Contractor who will be signed up the Considerate Constructors Scheme (http://www.ccscheme.org.uk/).

Pollution Prevention Guidelines (PPGs)

The development will apply the measures contained within the various relevant Pollution Prevention Guidelines for surface and groundwater resources that are produced by the Scottish Environmental Protection Agency (SEPA). The PPGs that will be used as part of this development relate to those of the Construction industry as recommended by SEPA:
(http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides/construction_ppgs.aspx).

The guidance includes but is not limited to:

- PPG1: General guide to the prevention of water pollution;
- PPG2: Above ground storage tanks, August 2011 ;
- PPG4: Disposal of sewage where no mains drainage is available;
- PPG5: Works and maintenance in or near water;
- PPG6: Working at construction and demolition sites;

- PPG7: The safe operation of refueling facilities;
- PPG13: Vehicle washing and cleaning;
- PPG18: Managing fire water and major spillages; and
- PPG21: Pollution incident response planning.
- Ministry of Agriculture, Fisheries and Food (MAFF) Good Practice Guide to the Storage and Handling of soils, 2000

Sustainable Urban Drainage Systems (SUDS)
The development will make use of SUDS in order to minimize the impact of runoff from any temporary or permanent hardstand facilities such as roads, paths, storage facilities and so on.

The full details of how the mitigation measures contained within the guidance above that will be employed on the site is detailed in Appendix 6.

7 ARCHAEOLOGY AND CULTURAL HERITAGE

7.1 Introduction

Aims and objectives

This section provides an assessment of the potential for direct and indirect impacts upon the cultural heritage resource within the development boundary and the wider historic landscape, arising from the construction, operation and decommissioning of two proposed turbines at Lower Cairny.

The specific objectives of the cultural heritage study are to:

- Identify the archaeological baseline and potential of the proposed wind cluster development area and its immediate vicinity;
- Assess the predicted and potential direct impacts of the construction and operation of the turbines upon the cultural heritage resource within the development boundary;
- Propose measures, where necessary to mitigate predicted adverse direct impacts;
- Identify key cultural heritage receptors in the wider historic landscape whose setting could be indirectly affected by the proposed turbines;
- Assess the predicted and potential indirect impacts of the development upon the settings of key cultural receptors in the wider historic landscape.

7.2 Potential effects of wind cluster development upon cultural heritage

The physical impact of construction activity arising from the development has the potential to destroy archaeological deposits, monuments and historic structures; destroy parts of archaeological deposits, monuments and historic structures; and to alter the burial environment of archaeological deposits which may result in accelerated rates of deterioration and consequential destruction of deposits.

Direct impacts upon the cultural heritage resource caused by construction activities will always be major and adverse unless effectively mitigated.

Where effective mitigation is implemented, cultural heritage assets will be preserved *in situ* or preserved by record. Positive outcomes of mitigation can result in improved understanding and interpretation of the asset; previously unavailable information being made available to a wider audience; and increased public understanding and enjoyment of cultural heritage.

The indirect impact of the two turbines as a new feature in the landscape has the potential to affect the setting of cultural heritage assets. The archaeological/historical context, visual appearance and the aesthetic qualities of a site's surroundings are important to the intrinsic value of certain cultural heritage features and to our modern perceptions and experience of some sites. The alteration of those qualities has the potential to impact negatively upon site character and value.

Indirect impacts caused by wind farms are assumed to be adverse i.e. the introduction of a turbines is at best, neutral with regard to impacts upon the setting of cultural heritage.

7.3 Legislation, Guidance and Planning Policy

A series of designations have been applied to historic environment sites in Scotland, at international, national and local level. At an international level, the United Kingdom government is party to the Valletta Convention, the European convention on the protection of archaeological heritage. Article 2 notes that States must have a legal system for the protection of the archaeological heritage, on land and under water. Article 4 requires provision for 'the conservation and maintenance of the archaeological heritage preferably *in situ*'.

At a national level, the relevant legislation relating to the historic environment includes:

- the Historic Buildings and Ancient Monuments Act 1953 ("the 1953 Act") (amended by the Historic Environment (Amendment) (Scotland) Act 2011),
- the Planning (Listed Buildings and Conservations Areas) (Scotland) Act 1997 (amended by the Historic Environment (Amendment) (Scotland) Act 2011),
- the Ancient Monuments and Archaeological Areas Act 1979, (amended by the Historic Environment (Amendment) (Scotland) Act 2011),
- the Town and Country Planning (Scotland) Act 1997,
- the Planning etc. (Scotland) Act 2006,

A statement of the Scottish Government's policy on nationally important land use planning matters is given in Scottish Planning Policy (SPP 2010). Further guidance is provided by Historic Scotland, an executive agency of the Scottish Government that is charged with safeguarding the nation's historic environment. Historic Scotland has set out the Scottish Government's policy on the historic environment in Scottish Historic Environment Policy (SHEP, revised 2011) and has published a series of guidance notes, Managing Change in the Historic Environment, intended to explain how to apply the policies contained in the SHEP (2009, revised 2011) and the SPP (2010). Advice and information on technical planning matters is included in a Planning Advice Note PAN 2/2011 PLANNING AND ARCHAEOLOGY. Together, these documents set out the Scottish Ministers' policies for planning and the historic environment and are the documents to which planning authorities are directed in their consideration of applications affecting the historic environment and the setting of individual elements of the historic environment.

7.4 Definition of the Historic Environment

The SPP notes that the *historic environment includes ancient monuments, archaeological sites and landscape, historic buildings, townscapes, parks, gardens and designed landscapes and other features. It comprises both statutory and non-statutory designations. The location of historic features in the landscape and the patterns of past use are part of the historic environment* (SPP 2010, section 111).

7.5 Protection of the Historic Environment

The SPP states that *when significant elements of the historic environment are likely to be affected by development proposals, developers should take the preservation of this significance into account in their proposal* (SPP 2010, section 112).It further states that factors that should be taken into account when making decisions on renewable energy generation developments are likely to include impacts on the historic environment (SPP 2010, section 185). The SHEP states that *there should be a presumption in favour of preservation of individual historic assets and also the pattern of the wider historic environment; no historic asset should be lost or radically changed without adequate consideration of its significance and of all the means available to manage and conserve it* (SHEP 1.14 b, p8). However, the SHEP notes that the protection of the historic environment is not about preventing change. Ministers believe that change in this dynamic environment should be managed intelligently and with understanding, to achieve the best outcome for the historic environment and for the people of Scotland. Such decisions often have to recognise economic realities (SHEP 1.8; p6). It further recognises that the historic environment faces many challenges, including the needs of renewable energy generation (SHEP 1.9; p6).

7.6 National designations applied to the Historic Environment

In order to assist with the protection of the historic environment, a series of statutory and non-statutory designations have been applied to historic environment sites. Sites with statutory designations include:

- Ancient Monuments (designated through scheduling)
- Buildings and other structures (which are designated through listing)
- Gardens and Designed Landscapes
- Conservation Areas
- Historic Martine Protected Areas (not relevant to this application)
- Historic Battlefields (not relevant to this application)

7.7 Definitions of sites with statutory and non-statutory designations

The following definitions are taken from the SPP and SHEP, with reference to the relevant Acts.

Listed Buildings

Listed buildings are buildings of special architectural or historic interest. They are protected under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. Listed Buildings are divided into categories A (national or international importance), B (regional or more than local importance), or C(S) (buildings of local importance). Under section 59(1) of the 1997 Act, the planning authority, in determining any application for planning permission for development that affects a listed building or its setting, is required to have special regard to the desirability of preserving the building, or its setting, or any features of special architectural or historic interest which it possesses.

Ancient Monuments

Ancient monuments include archaeological sites, buildings or structures of national or international importance. They are a finite and non-renewable resource that offer a tangible, physical link with the past and are protected under the provisions of the Ancient Monuments and Archaeological Areas Act 1979

through scheduling. The purpose of scheduling is to secure the long term legal protection of the monument, in-situ and as far as possible in its existing state and within an appropriate setting.
Annex 7 paragraph 3 of the SHEP notes that securing the preservation of a scheduled monument *'within an appropriate setting' as required by national policy is solely a matter for the planning system. Whether any particular development will have an adverse impact on the setting of a scheduled monument is a matter of professional judgement. It will depend upon such variables as the nature, extent, design of the development proposed, the characteristics of the monument in question, its relationship to other monuments in the vicinity, its current landscape setting and its contribution to our understanding and appreciation of the monument.* Historic Scotland's guidance note Managing Change in the Historic Environment: Setting (October 2010) provides more detail on how to assess setting.
Some monuments are both scheduled and listed. Where this is the case only scheduled monument consent is required for any works.

Conservation Areas
Conservation areas are 'areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance'.

Gardens and Designed Landscapes
Gardens and designed landscapes have been defined as grounds which have been laid out for artistic effect. They are often the setting of important buildings and, in addition to parkland, woodland, water and formal garden elements, can often have significant archaeological and scientific interest (SHEP 2.65). There is no primary legislation that gives protection to gardens and designed landscapes. However, regulation 25 and paragraph 5(4) (a) of Schedule 5 of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 requires planning authorities to consult Scottish ministers on '*development which may affect…a garden or designed landscape*'. The effect of a proposed development on a garden or designed landscape should be a consideration in decisions on planning applications. Change should be managed to ensure that the significant elements justifying designation are protected or enhanced.

Properties in Care
Historic Scotland cares for 345 ancient monuments on behalf of Scottish ministers. The majority are held by guardianship, but some are held by ownership (around a fifth of the estate), and a small number by leasehold. The powers of the Scottish ministers' relating to the estate of properties in care are enshrined in the Ancient Monuments and Archaeological Areas Act 1979 It is recognised that properties in care are more than the sum of their constituent parts. Many have outstanding landscape or picturesque values and settings.

Other non-designated historic environment assets
The SPP notes that *archaeological sites and monuments are an important, finite and non-renewable resource and should be protected and preserved in situ wherever feasible. The presence and potential presence of archaeological assets should be considered… …when making decisions on planning applications. Where preservation in-situ is not possible planning authorities should, through the use of conditions or a legal agreement, ensure that developers undertake appropriate excavation, recording, analysis, publication and archiving before and/or during development (*paragraph 123).
In Angus, non-designated historic environment assets are included within the Angus Council Sites and Monuments Record (SMR), managed by the Archaeology Service of Aberdeenshire Council.

7.8 Regional and Local Planning Policy Guidelines

The Angus Local Plan

The Angus Local Plan has been successively developed and revised (Adopted Angus Local Plan (2000), The Finalised Angus Local Plan Review 2005). The policies were again reviewed in the Angus Local Plan Review (2009).
The Angus Local Plan Review (2009) 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*. With regard to renewable energy and the historic environment, Policy ER34 states that proposals for all forms of renewable energy developments should be assessed against several requirements, including:

(c) the development will have no significant detrimental effect on any sites designated for nature conservation, scientific, historic or archaeological reasons

Policy ER18 sets out the requirements to safeguard archaeological sites of national importance.

An Implementation Guide for Renewable Energy Proposals (June 2012) clarifies and expands on Local Plan Review Policies ER34 and ER35 and those factors that will be taken into account in considering and advising on proposals for renewable energy projects in Angus. Table 2 of the Implementation Guide states that proposed turbines of any height require supporting information that 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.

A Draft Strategic Environmental Assessment (SEA) of the Angus Local Development Plan (The Angus Local Development Plan Main Issues Report A Strategic Environmental Assessment: ENVIRONMENTAL REPORT) was published in November 2012. This notes that there is support for wind turbine development (Option 5a), stating:

This option is likely to have significant positive/beneficial impacts on Climatic Factors through increased renewable energy generation. Probable long term positive cumulative impacts from tackling greenhouse gas emissions and their contribution to tackling the effects of climate change including where appropriate their effect on biodiversity, flora and fauna. While wind turbine development has significant potential to have negative impacts on Nature Conservation interests, landscape and Cultural Heritage, the nature and scale of the impacts is dependent on the location, scale and nature of any proposed wind turbine development. The purpose of policies and spatial framework prepared under this option will be to support wind turbine development in the most appropriate locations while protecting important environmental assets of Angus, including taking account of cumulative landscape and visual impact.

The Dundee and Angus Structure Plan 2001-2016

The Dundee and Angus Structure Plan DASP (2002) established strategic policy and reflected national planning policy at the time. It noted that proposals for renewable energy development would be favourably considered where they delivered quantifiable environmental and economic benefits and any significant or cumulative adverse impacts on the natural and historic environment were satisfactorily addressed. DASP was replaced by The TAYplan Strategic Development Plan on 8 June 2012.

TAYplan: Scotland's SusTAYnable Region Strategic Development Plan 2012-2032

TAYplan notes that there is an aim 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. It also aims to contribute towards greater regional energy self-sufficiency. It notes that Local Development Plans and development proposals should ensure that all.. decisions on development proposals for energy management infrastructure have been justified, at a minimum, on the basis of several considerations, including the sensitivity of landscapes... tourism, recreational access and listed/scheduled buildings and structures;

Policy 3 of TAYplan notes that one aim of the plan is understanding and respecting the regional distinctiveness and scenic value of the area through safeguarding, amongst other things, 'archaeology, historic buildings and monuments and allow development where it does not adversely impact upon or preferably enhances these assets.'
Angus Windfarms Assessment Landscape Capacity Study
A review of windfarm development in Angus, together with a landscape capacity study was published in 2008 (Angus Windfarms Assessment Landscape Capacity Study).

7.9 Setting

The proposal at Cairny does not physically impact upon any designated or non-designated historic environment assets. However, as noted in the above discussion, setting is an important consideration when discussing the effect of developments on the historic environment.

Definition of setting

Section 112 of the SPP notes that there should be an *assessment of the impact of proposed development on the historic environment and its setting.* The SPP states that *…setting is more than the immediate surroundings of a site or building, and may be related to the function or use of a place, or how it was intended to fit into the landscape or townscape, the view from it or how it is seen from around, or areas that are important to the protection of the place, site or building.*
The Historic Scotland guidance note, Managing Change in the Historic Environment – Setting (October 2010) notes that setting should be thought of as *…the way in which the surroundings of a historic asset or place contribute to how it is experienced, understood and appreciated.* It notes that *monuments, buildings, gardens and settlements were not constructed in isolation* and that *…setting often extends beyond the immediate property boundary of a historic structure into the broader landscape.*

The guidance records several factors that contribute to setting (p 4), including:

- *visual envelope, incorporating views to, from and across the historic asset or place;*

- *key vistas, framed by rows of trees, buildings or natural features that give an asset or place a context, whether intentional or not;*
- *the prominence of the historic asset or place in views throughout the surrounding area;*
- *character of the surrounding landscape;*
- *general and specific views including foregrounds and backdrops;*
- *relationships between both built and natural features.*

Stages to assessing the impact of change upon setting

Managing Change in the Historic Environment – Setting states that there are three stages to assessing the impact of change upon setting:

- Stage 1: identify the historic assets that might be affected a proposed change.
- Stage 2: define the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced.
- Stage 3: assess how any change would impact upon that setting.

This report on the historic environment has followed the guidance outlined in the national and local plans and guidance notes. It has used the definitions of setting provided by Historic Scotland and has followed the stages of assessing the impact of change on setting as defined in Managing Change in the Historic Environment.

7.10 Methodology

Consultations

Written requests for comments and identification of key issues arising from the proposed development were sent to Historic Scotland and Angus Council during the Scoping phase of the assessment. A meeting was held with Historic Scotland's Senior Development Assessment (EIA) Officer, Robin Campbell and colleagues for follow up discussion of specific sites raised in Scoping as of particular sensitivity. These included: The Caterthuns hillforts; White Caterthuns houses, cairns and fields; Newbigging hut circle; Bridgend cairn; Hill of Menmuir fields and cairns; Edzell Castle and Castle Hillock motte.

Definition of the study area

Two study areas were defined in order to meet the aims and objectives of the assessment:

<u>The development site study area</u>

For the purposes of assessing construction phase impacts upon the cultural heritage resource within the development site, the development site study area includes a *c.* 1000m buffer extending from the site boundary. The buffer was further extended on the western development site boundary to capture a group of sites which fell just outside the 1000m radius but were considered relevant to the wider context of the area. The buffer ensures that cultural heritage assets noted within the development area are placed in a wider context and that cultural heritage assets in the immediate vicinity of the development

site are included in the case of possible impact by peripheral activities associated with construction and decommissioning.

The wider study area

For the purposes of the identification of key cultural heritage receptors in the wider historic landscape the search area in this report focuses on designated heritage within the zone of theoretical visibility (ZTV) up to 10km from the development boundary.

Data parameters

Every cultural heritage asset within the development site study area was considered in the assessment of direct and indirect impacts of the wind farm development. This includes all known designated and non-statutory recorded heritage, and was supplemented by additional desk-based research and site walkover survey.

Within the wider study area, designated heritage assets of medium and high sensitivity (see Table 7.1 below for definitions of sensitivity) were selected for assessment of indirect impacts of the wind farm upon setting. This includes Scheduled Monuments; Conservation Areas; Properties in Care and Listed Buildings of individual or group Category A and B status. Category C(S) listed buildings were rapidly assessed but not considered in detail unless they form part of a Category A or B group or are located within a designated policy. Inventory Gardens and Designed Landscapes are assessed as part of the Landscape and Visual Impact Assessment in Section 4 of this report.

A zone of theoretical visibility (ZTV) was constructed and used to filter designated cultural heritage receptors within the wider study area which would have potential theoretical views of one or more turbines. This information is presented in Figure 7.2 and Appendix 7 Table 2. The assessment of the theoretical number of turbines visible given in the appendices is based on the 'bare ground' ZTV plan, Figure 7.2. The actual visibility is based on site visits to each heritage asset.

Data collection

All work has been conducted in accordance with the Institute of Field Archaeologists Code of Conduct (IFA 2006) and Standard and Guidance for Archaeological Desk-Based Assessment (IFA 2008).
The following sources have been consulted:

- National Monuments Record Scotland (NMRS) for NMRS data;
- Angus Council Historic Environment Record;
- Historic Scotland (HS) for data on Scheduled Monuments, Listed Buildings, Gardens and Designed Landscapes, Conservation Areas and Properties in Care;
- Map Library of the National Library of Scotland for Ordnance Survey maps and other historic maps to provide information on historic land use, and any unrecorded sites of historical or archaeological interest;

- Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) vertical aerial photographic collection to provide information on recent historic land use, and to identify any unrecorded sites of historical or archaeological interest;
- Relevant bibliographic sources were consulted for general background and historical context.

A walkover of the development site was undertaken to assess the current condition of recorded cultural heritage sites, to record current land use, and to assess the potential for undiscovered or unrecorded cultural heritage sites within the development area. A photographic record of the site, the environs and every heritage asset visited was compiled.

Site visits were made to every Scheduled Monument (SAM) and Category A and B listed buildings with theoretical views of the wind farm within the wider study area to experience and assess their current setting and the potential impact of the development upon it.

7.11 Impact Assessment Methodology

Types of impact of the proposed wind farm on the cultural heritage resource are assessed in the following categories:

Direct impacts*:* where there will be a physical impact on a site caused by the proposed development. Direct impacts may be caused by a range of activities during the *construction phase* of development, including ground disturbing excavations for turbine foundations; crane pads; access tracks; borrow pits; storage and compound areas and cable and service trenches. Direct impacts may also occur during the *decommissioning phase* of development. Direct impacts on cultural heritage features are normally adverse, permanent and irreversible.

Indirect impacts: where the setting of a site may be affected. Indirect impacts persist through the *operational phase* of the turbines and arise from the introduction of a new element in the landscape. This may result in, changes to views to or from cultural heritage features with important landscape settings; fragmentation of the historic landscape and the loss of connection between its component parts; and the introduction of noise and vibration. Indirect impacts caused by wind farms are assumed to be adverse i.e. the introduction of a wind farm is at best neutral with regard to impacts upon the setting of cultural heritage.

Assessment criteria

The assessment of significance of both construction and operational phase impacts was undertaken using two key criteria: the **sensitivity** of the receptor and the **magnitude** of the predicted effect. These criteria are combined to provide an assessment of the **significance of impacts** of the development on the receptor. Impacts that are major or major/moderate are considered to be significant as required by the *Environmental Impact Assessment (Scotland) Regulations 1999.*

Sensitivity of the receptor

The assessment of the sensitivity of a cultural heritage asset to direct and indirect impacts is based upon a rating of its heritage value, i.e. the relative significance of the asset in terms of the nation's heritage. This has been guided by criteria used by Historic Scotland for scheduling ancient monuments and classifying listed buildings. Monuments are generally considered for scheduling based upon factors such as age, rarity, condition and archaeological context, while listed buildings are designated and categorised based upon similar criteria as well as technical innovation/virtuosity, architectural design and associations with well-known architects, historical persons or events. In some cases a site or building which does not have a protective designation assigned to it could nonetheless still be rated as having the same significance as another one which is protected. This is because the selection of items for listing and scheduling is an ongoing national activity. The criteria for judging archaeological significance are gradually evolving, and in some cases, important buildings or monuments may have been overlooked during listing, or could now be judged worthy of listing, whereas they were not previously.

Table 7.1: Summary of the criteria used in this study to assess the relative sensitivity of a cultural heritage feature

Sensitivity	**Criteria**
High	• World Heritage Sites • Scheduled Ancient Monuments (actual and potential) • Category A Listed Buildings • Inventory status Gardens and Designed Landscapes
Medium	• Archaeological sites and monuments of distinctive regional importance • Category B Listed Buildings • Conservation Areas
Low	• Archaeological sites and monuments of local importance • Category C (S) Listed Buildings • Unlisted buildings, structures of historic or architectural interest
Negligible	• Isolated find spots, finds or features removed from their context

Impact Magnitude

The magnitude of impacts caused by the development upon the cultural heritage resource has been rated according to the criteria summarised in Table 7.2.

Table 7.2: Summary of the criteria used in this study to assess the magnitude of impact of the proposed wind farm development upon cultural heritage

Impact magnitude	**Criteria**
Substantial	Total loss or substantial changes to key elements of the baseline conditions such that the post development character (whether to its physical integrity or to its setting) will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements of a monument's baseline condition such that the post-development character (whether to its physical integrity or to its setting) will be materially changed.
Slight	A minor shift away from baseline conditions. Change arising from alteration will be detectable but not material. The underlying character of the baseline conditions will be similar to the pre-development situation
Negligible	Very little change, barely distinguishable from baseline conditions
None	No predicted impact

Impact Significance

The significance of the effects on resources/receptors can be determined from the following matrix:

Table 7.3: Matrix used in this study to determine the significance of impact of the proposed wind farm development upon cultural heritage

	Sensitivity		
Magnitude	High	Medium	Low
Substantial	Major*	Major/Moderate*	Moderate
Moderate	Major/Moderate*	Moderate	Moderate/Minor
Slight	Moderate	Moderate/Minor	Minor
Negligible	Moderate/Minor	Minor	Negligible

*Effects that are major or major/moderate should be deemed to be significant for the purposes of the ES (and EIA regulations).

7.12 Existing Cultural Heritage Baseline

(Site reference numbers in bold.)

Introduction

<u>The development site study area</u>

Figure 7.1 shows the development site boundary and the location of all known cultural heritage sites within the development site study area up to 1,000m.

Appendix 7: Table 1 summarises the environmental baseline of cultural heritage assets located within the development site study area and provides an assessment of the sensitivity of each asset.

There are 18 cultural heritage sites recorded on the Angus Historic Environment Record within the development site study area. None fall within the areas of potential direct impact arising from construction activities associated with the wind farm development.

The wider study area

There are 30 Scheduled Ancient Monuments within the wider study area which have potential theoretical views of one or more turbines according to the bare earth ZTV model. Three of these (The Caterthuns, Edzell Castle and Lindsay Burial Aisle) are also properties in the care of Historic Scotland. Fettercairn Conservation Area, which lies on the 10km boundary to the northeast of the proposed development, has potential theoretical views of the turbines.

There are 53 Listed Buildings of medium and high sensitivity from which there would be theoretical views of one or more turbines. Of these, 6 are Category A and 47 are Category B. The majority of Listed Buildings are associated with historic settlements or properties of Edzell, Fettercairn, Strathcaro and Newtonmill.

Figure 7.2 shows the location of all designated cultural heritage receptors included in this study within 10km of the site boundary that fall within the bare earth ZTV and have potential theoretical views of one or more turbines.

Appendix 7: Table 2 provides tabulated information on the baseline character and current setting of designated cultural heritage receptors included in this study within a 10km radius of the proposed wind farm that fall within the ZTV.

Overview of the development site study area

Of the 18 sites recorded within the development site study area, 2 are prehistoric. These are a possible recumbent stone circle (**16**), destroyed in the 19th century, which was probably Bronze Age and the earthwork remains of Newbigging hut circle (**18**), which could be Bronze or Iron Age in date. A 19th century description of the stone circle describes a large cairn surrounded by a double circle of 20-30 stones. When it was dismantled and removed in the mid-19th century, a quantity of black clammy earth mixed with charcoal was recorded within the cairn. Flint arrowheads were also reported in the vicinity prior to 1853. Newbigging hut circle is a scheduled monument (**6874**). Its setting in relation to the proposed development is discussed below. Both of these monuments are located at around 1.5km distance from the nearest proposed turbine.

Thirteen sites are recorded as Post-medieval. Two groups of clearance cairns (**9** and **12**) are tentatively assigned to the medieval or post-medieval period; and the date of a fishing weight (**2**) is unknown. The

sites relate to historic settlement and agriculture around Lower Cairny. A cluster to the northeast of the development boundary (**5**, **6**, **8**) comprise the ruinous and earthwork remains of a farmstead, rig and furrow and an extant boundary stone at Redfaulds. Earthwork remains of buildings and rig and furrow (**7**, **14**) are also located just to the north of Witton, (**11**) a post medieval farmstead, now called Lark Hall Cottage, which is still occupied. A further cluster of sites (**9**, **12**, **13, 17**) located west southwest of the development site boundary at Newbigging comprise plough damaged slight earthwork remains of a rectangular building and two groups of around ten small clearance cairns. The remains of a building at site **13** have been identified as likely to be the remains of the *Castle of Dennyfern*. The remains of a building at **17** are possibly related to a former farmstead of *Touffat* referred to in Ainslie's map of 1794. The numerous small clearance cairns may relate to agricultural clearance associated with these post medieval farmsteads.

Post medieval landscape and land use can be traced through map regression. The 1st Edition 6 inch Ordnance Survey Map of 1865 and the first revision of 1892-1905 show the development area in sufficient detail. John Ainslie's 1794 map of the County of Forfar is useful for general context.

The 1st Edition OS surveyed in 1863, shows that by the mid-19th century, the limit of improved land had extended up Cairny Hill to around the 250m contour, only 50m lower than the general limit today. Oldtown, Bogton and Witton are depicted as occupied farmsteads. A sheepfold is located near site **7**, recorded as the remains of a farmstead. A small rectangular building with an attached double enclosure is depicted within the present shelter belt on the eastern site boundary (site **4**). Nothing now remains here. Around Newbigging, to the west of the development area, the 1st Edition records the remains of the stone circle (**16**), and misidentifies the Newbigging hut circle (**18**) as the Castle of Dennyfern. Building **17** is already unroofed.

Results of the walkover survey

A walkover of the development area was undertaken on the 16th September 2012. There is good access over the site and good views over the entire development area.

The site has a southeast facing aspect. The ground gently slopes upwards from the road at its southern boundary to the end of the shelter belt that forms the eastern site boundary. Here there is a break of slope and the ground steepens to the summit of Cairny Hill.

The gently sloping southern half of the development site, below the 160m contour, is under cultivation and had just been cut for silage. The northern half of the site is improved grassland.

One possible new site was identified as a result of the walkover survey and subsequent inspection of aerial satellite images. This comprises the possible remains of 20+ small clearance cairns and at least one low relief D-shaped earthwork enclosure. These are located in an area between Bogton and Oldtown centred on NGR 354964 770130 (site **19**) Figure 7.1). They are similar in form and extent to the clusters of features identified as possible medieval or post medieval clearance cairns at Newbigging (**9**, **12**). The 1st Edition OS map depicts both areas of possible cairns as hummocky marshy ground. The new site falls outwith the development boundary.

No further visible evidence in the landscape, other than that already recorded, relating to archaeological remains of any period within the development boundary was noted in the walkover survey.

Assessment of sensitivity of known cultural heritage features within the development site study area

Appendix 7: Table 1 summarises the assessment of sensitivity for every known cultural heritage asset within the development site study area. The assessment was made using criteria outlined in Table 1 of this section, and based upon recorded information, site visits and professional judgement.

Except for the scheduled remains of the hut circle at Newbigging, there are no individual sites of greater than local significance within the area of development and all have either **low** or, in the case of documentary records of destroyed sites and findspots, **negligible** sensitivity.

Archaeological potential of the proposed development area

The desk-based investigation and site walkover surveys have enabled the land use history of the development area to be reconstructed with some degree of confidence from the mid-19th century to the present day. The work has shown that the area within which the turbines and associated infrastructure will be constructed, was already improved land in the mid-19th century, and has been ploughed since at least then.

The presence of three clusters of probable medieval or post medieval clearance cairns in association with post medieval farmsteads indicates that cultivation of the gentler lower slopes of Cairny Hill, probably extends back at least into the 18th century and probably further.

This long history of arable land use is likely to have had a profound detrimental impact on the survival and condition of any buried archaeological deposits within the cultivated areas. Evidence for the already significant damage caused by cultivation upon cultural heritage comes from the recorded removal of the stone circle, the historic reports of flint artefacts and the either total destruction or poor condition of recorded archaeological sites recorded in cultivated areas. If archaeological deposits are present, there is a high potential that they have been severely truncated.

For the post-medieval and modern periods, there is a very low potential of unknown archaeological deposits and remains to exist within the development area, due to the relatively detailed spatial and historical information available for these periods in the historical record.

There are no references to medieval sites within the development site study area and the likelihood of encountering unknown medieval archaeological deposits within the area of construction impact is assessed to be low.

Artefacts and monuments of the prehistoric period are recorded in the vicinity of the development area. This shows there is some potential for unrecorded prehistoric remains within the local area. However, the potential for unknown prehistoric deposits to be encountered within the areas of construction impact is tempered by the very small footprint of ground disturbance and the strong likelihood that any deposits will have suffered significant damage as a result of the agricultural history of the area.

7.13 Impact Assessment

Direct impacts

New construction elements associated with the development of the wind farm include two turbine bases (15m x 15m); two crane pads and hard standing assembly areas (48m x 22m), a temporary site compound; and a switch gear and meter house (3m x 4.2m). The existing farm tracks will be upgraded and used to access the site. Improvements to the track do not entail further ground disturbance.

Predicted impacts of construction upon known cultural heritage features within the development area
No known monuments within the site boundary are predicted to be affected by construction activities.

The predicted impact magnitude upon any features within the area of construction is predicted to be **none**.

The predicted significance of construction impact upon existing recorded cultural heritage sites is, therefore predicted to be **negligible**.

Potential impact of construction upon unknown cultural heritage
The most potential for unexpected discoveries within the area of construction is of buried prehistoric features and objects. The evidence indicates that deposits would probably already be damaged as a result of agricultural impact. There is no evidence to suggest any unknown remains within the areas of construction are likely to be more than of local significance, or **low** sensitivity.

The magnitude of construction impacts upon buried, unknown archaeological deposits in all cases is assessed to be **substantial**.

The resulting impact significance upon buried, unknown archaeological deposits is assessed to be **moderate**.

However, the assessment of impact significance must be balanced with the extremely low chance of encountering prehistoric deposits within the small areas of ground disturbance, and the consequent quality of information that is possible to be recovered from such limited excavations.

Potential direct impacts of decommissioning upon cultural heritage features

Decommissioning of the turbines is not anticipated to have any direct effects upon buried cultural heritage as no further land take will occur during this stage.

7.14 Mitigation

Mitigation of direct impacts

Construction

The extent of the proposed groundworks is very limited. The most extensive works relate to the creation of areas of hard standing for assembly of the turbines and the site compound. The construction of these will not impact below the current plough level. The groundworks will not result in disturbance that is greater than would occur in normal agricultural operations. There is also a very low potential of encountering *in situ* archaeological deposits during construction. For these reasons, no mitigation measures are proposed.

Decommissioning

Existing infrastructure will be used or reinstated for all decommissioning activities. There are no expected direct effects upon buried cultural heritage as no further land take will occur during this stage.

Mitigation of indirect impacts

Decisions relating to the number, scale, siting and layout of the turbines have evolved during the design process to minimise the operational impact of the wind farm upon nearby settlement, the surrounding landscape and key cultural heritage receptors identified during the Scoping Phase, and particularly the impact upon the Caterthuns.

The scale and siting of the turbines, along with the screening effect of local topography and existing woods, plantations and tree belts has resulted in only 6 designated cultural heritage sites within the 10km study area as having potential actual views of the turbines.

A summary of the present setting and the results of the impact assessment for each of the 84 designated cultural heritage assets considered within the 10km of the proposed development, with theoretical views of the turbines according to a bare earth model, is given in Appendix 7: Table 2.

Mitigation of the operational impact of the wind farm has, therefore, been embedded within the design process, and no further specific mitigation of the effects on the setting of designated heritage is proposed.

7.15 Residual Impacts

Because mitigation of indirect impacts has been embedded into the design of the wind farm from the earliest stages, all indirect impacts are considered to be residual.

This section considers the residual effects of indirect impacts upon the six scheduled monuments identified in site visits as having potential actual views of one or more of the proposed turbines. These are summarised in Table 7.4 below.

Table 7.4: Summary of impacts upon cultural heritage receptors with potential actual views of the Lower Cairny turbines, based on site visits.

Site name	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact magnitude	Impact significance	Factors affecting visibility
Newbigging, hut circle	HIGH	2	1.3	MODERATE	MAJOR/ MODERATE	Clear view of turbines looking eastwards.
Hill of Menmuir, fields and cairns	HIGH	0-2	4	NEGLIGIBLE	MINOR	Development site back dropped by hills and difficult to make out from the scheduled area. Possible partial views of turbine tips from the higher ground in the north western part of the scheduled area.
White Caterthun, houses, cairns and fields	HIGH	0-2	4	NEGLIGIBLE	MINOR	There are partial views of the development site from the northern edge of the scheduled area, and so possible fragmented and occasional views of turbines, but conifer tree belts screen most views north eastwards.

Site name	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact magnitude	Impact significance	Factors affecting visibility
The Caterthuns, hill forts	HIGH	2	3.5	SLIGHT	MODERATE	Brown Caterthun: The development site comes into view from the summit northwards. The turbines would be clearly visible but back dropped by higher ground behind them. Because of their position at a relatively low altitude in relation to the view from the summit, they would appear as features below your natural line of sight. White Caterthun: The development site is clearly visible along the path up to the summit and from the ramparts around their north and east end. There would be clear views of the turbines from these areas. There are no theoretical or actual views of the turbines from the west and southern stretches of rampart. The ramparts obscure views of the turbines from anywhere within the summit enclosure of the White Caterthun. Intervisibility between Caterthuns: There is no view of the turbines when looking south eastwards from the Brown Caterthun to the White Caterthun.When looking from the White Caterthun north eastwards across to the Brown Caterthun, the turbines would be a peripheral feature to the north, at a much lower elevation, so below the line of sight.

Site name	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact magnitude	Impact significance	Factors affecting visibility
Ballownie, mound	HIGH	0-2	8	SLIGHT	MODERATE/ MINOR	Within woodland. Turbines would be visible as distant features, back dropped against high ground behind them, only from the north western edge of the site.
Bridgend, cairn	HIGH	2	1.3	SLIGHT	MODERATE/ MINOR	Only the upper western part of Cairny Hill is visible from the monument, so it is possible that the tips of the turbines may be seen as a worst case scenario.

It is not considered that the noise generated by the turbines will have a significant additional effect on the appreciation of designated heritage over the distances involved as these are at least as far from the turbines as residential receptors on which the potential effects of noise have been taken into account in the scheme design. Similarly, the movement of the turbine blades is not considered to be a significant factor over and above the visual presence of the turbines over the distances involved.

Newbigging hut circle (**6874**)

Newbigging hut circle comprises a circular earthwork bank approximately 3m wide and 0.4m high with an entrance on the southeast side. The monument is located in a ploughed field on the lower slopes of the Hill of Formal. Ploughing right up to the edge of the monument is truncating and damaging the base of the banks. There is also evidence of rabbit burrowing into the banks. The northern side of the monument is partially truncated by a later boundary wall. The hollowed centre of the monument is filled with a modern clearance cairn.

The monument is located 1.5km from the nearest turbine, and it is assessed that there would be clear views of at least the upper parts of the turbines from the site. During the operational period of the wind farm, the turbines will be experienced as a relatively prominent landscape feature when looking eastwards from the hut circle.

The condition of the monument and the modern agricultural landscape within which Newbigging hut circle is now situated has resulted in the total loss of its contemporary landscape setting. There are no other surviving contemporary monuments or features in the vicinity. The deposits immediately below the earthwork may be intact and have archaeological value. However the monument's setting has not survived.

The magnitude of impact to the setting of the monument is assessed to be moderate to slight, because of the loss of its setting; a result of long-term historic land use as well as modern agricultural practise. It is not considered that the monument will be harmed by the presence of the turbines and that the significance of the impact is predicted to be **moderate**.

Hill of Menmuir fields and cairns (**4464**)
The monument is described as slight earthwork banks of at least 21 open ended rectangular fields which underlie 50+ small clearance cairns. It is a multi-period site, although the fields are likely to be prehistoric and could be contemporary with settlement at White Caterthun and the Caterthuns themselves. There are clear uninterrupted views from the Hill of Menmuir to the Caterthuns.

Although viewed in low light conditions during the field visit, the earthwork banks of the fields were very difficult to make out on the ground. Much of the scheduled area is covered in heather and long grass. The development site was only visible from the higher ground in the northeast of the scheduled area. Even then, it was difficult to make out. It is possible, but not certain that turbine tips could be seen from this part of the site. If visible, they would appear as distant elements, back dropped by higher ground behind them.

The magnitude of impact to the setting of the monument is assessed to be negligible due to the minimal views of the turbines from a limited area within the scheduled area. The important view in terms of setting of the monument is with the Caterthuns, and the presence of the turbines would not affect this at all. The significance of the impact is predicted to be **minor**.

White Caterthun houses, cairns and fields (**4571**)
The monument is described as consisting of 3 ring ditched houses, small cairns and a system of rectangular fields defined by slight turf banks. It is likely they are contemporary with the construction and/or use of the Caterthuns and the settlement may be particularly associated with the White Caterthun, on the lower south western slope of which it is situated. The remains are located in an extremely boggy and tussocky ground. In September when the site visits were undertaken, the long grass and boggy terrain made identification of earthworks impossible. A substantial conifer tree plantation along the northern boundary of the scheduled area and undulating ground screens the proposed development site from view. It is possible that an occasional and fragmented view of a turbine may be seen from the higher ground on the northern part of the site.

The magnitude of impact to the setting of the monument is assessed to be negligible due to the partial and fragmented views of the turbines from a limited area within the scheduled area. It is possible there will be no views at all. The significance of the impact is predicted to be **minor**.

The Caterthuns hillforts (**90069**)
The Brown and White Caterthuns are multivallate hillforts, characterised by multiple enclosing works of varying form and scale that date to the pre-Roman Iron Age. They occupy twin summits of the Menmuir

ridge – a line of low foothills that define the boundary between the lowland tract of Strathmore to the southeast, and the mountainous terrain of the Braes of Angus beyond the valley of the West Water to the north. From the summits of the hillforts, panoramic views encompass mountain and coast and take in every detail and feature of the landscape and elements within it; a factor that must have been important in the siting of the monuments.

Other enclosed settlements referred to as 'forts' in the vicinity of the Caterthuns and likely to be contemporary with them include, the nearby Mains of Edzell, (now a cropmark site); the vitrified fort of Green Cairn near Fettercairn 5km to the northeast (largely destroyed); the vitrified fort of Finavon; and the multivallate forts on Turin Hill, both around 7km to the southwest.

The enclosing works of the Brown Caterthun today survive as a series of six low earth banks with multiple gaps, progressively encircling the slopes of the summit. Excavations have revealed a walled enclosure at the summit and evidence for palisading along earth bank outer works. It is also suggested that archaeologically invisible features such as hedges or thorn fences could have topped the earthen ramparts. The slopes of the White Caterthun are also encircled by low earth banks; however, contrastingly the flat summit is completely enclosed by a massive stone rampart, the scale of which even today clearly expresses an astonishing feat of effort and mobilisation of labour, of a presumably powerful builder.

The purpose of the Caterthuns can only be understood in relation to what else was going on at this time and in this place. Research and excavation has shown that they were unlikely to have been the foci of settlement, but probably had their origins as the sites of communal places for economic and ceremonial activities, e.g. markets, festivals and meeting places. The villages and farms where the people who built and used the forts lived, are detected in the archaeological record on the fertile lowland plains that surround the Caterthuns, usually as cropmarks. On higher marginal ground, where different historic land use has resulted in the survival of upstanding archaeological remains, the houses and fields of contemporary settlements survive as low earthworks, e.g. the houses cairns and fields recorded on the lower slopes of the White Caterthun, Hill of Menmuir and Tullo Hill.

Today, the Caterthuns are well-visited monuments, appreciated for the spectacular views from their summits. Now, as in the past, access for most visitors is controlled, although not by ramparts and palisades, but by clear paths though otherwise difficult terrain. This constrains views for most, from the paths. For both monuments, the views of the turbines are confined to their north or north eastern quadrant. No views over Strathmore and to the coast eastwards and southwards are affected. No views towards the mountains of the Braes of Angus westwards are affected.

The turbines come clearly into view from the Brown Caterthun from a point just north of the summit. From here and the northern quadrant of the monument, they would appear as new elements within the geometric, cultivated lower ground back dropped by the Highland landscape of the Braes of Angus. There is no visibility of the turbines from other parts of the Brown Caterthun. When looking south and eastwards over Strathmore and to the coast, the turbines would not be visible.

From the White Caterthun, the turbines would be clearly seen as new elements in the landscape when making the descent along the path from the summit to the car park and picnic area, and from the top of the summit rampart at the north eastern end. When looking over to the summit of the Brown Caterthun from these areas, the turbines would be peripheral to this view and positioned lower than the natural line of sight. There are no views out from the enclosed summit of the White Caterthun.

As shown above, the setting of the Caterthuns cannot be defined singly. At the regional level, their setting is about their relationship with the landscape and with other contemporary prominent sites with similar hilltop locations, e.g. Green Cairn, Finavon Fort and Turin Hill forts. This landscape sale context is perhaps of greatest importance to the modern setting of the Caterthuns. Most visitors who scale their summits do so for the view. At this scale, the two turbines would be new but small scale elements in the landscape. In most of these panoramic landscape views the turbines would not be visible. In views north and north eastwards towards the mountains, the turbines would be associated with the modern agricultural landscape and be below a natural line of sight.

The magnitude of impact to the setting of the monument at a landscape scale is therefore assessed to be slight. It is not considered that the regional setting of the monument will be harmed by the presence of the turbines and that the significance of the impact is predicted to be **moderate/minor**.

At a local scale, the setting of the Caterthuns may be defined as their relationship with the contemporary settlement and other sites on the lower land where the people who built and used the Caterthuns lived and worked. In a modern intensively farmed landscape, the evidence for these is gone or survives as below ground deposits, the agricultural erosion of which creates cropmarks. On marginal land, these sometimes survive as slight earthworks, and in most cases are protected by scheduling. Despite these rare survivals, the contemporary local context of the Caterthuns is long gone. It would not be possible to see and comprehend the physical remains of the relationship between settlement and hillfort from anywhere on the Caterthuns.

The magnitude of impact to the setting of the monument at a local scale is therefore assessed to be slight. It is not considered that the local setting of the monument will be harmed by the presence of the turbines and that the significance of the impact is predicted to be **moderate/minor**.

Finally, there is consideration of setting within and between the monuments themselves. During their use, high earthen and stone ramparts, topped with palisades and possibly hedges or fences would have controlled access and restricted views within and between the forts – although views of them from elsewhere in the landscape would have been much more dramatic. The massive stone ramparts enclosing the summit of the White Caterthun still effectively close off all views out of the monument by creating a stadium-like space. The turbines appear as peripheral lower level features in the modern view from the path to the White Caterthun across to the Brown Caterthun.

It is not considered that the interior setting of the monuments will be affected at all by the presence of the turbines and so the significance of the impact is predicted to be **minor**.

Ballownie mound (**6376**)
The monument is described as a 4m high, 25m diameter turf covered stony mound within woodland which forms a burial mound of prehistoric date. The mound is now covered with mature trees. It is sited on the northern river cliff of Cruick Water. The setting of the monument is defined by its relationship with the adjacent river and woodland. The 1st Edition OS shows a second tumulus, no destroyed, in the ploughed field on the other side of the road just to the north of Ballownie mound.

From the edge of the monument on the side of the road, there are relatively clear views across flat open arable land interspersed with clumps of trees and blocks of plantations towards the development site with the hills behind. It is possible, but not certain that the turbine tips would be visible from here. There would be no views of the turbines from the main part of the monument itself because it is located in woodland.

The magnitude of impact to the setting of the monument is assessed to be negligible due to the partial distant views of the turbines from the edge of the scheduled area and the fact that the principal setting of the monument is defined by its relation to the river. The significance of the impact is predicted to be **minor**.

Bridgend Cairn (**4416**)
The monument is described as a cairn standing to 1m high, with a kerb of large boulders. It is a rare example of its type and dates to the Bronze Age. The cairn is located on grazed grassland on a high ridge of glacial sand and gravel deposits above a bend in the West Water. The principal views from the cairn summit are over the river valley and it is the siting upon the ridge above the river that is important in defining its setting.

It is possible to see the upper western part of the development site from the summit of Bridgend Cairn, and possible, but not certain that a turbine tip would be visible. This would not affect the setting of the cairn in relation to the river and its immediate surroundings.

The magnitude of impact to the setting of the monument is assessed to be negligible due to the partial views of the turbines and its closely defined setting with the river below, which will be unaffected by the presence of the turbines. The significance of the impact is predicted to be **minor**.

7.16 Summary and Conclusions

Table 7.5 below provides a summary of the predicted significance of impacts upon cultural heritage receptors within the development site and wider study areas prior to, and following the implementation of suggested mitigation actions, and an assessment of the predicted residual impacts, for the construction, operation and decommissioning phases of the wind farm development.

Table 7.5: Summary of assessment of residual impact of development upon cultural heritage features

Impact	Impact significance (worst case)	Mitigation measure	Impact significance after mitigation (worst case)	Residual impact
Construction				
Loss or partial loss of known cultural heritage features.	NONE	None proposed.	NEGLIGIBLE	NEGLIGIBLE
Loss or partial loss of unknown buried archaeological deposits.	MODERATE	None proposed. The small scale and low impact of groundworks effectively mitigate the potential impact of construction.	MINOR/ NEGLIGIBLE	MINOR/ NEGLIGIBLE
Operation				
Indirect effects upon key cultural heritage receptors in the wider historic landscape.	MODERATE/ MINOR	Mitigation of indirect impacts embedded in wind farm design.	MODERATE/ MINOR Turbines will either be barely visible or will not impact upon the relevant setting of the 6 affected designated heritage assets within 10km of the wind farm.	MODERATE/ MINOR
Decommissioning				
Possible unintentional damage to upstanding cultural heritage features.	NONE	None proposed.	NEGLIGIBLE	NEGLIGIBLE

The study has shown that there will be indirect impacts to only six designated cultural heritage receptors within a 10km radius of the site. In four of these the predicted impact is assessed to be minor at most, and in two the predicted impact is assessed to be moderate at most.

The potential impact to each cultural heritage site has been individually considered. It is concluded that in no case during the operational period of the wind farm will the turbines be experienced as a detracting or detrimental element in the landscape in relation to the setting of any of the monuments.

The overall predicted significance of impact arising from the Lower Cairny wind cluster, either to the survival or setting of the cultural heritage resource is assessed to be overwhelmingly neutral and acceptable in terms of the EIA regulations.

References

Written sources *(not including legislation, planning and policy guidance which is referenced in the text)*

Dunwell, A. and Strachan, R. 2007. *Excavations at the Brown Caterthun and White Caterthun hillforts, Angus 1995-1997*. Tayside and Fife Archaeological Committee Monograph 5.

IFA 2008, *Standard and guidance for archaeological desk-based assessment*. IFA

Internet sources

http://canmore.rcahms.gov.uk/

http://www.nls.uk/collections/maps

https://www.aberdeenshire.gov.uk/smrpub/angus/default.aspx

Cartographic sources

1794	Ainslie, J. Map of the County of Forfar or Shire of Angus NE section
1865	Ordnance Survey Forfarshire Sheet XIX, 1st Edition, 6-inch
1892-1905	Ordnance Survey Forfarshire Sheet XIX 1st Edition 6 inch (1st revision)

8 NOISE

8.1 Introduction

Sources of noise during operation of a wind turbine are mechanical (from machinery housed within the turbine nacelle) and aerodynamic (the noise of the blades through the air). Whilst modern wind turbines are designed to minimise mechanical and aerodynamic noise, the additional noise generated by the proposed wind turbine development has been assessed in consultation with Angus Council's Environmental Health Department.

This report presents an assessment of the noise impact of the Lower Cairny wind turbine development on nearby noise sensitive receptors (NSRs). This assessment considers noise impact only during operation.

Wind turbine generator (WTG) operational noise is assessed, as a function of wind speed, against existing background noise levels at the same wind speed, with fixed lower noise limits that typically only affect the lowest wind speeds. The operational noise assessment has been carried out in accordance with the recommendations of ETSU-R-97 *The Assessment and Rating of Noise from Wind Farms*[16], (the methodology recommended to assess noise from wind turbines in the Scottish Government's online planning policy[17] and in particular, the page on onshore wind turbines[18]).

Background noise monitoring was undertaken at two locations after agreement with the Council's EHO, between the following dates:

- Tillydovie Cottage 24 September to 9 October 2012;
- Oldtown 24 September to 9 October 2012;

Noise levels have been predicted for Lower Cairny wind cluster, based on the proposed WTG locations and the predicted sound power level for a candidate WTG (Enercon E48).

8.2 Site Details

In this case, the operational noise impact assessment considered seven receptors, covering a range of directions from the wind cluster location. The Lower Cairny wind turbine coordinates and receptors for which the operational noise impact has been assessed are listed in Table 8.1 and Table 8.2 and shown in map form at Figure 8.1, Appendix 8.

[16] ETSU-R-97 (2007) *The Assessment and Rating of Noise from Wind Farms*, ETSU for the Department of Trade and Industry
[17] *Renewable Energy*, http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables (Scottish Government, last viewed 15 March 2012)
[18] *Onshore wind turbines*, http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore (Scottish Government, last viewed 15 March 2012)

Table 8.1: Noise Sensitive Receptors			
Receptor	**Name**	**Easting**	**Northing**
A	Tillydovie Cottage	355747	769564
B	Witton	356324	770117
C	Oldtown	354732	770086
D	Larkhall	355001	769464
E	Larkhall 2	355007	769339
F	Margie	356601	770433
G	Newbigging	354385	768949

Table 8.2: WTG Locations		
ID	**Easting**	**Northing**
T1	355356	769976
T2	355594	770017

8.3 Assessment Methodology and Significance Criteria

8.3.1 Legislation, policy and guidance

An overview of key guidance with respect to operational noise is outlined below, and further details of legislation, policy and guidance specifically for operational noise (ETSU-R-97[16]) are set out in Section 8.4.

Noise propagation has been modelled in accordance with International Standard ISO 9613-2: 1996 Acoustics – Attenuation of Sound Propagation Outdoors – Part 2: General Method of Calculation[19].

PAN 1/2011: Planning and Noise[20] provides advice on how the planning system can be used to reduce the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.

The Scottish Government's online planning policy[21] and in particular, the page on onshore WTGs, recommends the framework set out in the report *The Assessment and Rating of Noise from Wind Farms*

[19] International Standard ISO 9613-2: 1996, *Acoustics – Attenuation of Sound during Propagation Outdoors*
[20] Planning Advice Note 1/2011, *Planning and Noise*, http://www.scotland.gov.uk/Resource/Doc/343210/0114180.pdf, (Scottish Government, last viewed 15 March 2012)

(ETSU-R-97) for the measurement of WTG noise. It gives indicative noise levels calculated to offer a reasonable degree of protection to those living near to WTGs, without placing unreasonable restrictions on wind farm development. It also states that well-specified and well-designed wind farms should be located so that increases in ambient noise levels around noise sensitive receptors are kept to acceptable levels in relation to existing background noise. This will normally be achieved through good design of the WTGs and through allowing sufficient distance between the WTGs and any existing noise-sensitive development so that noise from the wind farm will not normally be significant. Noise levels from WTGs are generally low, and under most operating conditions it is likely that WTG noise would be completely masked by wind-generated background noise.

The impact of operational noise has been assessed in accordance with ETSU-R-97, taking cognisance of the most recent best-practice guidelines of Bowdler et al (2009)[22]. In October 2009, The Rt Hon Lord Hunt of Kings Heath OBE (Minister of State, DECC) wrote to Environmental Protection UK in response to their claim that a review of ETSU was due. He states[23]:

'You're quite right that modern turbines are generally larger than those on which the ETSU-R-97 guidance was based. Noise outputs from these larger turbines have also, however, reduced in that time. Since the ETSU-R-97 derived noise limits are a function of background noise, there is currently no evidence to suggest that the larger turbines are any more likely to cause a noise impact than earlier and smaller designs. Similarly, there is currently no evidence to suggest that the small incidence of Amplitude Modulation (AM) that is reported to occur at a few sites is as a result of turbine size.'

In essence, therefore, we continue to support the approach set out in Planning Policy Statement (PPS) 22 - Renewable Energy, including the use of ETSU-R-97 to "ensure that renewable energy developments have been located and designed in such a way to minimise increases in ambient noise levels".

8.3.2 Consultation

Consultations were carried out as outlined in Table 8.3.

8.3.3 Property Ownership

The Applicant owns the properties at Tillydovie Cottage, Witton, Larkhall, Larkhall 2, the new farmhouse at Tillydovie and also the abandonded property at Bogton. The property at Bogton is owned by the applicant. It is abandonded and derelict as confirmed by the Bell Ingram survey report at Appendix 8. The Applicant has no intention of developing the property as it is too derelict and without services.

[21] *Renewable Energy*, http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables (Scottish Government, last viewed 15 March 2012)
[22] *Prediction and assessment of wind turbine noise - agreement about relevant factors for noise assessment from wind energy projects*. D Bowdler, AJ Bullmore, RA Davis, MD Hayes, M Jiggins, G Leventhall, AR McKenzie. Institute of Acoustics, Acoustics Bulletin, Vol 34, No 2 March/April 2009
[23] http://www.environmental-protection.org.uk/news/detail/?id=2300

Table 8.3: Summary of Consultations
Consultee: Louise Ackroyd; Angus Council Environmental Health Officer
Response: Email on 31 August 2012 confirming that: • Lidar would appear to be an acceptable method for gathering wind speed data and would therefore be accepted by this department for the site at Lower Cairny. ***Response:*** Email on 12 September 2012 confirming that: • In relation to the methodology suggested for the noise and wind monitoring I am happy with what is being proposed… ***Response:*** Meeting on the proposed wind cluster site confirming that: • The noise measurement locations are suitable and representative of the surrounding area. **Discussions Post-Withdrawal of Application 13/00257/FULL - WITTON FARM, August 2013.** The Environmental Health Officer noted that several of the nearby properties within the ownership of the Applicant would not meet the Council's noise criteria, in particular at Tillydovie Cottage which lies on the edge of the acceptable noise limit contour. As a result, the application was withdrawn in August 2013 in order to enable the Applicant to resolve these noise related issues. The Applicant has now developed mitigation measures that respond to the Council's concerns. It is possible to reduce the noise levels of the candidate Enercon E48 turbine by reducing the rotational speed of the blades, with a resultant reduction in the amount of electrical energy produced. This will be done for wind direction when the property is downwind of the wind turbine, and for the wind speed range over which there is a predicted exceedance of the noise limit. Further details of this mitigation package are contained within Section 8.9 and Appendix 8 within the Hayes McKenzie Report. It is also worth noting that the residents at Tillydovie Cottage have a financial 'share' in the proposed development.

8.4 Operational noise

The assessment of operational noise effects was undertaken following the guidance of ETSU-R-97. Details of the ETSU guidance are set out below.

The current practice on controlling WTG noise imposes noise limits at the nearest noise sensitive properties. Noise limits should be applied to external locations and should apply only to those areas frequently used for relaxation or activities for which a quiet environment is highly desirable.

Noise limits set relative to the background noise are more appropriate than fixed limits in the majority of cases. Generally, the noise limits should be set relative to the existing background noise at the nearest noise-sensitive properties and the limits should reflect the variation in both WTG source noise and background noise with wind speed.

Separate noise limits should apply for day-time and for night-time as during the night the protection of external amenity becomes less important and the emphasis should be on preventing sleep disturbance. Absolute noise limits and margins above background should relate to the cumulative impact of all WTGs in the area contributing to the noise received at the properties in question. Any existing WTGs should not be considered as part of the prevailing background noise.

The $L_{A90,10min}$ descriptor should be used for both the background noise and the wind cluster noise, and when setting limits it should be borne in mind that the $L_{A90,10min}$ of the wind cluster is likely to be about 1.5-2.5 dB(A) less than the L_{Aeq} measured over the same period. The use of the $L_{A90,10min}$ descriptor for wind cluster noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

For single WTGs or wind farms with very large separation distances between the WTGs and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to a $L_{A90,10min}$ of 35 dB(A) up to wind speeds of 10 m/s at 10 m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary.

8.4.1 Operational noise assessment criteria

The operational noise criteria, above which noise levels would be considered a significant impact, are derived as set out in ETSU-R-97. They have been consistently applied by planning authorities to wind energy developments since 1997 and have a high level of general acceptance[24]. In assessing impact, the day is divided into quiet day-time hours and night-time hours.

- Night-time: (2300-0700) limit 43 dB(A) L_{90} (10 minutes) when measured in free field conditions outside dwellings or up to 5 dB above background, whichever is the greater.
- Quiet day-time: (All evenings 1800-2300, Saturdays 1300-1800, Sundays 0700-1800) but in rating terms covering all daytime. When background levels do not exceed 30 dB(A), L_{90} (10 minutes) absolute level limit of between 35 dB(A) and 40 dB(A) L_{90} (10 minutes) the precise level depending on location factors or up to 5 dB above background level, whichever is the greater.

Both day- and night-time lower fixed limits can be increased to 45 dB(A) if the occupier has some financial involvement in the wind.

These criteria include an allowance for that character of WTG noise generally described as ‘blade swish’.

[24] HM: 2293/R1 Analysis of How Noise Impacts are Considered in the Determination of Wind Farm Planning Applications Hayes McKenzie Partnership, 6 April 2011

The actual absolute level selected for low background noise conditions depends on a number of factors. These factors include the number of dwellings in the neighbourhood, the impact of noise limits on the energy yield of the wind and the duration and level of exposure.

8.4.2 WTG Emission Data

A-weighted octave band noise levels for a candidate WTG have been used to predict the noise levels at sensitive receptors. The sound power level of the candidate machine, the Enercon E-48, is representative for an 800 kW machine[25]. The noise emission curve of the WTG is understood to be based on theoretical modelling, rather than a warranted level that the manufacturer is prepared to contract not to exceed. This has been accounted for in the model by the use of a ground absorption factor of 0.0, as recommended by Bowdler et al (2009)[22].

Wind cluster operational noise propagation model

The sound propagation over distance, including the effect of atmospheric absorption, was calculated using the WindPRO model based on ISO 9613-2.

8.4.3 Cumulative effects

ETSU-R-97 states that noise limits should be set relative to the pre-development background noise levels at the nearest noise sensitive receptor and that other existing wind farms should be taken into consideration. It is understood that there are no operational or consented nearby wind farms at this stage.

8.5 Baseline conditions

8.5.1 Background noise survey

The operational noise of wind farms is assessed by comparison with existing background noise. Background noise is usually measured in the external amenity of nearby noise sensitive receptors. Measurements are made in ten-minute intervals over an extended period. For this impact assessment, background noise measurements were obtained between 24 September and 9 October 2012.

Background noise monitoring was undertaken at two locations. The monitoring locations were discussed with the Angus Council Environmental Health Officer (Table 8.3 above). During a site visit on the 24 September SgurrEnergy personnel installed the noise monitoring equipment in the presence of the Environmental Health Officer.

Measurements were made in accordance with best practice set out in ETSU-R-97, (i.e. at a height of 1.2 m to 1.5 m above ground level and not less than 3.5 m from any reflective façade). Care was also taken to position the microphones as far as reasonably practicable from potentially noisy trees and bushes. Periods of heavy rainfall were excluded from the analysis.

[25] SIAS-04-SPL E48 OM I Rev3_0eng-eng.doc Sound Power level of the Enercon E-48 Operational Mode 1, 04/02/2011

Ten minute consecutive noise measurements of L_{A90} were undertaken throughout the measurement period. Noise levels were measured in conjunction with wind speed data in order to correlate background noise levels with changes in wind speed.

Figure 8.2 and Figure 8.3 show the microphone positions in the environment of the background noise monitoring receptors.

Figure 8.2: Measurement Location at Tillydovie Cottage (A)

Figure 8.3: Measurement Location at Oldtown (C)

8.5.2 Wind speed data

Wind speed measurements were also carried out over the duration of the noise measurements, using a Zephir lidar remote sensing device. The measurement location was agreed with the Angus Council Environmental Health Officer and is shown in Table 8.4 and Appendix 8. The measured height, amongst

others, was 50 m which matches the proposed hub height of the two Lower Cairny WTGs. The wind speed was then referenced back to 10 m using a hypothetical surface roughness length of 0.05 m, as recommended by Bowdler *et al*[22]. As sound power levels of WTGs are always referenced to 10 m with a 0.05 m surface roughness, this ensures a consistent treatment of wind speeds and noise levels.

Table 8.4: Lidar Measurement Location	
Easting (m)	Northing (m)
355200	769956

8.5.3 Current conditions

The survey results have been analysed in accordance with the procedures outlined in ETSU-R-97.

The measured L_{A90} noise levels at 10-minute intervals have been correlated with the wind speed measurements at 10 minute intervals (standardised to a height of 10 m) for the period of the noise measurement survey.

Any 10-minute interval in which rainfall was logged has then been discarded, as have any periods of unusually high noise levels for a given wind speed.

The measurement results have then been separated into the different time periods for day and night-time limits.

A two-hour period around dawn was removed each day to eliminate the effect of the dawn chorus.

The LA90,10-minute noise levels have been plotted against the corresponding wind speeds at the reference height of 10 m. For each period a second order polynomial "best-fit" regression curve is fitted to the data. The resultant background noise levels against wind speed at the two measurement locations are shown in Figures 8.4 to 8.7 and in Table 8.5*.*

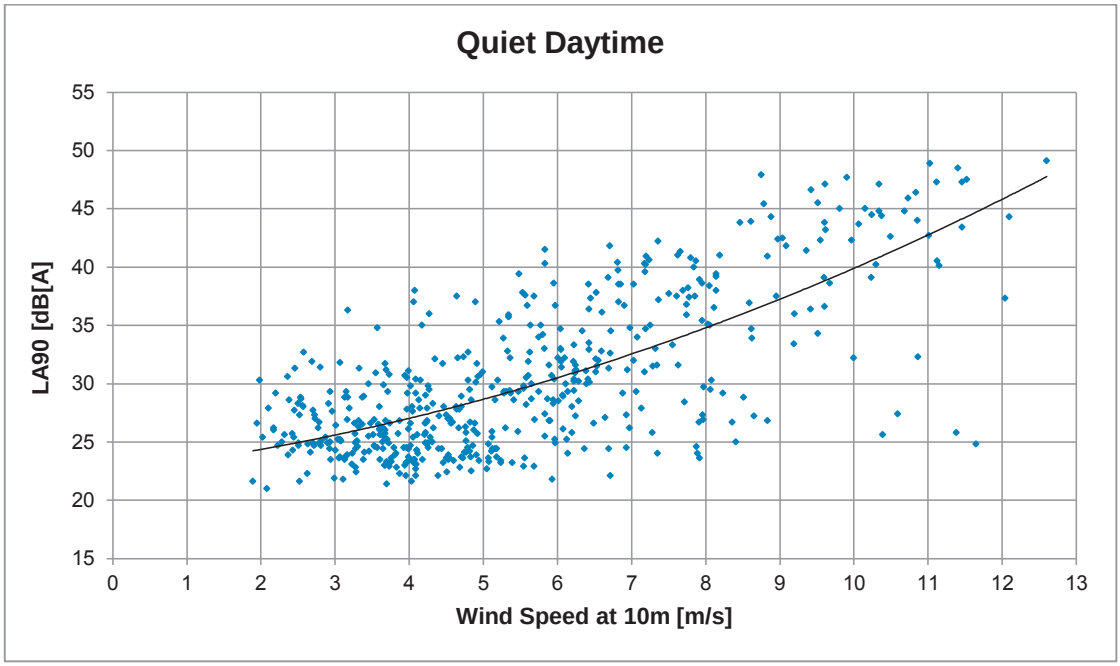


Figure 8.4: Polynomial fit to the background noise at Tillydovie Cottage (A) - Quiet daytime

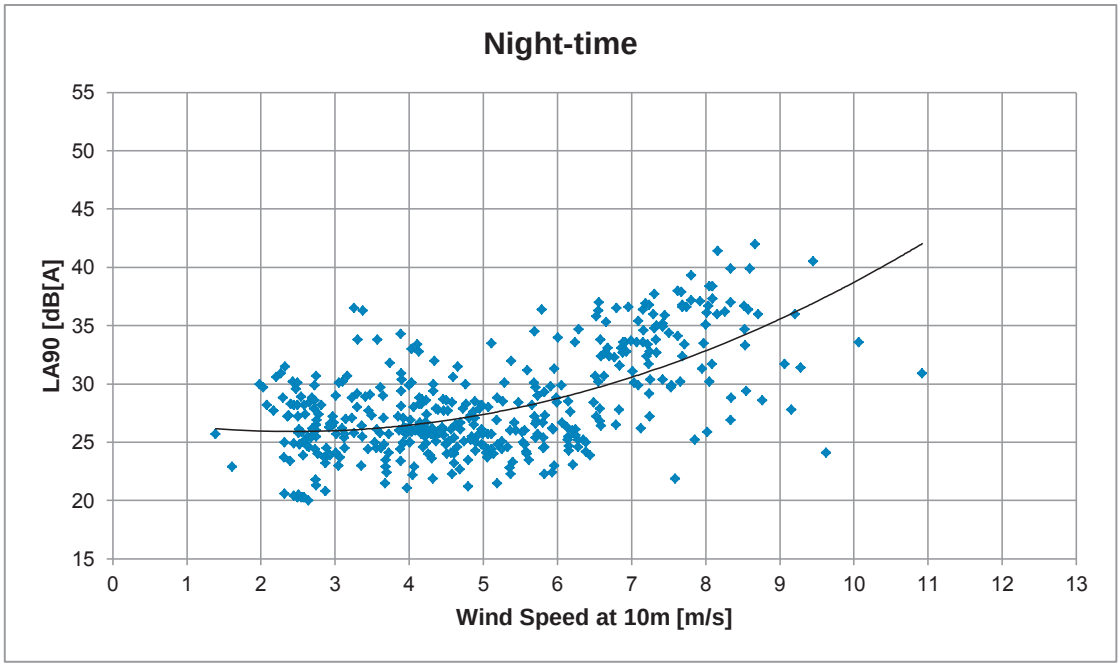


Figure 8.5: Polynomial fit to the background noise at Tillydovie Cottage (A) – Night-time

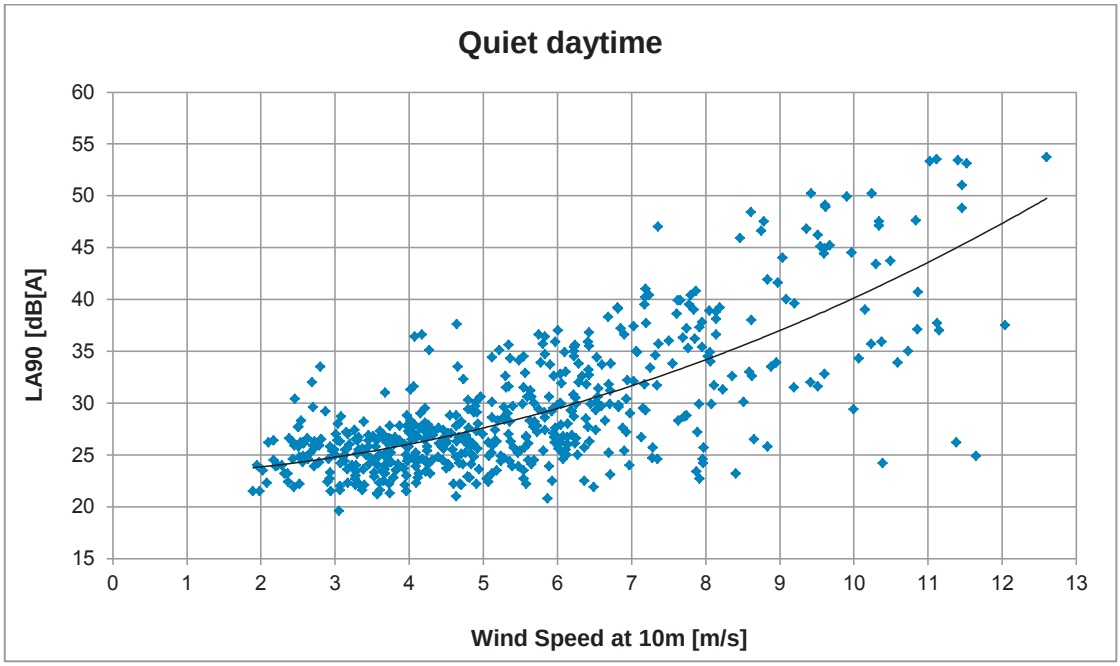


Figure 8.6: Polynomial fit to the background noise at Oldtown (C) – Quiet daytime

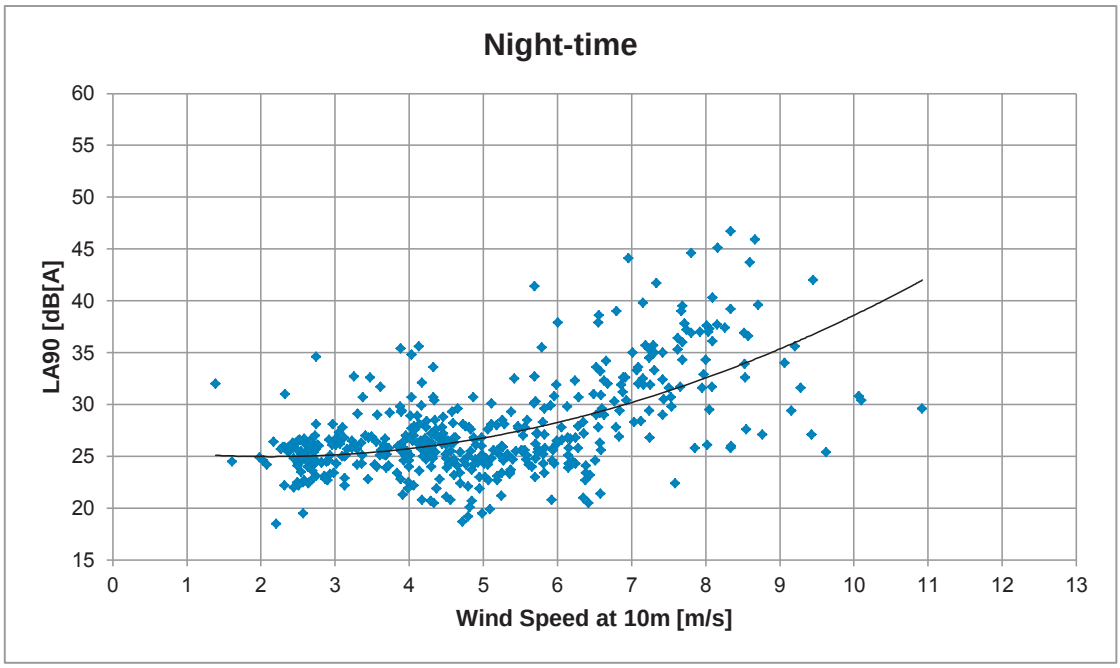


Figure 8.7: Polynomial fit to the background noise at Oldtown (C) – Night-time

Table 8.5: Ambient Background Noise Levels, L_{90}, dB(A)				
Wind speed (m/s)	**Tillydovie Cottage**		**Oldtown**	
	Quiet daytime	**Night-time**	**Quiet daytime**	**Night-time**
4	27.0	26.6	26.0	25.7
5	28.7	27.6	27.6	26.8
6	30.5	28.9	29.5	28.3
7	32.5	30.5	31.7	30.2
8	34.8	32.5	34.2	32.5
9	37.2	34.7	37.0	35.4
10	39.9		40.1	
11	42.8	-	43.6	-
12	-	-	-	-

8.6 Assessment of Potential Effects

8.6.1 Derivation of noise limits for wtg noise

The criteria for operational noise are based on existing background noise, subject to fixed lower limits. The results of the background noise survey are presented in Table 8.5.

The measurements at Tillydovie Cottage (Receptor A) are taken to represent itself as well as Receptors B and F. Those at Oldtown (C) are taken to represent itself and Receptors D, E and G.

Based on the ETSU guidance, criteria are 5 dB above local background noise, subject to various lower limits. Where background noise levels are not available at high wind speeds, a constant background noise level is assumed; this assumption is very conservative. At levels above criteria the noise emissions from the development would be considered a significant impact.

The choice of 35 dB or 40 dB as the noise criterion in the limit of low wind speeds depends on the number of sensitive receptors and the power output of the development. A worst-case value of 35 dB has been assumed. At Tillydovie Cottage (A) the low wind-speed limit is taken to be 45 dB because the owners have a financial interest in the wind turbine cluster. The resulting criteria are shown in Table 8.6.

8.6.2 Operational effects

The noise impact assessment assumes that the sound energy propagates in all directions from the WTG. Some energy will be absorbed in the air and some by the ground. On that basis, the predicted levels received at the sensitive receptors, as a function of wind speed, referenced to 10 m above ground level, are as shown in Table 8.6.

Table 8.6: Noise Immission and Criteria, L_{90}, dB(A)										
Receptor		**Wind Speed**								
		4	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
A Tillydovie Cottage	Daytime criteria	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	47.8
	Night-time criteria	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	WTG Noise	26.2	30.5	34.7	37.7	38.7	39.7	39.7	39.7	39.7
B Witton	Daytime criteria	35.0	35.0	35.5	37.5	39.8	42.2	44.9	47.8	47.8
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	21.5	25.8	30.0	33.0	34.0	35.0	35.0	35.0	35.0
C Oldtown	Daytime criteria	35.0	35.0	35.0	36.7	39.2	42.0	45.1	48.6	48.6
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	23.0	27.3	31.5	34.5	35.5	36.5	36.5	36.5	36.5
D Larkhall	Daytime criteria	35.0	35.0	35.0	36.7	39.2	42.0	45.1	48.6	48.6
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	23.3	27.6	31.8	34.8	35.8	36.8	36.8	36.8	36.8
E Larkhall 2	Daytime criteria	35.0	35.0	35.0	36.7	39.2	42.0	45.1	48.6	48.6
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	21.9	26.2	30.4	33.4	34.4	35.4	35.4	35.4	35.4
F Margie	Daytime criteria	35.0	35.0	35.5	37.5	39.8	42.2	44.9	47.8	47.8
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	17.7	22.0	26.2	29.2	30.2	31.2	31.2	31.2	31.2
G Newbigging	Daytime criteria	35.0	35.0	35.0	36.7	39.2	42.0	45.1	48.6	48.6
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	15.1	19.4	23.6	26.6	27.6	28.6	28.6	28.6	28.6

From the results in Table 8.6 it is clear that the criteria are met at all sensitive receptors at all wind speeds. The levels shown in Table 8.6 are also presented graphically compared with the daytime and night-time criteria in Appendix 8.

8.7 Infra-sound

Infra-sound is defined as noise occurring at frequencies below that at which sound is normally audible, i.e. at less than 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it has to be at very high amplitude and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance.

WTGs have been cited as significant producers of infra-sound. This has, however, been due to the high levels of such noise, as well as an audible, low frequency, thumping noise, occurring on older 'downwind' WTGs of which many were installed in the USA prior to the large-scale take up of wind power production in the UK. Downwind WTGs are configured with the blades downwind of the tower such that the blades pass through the wake left in the wind stream by the tower resulting in a regular audible thump, with infra-sonic components, each time a blade passes the tower. All modern WTGs are of the upwind design, with the blades upwind of the tower, such that this effect is eliminated.

The DTI Low Frequency Noise Study concluded that 'Infrasound noise emissions from WTGs are significantly below the recognised threshold of perception for acoustic energy within this frequency range. Even assuming that the most sensitive members of the population have a hearing threshold which is 12 dB lower than the median hearing threshold, measured infrasound levels are well below this criterion'. It goes on to state that, based on information from the World Health Organisation, that 'there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects' it may be concluded that 'infrasound associated with modern wind WTGs is not a source which may be injurious to the health of a wind farm neighbour'.

8.8 Low frequency noise

Noise from modern WTGs is essentially broad band in nature in that it contains similar amounts of noise energy in all frequency bands from low to high frequency. With increasing distance from a wind farm site, the noise level decreases as a result of the spreading out of the sound energy, but also due to air absorption which increases with increasing frequency. This means that although the energy across the whole frequency range is reduced, higher frequencies are reduced more than lower frequencies with the effect that as distance from the site increases, the ratio of low to high frequencies also increases. This effect may be observed with road traffic noise or natural sources such as the sea where higher frequency components are diminished relative to lower frequency components at long distances. At such distances, however, overall noise levels from WTGs are so low that this effect is not significant.

8.9 Mitigation Measures

The Enercon E-48 turbine can be programmed to run at noise reduced modes, whereby the rotational speed of the wind turbine is restricted with a resultant reduction in noise level and energy production. The declared apparent sound power levels for the reduced noise modes are detailed in Table 8.7 below, and the datasheet they are based on is included in Appendix 8.

Table 8.7 - Reduced Noise Mode Turbine Source Sound Power Level (dB L_{WA})

	Standardised 10 m Height Wind Speed (m/s)								
Reduced Noise Mode	4	5	6	7	8	9	10	11	12
800 kW (standard mode of operation)	91.0	95.3	99.5	102.5	103.5	104.5	104.5	104.5	104.5
700 kW	91.0	95.3	99.5	102.5	103.5	103.5	103.5	103.5	103.5
600 kW	91.0	95.3	99.5	102.5	102.6	102.6	102.6	102.6	102.6
500 kW	91.0	95.3	99.5	102.0	102.0	102.0	102.0	102.0	102.0
400 kW	91.0	95.3	99.5	100.5	100.5	100.5	100.5	100.5	100.5
300 kW	91.0	95.3	99.5	99.5	99.5	99.5	99.5	99.5	99.5

In this case there is an exceedance of the lower daytime noise limit at 7 m/s standardised 10 m height wind speed, and so a mitigation strategy has been developed to enable this limit to be met. The lower daytime limit can be met by running turbine T2 in the 400 kW mode during the daytime hours of 0700-2300 for standardised 10 m height wind speeds of 6 – 8 m/s. The 400 kW mode has a source sound power level 2 dB lower than the normal 800 kW operating mode at that wind speed. The turbine source sound power level for T2 including this mitigation can be seen in Table 8.8 below.

Table 8.8 - Mitigated T2 Source Sound Power Levels

Turbine Model	Standardised 10 m Height Wind Speed (m/s)	4	5	6	7	8	9	10
Enercon E-48 800 kW (OM I) 50 m hub-height	Warranted Sound Power Level (dB L_{WA})	89.0	93.3	97.5	98.5*	101.5	102.5	102.5
	K (95%)	2	2	2	2	2	2	2
	Declared Sound Power Level (dB L_{WA})	91.0	95.3	99.5	100.5	103.5	104.5	104.5

mitigated to 400 kW noise reduced mode.

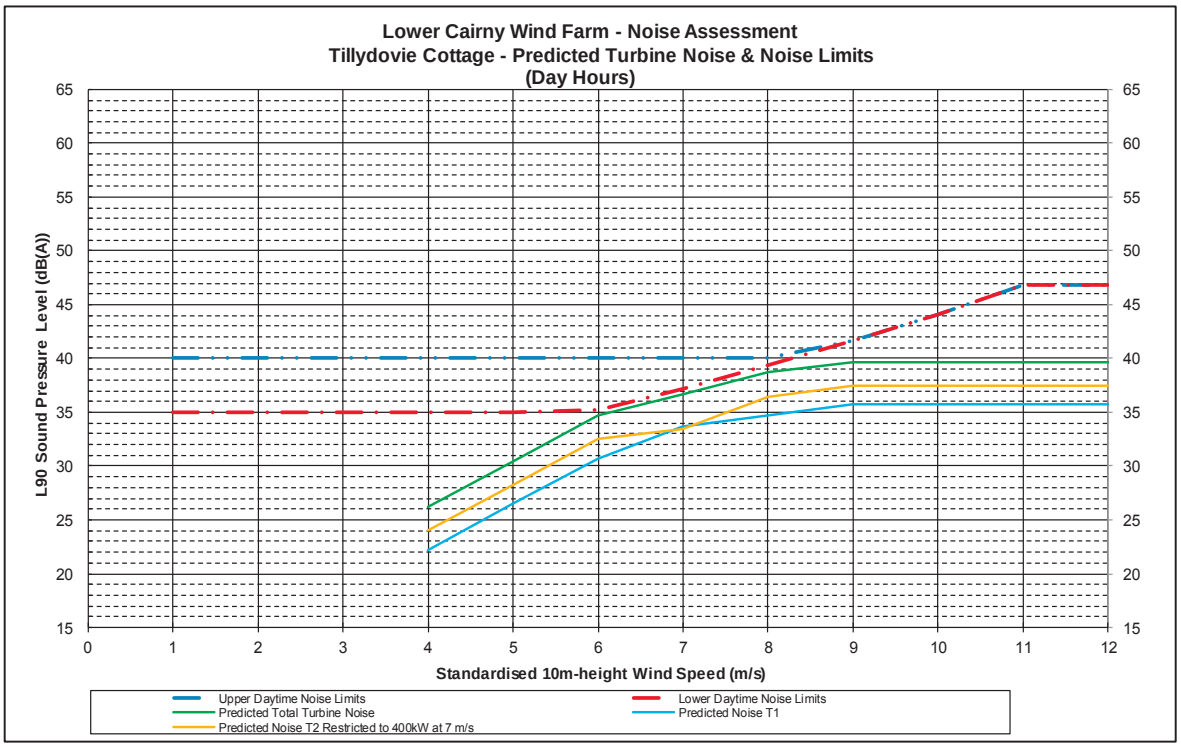
A revised assessment has been carried out based on this mitigation strategy, the results of which can be seen in 8.9 below. The predicted noise levels at Tillydovie Cottage with the mitigation implemented and the noise limits can be seen plotted against wind speed in Figure 8.8 (see also Appendix E of the Hayes McKenzie Report in Appendix 8).

Table 8.9 - Mitigated T2 Assessment Results (dB L_{A90})

		Standardised 10 m Height Wind Speed (m/s)								
Dwelling	Data	4	5	6	7	8	9	10	11	12
Tillydovie Cottage	Predicted Noise Level	26.2	30.5	34.7	36.6	38.7	39.7	39.7	39.7	39.7
	Lower Daytime Margin	8.8	4.5	0.6	0.6	0.6	1.9	4.4	7.1	7.1

It can be seen in Table 8.9 and in Figure 8.8, that with the mitigation strategy implemented, the predicted noise levels are below the lower daytime noise limit at Tillydovie Cottage by a minimum margin of 0.6 dB. It should be noted that in practice T2 would only need to be operated in the 400 kW mode for wind speeds of 6 – 8 m/s and wind directions of 255 – 45 degrees when the property would be downwind of the wind turbines. In should be noted that when T2 is operating with mitigation, operational noise levels would also be reduced at other properties. The detailed information regarding the other properties is contained within the Hayes McKenzie Report in Appendix 8.

Figure 8.8 Tillydovie Cottage Day Hours Mitigated Noise Assessment Chart



8.10 Conclusions

The noise impact of the proposed wind turbine cluster on nearby noise sensitive receptors has been modelled in accordance with ETSU-R-97, ISO 9613-2 and the guidance in the Institute of Acoustics' Acoustics Bulletin, assuming a candidate WTG, the Enercon E-48.

The noise assessment showed an exceedance of the lower daytime noise limit at Tillydovie cottage under certain wind conditions, and the mitigation required to enable the limit to be met has been calculated.

In terms of impact at Tillydovie Cottage, it is possible to reduce the noise levels of the candidate Enercon E48 turbine by reducing the rotational speed of the blades. This will be done for wind direction when the property is downwind of the wind turbine, and for the wind speed range over which there is a predicted exceedance of the noise limit.

The assessment of the proposed development with the mitigation strategy implemented shows that the predicted noise levels at all of the assessment locations meet the derived night and lower daytime noise limits by a minimum margin of 0.6 dB.

The proposed wind turbine cluster is predicted to meet the relevant criteria at all wind speeds at all noise sensitive receptors.

9 SHADOW FLICKER AND RESIDENTIAL AMENITY

9.1 Shadow Flicker

Shadow flicker occurs when the sunlight and the rotating wind turbine blades interact in such a way that a moving shadow is cast onto the ground or stationary objects. Within the range of the shadow at any specified location, a flickering effect is evident when the shadow passes.

There is no generally accepted rule with regard to shadow flicker impact. However, based on Scottish planning guidance (http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore) shadow flicker only occurs within 10 rotor diameters of WTGs.

Impact on properties within this area will depend on location of the property with respect to the wind turbines and the relative position of the sun. The area surrounding the site is rural in nature, and has only a limited number of dwellings nearby. The nearest property is Bogton and this is owned by the applicant. The property is currently abandonded and will remain so with the outhouses used for storage as part of the farm operation. Other properties are at least 600 m from the nearest properties. As the proposed WTGs have a rotor diameter of 48 m, only properties within 480 m are potentially at risk of shadow flicker impacts. As a result there is no risk of shadow flicker causing an impact on any residential properties around the site boundary. The Residential Amenity Assessment presented below expands on the situation of these properties with respect to the proposed turbines.

9.2 Lower Cairny 2km Residential Amenity Assessment

The site for installation of 2 x 74m high wind turbines is located to the east south east of the abandonded property at Bogton. There are 11 properties located within a 2km radius of the site. These properties and their situation with respect to the proposed turbine site are summarised in Table 9.1 below. Figure 9.1 shows the location of each property with respect to the 'with trees' ZTV for the turbines.

	Location	Distance from Site	Grid Reference	Description of Accommodation and Views	Comments
1	Bogton	200m west north west of the nearest turbine.	35515, 77010	Property owned by applicant. Property uninhabited and abandonded . No plans to develop property.	No impact
2	Oldtown	700m west of the site and at a higher elevation than the nearest turbine (230m AOD).	35470, 77050	Living area faces due south with no window views towards the site. Walled garden around property limits views from curtilage.	Direct views onto the 232kVA pylon network. Minor to moderate impact.

	Location	Distance from Site	Grid Reference	Description of Accommodation and Views	Comments
3	Tillydovie	600m due south of the nearest turbine.	35571, 76950	2 x properties owned by applicant. Views to south from main living areas. Small woodland copses partially screen site.	Minor impact
4	Witton	600m east of the nearest turbine.	35628, 77010	Property owned by applicant. Views east and to the south from main living areas.	Minor impact
5	Larkhall	600m south west of nearest turbine.	35513, 76950	Property owned by applicant. Views from living areas are to the south away from the site. Some limited view from utility rooms to rear of property. Property screened from site by trees/ hedging at high level.	Negligible impact
6	Margie	1km east of the property.	35667, 77042	Main views are away from the site. Some limited views of site from gable upstairs windows. Local woodland screening at Margie will provide local screening of the turbine structures.	A separate wireline looking to Lower Cairny from this location has been produced at Figure 9.2, Appendix 8.
7	Blacks Pot (Margie Burn)	1km east south east of the nearest turbine.	35670, 77010	Property is located near the bottom of a steep sided valley. It is unlikely that there will be any views of the turbines.	Negligible impact

	Location	Distance from Site	Grid Reference	Description of Accommodation and Views	Comments
8	Newbigging Farm	1.5km west south west from nearest turbine.	35434, 76890	Main views from living area are to the south east away from the site. Some rooms at the rear of the property look east. Partial screening by intervening woodland.	A separate wireline looking to Lower Cairny from this location has been produced at Figure 9.2, Appendix 8.
9	Mill of Lethnot	1.75km west south west of nearest turbine.	35403, 76875	Property located within steep-sided valley. No visibility towards the site. Property screened by intervening topography, buildings and trees at Newbigging Farm.	Negligible impact
10	Balfield	1.6km south west of nearest turbine.	35460, 76850	Properties here include detached house and small row of cottages. All properties face south east, south or east. The properties are all screened from the site by intervening trees.	Negligible impact
11	Clochie Farm	1.7km south west of nearest turbine.	35470, 76835	Properties here include detached house and small row of cottages. All properties face south east, south or east. The properties are all screened from the site by intervening trees.	Negligible impact

	Location	Distance from Site	Grid Reference	Description of Accommodation and Views	Comments
12	West Clochie	Located more than 2km from nearest turbine.	35423, 76824	Views from main living areas are to the south.	Minor impact
13	Drumcairn	Located more than 2km from nearest turbine.	35395, 76823	Property owned by applicant and unoccupied at present.	No impact
14	Caravan site	Located more than 2km from nearest turbine.	35411, 76825	No visibility of site due to intervening topography and trees.	No impact
15	Bridgend	Located more than 2km from nearest turbine.	35365, 76840	No visibility of site due to intervening topography and trees.	No impact

Table 9.1 Residential Amenity Assessment

9.3 Summary of Findings

Property 6 – Margie

The detail of the 'with trees' ZTV indicates that the property may see two turbines along its western edge, which quickly reduces to one turbine and then no visibility to the west. The wireline that was generated for the property shows the worst case visibility of the turbines, based on 'bare ground'. It is difficult to say how much of the turbines will be potentially screened by intervening trees as illustrated on the 'with trees' ZTV. The tree belts along the minor burn to the west of Margie as well as to the east of the turbines would provide some degree of screening. There may be visibility to some extent from the garden areas to the immediate west/north of the house but it is likely that the level of any potential instruction is not such that it would comprise a 'noticeable intrusion' given the screening of the trees, the topography and the distance to the turbines.

Property 8 – Newbigging

The detail of the 'with trees' ZTV indicates that the property may see two turbines along its eastern edge. The wireline shows the worst case visibility of the turbines, based on 'bare ground'. It is difficult to say how much of the turbines will be potentially screened by intervening trees. There would be visibility from the garden areas and lane to the immediate east/south of the house but it is likely that the level of any potential instruction is not such that it would comprise a 'noticeable intrusion' at 1km distance.

9.4 Conclusions

Many of the properties that are located close to the proposed turbine cluster are in the ownership of the Applicant. The property at Oldtown may receive a minor impact from views from the garden grounds to the east. Other properties at Margie and at Newbigging may also see the turbines to a limited degree from various parts of the garden grounds and laneways with intermediate tree screening providing some attenuation of views. The topography and distance from the site means that a number of properties in and around Bridgend will not have any visibility of the machines. It is acknowledged that those residing there will see the machines as they pass by on the road.

It is considered that the careful siting of the machines as described in the Landscape and Visual Impact chapter and the benefit of the topography and tree belts in the area means that there will be no significant impact on residential amenity.

10 TELECOMMUNICATIONS

Wind turbines can cause interference on television, radio and microwave signals by blocking and / or causing part of the signal to be delayed. To identify the presence of any issues, relevant stakeholders have been consulted. Ofcom has identified no microwave links within 1.5km of the centre of the site.
JRC, who manage the scanning telemetry systems of the UK power industry, have indicated that they would have no objections to a wind cluster development in this area. Similarly, CSS, who manage the scanning telemetry links on behalf of the UK water industry, has indicated that they would have no objections to a wind development in this area.

Television Reception
In terms of terrestrial television reception reference has been made to the BBC Windfarm Assessment Tool which is designed to determine the likely impact of a proposed wind turbine(s) on the television reception of residents. The BBC tool is used as a standard reference tool for this sort of application. In this particular instance, according to the tool, two turbines would have no impact on any homes for whom there is no alternative off-air service and no homes would be affected for whom there may be an alternative off-air service. The transmitters likely to be affected are Durris (Ch5) and Angus.

The television signal in Scotland is a digital signal that replaced the analogue signal in 2011. The digital signal is much more robust than the analogue one that it replaced. As a result, it is less susceptible to secondary interference caused by reflections from a turbine blade movement.

As a result, it is proposed that no mitigation measures are required.

11 AVIATION AND DEFENCE

Wind farm developments can affect the performance of primary and secondary radar systems. The performance of the system can be affected as follows:

- Clutter – increased number of unwanted returns due to the detection of wind turbines;
- Desensitisation – reduced detection performance against air targets in a region extending above and around the wind turbine development; and
- Tracking – increase in clutter may lead to an impact on tracking performance.

It is not anticipated that there would be any conflict with aviation and defence interests as a result of the proposed development. However consultation with Aberdeen Airport and Defence Estates has been carried out. ZTV assessment shows that there would be no potential line of sight to the airport at Dundee which is located some 34 miles from the site.

Aberdeen Airport – Aberdeen Airport is within approximately 54km south west of the proposed development area. The airport has confirmed that the site is outside of the NATS radar consultation zone which means that technically there is no need to consult with either the airport or NATS, as there would be no effect.

Defence Estates (Ministry of Defence) – the MOD was consulted in October 2010 and their response noted that they had no objections. The response is included at Appendix 11. A new consultation with MOD was issued in November 2011 but no response has been received.

12 ECONOMY AND TOURISM

12.1 Economic Benefit

The development will have a number of positive local economic benefits for the TAYplan area.

- The assessment work being carried out by professionals involved from the project is already bringing benefit to the Angus area.
- Diversification of the farm enterprise will ensure the long term stability of the farm for the immediate and extended family, staff and contractors employed throughout the year. The generation of a stable income will mean that long term capital planning for the farm enterprise can be more securely delivered. This aspect is very much aligned to the Environment Minister's Agri-renewables Strategy 2011 and meets the wider Government target to make Scotland a net exporter of renewable electricity that generates revenue for Angus and Scotland.
- Construction, operation and maintenance of the turbine cluster will generate economic benefits for the local and regional supply chain both in terms of direct and indirect benefits. The capital expenditure of several million pounds sterling and an ongoing revenue spend over a 25 year life will bring considerable benefits to the area that do not presently exist. The net benefit could be £0.8 million and 7 job years.
- The turbines will directly benefit Angus Council in terms of the rateable value generated by the development.
- Wider benefits to the wider economy and society as a whole that are largely incalculable will be generated. The Government recognizes these benefits as part of its Energy Review.

12.2 Tourism

The recent Government Committee finding that there is no evidence that wind turbines have a negative impact on tourism confirms that this aspect is not a concern for machines that are properly planned and designed. The applicant has designed the development to minimise impact and mitigation measures have been put in place to achieve a sustainable development. A potentially negative impact on tourism is often a reason cited by objectors to wind farms, particularly in areas where tourism is an important driver of the local economy. The drivers of tourism are factors such as exchange rates, the state of the economy, trends in leisure time and pursuits etc, not wind farm developments.

The most substantive survey to date is the Moffat Report (2008) "The Economic Impacts of Wind Farms on Scottish Tourism: A Report for the Scottish Government", which concludes that wind farms are not a major factor in visitors decision making, while amongst those who do take note of them, most regard them as having either a positive or a neutral effect on the landscape.

The Insight Department of VisitScotland Wind Farm Consumer Research Topic Paper of 2011 contains the results of commissioned research on attitudes to wind farms and their effect on tourism. This research was carried out to inform VisitScotland policy.

VisitScotland's Position Statement – Wind Farms of May 2012 confirms that their latest study suggests that wind farms have a limited impact on tourist views, however the organisation would encourage all future development to continue to be sensitively sited.

In April 2012, a University of Edinburgh study entitled, Tourism Impact of Wind Farms, reviewed primary and secondary research carried out and concluded that, "there has been no measurable economic impact, either positively or negatively of wind farms on tourism". The Report notes that the opposition to wind farms on tourism grounds is informed more by fear than fact. The reports described here are included within Appendix 12.

Tourism is certainly important to the area with activities like fishing, hill walking and cycling popular in the hills and rivers around the site. It is considered that because of the relatively small size and scale of this development, there will be no discernible impact on tourism.

12.3 Conclusion

The greatest impact is expected to result from the short term development and construction economic benefits to the local area. These impacts are expected to be moderate/minor in Angus, which could benefit from £0.8 million and 7 job years.

No negative economic impacts are likely to arise from this development.

13 TRAFFIC AND TRANSPORT

13.1 Project Scoping

The Scope of the Transport Assessment has been agreed with Angus Council through the Environmental Impact Assessment screening process.

Key issues identified are as undernoted:

- Details of access point to site
- Existing condition of local road network
- Detailed Assessment of Local Roads to Site
- Details of Abnormal Load Movements
- Details of Construction Traffic Movements
- Impacts of additional traffic on existing traffic flows
- Traffic Management requirements
- Suitability of access and parking arrangements

Angus Council have not identified a requirement for consultation with Transport Scotland in respect of possible impacts of vehicle movements, given the anticipated modest levels of Abnormal Load and construction traffic movements. Consultation with Trunk Road Network Administration in respect of the possible limitations on the movement of Abnormal Loads has been undertaken.

13.2 Development Location

The wind cluster site is located at Cairny Hill, approximately 5km to the west of Edzell, Angus. The general location of the site is shown at Figure 13.1.

Figure 13.1 Context Plan of Development

Definitions

A glossary of Definitions used throughout this report is contained at Appendix 13.

13.3 National, Regional and Local Policy

National, Regional and Local Policy has been reviewed elsewhere in the Report and will not be dealt with in detail here. Local Policy notes that under Policy ER34, that developments should ensure that 'access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent and significant change to the environment and landscape.' Furthermore, Policy ER35, Wind Energy Development notes that, Wind energy developments must meet the requirements of Policy ER34 and also demonstrate: '(g) a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed.'

The LTS notes as a Vision/Aim within the section on Road Network:

‘To provide a safe, well maintained, accessible uncongested roads network to enable people and goods to move in the most effective and efficient way throughout Angus.’

The LTS goes on to note that:

‘Bridges are key links in the road network infrastructure particularly for freight movement and the Council completed the assessment of its own bridges to check their carrying capacity prior to the introduction of the new Construction and use Regulations (5-axle 40T vehicles and 6-axle 44T vehicles). A programme is in hand for the assessment of all privately owned bridges carrying public roads within Angus. Following on from these assessments strengthening work is progressing where required taking into account available funding and the importance of each bridge to the strategic route network. The Council has been liaising closely with Railtrack and Rail Property Ltd in prioritising and carrying out these programmes.’

The LTS ensures that the local road network is maintained to a standard appropriate for the movement of large components and construction materials.

IGREP was issued by Angus Council in 2012 as Supplementary Guidance in support of ALPR Policies ER34 Renewable Energy Developments and ER35 Wind Energy Development which are reviewed above.

IGREP notes under Access and Traffic Management for Turbines greater than 50m in height that:

‘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.’

Summary

Proposals for a wind cluster at Lower Cairny are in accord with current policy at National, Regional and Local level. The preparation of this Transport Assessment addresses the specific requirements of the planning authority in considering the transportation implications of delivery of turbine components and construction materials via the adjoining access road network in line with Policy.

13.4 Abnormal Load Route Assessment

This section will confirm suitability of the proposed route for the transport of turbine components from the preferred Port of Entry to the wind cluster site.

Consultations have utilised the Enercon E-48 Turbine manufacturer specification.

13.4.1 Consultations

Consultations with Port of Dundee and Montrose Harbour confirm both ports have capability to accommodate turbine components.

Initial consultations with Angus Council and Transport Scotland confirmed the suitability in principle of the Abnormal Load routes outlined below. The recommended Abnormal Load Route is from Port of Dundee via A972 and A90(T) to Keithock junction, B966 to Edzell, and via the unclassified road west to the wind cluster site. However, consideration is also given to use of the route from Montrose as a Port of Entry. Consultation correspondence is reproduced at Appendix 13. It is anticipated that a trial run with an empty turbine blade trailer will be performed prior to the first delivery of turbine components.

13.4.2 Route Limitations

Route Limitations are features on the road network which cannot be modified in order to accommodate the passage of Abnormal Loads. Consultations with Angus Council identified that a structure on a possible alternate route from A90(T) located on B966 at Gannochy Bridge is unsuitable for the passage of turbine components in the context of a maximum overall vehicle weight of 120t identified by the turbine manufacturer. Consultations with Tayside Police identified a possible concern over the maximum height clearance at Dalhousie Arch, Edzell. Angus Council have confirmed the dimensions of the arch which provide an approximate clearance width of 4.2m at the 4.6m maximum height required, more than sufficient for the maximum component width of 3.7m.

13.4.3 Abnormal Load Dimensions

The key load dimensions for turbine components are identified in Table 13.1.

Table 13.1 Abnormal Load Dimensions

Abnormal Load Dimensions				
	Weight (t)	Height (m)	Width (m)	Length (m)
Tower sections (maximum)	24	3.89	3.74	20.1
Blades	9	2.72	2.47	24.7
Nacelle/Generator	30	3.25	4.95	5.08
Maximum Axle Load (tonnes)	12			
Maximum Load (tonnes)	120			
Clearances		4.6	5	

13.4.4 Route from Port of Entry

Abnormal loads are expected to be delivered to Port of Dundee and will route as undernoted from Dundee. This route is illustrated at Appendix 13, Diagram 1, with the local route from Edzell village shown in more detail at Diagram 2.

- Stannergate Road, Dundee to A930 Broughty Ferry Road
- A930 Broughty Ferry Road to A92 Greendykes Road (reverse)
- A92 Greendykes Road to A972 Kingsway East
- A972 Kingsway East to A90 Forfar Road
- A90(T) to B966 at Keithock
- B966 to Edzell village (reverse)
- Lethnot Road west to site access in vicinity of Tillydovie Farm

Recent improvements at Port of Dundee now permit turbine components to depart from the East Gate towards the local road network.

13.4.5 Review of route from alternative Port of Entry

Consideration to the use of an alternative Port of Entry at Montrose has been given. The route is also illustrated at Diagram 1.

- Montrose Harbour to A92 Rossie Island Road
- A92 to A935 Medicine Well Road
- A935 Medicine Well Road to A935 Brechin Road
- A935 via Brechin to B966 Trinity Road
- B966 Trinity Road to Edzell village (reverse)
- Lethnot Road west to site access in vicinity of Tillydovie Farm

13.4.6 Alterations to the Abnormal Load Route

The route inspection identifies the undernoted principal constraints on the Abnormal Load route options which are envisaged to require temporary alteration to accommodate the passage of turbine components. These constraints are identified subject to the completion of a turbine blade test run which will be performed following the issue of Detailed Planning Consent and the implementation of temporary works to confirm the adequacy of the alterations and identify any further requirement for minor alterations which have not been identified from the initial route inspections and swept path analysis.

A further route inspection will be required prior to the commencement of temporary works to confirm requirements for temporary works, as conditions may have changed as a consequence of alterations to the road network not currently planned. In particular, confirmation will be sought from Angus Council and Transport Scotland that there are no changes to weight limits on structures.

In order to permit movement of replacement components during the Wind Cluster operational phase, all identified alterations are expected to require reinstatement which will allow the route to be re-used if necessary. The use of removable signage, flat central and modular traffic islands are identified as measures which can be utilised in such circumstances.

Swept Path Analyses for 24m blades are provided in Appendix 13 at drawings 97659/8001 to 97659/8006 and 97659/8010-11. The approach to Bridge of Margie is constrained by a sloping embankment to the right and as the initial blade trailer swept path shown at drawing 97659/8005 shows the rear overhang crossing this embankment, consideration has been given to the transport of a single 24m blade at drawing 97659/8007 and to twin 24m blades in a forward position on the trailer at drawing 97965/8009 to ensure that the blades can be accommodated at this location. Movement of the widest tower section which is 18m in length has also been assessed at Bridge of Margie at 97659/8008 to take account of this possible constraint. It has been assumed that all component moves will be accompanied by a second rear tractor unit to allow reversal of the load trailer as required. Swept Path Analysis confirms suitability of the route in principle.

Rear tractor unit in use on abnormal load move

Angus Council have indicated that passage of components on B966 over Westwater Bridge should follow the centre line of the bridge and be at slow speed.

Locations where possible alterations to the road network may be required are as undernoted.

A930 Broughty Ferry Road via A92 Greendykes and A972 Kingsway to A90 Forfar Road

- Removal and reinstatement of junction signage/pedestrian fencing/bollards

A90 at B966 junction

- Removal and reinstatement of traffic bollards/signage to allow use of southbound carriageway at B966 roundabout

B966 at A90 looking towards Edzell

B966 High Street Edzell at Lethnot Road

- Removal and reinstatement of traffic bollards/signage to allow reversal

B966 High Street Edzell at Lethnot Road

Lethnot Road at Edzell Old Parish Church

- Possible removal and reinstatement of wire fencing at Graveyard

Edzell Old Parish Church Graveyard

Lethnot Road at Bridge of Margie

- Clearing of vegetation to north side of carriageway (may require blades to be moved singly rather than in pairs to reduce width at 24m length)

Bridge of Margie looking west

Lethnot Road at Witton Farm

- Removal and reinstatement of fencing to north side of carriageway

Further requirements for minor alterations such as removal of overhanging branches are anticipated to be identified as part of the detailed route inspection immediately prior to a test run.

Locations where possible alterations to the road network may be required on the route from the alternate Port of Entry at Montrose are as undernoted. Angus Council have confirmed that the bridge parapets at A935 Arrat Bridge can be raised or lowered as required to accommodate Abnormal Loads.

A92 Basin View at Montrose Railway Station

- Removal and reinstatement of junction signage/pedestrian fencing/bollards

A92 Basin View at Montrose Railway Station

A935 Brechin at Montrose Road

- Removal and reinstatement of signage to accommodate reversal

A935 Brechin at B966 junction

- Removal and reinstatement of bollards

A935/B966 junction in Brechin

The use of the alternative Port of Entry at Montrose would have the benefit of reducing the overall distance over which the turbine components require to be moved. The route from Dundee whilst longer has the benefit of utilising the principal road network in Dundee, much of which is dual carriageway and with limited frontage access, and the Trunk Road network, and minimises impacts on residential areas as far as possible.

13.4.7 Access to Site from Local Road Network

Access will be provided from the unclassified road by means of a simple priority junction. Drawing 97659/8012 confirms available visibility splays.

Lethnot Road looking east to Edzell with site access to left

Lethnot Road at the site access is extremely lightly trafficked and it is not considered necessary in view of the predicted very modest additional traffic flows to improve visibility splays beyond those existing.

13.4.8 Summary and Conclusions

The Abnormal Load Route Assessment confirms in principle the feasibility of the transportation of turbine components from Port of Entry to the site.

A test run from the agreed Port of Entry to the site will be required prior to the commencement of site enabling works.

13.5 Route Condition Survey

13.5.1 Introduction

The Scoping process with Angus Council requested that consideration be given to the condition of the route between A90(T) and the wind cluster site.

Dialogue with Angus Council confirmed that for the purposes of this report, a visual inspection as part of the Route Inspection process supported by photographs would be sufficient.

It is suggested that a further two-way Condition Survey be performed by video on Lethnot Road from Edzell village to the site immediately prior to the commencement of the construction period, as road surface conditions may have changed in the intervening period.

B966 from Keithock Junction to Edzell Village

This section of route was surveyed in a northbound direction. Road surface condition was noted as generally of an acceptable standard with little evidence of dilapidation.

Damage to the road surface at Westwater Bridge was noted on approach from the south and on the bridge itself.

B966 Westwater Bridge looking north

In Edzell village, the road surface at the roundabout junction with the unclassified Lethnot Road was noted as having some level of deterioration which appears in part to have arisen from previous roadworks.

Edzell village looking west to Lethnot Road

Lethnot Road from Edzell Village to site

This section of route was surveyed in a westbound direction. The road surface condition was again noted as generally of an acceptable standard as far as Witton Farm.

Several instances of deterioration of the edge of the carriageway surface, particularly on the inside of bends where vehicles may encroach on the verge as a result of the provided road width, were noted. An example of this type of dilapidation will be presented in this section but it is not intended to identify each location for the purposes of this report as the existing damage is generally minor.

Deterioration of the surface was however more noticeable beyond Witton Farm as far as the site access in the vicinity of Tillydovie Farm.

Lethnot Road was noted as in poor condition within the built form of the village with evidence of earlier roadworks having contributed to this deterioration.

Lethnot Road in Edzell - north side of carriageway

Damage was observed west of Mains of Edzell farm which appears to be related to an intervention to deal with a drainage issue.

Lethnot Road west of Mains of Edzell farm

An example of the minor deterioration observed at carriageway edges at some points is presented below.

Edzell Old Parish Church looking west

The westbound approach to Bridge of Margie was noted as in poor condition. This may in part have been as a result of works currently ongoing at Margie Farm.

Westbound approach to Bridge of Margie

The general condition of the road surface west of Witton Farm was noted as poorer than that encountered elsewhere on the Route Inspection, with evidence of patching and frost damage more prevalent than evidenced from Edzell village westwards as far as Witton Farm.

Lethnot Road west of Witton Farm

13.5.2 Summary and Conclusion

The Route Condition Survey identifies that B966 between A90 at Keithock Junction and Edzell village is generally of an acceptable standard, with minor damage to the road surface noted at Westwater Bridge.

The survey identifies that Lethnot Road westwards to the wind cluster site at Lower Cairny has a number of locations where existing damage to the road surface exists.

It is recommended that a video survey of Lethnot Road from Edzell village to site be performed immediately prior to the commencement of enabling and construction works to confirm where existing Dilapidation exists.

13.6 Impact Assessment

13.6.1 Introduction

The methodology employed in this assessment has been developed from guidance provided in the Chartered Institution of Highways and Transportation's (CIHT) 'Guidelines for Traffic Impact Assessments' and the Institute of Environmental Management and Assessment's (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic'. Methodologies detailed in the IHT guidelines recommend

that Environmental Impact Assessments (EIA) for large developments should be assessed in accordance with IEMA guidelines. This guidance requires the assessment of Sensitivity, Magnitude and Significance, and a brief synopsis of each type of assessment is provided below.

13.6.2 Impact Magnitude and Sensitivity

The magnitude of traffic effects is a function of existing traffic volumes, percentage increase due to the proposals for the Development, and changes in type of traffic. IEMA Guidelines identify thresholds for effect magnitude based on percentage changes in traffic levels applicable to severance and intimidation effects. The magnitude of effects arising from the increase in traffic volumes (taken as being either the traffic flow including all vehicles or the HGV traffic flow, whichever is higher) is categorised as follows:

- Substantial: above 90% increase in existing traffic levels;
- Moderate: between 60% and 90% increase in existing traffic levels;
- Slight: between 30% and 60% increase in existing traffic levels; and
- Negligible: under 30% increase in existing traffic levels.

The determination of the magnitude of the effects will be undertaken by reviewing the proposals for the Development, establishing the parameters of the road traffic that have the potential to cause an effect (e.g., construction traffic), and quantifying these effects against the criteria set out above.

Consideration has been given to the composition of the traffic on the road network under both existing and predicted conditions. For example, cars and LGVs have less effect on traffic and the road system than HGVs. Similarly, HGVs could have less effect than abnormal load vehicles depending on the timing and frequency of the abnormal loads.

The sensitivity of roads to increased severance of communities and pedestrian delay and intimidation is conventionally evaluated based on the proximity and size of residential populations to each road section, in accordance with the IEMA guidelines. The IEMA guidelines do not provide specific criteria for evaluating sensitivity, however, for the purposes of this assessment, the sensitivity of road sections to changes in traffic levels will be evaluated on a scale of ‘low’, ‘medium’ and ‘high’, based on their usage by pedestrians and cyclists and the size of communities through which the road section passes.

13.6.3 Impact Significance

Significance of effects will be assessed based on the categories of sensitivity and magnitude (identified in accordance with the approach outlined above) as shown in Table 13.2 below.

Table 13.2 Impact Significance

Assessment of Significance of Effects on Road Sections				
		Sensitivity		
Magnitude		**High**	**Medium**	**Low**
Substantial		Major	Major	Moderate
Moderate		Major	Moderate	Minor
Slight		Moderate	Minor	Minor
Negligible		Negligible	Negligible	Negligible

Effects will be considered to be significant where the effect is classified as being of 'major' or 'moderate' significance, for the purposes of the EIA Regulations.

13.6.4 Study / Assessment Limitations

The limitation preventing use of B966 Gannochy Bridge as an alternative route was identified. This limitation has no effect on the Impact Assessment presented as the alternative route from A90 Northwater Bridge junction via Edzell Woods passes through similarly modest levels of settlement to that via B966 from A90 Keithock junction.

13.6.5 Existing Environment

A route assessment including a full visual route inspection was undertaken to assess existing road layout and traffic conditions along the delivery and access routes to the site. This assessment enabled an abnormal load access route and a construction traffic access route and associated study area to be defined.

The study area from the Preferred Port of Entry at Dundee Port is defined as the undernoted roads:

- A90 in the vicinity of Keithock Junction
- B966 from A90 junction to Edzell village
- Unclassified road from Edzell village to Cairny Hill

In the event the alternate Port of Entry at Montrose is utilised, an alternate study area is identified as:

- A935 from Montrose to Brechin
- B966 from Brechin to Edzell village
- Unclassified road from Edzell village to Cairny Hill

13.7 Baseline Traffic Flows

AADT flow data on the trunk and local road network surrounding the site has been obtained from Transport Scotland and Angus Council ATC databases for locations along the preferred and alternative routes for Abnormal Load and Construction Traffic. The data is summarised at Table 13.3 below.

Table 13.3 Baseline Traffic Flows

Baseline Traffic Data	Year	5 Day Two Way AADT	HGV %
JTC00059 A90 Brechin Bypass - S of B966	2010	16943	8%
A935 Kincraig	2012	4353	10%
B966 Inchbare	2012	2922	14%

13.7.1 Construction Vehicles

Construction Vehicles (HGV) will route via the principal and local road network from their point of origin. Principal movement flows are envisaged to be of aggregate and concrete, and possible local supply points and routes for these are identified at Diagram 3.

In order to minimise the impact on the local road network in the immediate vicinity of the site, deliveries of crushed stone will be scheduled to ensure that loaded and empty vehicles should not meet on the unclassified road west from Edzell. No requirement for Routeing Orders is anticipated to be appropriate as there is no suitable alternative route to the site.

13.7.2 Construction Workers

Construction workers are anticipated to arrive by a variety of routes from the local area and from Dundee, utilising A90, A935 and B966 to connect to Lethnot Road towards the site.

13.7.3 Construction Phase Timing and Duration

The construction phase is estimated to be over a twelve month period, with initial mobilisation and the provision of an access road anticipated to take place over a period of three months. Construction of the two turbines is planned to take place over a further six months, with the final three months being required for commissioning and demobilisation. An indicative Construction programme with associated vehicle movements is shown at Appendix 13.

Traffic generating activities during this period include:

- Construction Site Mobilisation
- Access Track Improvements and Site Track Construction
- Compound and Laydown Area construction
- Turbine Foundation Construction
- Crane Hardstanding Construction
- On Site Buried Cable Laying
- Turbine delivery and erection
- Substation Construction
- Commissioning and Site Demobilisation

13.7.4 Abnormal Loads Trip Generation

Abnormal loads trip generation is shown at Appendix 13. Approximately 16 abnormal load trips (turbine delivery plus cranes) are anticipated to be made over a 5 month period.

13.7.5 Abnormal Loads Trip Timing and Duration

If required, abnormal loads could travel in convoys. The overall distance from port to site is approximately 57km from Port of Dundee via A90(T) and B966. If the Port of Entry is identified as Montrose, distance via A92/A935/B966 is noted as approximately 31km. The ability to use Montrose Port for delivery of components significantly reduces the overall distance the components require to be transported, limiting the impacts on the road network. The Trunk Road network is however designed to permit movements of abnormal loads, and it is recommended that Port of Dundee be used in preference to Montrose to minimise impacts on settlements.

If required by Tayside Police, stops could be made along the route to permit overtaking and reduce delays to other vehicles. It is envisaged that abnormal load deliveries will be made overnight at weekends to minimise as far as practicable impacts on other road users. It is therefore not possible to estimate an overall journey time.

13.7.6 HGV Trip Generation

Plant, equipment and temporary buildings would be required to mobilise and establish the construction site compound at the outset and to demobilise it upon completion.

HGV deliveries during the construction period would include bulk construction materials such as concrete and aggregate, steel bars, and smaller components such as cables and transformers which can be accommodated within a standard HGV of up to 44t.

The sourcing of materials required for the construction of new access tracks and upgrading of existing tracks is envisaged to be from local quarries.

It is estimated that on average, 8 HGVs would access the site on a daily basis over the construction period, assuming a 20 day working month. During the main construction period, approximately 15 HGVs per day would deliver stone for access tracks and compound areas along with a very modest number in connection with component delivery and other activities.

The Traffic Management Plan will be developed to minimise HGV movements during conventional peak periods and limit the number of arrivals within specific time periods to prevent "convoy" movement of construction materials and reduce the requirement for HGV to pass on Lethnot Road.

13.7.7 Construction worker traffic

It is estimated that on average up to 15 light vehicles would access the site on a daily basis throughout the construction period. This robust estimate is based on a similar scale of site where 5 turbines were being constructed where the average was identified as 17 vehicles per day.

13.8 Traffic Flows

Table 13.4 summarises the peak and average increases in traffic during construction at the assessment points and describes their significance in terms of the predicted increase in traffic volumes.

Table 13.4 Traffic Flows

Predicted Impacts of Additional Traffic												
Location	Year	AADT	NRTF Low Growth	2013 AADT	One Way AADT	Max Veh	%	HGV %	HGV	Max HGV	%	Effect
A90 south of B966	2010	16943	1.035	17528	8764	30	0.3%	8%	701	15	2%	Negligible, Not Significant
B966 Inchbare	2012	2922	1.012	2957	1478	30	2.0%	14%	210	15	7%	Negligible, Not Significant
A935 Kincraig	2012	4353	1.012	4404	2202	30	1.4%	10%	227	15	7%	Negligible, Not Significant

HGVs and Construction personnel vehicles would both average a maximum of 15 one way movements per day, making 30 in total. In comparison to the projected Base Traffic Flows at the assessment locations, this would represent an average increase of 2% on B966, with a 7% maximum increase in HGV traffic.

In terms of the thresholds outlined in the IEMA Guidelines, Table 13.4 illustrates that there would be a Not Significant effect on the access routes in terms of traffic flows.

Operational Phase Impacts

Increased traffic demands during the operational phase are predicted to be very modest, with daily maintenance requirements of the order of one two-way light vehicle trip. Six monthly servicing requirements are expected to result in a further five two-way trips each servicing period, and there will be very occasional requirements for HGV movements associated with replacement turbine components.

13.9 Decommissioning

It is envisaged that prior to decommissioning (expected to be 25 years from the date of formal commissioning) a further Transport Assessment may be required prior to the agreement of appropriate traffic management procedures with the relevant authorities. It is envisaged that turbine bases and access roads will remain in situ following decommissioning, with consequential reductions in the levels of traffic by comparison with the construction period. The dismantling of turbine components prior to removal could eliminate the requirement for Abnormal Load movements. Levels of traffic associated with the decommissioning process are predicted to have an insignificant impact on the local road network.

13.10 Cumulative Impact Assessment

No requirement for consideration of Cumulative Impacts arising from other wind farm projects in the local area has been identified by Angus Council during the Scoping process.

13.11 Proposed Mitigation Measures and Residual Impacts

This section identifies potential mitigation measures which could be implemented in order to minimise the traffic and transport impacts of the Construction, Operation and Decommissioning Phases of the Lower Cairny Wind Cluster.

During construction, utilisation of an upgraded existing farm track from the local road network to the wind cluster site will minimise impacts in the immediate vicinity of the site.

The implementation of an agreed traffic management plan and routeing strategy will minimise the impacts of construction traffic on the local road network, particularly during the morning and evening peak periods.

Whilst levels of car and light van movements associated with the construction phase of the project are envisaged to be at modest levels, it will nevertheless be appropriate to encourage staff to car-share. For the purposes of robust assessment of impacts, however, no allowance for car-sharing or shuttle bus transport has been made in considering staff travel to the site.

Following the granting of Detailed Planning Permission and prior to the construction phase of the project, a draft Traffic Management Plan would be submitted to Angus Council for approval and subsequent implementation by the principal contractor. Typically, a Traffic Management Plan will give consideration to the undernoted matters

- Appropriate Police or contractor escort to accompany Abnormal Load movements from Port of Entry, at times to be agreed with Police and Local Authorities
- Notification to general public along agreed route of Abnormal Load movements
- Signage notification to road users of Abnormal Load and Construction Traffic movements
- Specific timing of deliveries outwith peak traffic hours
- Arrangements for regular road maintenance and cleaning in the vicinity of the site access, to include visual inspection of road pavement condition and regular road sweeping arrangements
- Requirement for all vehicles accessing site to use wheel clean facilities
- Appropriate provision of temporary signage and traffic control where necessary

The very modest predicted levels of Traffic impacts during the operational phase of the wind cluster are not envisaged to require the provision of any mitigation measures.

A Traffic Management Plan would be prepared and agreed with Angus Council and Transport Scotland for the decommissioning process.

A requirement to monitor road conditions along the Abnormal Load and Construction Traffic Routes to allow any deterioration identified as a result of vehicle movements during the construction period to be rectified may be required.

13.12 Summary of Effects, Mitigation and Residual Effects

Table 13.5 summarises the potential effects, possible mitigation measures and residual effects during the Construction, Operation and Decommissioning phases of the wind farm.

Table 13.5 Summary of Effects

Summary of Effects, Mitigation and Residual Effects			
Potential Effects	**Pre-Mitigation Effect**	**Mitigation**	**Residual Effects**
Construction			
Increase in traffic along Lethnot Road, Edzell	Negligible	Traffic Management Plan to be agreed with Angus Council	Negligible, **Not Significant** and Temporary
Potential traffic delays by Abnormal Loads	Negligible	Abnormal Loads to be escorted overnight at weekends. Timings to be agreed with Dundee City and Angus Councils and Tayside Police. Traffic Management Plan	Negligible, **Not Significant** and Temporary
Increase in construction traffic along B966 and via Lethnot Road, Edzell	Negligible	Traffic Management Plan to be agreed with Angus Council. Consideration to scheduling system for construction deliveries	Negligible, **Not Significant** and Temporary
Operation			
Increase in traffic along Lethnot Road, Edzell	Negligible	None required	Negligible, **Not Significant** and Temporary
Potential replacement of large turbine components	Negligible	Transport arrangements and Mitigation measures to be agreed with Angus Council	Negligible, **Not Significant** and Temporary
Decommissioning			
Potential increases in HGV traffic on local road network	Negligible	Traffic Management Plan to be agreed with Angus Council prior to decommissioning	Negligible, **Not Significant** and Temporary
Potential traffic delays by Abnormal Loads	Negligible	Traffic Management Plan to be agreed with Angus Council prior to decommissioning	Negligible, **Not Significant** and Temporary

Residual effects are noted as being negligible, **not significant** and temporary.

13.13 Statement of Significance

This Transport Assessment has assessed the likely significance of the effect of traffic movements associated with the development of the Lower Cairny Wind Cluster during the Construction, Operational and Decommissioning Phases.

The implementation of mitigation measures is expected to include an appropriate Traffic Management Plan and liaison as appropriate with Dundee City Council, Angus Council, Transport Scotland and Tayside Police.

The residual traffic and transport effects on all road networks within the study area have been assessed as being negligible, **not significant** and temporary.

13.14 Conclusions

National, Regional and Local Policy Review

The TA concludes that the Lower Cairny proposals are in accord with policy.

Abnormal Load Route Assessment

The Abnormal Load Route Assessment confirms in principle the feasibility of the transportation of turbine components from the identified Port of Entry to the site.

Route Condition Survey

The TA provides an assessment of the existing condition of the local road connection from A90(T) to site via B966 and Lethnot Road.

The Route Condition Survey identifies that B966 between A90 at Keithock Junction and Edzell village is generally of an acceptable standard, with minor damage to the road surface noted at Westwater Bridge.

The survey further identifies that Lethnot Road westwards to the windfarm site at Lower Cairny has a number of locations where existing damage to the road surface exists.

The TA recommends that a video survey be performed on Lethnot Road between Edzell and the wind cluster site immediately prior to the start of the construction period.

Impact Assessment

The TA provides an assessment of the impacts of the wind cluster utilising guidance provided by the Chartered Institution of Highways and Transportation and the Institute of Environmental Management and Assessment.

The TA identifies the Study Area and predicts the Traffic Impacts of the wind cluster during the Construction, Operational and Decommissioning Phases.

The TA concludes that the residual traffic and transport effects on all road networks in the study area are negligible, not significant and temporary.

Overall Conclusion

The Transport Assessment concludes that the construction of a Wind Cluster at Lower Cairny, Glen Lethnot, Angus can be accommodated without significant impacts on the identified approach road network during the construction or de-commissioning phases.

Glossary of Terms

Abnormal Load	*Large or heavy load which requires specialist large goods vehicle with Police or contractor escort*
Port of Entry	*Port where turbine components will arrive by sea for onward movement by road to the wind cluster site*
Trunk Road	*Principal Road which is the responsibility of Transport Scotland*
Local Road	*Road which is the responsibility of the appropriate local Council*
AADT	*Average Annual Daily Traffic*
Vehicle Movement	*All vehicle movements are considered in one direction only and compared with AADT for one direction*
ATC	*Automatic Traffic Counter*
GVM	*Gross Vehicle Mass*
HGV	*Heavy Goods Vehicle (above 7.5t GVM)*
LGV	*Light Goods Vehicle (up to 7.5t GVM)*

Chapter 14 CONCLUSIONS

This Environment and Planning Report has described the proposed development of two turbines at Lower Cairny and has demonstrated that a robust assessment process has been carried out. The assessment work has been carried out with guidance from Angus Council as well as consultation with Council Officers and other stakeholders. A detailed assessment of the aspects has been carried out to inform the findings in each environment and planning aspect area. The conclusions for each key aspect area are listed in the key chapters of the Report.

Diversification of the farm enterprise will ensure the long term stability of the farm for the immediate and extended family, staff and contractors employed throughout the year. The generation of a stable income will mean that long term capital planning for the farm enterprise can be more securely delivered. This aspect is very much aligned to the Environment Minister's Agri-renewables Strategy 2011 and meets the wider Government target to make Scotland a net exporter of renewable electricity that generates revenue for Angus and Scotland.

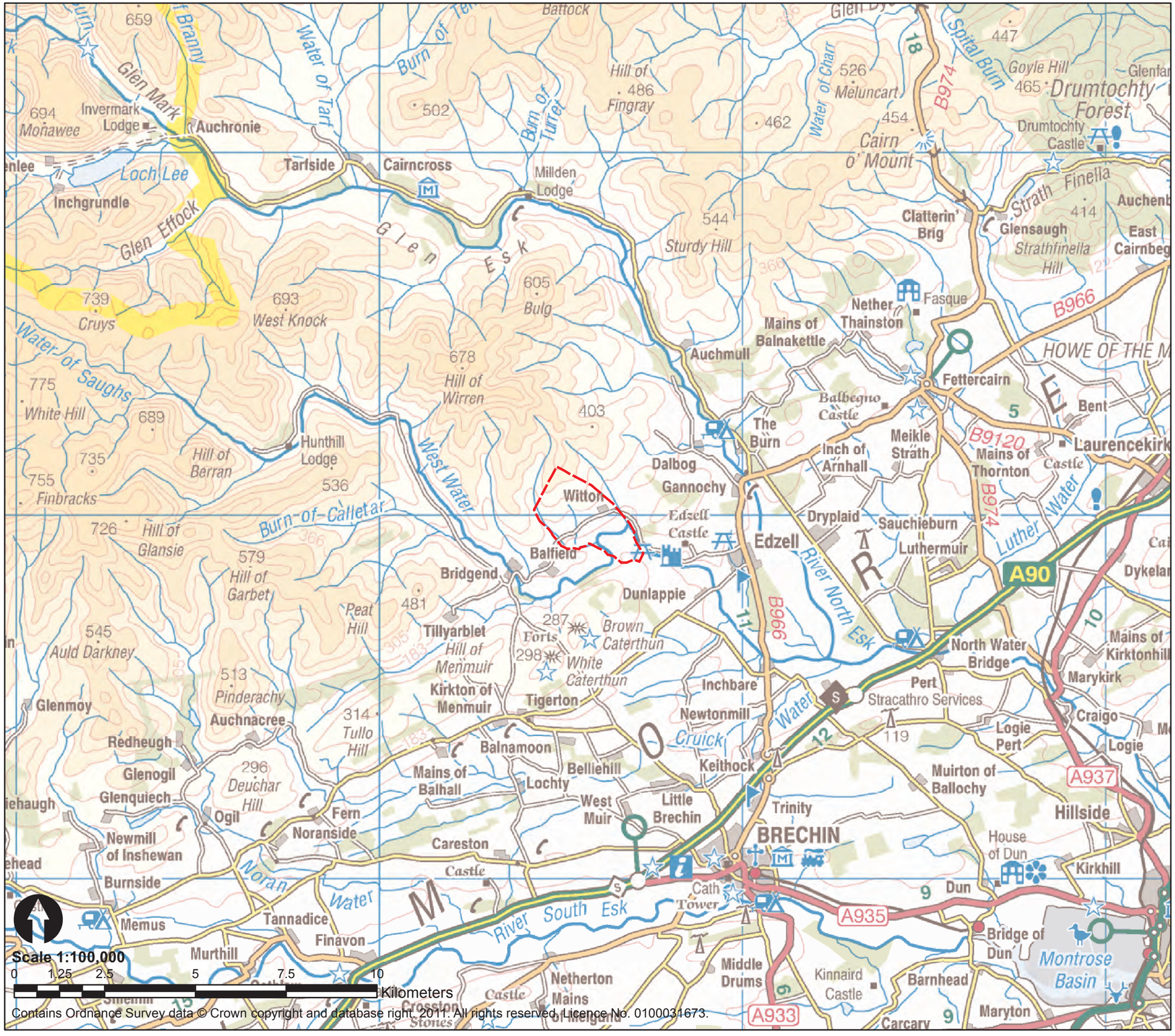
Construction, operation and maintenance of the turbine cluster will generate economic benefits for the local and regional supply chain both in terms of direct and indirect benefits. The capital expenditure of several million pounds sterling and an ongoing revenue spend over a 25 year life will bring considerable benefits to the area that do not presently exist.

The turbines will directly benefit Angus Council in terms of the rateable value generated by the development.

Wider benefits to the local and national economy and society as a whole that are largely incalculable will be generated. The Government recognises these benefits as part of its Energy Review.

Overall, the proposed development complies with the relevant elements of the Development Plan. The proposed development would not lead to any significant environmental impacts. The development is scaled such that there is no significant impact on landscape and visual amenity. The proposal has no significant lateral extent and will not cause 'clutter' in the landscape. Where appropriate, mitigation measures have been presented in the Report.

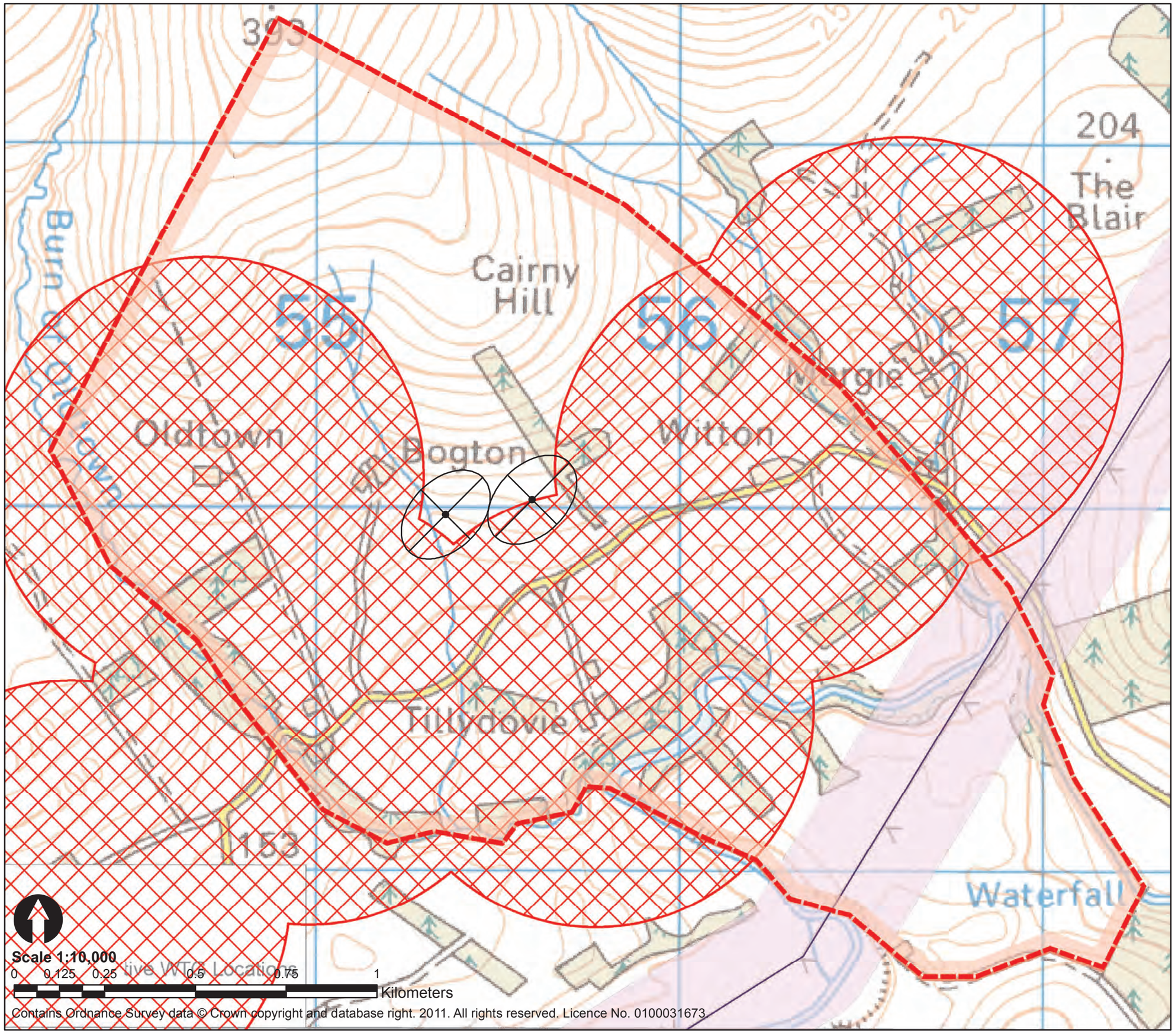
APPENDIX 1 SITE LOCATION AND CONSTRAINTS



Legend

Site Boundary

Cairny Hill T74_v1
Location Plan



Legend

- T74_v1
- T74_TurbineEllipses
- Site Boundary
- 45m Buffer from Site Boundary
- 600m Buffer Surrounding Houses
- Overhead power line
- Buffer of overhead power line (187.5m)

Cairny Hill T74_v1 Constraints Plan

APPENDIX 2 TURBINE AND SITE LAYOUT PLANS

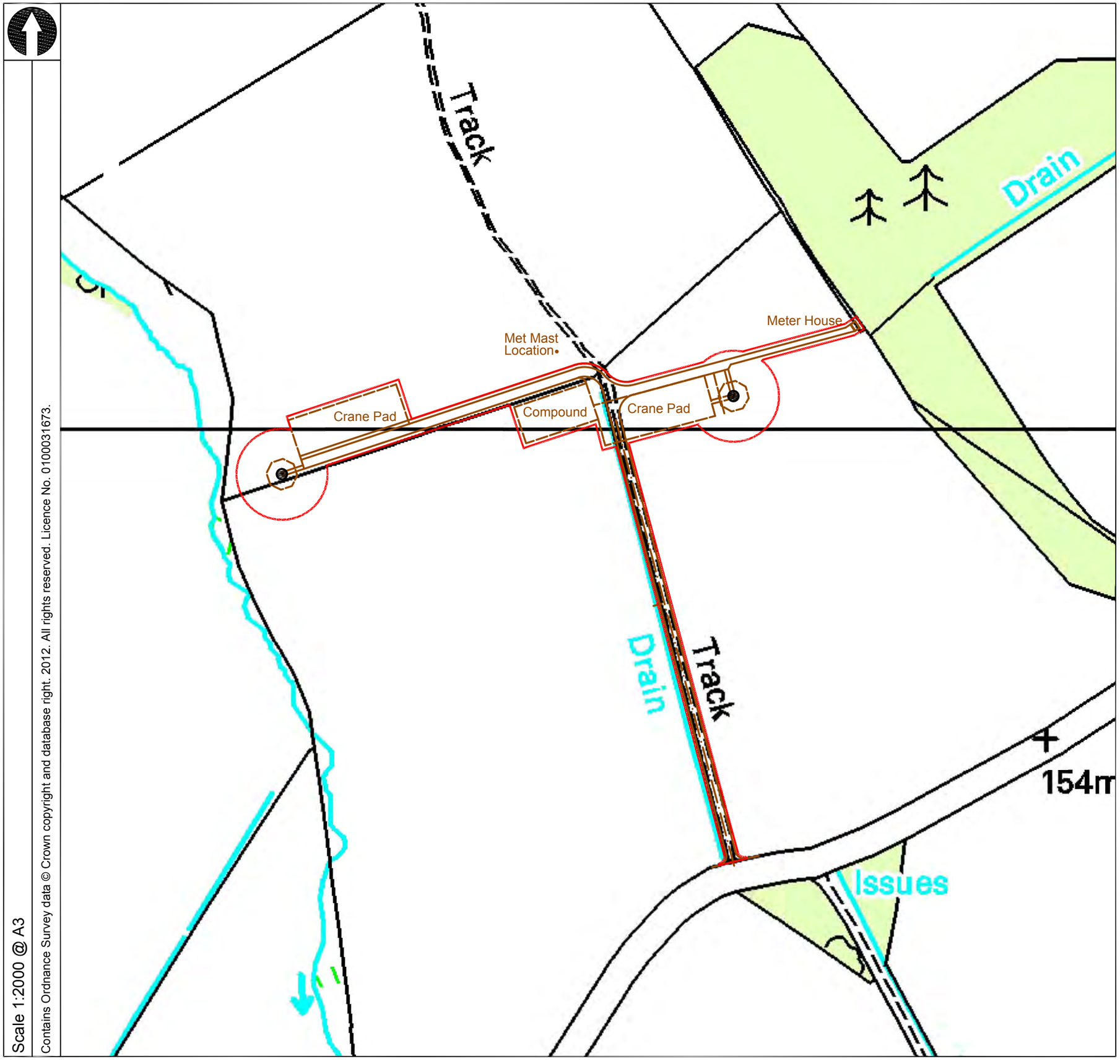


Figure No. 2.1 *Revision No. A*

Site Layout Plan

Legend

Site of Lower Cairny Wind Cluster Planning Application Boundary

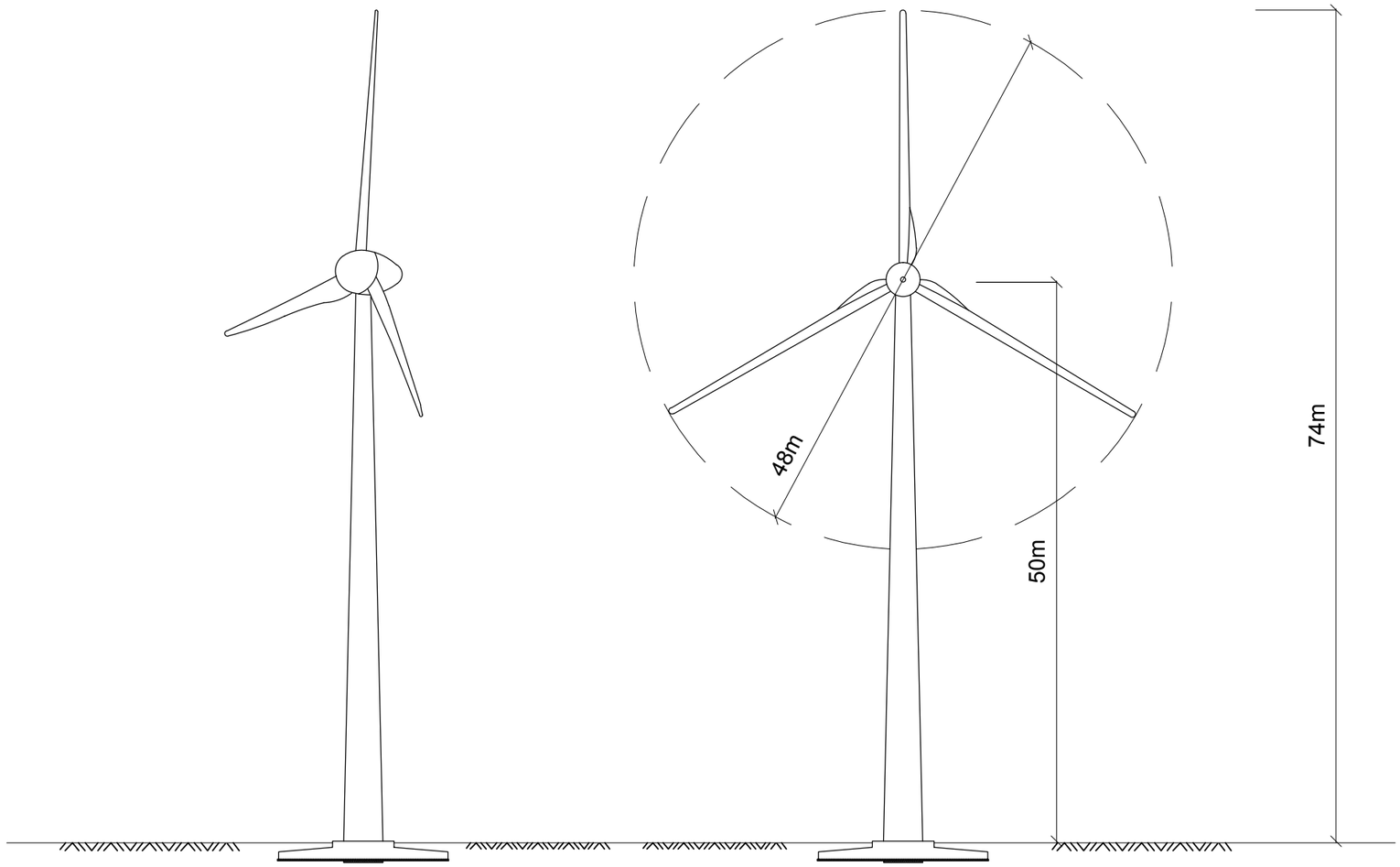
Turbine Locations

Note:
All land shown on plan is in the ownership of the applicant.

05.08.14 Rev A Amendment to boundary and addition of ownership note.

h+m

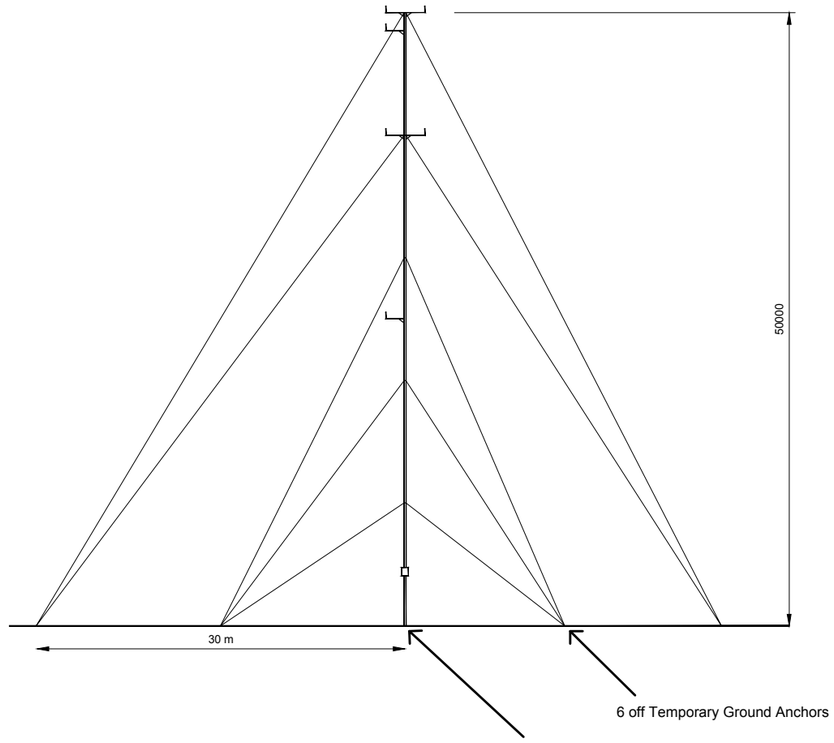
Lower Cairny Wind Cluster



Project: Lower Cairny

Dwg Title: Fig 2.2 - Turbine Dimensions

Scale: 1:500 @ A3 Date: Nov 2012

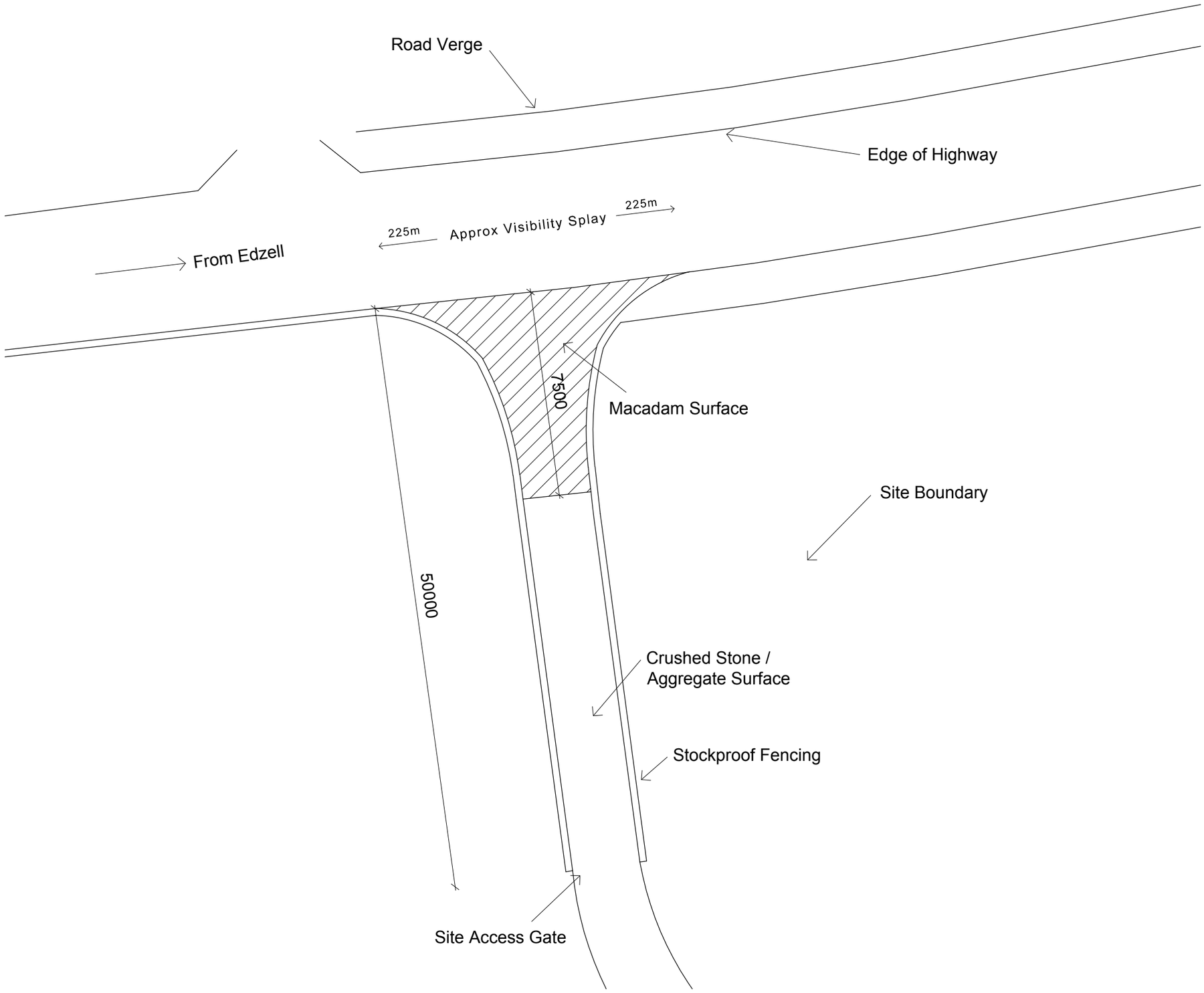


50m Meteorological Mast - Side Elevation

Project: Lower Cairny

Dwg Title: Fig 2.3 - 50m Meteorological Mast

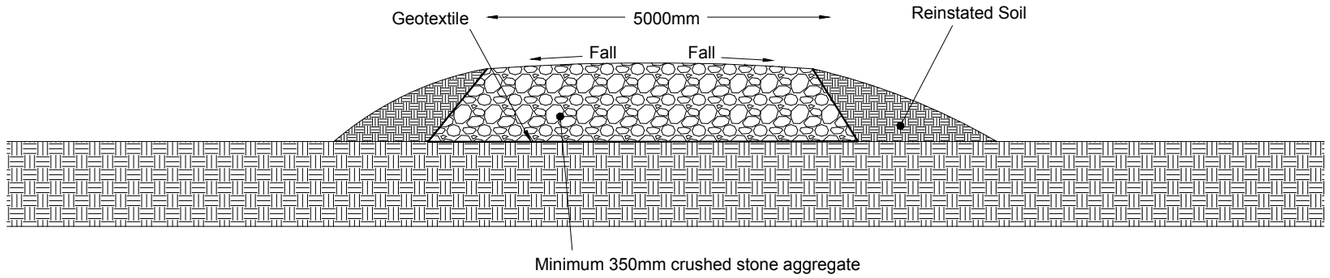
Scale: 1:500 @ A3 Date: Dec 2012



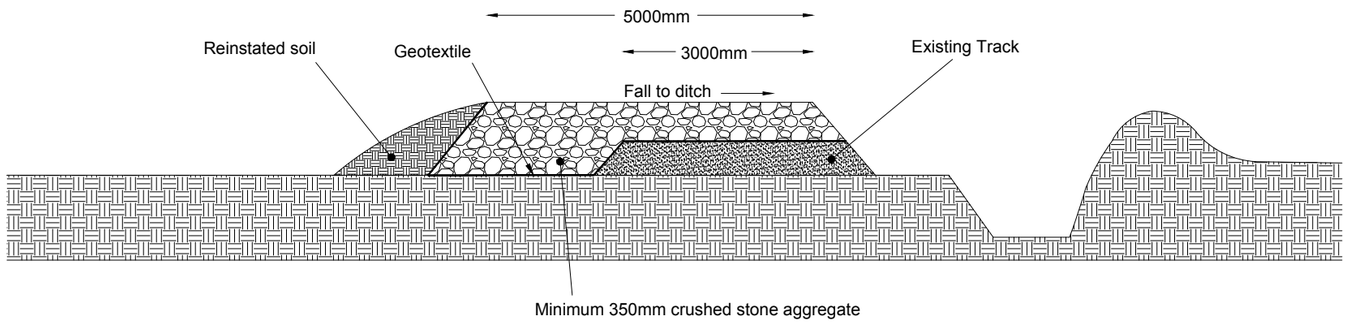
Project: Lower Cairny

Dwg Title: Fig 2.4 - Road Access

Scale: NTS @ A3 Date: Nov 2012



Typical New Track Construction Detail

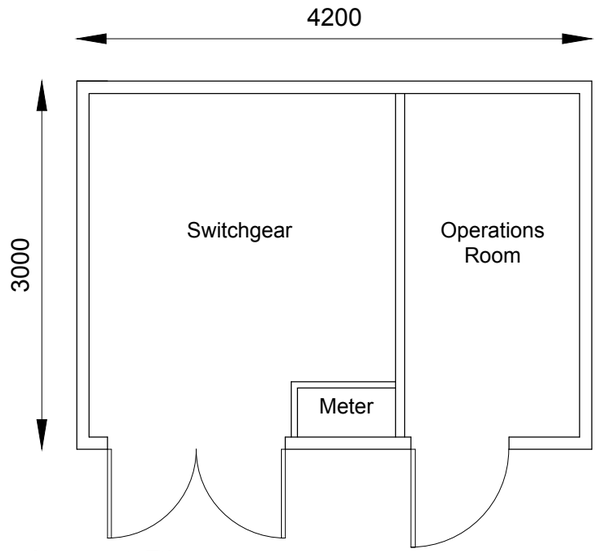


Typical Track Widening Detail

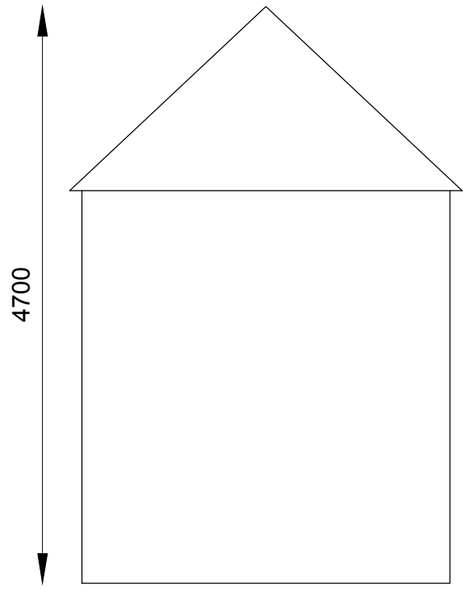
Project: Lower Cairny

Dwg Title: Fig 2.5 - Road Cross Section

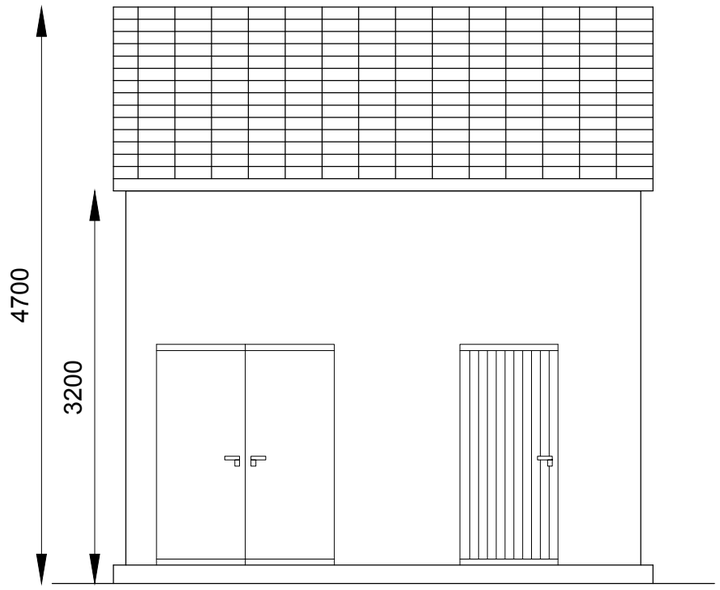
Scale: NTS @ A3 Date: Nov 2012



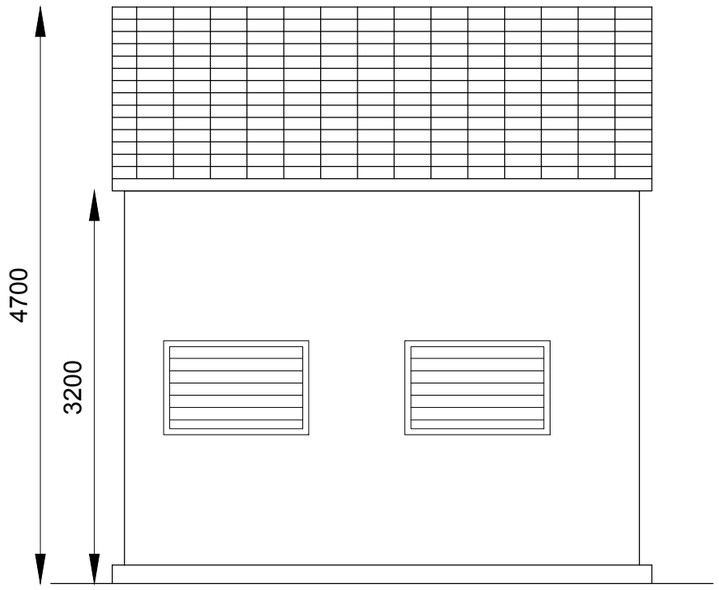
Layout Plan



Side Elevation



Front Elevation

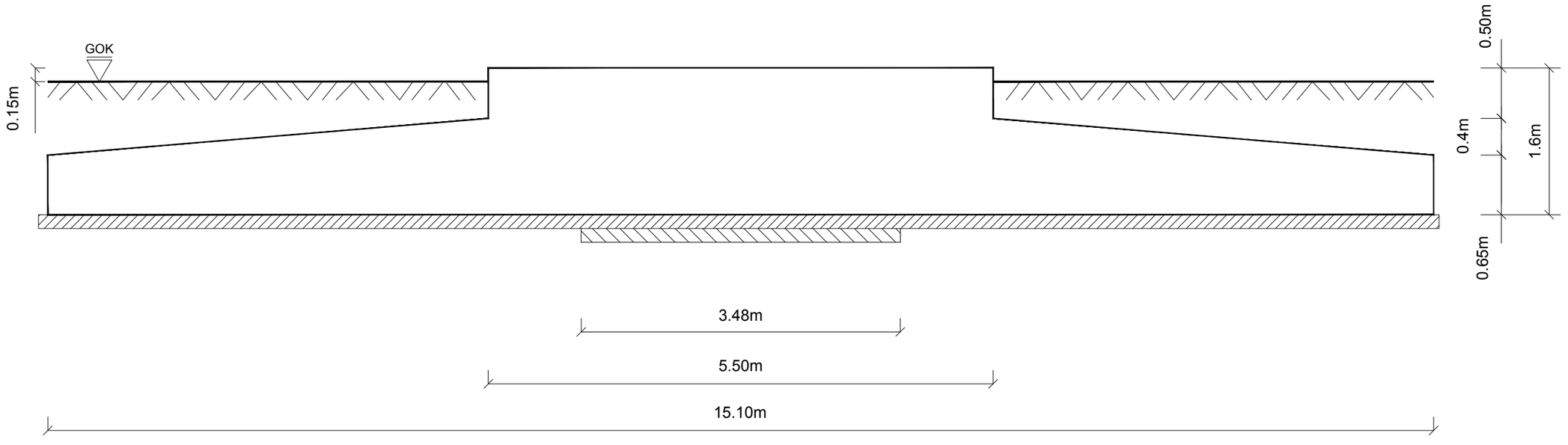


Rear Elevation

Project: Lower Cairny

Dwg Title: Fig 2.6 - Switch Gear & Meter House

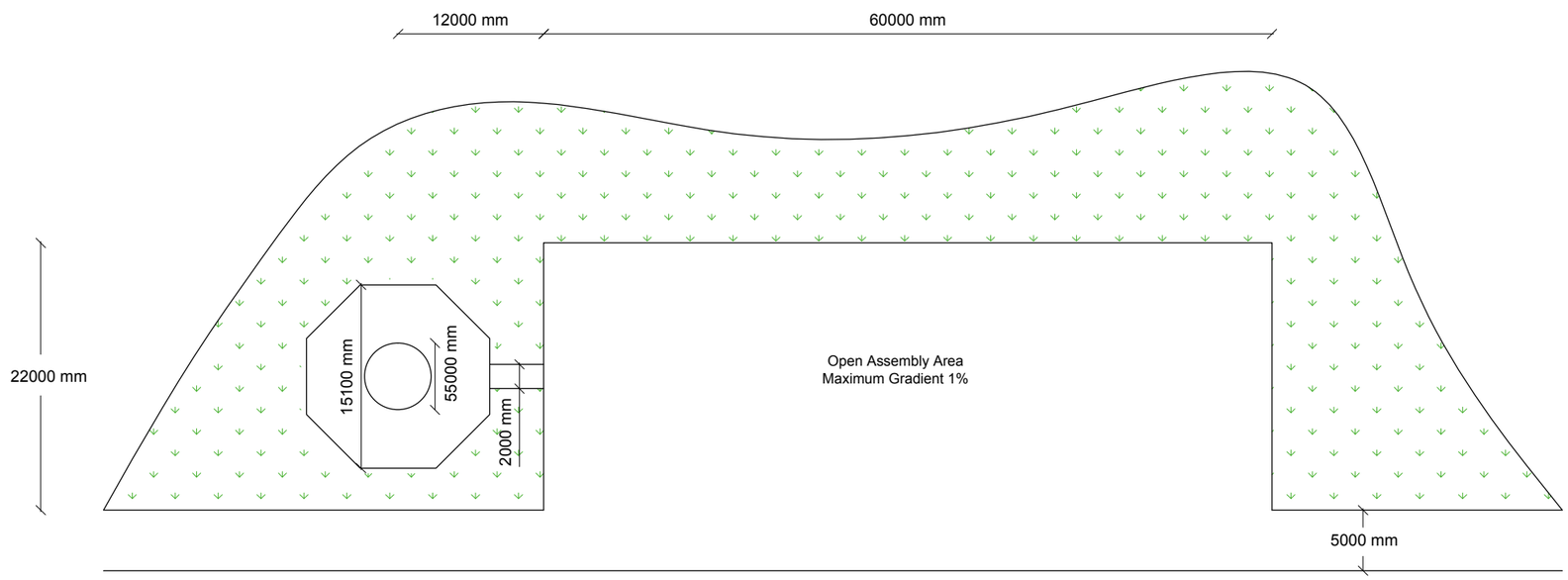
Scale: 1:50 @ A3 Date: Nov 2012



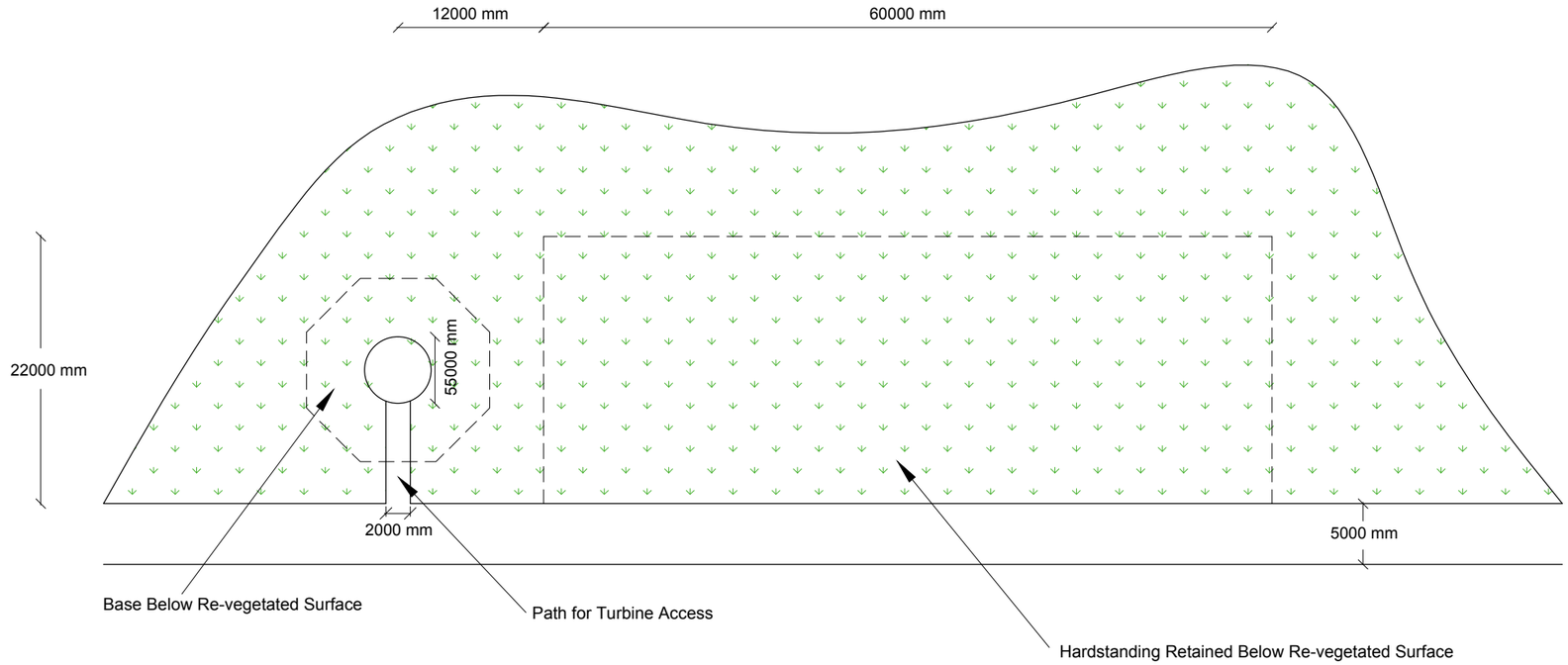
Project: Lower Cairny

Dwg Title: Fig 2.7 - Turbine Foundations

Scale: 1:50 @ A3 Date: Nov 2012



Construction Hardstand Detail

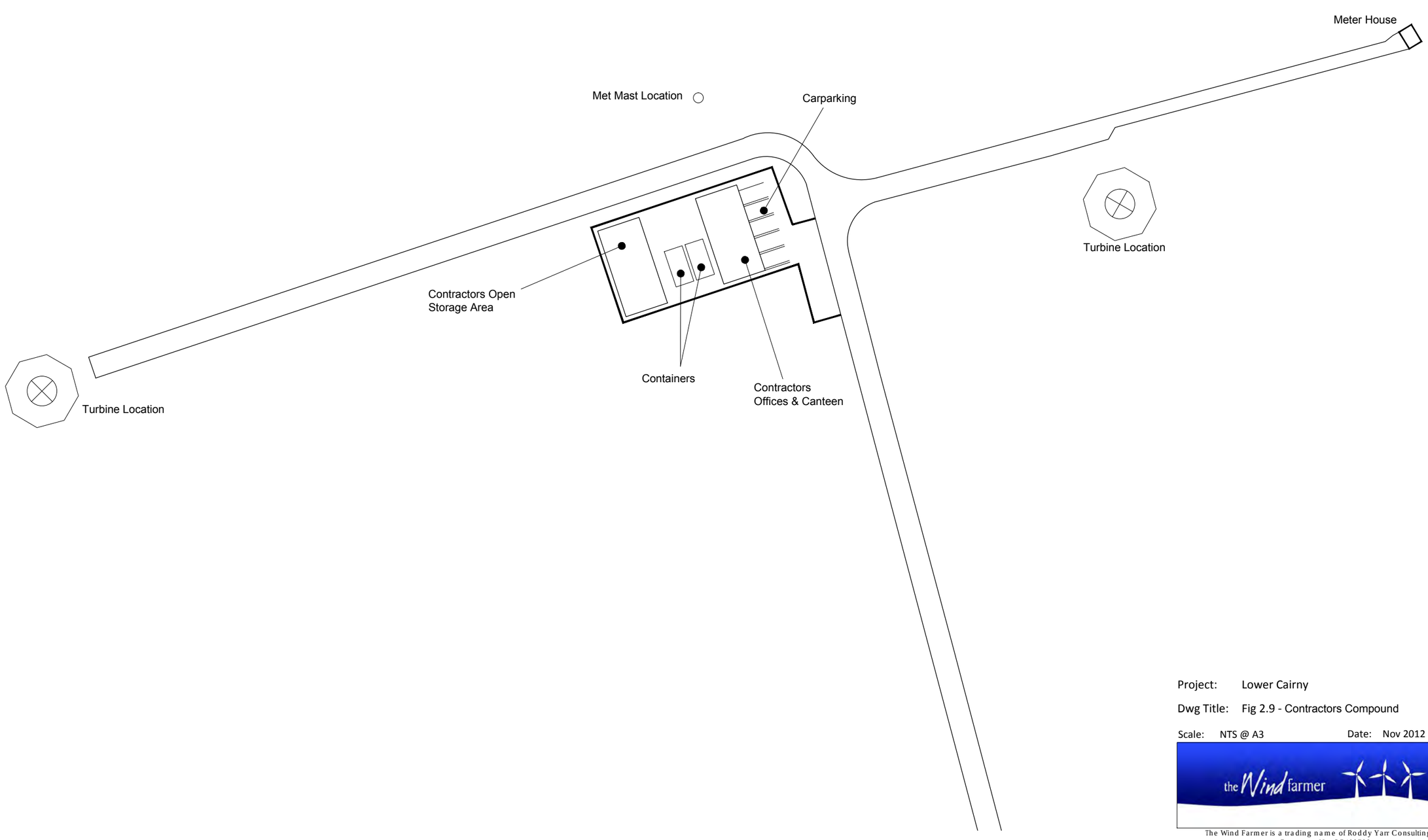


Re-vegetation to Hardstand Area Detail

Project: Lower Cairny

Dwg Title: Fig 2.8 - Crane Pad

Scale: 1:500 @ A3 Date: Nov 2012



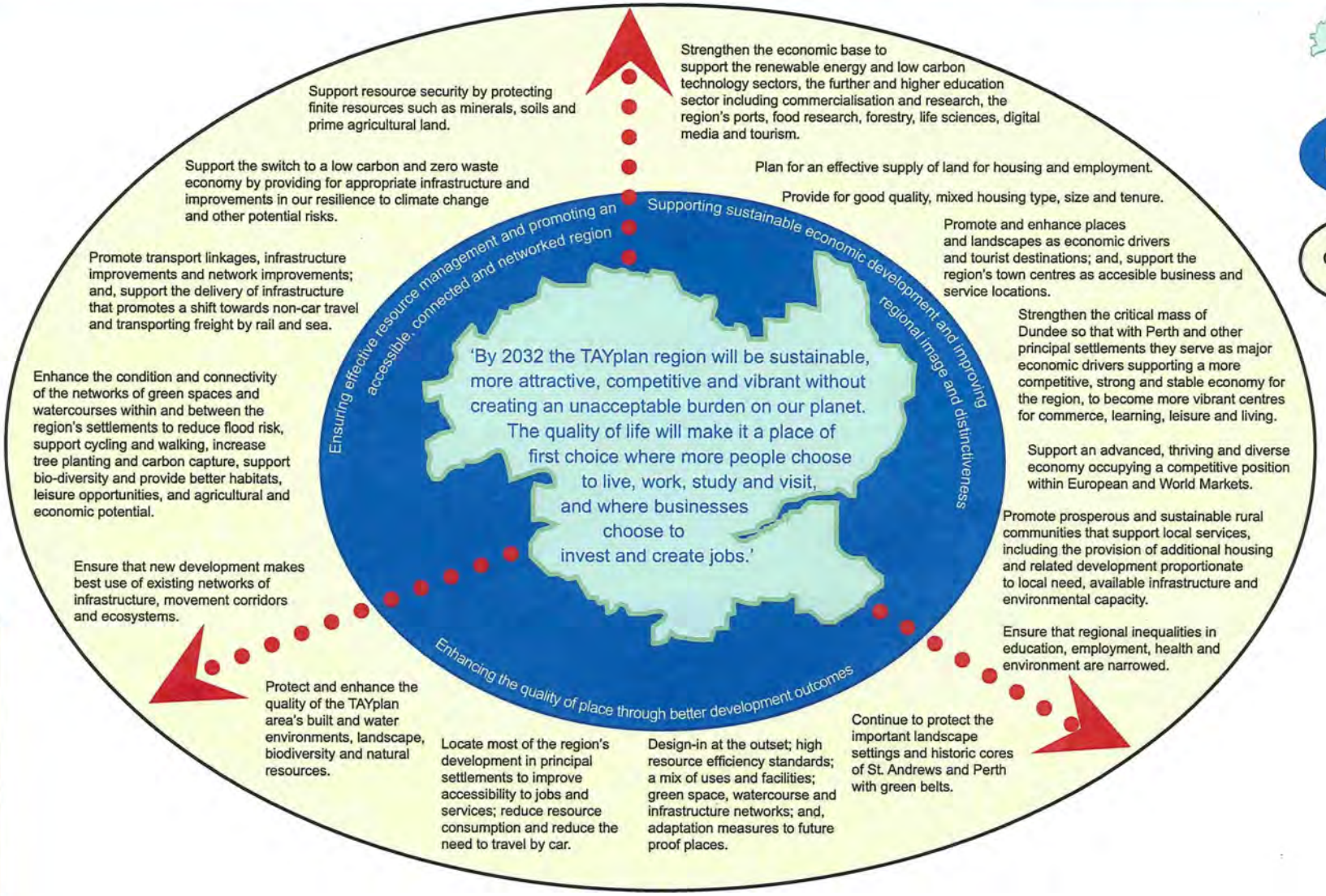
Project: Lower Cairny

Dwg Title: Fig 2.9 - Contractors Compound

Scale: NTS @ A3 Date: Nov 2012

APPENDIX 3 PLANNING

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



Vision and Objectives

APPENDIX 4 LANDSCAPE DESIGN STATEMENT, VISUALISATIONS AND VISUAL IMPACT ASSESSMENT METHODOLOGY

LVIA Methodology Introduction

A1.1 The assessment methodology employed is largely based on the 'Guidelines for Landscape and Visual Impact Assessment (Second Edition)', produced by the Landscape Institute and Institute of Environmental Management and Assessment (2002).

A1.2 The initial stages of the assessment process considers the baseline landscape and visual character, landscape designations and Government policy relevant to an assessment Study Area.

A1.3 The Study Area, on which the LVIA focuses, extends to include all areas from within which significant landscape and visual effects (as defined by EIA Regulations) are most likely to occur. This extends to x km from the site of the proposed wind energy development, and is consistent with the guidance provided in 'Visual Representation of Windfarms Good Practice Guidelines'. This radius was agreed with Dumfries and Galloway Council and Scottish Natural Heritage, and has been used for all aspects of the landscape and visual assessment.

A1.4 The aim of the landscape and visual assessment is to:

- Identify, predict and evaluate potential key effects on particular elements of the landscape and visual resource arising from the proposed wind energy development;
- Outline the likely effects on the landscape and visual resource of the Study Area and the resulting overall significance of these effects arising from the proposed wind energy development.

A1.5 The **Landscape Resource** is defined here as:

The distinct spatial distribution, at a given moment in time, on the surface of the earth, of the physical components resulting from the interaction between natural and human processes over time, and which produce consistently occurring patterns and homogeneity of landscape character and landscape context and how these are experienced and valued.

A1.6 The ***Visual Resource*** is defined here as:
The assembly of components which provide an attractive visual setting or backcloth for activities.

A1.7 Assessment of sensitivity of existing baseline conditions and prediction of magnitude of change lead to the assessment of residual landscape and visual effects on particular elements and the overall landscape and visual effects on the Study Area. The significance of these effects can be defined.

A1.8 In order to provide a level of consistency to the assessment, the assessment has been based on pre-defined criteria.

A2 **Sensitivity to Change**

A2.1 The sensitivity of the landscape resource to changes associated with the proposed development can be defined as high, medium or low based on professional judgement of a combination of parameters, as follows:

- Landscape character - scale, enclosure, openness, land cover, texture and form;
- Landscape value - local, regional or national landscape statutory designations and non-statutory designated areas;
- Distribution of receptors; and
- Scope for mitigation.

A2.2 Usually, an area would not fit every criterion within just one category; but, rather, it would be categorised based on best fitting more of the criteria within one allocation than another.

Definition of Landscape Sensitivity	
High	Key characteristics and features that are very sensitive to the location of a wind farm, such as simple or indistinct pattern, few existing foci, sense of intimacy and shelter and sense of wildness or wild land, and these contribute significantly to the distinctiveness of the landscape character type. The distinctive characteristics of the landscape are widely experienced and contribute significantly to the value of the landscape at a local, regional and national level. Designated landscapes e.g. National Scenic Area (NSA) and those identified as having possible landscape value, for example within SNH Search Areas for Wild Land (SAWL) .
Medium	Key characteristics and features that are sensitive to the location of a wind farm, but with which the wind farm may also integrate, such as a landscape with a distinct pattern, with occasional prominent foci, large scale structures, a sense of enclosure and a landform to which wind turbines could fit. A landscape where the wind farm would not affect the key characteristics that contribute to the distinctiveness and/or value of the landscape. The distinctive characteristics of the landscape are only locally experienced and/or only contribute to the value of the landscape at a regional level. Regionally and locally valued landscapes, both designated such as Areas of Great Landscape Value (AGLV), and non-designated areas.

	Landscapes in which it is possible to site and design a wind farm to have minimal impacts within the landscape.
Low	A landscape where the wind farm would not affect the key characteristics that contribute to the distinctiveness and/or value of the landscape. Landscape characteristics and features that do not make a significant contribution to landscape character or distinctiveness locally, or which are untypical or uncharacteristic of the landscape type. Areas where a wind farm would fit the key characteristics of the existing landscape and/ or where this can easily accommodate landscape change subject to careful design. The distinctive characteristics of the landscape are only experienced locally. Landscapes in which it is possible to site and design a wind farm to have minimal impacts within the landscape.

A2.3 The sensitivity of the visual resource to changes associated with the proposed development is defined as **high, medium** or **low** based on professional interpretation of a combination of parameters, as follows:

- Location and nature of the view;
- Direction and extent of the view;
- Value/importance of the view
- Scope for mitigation (including ability of the view to absorb development); and
- Activity of the receptor and expectations, frequency and duration of the view.

A2.4 Usually, a view would not fit every criterion within just one category; but, rather, it would be categorised based on best fitting more of the criteria within one allocation than another.

Definition of Visual Sensitivity	
High	Focused view or panoramic view in which a wind farm would form the dominant focus, distracting from existing elements or features. Existing view includes important landscape features with physical, cultural or historic attributes. Principal view from prominent buildings and residences, 'beauty spots' or popular viewpoints. Area designated for scenic value, or en route or in a location valued for its visual amenity. Wind farm difficult to integrate within visual composition, for example very complex pattern of elements, or these are of very different prominence or scale to wind turbines. Users of outdoor recreational facilities including those on footpaths, cycle routes

	or rights of way and popular hill or mountain tops, and key vehicular access routes from which viewers' attention is directed to the landscape.
Medium	Open, but unfocussed view in which a wind farm would be seen as one of several foci. Existing view includes some important landscape features with physical, cultural or historic attributes. Forms secondary or marginal part of view from prominent buildings and residences, 'beauty spots' or popular viewpoints. View within area of some scenic value, although not designated. Or visible along route or in location that is valued as having scenic value. Wind farm able to be accommodated within visual composition, for example in relation to linear features or pattern of point features, although this would result in some change to the pattern and/or nature of this composition. Wind turbines would be of similar prominence to existing visual features. Users of outdoor recreational facilities including local footpaths, cycle routes or rights of way, en route to locally popular hill or mountain tops whose attention may be focused on the landscape. Local access routes.
Low	Unfocussed and/or partially screened view in which a wind farm would be seen as a minor element of the view. Existing view does not include important landscape features with physical, cultural or historic attributes. Site not clearly visible from prominent buildings or residences, 'beauty spots' or popular viewpoints. View not within area of recognised scenic value and not designated. Not visible from routes, or in location, which are valued for their visual amenity. Wind farm able to be accommodated within visual composition, for example in relation to linear features or pattern of point features without significant change to the pattern and/or nature of this composition. Wind turbines would be of similar or lesser prominence to existing visual features. Local users whose attention is likely to be focused on work or activity rather than the wider landscape, for example using local access routes to travel to/from work or working within an industrial or commercial centre.

A3 Magnitude of Change

A3.1 The magnitude of change to the landscape resource arising from the proposed development at any particular point is described as **high, medium, low, negligible** or **none** based on the interpretation of a combination of largely quantifiable parameters as follows:

The scale of the change;

- Whether the change would affect key landscape characteristics on which the distinctive qualities of the landscape character type rely and/or for which it is valued, and thus result in a loss of landscape resource;
- The nature of the change in relation to landscape characteristics and whether this is beneficial or adverse; and
- The duration of the change and whether this is temporary or permanent.

A3.2 The magnitude of change to the visual resource arising from the proposed development at any particular viewpoint is described as **high, medium, low, negligible** or **none**. The considerations which have been taken into account during the assessment of the effect on visual amenity at individual viewpoints can be grouped as follows:

- Information regarding the viewpoint location and the people using it;
- The existing visual amenity at the viewpoint; and
- The change to visual amenity caused by the introduction of the proposed development.

A3.3 Within each of these groups, specific considerations have been examined for each viewpoint and these are described below. It should be noted that not all considerations are always relevant for every viewpoint.

Description of the Viewpoint and its Users

- Location;
- Direction of view to the proposed development scheme;
- The likely numbers and types of people visiting the viewpoint, the purpose of their visit to that viewpoint, and the nature of their activities;
- The likely duration of the view obtained by users;
- Scenic (landscape) designation.

Description of the Existing Visual Amenity at the Viewpoint

- The extent of view obtainable in terms of panorama and distance;
- The visual character of the view;
- The occurrence of existing visual foci in the view;
- The occurrence of any existing visual forces in the view ("visual force" occurs when a static image gives an illusion of energy or movement – visual forces in landform draw the eye down and up slopes);
- The nature of the skyline profile;
- The range of different landscape components comprising the view;
- The visual inter-relationship between the range of landscape components in terms of simplicity or complexity;
- Particularly prominent patterns discernible in the view;
- Colours present in the view;

- Motion present in the view;
- The impression of scale of the landscape resulting from the combination of landform, vegetation and other factors;
- A sense of remoteness;
- The presence or absence of man-made features in the view;
- The scenic attractiveness of the view;
- The potential for change in the future.

Description of the Change to Visual Amenity at the Viewpoint caused by the Proposed Development

- The number of elements comprising the development which will be visible;
- The extent of each element of the development which will be visible;
- The inter-relationship of the development's elements;
- The extent of ground/sky forming a backcloth;
- The extent of visual obstruction created by the development;
- The relationship of the development to skyline/horizon profile;
- Change in visual character;
- Creation of a new visual focus;
- Alteration to existing patterns in the view;
- Influence of the scale of the development on the impression of scale of the view;
- Alteration to sense of remoteness;
- Alteration as a result of the introduction of man-made elements;
- Change to scenic attractiveness of view;
- Potential for screening.

Definition of Magnitude of Change	
High	Fundamental change to the characteristics of the landscape or visual resource.
Medium	Considerable change to the characteristics of the landscape or visual resource.
Low	Noticeable change to the characteristics of the landscape or visual resource.
Negligible	Discernible change, but usually only in atypical circumstances, for example exceptional weather conditions, or not influencing the key characteristics of the landscape or visual resource. These impacts are thus classified as the 'no change' situation.
None	No change to the landscape or visual resource.

A4 Adverse and Beneficial

A4.1 When assessing effects on the landscape and visual resource, the following categorisation has been used:

- ***'Adverse'*** – the key characteristics of the landscape and visual resource are compromised;
- ***'No effect'*** – the key characteristics of the landscape and visual resource are not affected; and
- ***'Beneficial'*** – key characteristics of the landscape and visual resource are reinforced.

A5 Significance

A5.1 Significance of effects are based on two principal criteria - the magnitude of the change and the sensitivity of the location or person affected by the change (receptors). To comply with GLVIA, the definition of significance requires to be stated in relation to the specific circumstances of an individual development and landscape.

A5.2 To determine the significance of effect of the development on the landscape resource, the following factors are considered:

- The sensitivity of the landscape to the type of change proposed;
- The nature of the effect (i.e. whether the key characteristics of the existing landscape resource of the Study Area, and their consistency throughout that area, are reinforced or weakened as a result of the changes in landscape character brought about by the introduction of the proposed development);
- The quality of the landscape characteristics affected and the potential for enhancement;
- The value of landscape elements, feature or characteristics and the recognition of this by designation at various levels, such as local, regional, national and international and the effect of the change on the integrity of the designated area;
- The magnitude of the effect and whether the change would be positive, adverse, temporary or permanent; and
- The type and rate of other changes that are likely to occur in the landscape resource of the Study Area in the future.

A5.2 To determine the significance of the effect of the development on the visual resource, the following factors are considered:

- The nature of the effect (i.e. whether the scenic qualities of the view are strengthened or weakened as a result of the changes to visual amenity brought about by the introduction of the proposed development;
- The magnitude of the change;
- The sensitivity of the visual resource and receptors;

- The number of people affected by the change (although, changes affecting large number of people are generally more significant, this is not necessarily the case in sensitive landscape, for example areas of wild land);
- The type and rate of other changes that are likely to occur in the visual amenity of the Study Area in the future.

A5.3 Although assessment of effect significance, as described above, is based on professional judgment of a complex range of factors in relation to the sensitivity of receptors and magnitude of change, the following tables summarise and describe categories of significance to aid interpretation of this assessment. For individual effects, significance is measured in a scale of **no effect, slight, moderate** and **substantial**. For the overall landscape effect and visual effect of the proposed development within the Study Area, a determination is made regarding whether the likely effect would be significant or not significant.

Summary of Categories of Landscape Effect Significance	
Substantial Effect	The proposed development becomes a key characteristic of the landscape and/or changes the intrinsic landscape character of the area. A fundamental change to the landscape resource or a considerable change to a very sensitive or valued landscape.
Moderate Effect	Change affects the character of the landscape, but of a nature, scale or extent that does not change the intrinsic landscape character of the area. A considerable change to the landscape resource or a noticeable change to a very sensitive or valued landscape.
Slight Effect	Change introduces new element(s) into the landscape, but this does not affect the intrinsic landscape character of the area. A noticeable change to the landscape resource or barely perceptible change to a very sensitive/valued landscape.
No Effect	Negligible or no change.

Summary of Categories of Visual Effect Significance	
Substantial Effect	The proposed development dominates or has a defining influence on views. A fundamental change to the visual resource or a considerable change to very sensitive or valued views.
Moderate Effect	The proposed development is prominent and forms a focal feature, but the visual resource remains defined by the baseline conditions. A considerable change to the visual resource or a noticeable change to very sensitive or valued views.
Slight Effect	The proposed development is clearly visible, but as a minor feature and the visual resource remains defined by the baseline conditions. A noticeable change to the visual resource or barely perceptible change to very sensitive/valued views.
No Effect	Negligible or no change.

A5.4 Wherever possible, identified effects are quantified, but the nature of landscape and visual assessment often requires interpretation by professional judgment.

A5.5 EIA Regulations require judgment on the acceptability of a scheme to occur in the full knowledge of the likely significant effects on the environment. However, GLVIA explains that "in the context of EIA, however, 'significance' varies with the type of project and the topic under assessment" and "it may be helpful to define levels or categories of significance (including 'not significant') appropriate to the nature, size and location of the proposed development". To satisfy these requirements, it is stated that, where landscape or visual effects of either moderate or substantial impact are identified by this LVIA, as described within the tables above, these should be considered as a significant effect as per the EIA Regulations. Accordingly, slight or no effects are considered as not significant.

A6 Sequential Impacts

A6.1 Sequential impacts occur when an observer moves through a landscape along a linear route, in relation to a series or continuum of viewpoints/experiences. These views may include other developments in addition to the proposed wind farm.

A7 Cumulative Landscape and Visual Impacts

A7.1 Cumulative impacts result from a relationship between more than one wind energy development and are the summation which results from the effects accruing from a proposed wind energy development in conjunction with effects from other previous, present or reasonably foreseeable similar developments within or in close proximity to the Study Area. Cumulative impacts are affected by:

- The number and distance between the developments;
- Their inter-visibility and sequential visibility;
- The overall character of the landscape and visual resource and the sensitivity of this to numerous wind energy developments; and
- The siting and design of the different developments.

A7.2 To comply with PAN 45 and other guidance, the assessment of the cumulative landscape and visual impacts of other wind energy developments in addition to the development proposal considers those "…in the vicinity that have been built, those which have permissions and those that are currently the subject of undetermined applications". Where operational wind farms and those under construction fall within the Study Area, these are considered as part of the baseline conditions against which the development proposal in isolation is assessed, as well as being considered as part of the cumulative assessment.

APPENDIX A 09.07.12
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LOWER CAIRNY WIND ENERGY CLUSTER
DESIGN STATEMENT

1 Introduction

1.1 This report outlines the rationale for the design layout of a proposed wind cluster at Lower Cairny, near Edzell, Angus and describes the comprehensive design development process which has been undertaken to develop the detailed layout and design of the proposed project.

2 Background

2.1 The Applicant proposes to undertake a wind cluster project on a site at Lower Cairny, c3km to the west of the village of Edzell, on the unclassified road to Glen Lethnot. The Lower Cairny site is on land owned and farmed by Mr G Yarr, and forms part of the farm unit known as Witton Farm. The proposed site for the wind turbines lies on the western part of the farm unit.

2.2 The rising cost of energy, fuel, fertilizer and animal feed is a significant threat to the long-term finances of the farm operation. In addition to the rising cost of resources, the applicant wishes to develop the wind cluster as part of the farm's range of diversification options and to assist in reducing carbon emissions from energy generation.

2.3 Initial feasibility studies indicated that the topography of the land at Witton Farm has a good wind resource, based on the wind speeds recorded on the national wind database (NOABL). Subsequently, a small temporary meteorological mast was erected on site during 2011 to obtain a guide as to the wind environment on the site. Its collection of weather data supports the wind capacity conclusions of the initial studies.

2.4 Landscape studies of the farm unit, described in detail in the following section of this Report on Landscape Capacity, were initially undertaken for the highest areas of land within the farm unit, around the 300m contour and where the wind resource would be most likely to be greatest. These studies indicated various landscape and visual sensitivities associated with this elevated location, and suggested that the optimum location for a small scale wind energy development in landscape and visual terms lay towards the west of the farm unit, where the land comprises a combination of improved grazing and arable land which is generally located at the junction between lowland and foothills, around a height of 200m AOD.

2.5 As an individual landowner, it is not appropriate or feasible to consider other sites in the vicinity for a wind energy project which are not within the control and ownership of the Applicant. However, the following Landscape Capacity work considered the appropriateness of the whole of the farm unit for wind energy development as part of a

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strategic siting and design exercise undertaken to inform the most appropriate location for the proposed development.

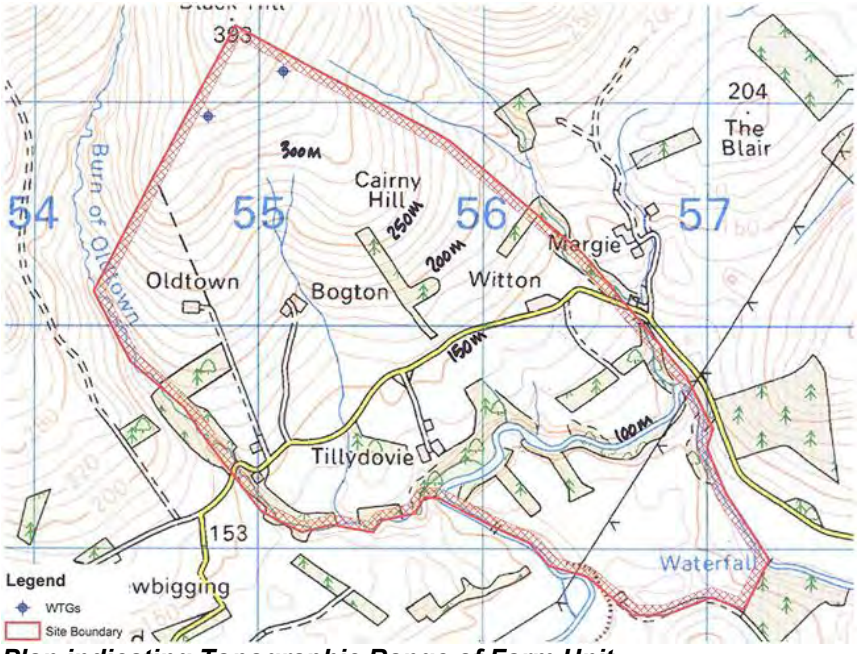
3 Landscape Capacity Study

General

3.1 The Applicant recognised from the outset the importance of landscape and visual considerations in relation to the potential development of a wind energy project at Lower Cairny, and commissioned a Landscape Capacity Study from horner + maclennan to assist in informing the proposed location and scale of any development proposal. This Study initially considered the highest areas of land within the farm unit, located approximately around the 300m contour level on the slopes of Cairny Hill. The study considered the following key issues:

- The existing landscape and visual character of the site
- How the site relates to its surroundings in landscape and visual terms
- The extent of visual prominence of the site within views from the surrounding landscape
- The general landscape and visual character of the surrounding landscape.

3.2 This landscape analysis was supplemented with consideration of Angus Council planning policy and other documents related to windfarm development in Angus, in order to reach conclusions on the landscape capacity for a wind cluster development on the Witton farm unit. In order to inform decisions on the landscape capacity of the site, consideration was given to the potential to introduce turbines of blade tip heights of 61m, 81m and 100m on the site.

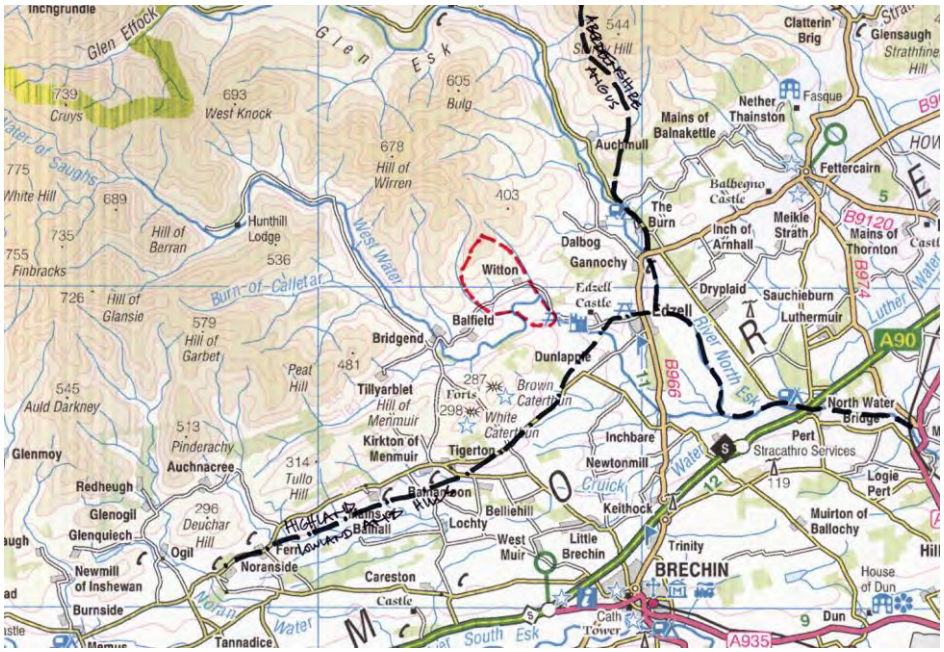


Plan indicating Topographic Range of Farm Unit

Landscape Context

3.3 The site of the proposed wind cluster project is located in north Angus, approximately 3.5km from the boundary with Aberdeenshire. Within Angus, there are three main regional landscape character areas, which inform the Angus Council Wind Energy Geographic Areas, namely:

- *Highland* – primarily the Angus Glens along and to the Highland Boundary Fault
- *Lowland and Hills* – mainly rolling farmland and low hills
- *Coast* – a mix of sand, cliffs and, around Montrose, lowland basin.



Site Location in relation to Regional Landscape Areas

3.4 The site occupies an area wholly located within the *Highland* region, although located towards its south-eastern boundary close to the *Lowland and Hills* region. In overall terms, the *Highland* region forms the important and highly visible backdrop to the settled lowland areas of Angus, as well as being an important recreational resource of high scenic quality, with remote and wilderness qualities within its northern section. Part of the *Highland* region is a designated National Park. It is noted that the Angus Local Plan Review identifies the *Highland* and *Coast* areas as having a greater potential sensitivity to the landscape and visual impact of large turbines.

The Landscape Character of the Site and its Surroundings

3.5 The site is an agricultural holding located on a south-easterly sloping hillslope of the Mounth Highlands rising above the valley of the West Water, and extending to the hill summit of Black Hill. The site encompasses a landscape transition from well drained arable and improved pasture in the lower areas, rising through unimproved pasture to open moorland and grassland on the upper slopes. This landscape transition is reflected along much of the hill slope edge which flanks the Howe of the Mearns, and is a recognisable landscape pattern in longer distance views to these hill slopes from the south and east, predominantly due to the changing colours which rise up the hillsides associated with this arable, improved pasture, unimproved pasture and moorland transition.

3.6 The landscape pattern is regular and ordered within the areas of the lower lying improved pastures, where rectilinear field patterns occasionally defined by geometric coniferous tree belts create a simple, organised layout. The coniferous tree belts form a series of separate, distinctive geometric shapes across the lower hillsides, which act as individual features along the lower slope areas rather than forming an interconnected broader scale pattern, except when seen from greater distances where they tend to visually merge into a more continuous tree cover pattern. The regular pattern of the lower slopes gradually gives way to the more informal layouts of the unimproved pastures further up the hill slopes, which lead to the diverse moorland and grassland mosaic of the upper slopes. Consequently, the site is strategically located at the interface between the humanised lowland agricultural landscape of the Howe of the Mearns with the more natural yet managed upland moorland landscape to the north.

3.7 Whilst the overall hillslopes which enclose the northern side of the Howe of the Mearns are extensive and generally large scale, at a more detailed level they predominantly comprise a sequence of inter-related smaller scale hill tops, of which Cairny Hill is one, which collectively form the wider hill massif. These smaller scale hill tops which fringe the lower slope areas generally comprise of individual summits or ridge shoulders where the vertical height gain above the fringes of the adjacent lowlands is in the vicinity of 100-150m. These relatively modest height changes allow these individual hilltops and ridge shoulders to be experienced as clearly separate and identifiable features at a local level.

3.8 Edzell Castle is included within the Inventory of Gardens and Designed Landscapes, and is located approx 2km to the east. The citation indicates that there are good views from the tower towards the northern hills, although it is noted that the tower is no longer open to the public. The intervening heavily wooded Hill of Edzell is likely to fully screen any views to the site from the car park.

Existing Visual Prominence of the Site

3.9 When seen from the surrounding landscape, the site appears as a small part of an extensive sequence of hills slopes and rounded ridges which form the important backdrop to the Howe of the Mearns.

3.10 In views from the south, the site is generally seen as a small component of the wider and higher hill slopes enclosing the north-western side of the Howe of the Means. The site does not form a prominent feature of these slopes, but is rather a part of a much more extensive range of rounded hills, ridges and shoulders extending to the north-east and south-west. The site is set well below one of the highest sections of the undulating skyline profile, particularly in more distant views and does not form part of the skyline profile in mid-long distance views.

3.11 The intervening ridgeline of the Caterthun hills, which reduces in height eastwards towards Edzell, frequently acts as an intermediate horizon and visual screen to the lower section of the site, particularly from the south-west, with only the upper section of the site being visible beyond and above the intermediate horizon. From certain directions, the Caterthun hills form locally prominent skyline features due to their distinctive profiles, having a visual significance considerably greater than their actual size and height. Additionally, from the east, Hill of Edzell plays a similar visual screening role from Edzell and its vicinities. A large-scale overhead transmission line passes along the valley of the West Water, between the site and the ridgeline of the Caterthuns and Hill of Lundie, where it forms a locally prominent feature in views in all directions.

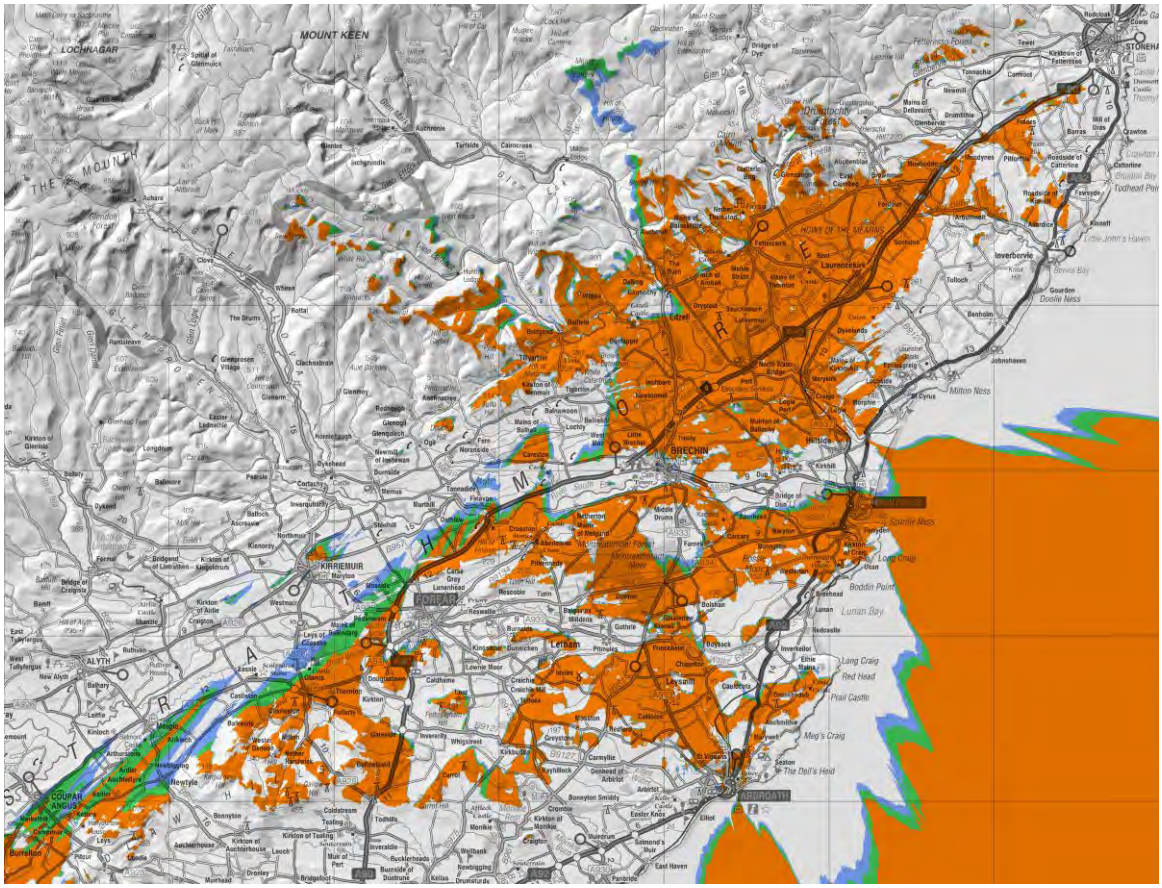
3.12 Views from the north would be predominantly from remote moorland summits and slopes which are relatively unfrequented, and comprise views largely over the site to the lowland agricultural landscape and the coastline of Angus beyond, rather than directly down onto the site.

3.13 Generally, the site does not comprise a prominent feature within the overall landscape but forms a small part of a more extensive, both horizontally and vertically, area of hills which form an important visual backdrop to the settled lowlands of the Howe of the Mearns.

Initial Zone of Theoretical Visibility Mapping

3.14 Initial Zone of Theoretical Visibility (ZTV) maps were prepared for introducing 61m, 81m and 100m blade tip height turbines onto the site in the vicinity of the 300m contour.

Each indicated a very similar pattern and spread of theoretical visibility. The ZTV pattern is primarily dictated by the elevation of the site on a hillside overlooking a lowland landscape. Much of the theoretical visibility pattern extends over the lowland agricultural landscape to the east and south of the site and is contained by rising ground of the coastal hinterland. Notably, the major settlement of Brechin indicates very little theoretical visibility, due to its low lying location in the river valley of the South Esk. The local hills of Hill of Edzell and the Caterthuns with their associated ridgeline provide some intervening screening of the turbines to their east and south/south-west respectively and are important in limiting the extent of visibility in these directions.



Composite ZTV map – orange indicates where 61, 81 and 100m turbines would be theoretically visible

Conclusions

3.15 The landscape capacity study concluded that the site is located in an area of landscape and visual sensitivity within Angus and would not have the landscape capacity to accept a wind cluster development in the location proposed at 300m AOD on the upper part of Cairny Hill, based on the following considerations:

- The elevated location of the proposed turbines at the 300m contour level, at the margins of the upland moorlands, would clearly relate the turbines to the *Highland* area of Angus, where they would be seen as an intrusion onto the undeveloped and open hill slopes which define the northern edge of the Howe of the Mearns
- The elevated location of the proposed turbines would be predominantly seen as a feature on the lower slopes of Hill of Wirren and its adjacent summits. These noticeably higher and distinctive summits form the central 'core' of the hills flanking the Howe of the Mearns and the close vicinity of the proposed turbines to

the skyline profiles of these hills would inherently detract from their current visual prominence in mid–long distance views from the south

- At a local level, the proposed height of the turbines, particularly at 81m and 100m tip height, located on relatively small scale hill summits and ridgeline shoulders, would dominate and overwhelm the scale of these landform features, leading to the potential for significant landscape and visual impacts on the local area.

3.16 Informed by the initial appreciation of the landscape and visual characteristics of the site and its surroundings, an alternative approach to the siting and design of a wind cluster development on the Witton Farm unit was proposed, which comprised the following design objectives:

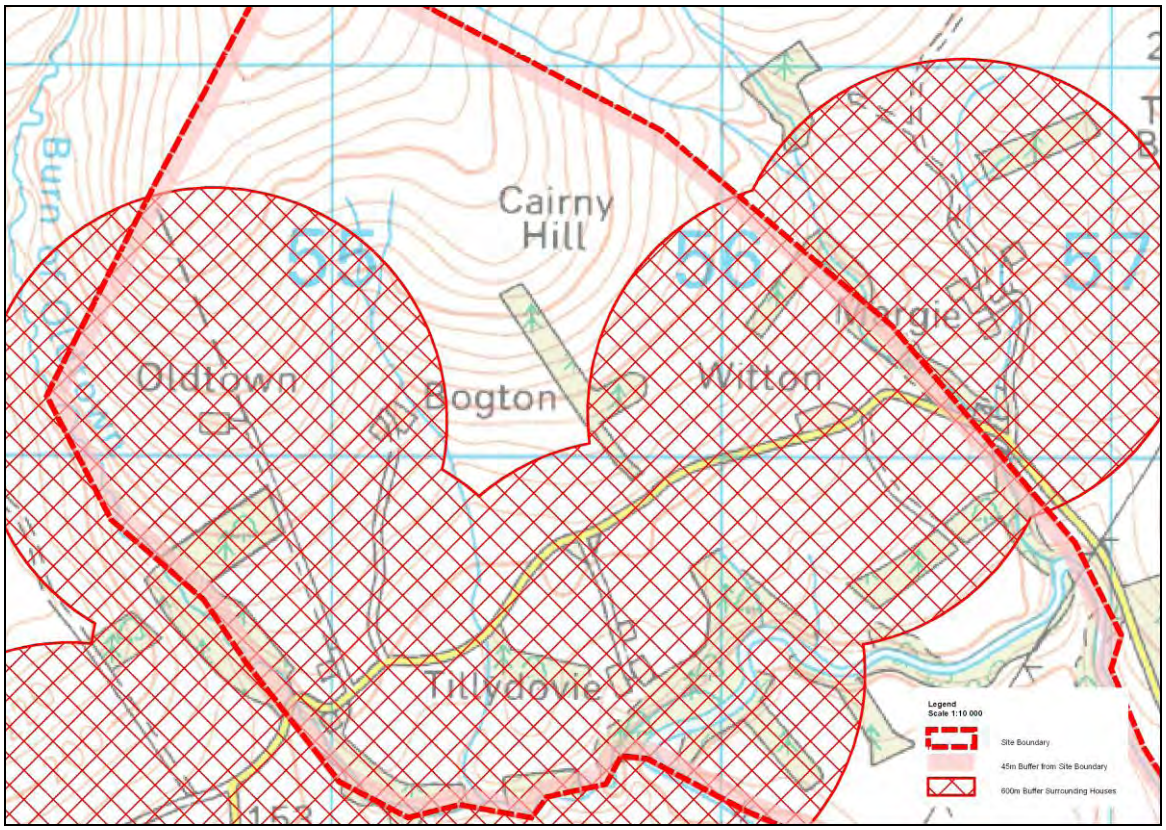
- Site the turbines at a lower elevation, around the 200m contour level, where they would be more directly related to the improved/unimproved agricultural landscape component of the site rather than to the upland moorland. This will create a better connection with the lowland agricultural landscape rather than the development appearing as part of the highland upland landscape
- Site the turbines on the south-west facing slope to the east of the derelict buildings at Bogton, which would remove them from the locally visually sensitive shoulder of Cairny Hill itself, particularly in views from the minor road to Edzell. In this way, the shoulder of Cairny Hill may act as a full or partial screen to views from the minor road and other local locations to the east of the site
- Siting turbines at a lower elevation would generally reduce the overall extent of theoretical visibility, particularly to the north in the more sensitive *Highland* area and also in relation to the boundary of the National Park
- Siting turbines at a lower elevation would allow the intervening ridgeline of the Caterthuns and Hill of Lundie to form a more effective visual screen and assist in limiting the overall spread of theoretical visibility to the south-west
- Turbines on any part of the Lower Cairny site would be fully backclothed by existing topography in most views except potentially those from directly adjacent to and below the site. Painting the turbines a grey colour would reduce the contrast with this backcloth – white painted turbines would contrast considerably with their backcloth and increase the visual perception of the turbines in the more frequently experienced mid – long distance views
- A reduced elevation of the turbines would limit the height gain needed for any access road and assist with reducing its visibility within the wider landscape
- Consider the detailed visual composition from the Caterthuns, as this is likely to be the most important viewpoint in the local area
- Seek to avoid or minimise visibility of turbines from Edzell Castle through a combination of layout and turbine height, although intervening tree cover may fully screen all views of the wind energy development, even from the top of the tower
- Whilst the initial ZTV plans indicate little overall difference in visibility pattern between 61, 81 and 100m high turbines, promote a turbine height which creates an appropriate scale relationship with the adjacent small scale local hills and ridges
- Brown and White Caterthun, two distinctive hill tops which lie approximately 3km to the south-west of the Cairny Hill site, are a Scheduled Ancient Monumment (SAM). The close proximity of this SAM, and its position on locally prominent hills, indicates that any proposed turbines on the site would clearly become visible new features within the view northwards from the forts. It would be important to consider the detailed visual composition of any wind energy development from the Caterthuns, as this is likely to be one of the most important viewpoints in any visual impact assessment.

3.17 Following acceptance of the siting and design approach included in the Landscape Capacity Study, further more detailed design development work was undertaken, to consider alternative layouts for different turbine heights, and to review these from a range of viewpoint locations, orientations and distances, to inform a recommendation on a preferred layout taking account of landscape and visual considerations.

4 Alternative Design Layouts

Constraints Mapping

4.1 In order to test a range of turbine heights and layouts, an initial constraints map was prepared, using 600m buffer zones around existing occupied properties, which identified areas of the site where turbines could be potentially positioned. This exercise indicated that considerable areas of the farm unit could not be considered for a wind cluster development.



Initial Constraints Map

4.2 An area at the south-west corner of the farm unit, south of the Glen Lethnot road, was indicated as being unconstrained; however it is noted that this area forms part of a geological/geomorphological SSSI where the possibility of excavating for turbine foundations and access tracks may prove problematic, and therefore this area was excluded from the design development process. The design development process therefore concentrated on the unconstrained area of the site to the east of the derelict buildings at Bogton which are in the ownership of the Applicant.

Design Principles

4.3 In developing the turbine design layouts, a series of more detailed design principles were utilised to supplement the siting and design strategy and to inform the development of the layouts and their evaluation. These design principles comprised:

1 The wind cluster development should appear as a similar and clearly identifiable form and composition of elements when seen from different orientations
2 There should be a clear arrangement of turbines incorporating a similar size and scale of visible spacings between them, avoiding or limiting occurrences of overlapping blades, to create a visually cohesive image and a balanced arrangement of elements. Overlapping of turbines themselves should be avoided from key viewpoints
3 The wind cluster should be concentrated to appear as a single isolated and contained feature, with a clearly legible and defined edge and extent
4 The arrangement of the turbines should present a simple clarity of visual composition, in relation to the turbines themselves, to the key landscape features of the site and the surrounding area and to the detailed landscape pattern of the site
5 Detailed turbine layout and arrangement should attempt to follow existing contour levels as much as possible, so that the turbines appear at a similar height and level on the site when seen within key views
6 Detailed arrangement of turbines should respond to existing land use patterns and geometries where possible, so that the turbines are either contained within and related to a single land use type, or are positioned in relation to land use boundaries and other landscape features
7 Generally, turbine base elevations/levels should be kept as low as possible within the site, to minimise their overall spread of visibility within the surrounding area, to maximise the potential screening effect of the eastern Caterthun ridgeline to the south and to create a better relationship with the 'lowland' landscape of the adjacent improved farmlands
8 The turbine layout and height should aim to avoid or minimise visibility from the Edzell Castle Garden and Designed Landscape.

Design Layouts

4.4 A series of alternative design layouts were generated for 61m, 81m and 100m high turbines, using the constraints mapping and their relevant separation ellipses, which sought to meet the siting and design strategy in order to establish the most appropriate scale and number of turbines for the site. Potential turbines were located on plan, and their positions incorporated into a 'Google Earth' browser, which allowed these layouts to be reviewed in three dimensions from key selected viewpoints. The key selected viewpoints, representing important local locations and different orientations and distances, included:

- Brown Caterthun
- Minor road near cemetery and Edzell Castle
- A90 Layby

4.5 For each alternative turbine height, various layouts were generated and reviewed against a range of criteria, particularly in relation to issues of visual composition, scale etc from the 3 key viewpoints, in order to select preferred layouts for each of the different turbine heights. This process established preferred layouts for each alternative turbine heights considered, and these were then compared against each other to establish an overall preferred layout in landscape and visual terms. The following layouts for each turbine height were preferred:

- *61m Blade Tip Height – T61v3*
- *81m Blade Tip Height – T81v4*
- *100m Blade Tip Height – T100v2*

Layout T61v3

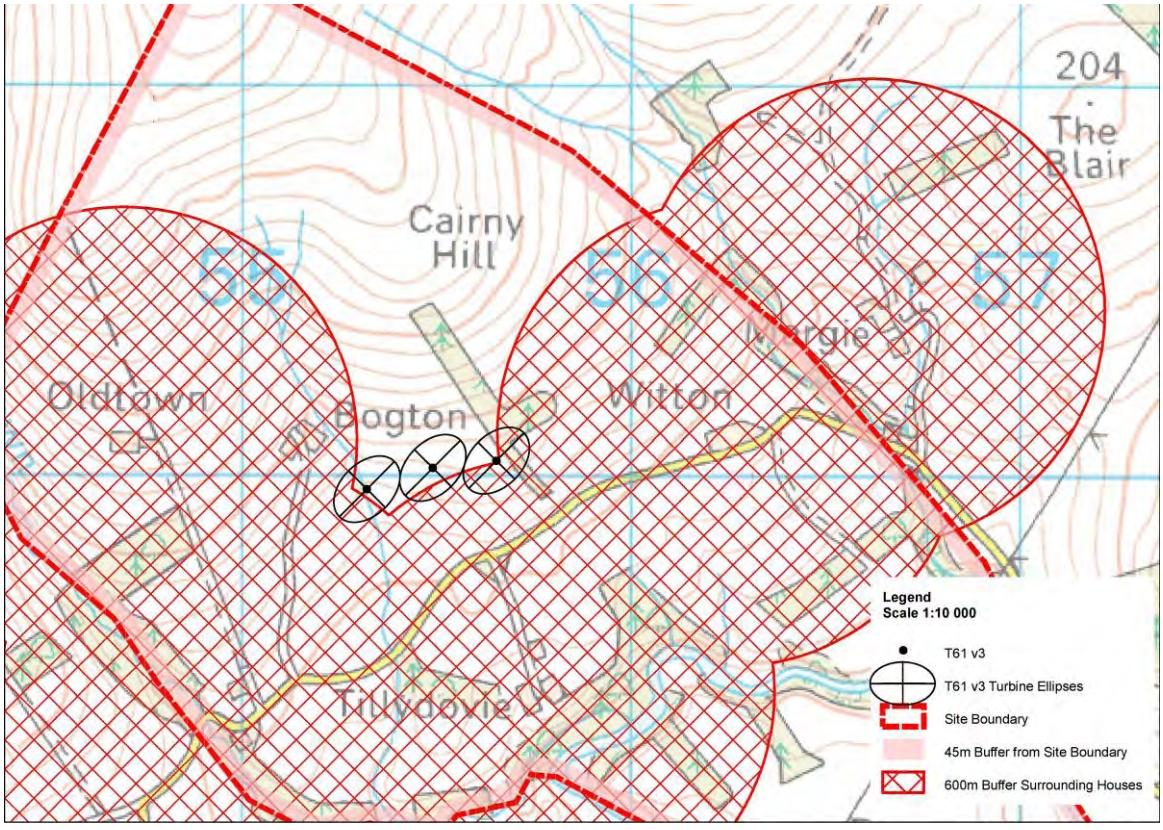
4.6 This layout positions three turbines in the southern section of the unconstrained area. Two turbines are located close to the western field boundary between improved and unimproved pasture, with the eastern turbine being fully located within the eastern field of improved pasture. There is approximately 20m of height difference in level between the western and eastern turbines, with 165m and 185m base levels respectively. There is generally a good equal spacing between the turbine positions.

4.7 From Brown Caterthun, the turbines would present a simple equally spaced grouping, with two turbines having a close relationship with the field boundary between improved and unimproved pasture.

4.8 From the minor road adjacent to the cemetery, the turbine layout has a good relationship with the landscape pattern, and the turbines have a generally equal spacing. Sections of blade tips would appear above the skyline but with towers and hubs backclothed.

4.9 From the A90 layby, the turbines would appear as a tight small scale grouping set fully against the backcloth of the higher hills behind. The turbines would have a clearly defined extent and simple visual composition.

4.10 T61v3 layout has a close relationship with the existing landscape pattern, and is set low down the hill, giving it a good connection with the lowland landscape character of improved pasture as well as reducing the extent of skylining in views from the east. The lower elevation assists in limiting the overall spread of visibility.



Layout - 61m Blade Tip Height – T61v3

Layout T81v4

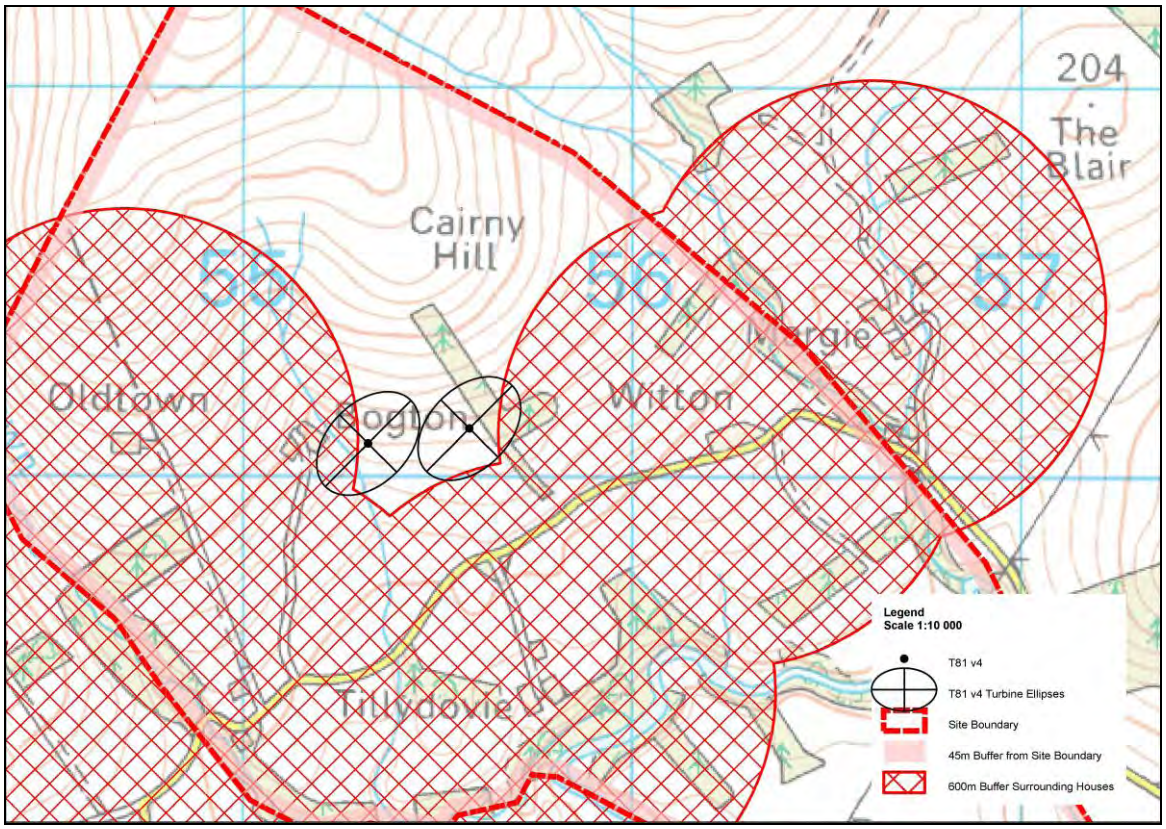
4.11 The layout introduces two turbines set at approximately the190m and 195m contour level, with both turbines located within the unimproved pasture.

4.12 From Brown Caterthun, the turbines have a close relationship to the landscape pattern, and the eastern turbine would be well positioned in relation to the adjacent tree block.

4.13 From the minor road adjacent to the cemetery, the turbines would be well grouped in relation to the landscape pattern. Sections of blades and hub would be skylined due to a slightly increased level.

4.14 From the A90 layby, the turbines would appear as a tight small scale grouping set fully against the backcloth of the higher hills behind. The turbines would have a clearly defined extent and simple visual composition.

4.15 T81v4 layout is considered to be located too high on the hillside to directly relate to the lower 'lowland' character, it extends considerably across the hillside increasing its landscape and visual influence in both closer and longer distance views, and the turbines would be prominent skylined features on the Cairny Hill ridge in close views from the east. In the view from Brown Caterthun, T81v4 indicates a reasonably good relationship with the field and landscape pattern of the site.



Layout - 81m Blade Tip Height – T81v4

Layout T100v2

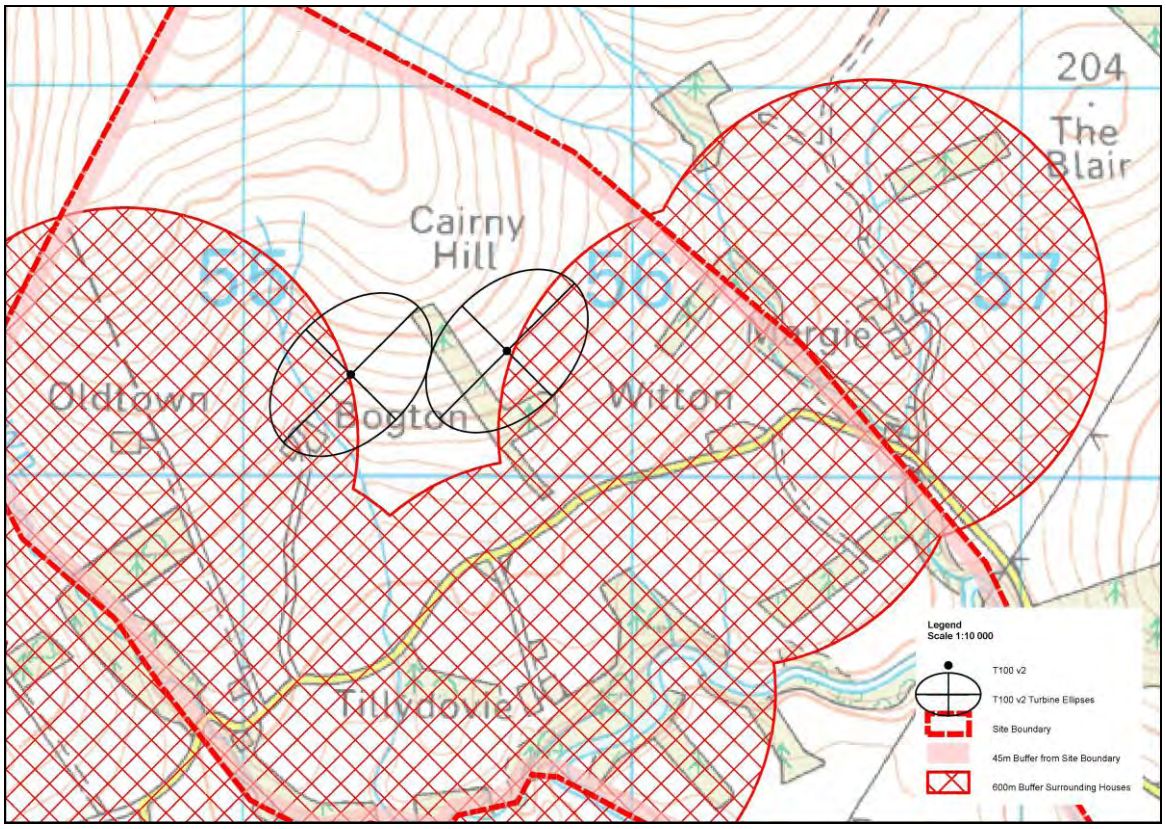
4.16 This layout introduces two turbines, located on the 225 contour. Both are located in unimproved pasture. The eastern turbine is located east of the former tree belt.

4.17 From Brown Caterthun, the turbines would sit well within the extent of unimproved pasture, although the blade tips of the eastern turbine would be seen close to the skyline profile of Cairny Hill. The turbines would be generally aligned level on the hillside.

4.18 From the minor road adjacent to the cemetery, the turbines would straddle the Cairny Hill ridge, with the eastern turbine appearing prominently on the eastern side of the ridge and being predominantly skylined.

4.19 From the A90 layby, the turbines would be set centrally against the highest backdrop of the hills beyond, being fully backclothed. Their spacing would be well related to the general landscape pattern.

4.20 T100v2 layout would have a good relationship to the land use pattern, and having the turbines at a consistent level results in better visual composition from different directions. However, T100v2 would be less satisfactory when seen from the east at close distances.



Layout - 100m Blade Tip Height – T100v2

5 Review and Selection of Preferred Layout

Landscape Recommendation of Preferred Layout

5.1 Each of the alternative layouts is well balanced and achieves a simple composition and clarity of image when seen from a range of viewpoints, and therefore each would meet the design objectives in this respect. It is likely that all layouts would be visible, to some degree, from the top of Edzell Castle tower, unless intervening tree belts screen the view entirely. If this is the case, as is suspected, then the view from the top of the tower, nor the Garden, will not be a determining factor in selecting a preferred layout. In addition, it is understood that there is currently no public access to the top of the Edzell Castle Tower.

5.2 In general, the ZTVs for each layout indicated very similar patterns of theoretical visibility throughout the Study Area, with only very subtle and minor changes between alternative layouts. This indicated that turbine height and numbers proposed didn't significantly alter the overall spread and pattern of theoretical visibility between alternative layouts, and therefore was not considered a major factor in selecting a preferred layout.

5.3 The key issues which the layouts need to respond to relate to relationship to landscape pattern and land use, and in terms of their general elevation within the site, which affects their overall visibility and their locational relationship with the 'lowland' landscape character of the surrounding farmland area. The view from Brown Caterthun is also considered crucial to achieving the optimum visual composition in terms of turbine location and layout.

5.4 T61v3 is considered to comprise the best overall visual composition when seen from Brown Caterthun. The turbines are equally spaced, their spacing generally accords with the scale of associated fields, they relate well to the clearly visible field boundary and their overall scale responds well to the general scale of field patterns and layout within the view. The turbines of the T81v4 and T100v2 layouts appear slightly over-scaled and dominant in relation to the scale of the field patterns, as well as being slightly less well related to the general landscape pattern. Additionally, the spacing of turbines for layout T100v2 appears visually too far apart in terms of visual composition and balance in relation to the turbine height.

5.5 T61v3 adopts the lowest elevation within the site, which gives the turbines a closer relationship to the 'lowland' landscape of the improved pasture, and this, together with the lower turbine height, will assist in limiting the overall extent of visibility of the turbines. T100v2 specifically, with its higher elevation and higher turbine height, results in the turbine blades being seen in a closer relationship to the skyline profile from Brown Caterthun, which links them more to the skyline profile than relating them to the central backdrop of the overall backcloth of hills. The T61v3 layout results in the turbines being set well away from the skyline profile when seen from Brown Caterthun.

5.6 In views from the east at close distances, the turbines of layout T61v3 will appear less skylined, whereas the eastern turbine of layout T100v2 would appear particularly dominant on the eastern flank of Cairny Hill. In the more distant views from the south, layout T61v3 will sit lower in the landscape, and obtain a greater level of potential intervening screening from the eastern Caterthun ridgeline.

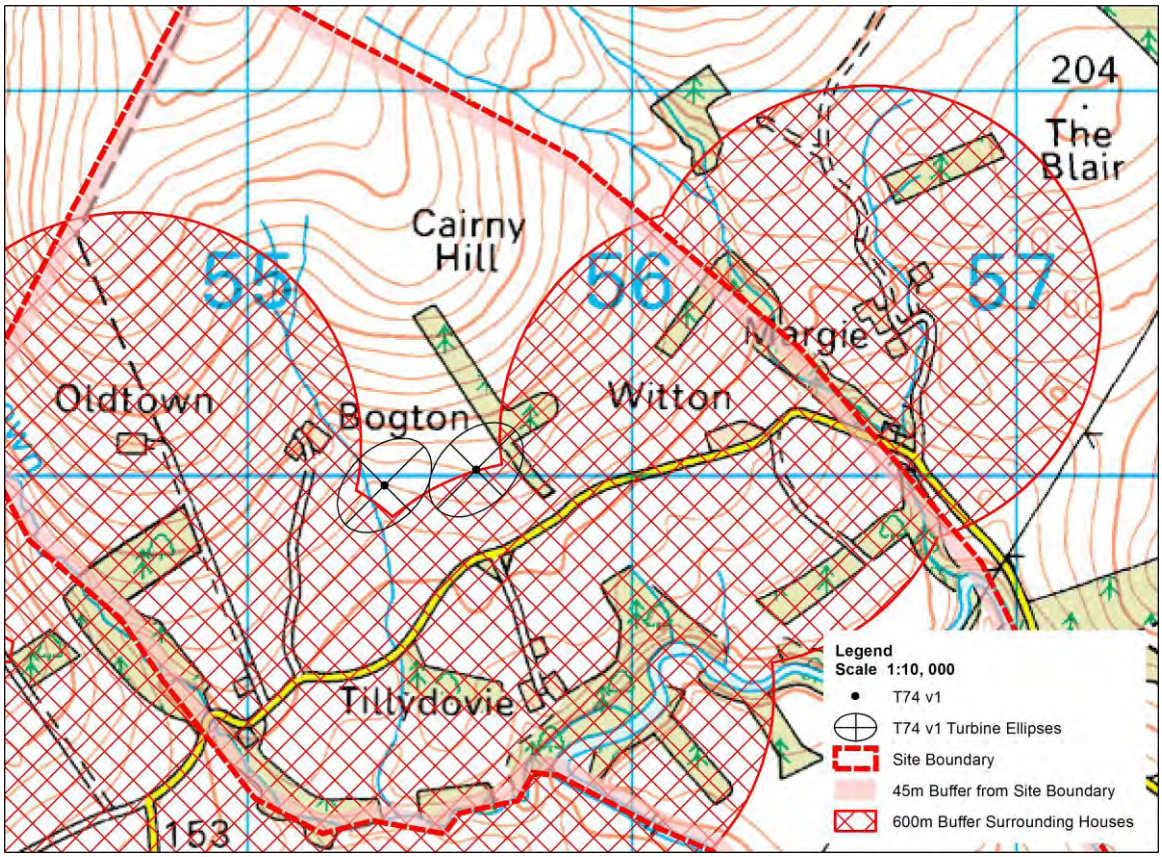
5.7 Taking all the above considerations into account, it is considered that layout T61v3 offers the most appropriate combination of characteristics and is preferred on landscape and visual issues.

Consideration of Generating Issues

5.8 Following the recommendation that layout T61v3 was preferred in landscape terms, further discussions with the Applicant and his advisors indicated that, in terms of generating output and economic considerations, 2 x 74m blade tip turbines would comprise a more effective proposal than a 3 x 61m blade tip turbine option. Consequently, further consideration was given to developing a 2 x 74m layout option, following the same design approach as previously developed. This process indicated that 2 turbines could be positioned in a layout which incorporated the following characteristics:

- The layout could be achieved without incurring into areas of constraints
- The turbines could be located at the junction between improved and unimproved pasture, and so would be well located to the existing landscape pattern of the site

- The turbines could be located close to the 170-180m contours, and so would relate well to the 'lowland' landscape of the improved pasture, and would sit low on the site to assist in reducing their overall extent of visibility within the wider landscape
- The turbines would create a simple balanced composition when seen from the Brown and White Caterthuns
- Whilst the turbines would be higher than the 61m option, they would remain visually separate from the skyline profile when seen from the Brown and White Caterthuns, and the slight increase in height would not result in any noticeable extension of the ZTV pattern within the wider area.



Layout - 74m Blade Tip Height – T74v1

5.9 Given that it was considered that a layout of 2 x 74m turbines could be developed which accorded with the design principles established, and which did not result in increasing the general levels of overall landscape and visual impact compared to a 3 x 61m turbine option, it was concluded that a 2 x 74m turbine option represented the optimum balance of generating output whilst relating well to the landscape and visual context and minimising potential landscape and visual impacts. Therefore, the 2 x 74m option was selected as the proposed layout for the Lower Cairny wind cluster.

6 Site Infrastructure and Associated Issues

6.1 The site would be accessed from the unclassified road to Glen Lethnot by an existing farm access track. This track leads directly to the site of the proposed turbines, and would require only minor upgrading.

6.2 The wind turbine generators would be connected via an underground cable route into a local suitably sized control building, located adjacent to the existing shelterbelt to the

immediate east of their location. Electricity generated from the wind cluster would then be exported into the existing local grid, via an underground or overhead connection. There has been an initial grid connection assessment carried out which has identified a potential connection option on land to the north west of the site. The connection to the grid will be the subject of a separate application.

6.3 None of these infrastructure provisions are considered to be likely to give rise to any significant landscape and visual impacts.

7 Finalised Wind Cluster Layout

7.1 The design development process has been primarily led by landscape and visual considerations, aiming to achieve a series of design principles whilst optimising energy generation and output, to achieve the best balance of considerations.

7.2 Consideration of landscape capacity issues have influenced the strategic approach to the design development of the wind cluster layout and landscape and visual issues have been at the forefront of the design development process, seeking to establish a layout of an appropriate scale to its landscape and visual context, avoid or minimise potential visibility from the surrounding area and establish balanced visual compositions of turbines when seen from the key local viewpoints, specifically Brown Caterthun.

Appendix 4
Landscape and Visual Impact Assessment Methodology

1 Introduction

1.1 The assessment methodology employed is largely based on the 'Guidelines for Landscape and Visual Impact Assessment (Second Edition)', produced by the Landscape Institute and Institute of Environmental Management and Assessment (2002).

1.2 The initial stages of the assessment process considers the baseline landscape and visual character, landscape designations and Government policy relevant to an assessment Study Area.

1.3 The Study Area, on which the LVIA focuses, extends to include all areas from within which significant landscape and visual effects (as defined by EIA Regulations) are most likely to occur. The radius which defines the Study Area will be consistent with the guidance provided in *'Visual Representation of Windfarms Good Practice Guidelines'*.

1.4 The aim of the landscape and visual assessment is to:

- Identify, predict and evaluate potential key effects on particular elements of the landscape and visual resource arising from the proposed wind energy development;
- Outline the likely effects on the landscape and visual resource of the Study Area and the resulting overall significance of these effects arising from the proposed wind energy development.

1.5 The ***Landscape Resource*** is defined here as:
The distinct spatial distribution, at a given moment in time, on the surface of the earth, of the physical components resulting from the interaction between natural and human processes over time, and which produce consistently occurring patterns and homogeneity of landscape character and landscape context and how these are experienced and valued.

1.6 The ***Visual Resource*** is defined here as:
The assembly of components which provide an attractive visual setting or backcloth for activities.

1.7 Assessment of sensitivity of existing baseline conditions and prediction of magnitude of change lead to the assessment of residual landscape and visual effects on particular elements and the overall landscape and visual effects on the Study Area. The significance of these effects can be defined.

1.8 In order to provide a level of consistency to the assessment, the assessment has been based on pre-defined criteria.

2 Sensitivity to Change

2.1 The sensitivity of the landscape resource to changes associated with the proposed development can be defined as ***high, medium*** or ***low*** based on professional judgement of a combination of parameters, as follows:

- Landscape character - scale, enclosure, openness, land cover, texture and form;
- Landscape value - local, regional or national landscape statutory designations and non-statutory designated areas;

- Distribution of receptors; and
- Scope for mitigation.

2.2 Usually, an area would not fit every criterion within just one category; but, rather, it would be categorised based on best fitting more of the criteria within one allocation than another.

Definition of Landscape Sensitivity	
High	Key characteristics and features that are very sensitive to the location of a wind farm, such as simple or indistinct pattern, few existing foci, sense of intimacy and shelter and sense of wildness or wild land, and these contribute significantly to the distinctiveness of the landscape character type. The distinctive characteristics of the landscape are widely experienced and contribute significantly to the value of the landscape at a local, regional and national level. Designated landscapes e.g. National Scenic Area (NSA) and those identified as having possible landscape value, for example within SNH Search Areas for Wild Land (SAWL).
Medium	Key characteristics and features that are sensitive to the location of a wind farm, but with which the wind farm may also integrate, such as a landscape with a distinct pattern, with occasional prominent foci, large scale structures, a sense of enclosure and a landform to which wind turbines could fit. A landscape where the wind farm would not affect the key characteristics that contribute to the distinctiveness and/or value of the landscape. The distinctive characteristics of the landscape are only locally experienced and/or only contribute to the value of the landscape at a regional level. Regionally and locally valued landscapes, both designated such as Areas of Great Landscape Value (AGLV), and non-designated areas. Landscapes in which it is possible to site and design a wind farm to have minimal impacts within the landscape.
Low	A landscape where the wind farm would not affect the key characteristics that contribute to the distinctiveness and/or value of the landscape. Landscape characteristics and features that do not make a significant contribution to landscape character or distinctiveness locally, or which are untypical or uncharacteristic of the landscape type. Areas where a wind farm would fit the key characteristics of the existing landscape and/ or where this can easily accommodate landscape change subject to careful design. The distinctive characteristics of the landscape are only experienced locally. Landscapes in which it is possible to site and design a wind farm to have minimal impacts within the landscape.

2.3 The sensitivity of the visual resource to changes associated with the proposed development is defined as ***high, medium*** or ***low*** based on professional interpretation of a combination of parameters, as follows:

- Location and nature of the view;
- Direction and extent of the view;
- Value/importance of the view
- Scope for mitigation (including ability of the view to absorb development);

and

- Activity of the receptor and expectations, frequency and duration of the view.

2.4 Usually, a view would not fit every criterion within just one category; but, rather, it would be categorised based on best fitting more of the criteria within one allocation than another.

Definition of Visual Sensitivity	
High	Focused view or panoramic view in which a wind farm would form the dominant focus, distracting from existing elements or features. Existing view includes important landscape features with physical, cultural or historic attributes. Principal view from prominent buildings and residences, 'beauty spots' or popular viewpoints. Area designated for scenic value, or en route or in a location valued for its visual amenity. Wind farm difficult to integrate within visual composition, for example very complex pattern of elements, or these are of very different prominence or scale to wind turbines. Users of outdoor recreational facilities including those on footpaths, cycle routes or rights of way and popular hill or mountain tops, and key vehicular access routes from which viewers' attention is directed to the landscape.
Medium	Open, but unfocussed view in which a wind farm would be seen as one of several foci. Existing view includes some important landscape features with physical, cultural or historic attributes. Forms secondary or marginal part of view from prominent buildings and residences, 'beauty spots' or popular viewpoints. View within area of some scenic value, although not designated. Or visible along route or in location that is valued as having scenic value. Wind farm able to be accommodated within visual composition, for example in relation to linear features or pattern of point features, although this would result in some change to the pattern and/or nature of this composition. Wind turbines would be of similar prominence to existing visual features. Users of outdoor recreational facilities including local footpaths, cycle routes or rights of way, en route to locally popular hill or mountain tops whose attention may be focused on the landscape. Local access routes.
Low	Unfocussed and/or partially screened view in which a wind farm would be seen as a minor element of the view. Existing view does not include important landscape features with physical, cultural or historic attributes. Site not clearly visible from prominent buildings or residences, 'beauty spots' or popular viewpoints. View not within area of recognised scenic value and not designated. Not visible from routes, or in location, which are valued for their visual amenity. Wind farm able to be accommodated within visual composition, for example in relation to linear features or pattern of point features without significant change to the pattern and/or nature of this composition. Wind turbines would be of similar or lesser prominence to existing visual features.

	Local users whose attention is likely to be focused on work or activity rather than the wider landscape, for example using local access routes to travel to/from work or working within an industrial or commercial centre.

3 Magnitude of Change

3.1 The magnitude of change to the landscape resource arising from the proposed development at any particular point is described as ***high, medium, low, negligible*** or ***none*** based on the interpretation of a combination of largely quantifiable parameters as follows:

- The scale of the change;
- Whether the change would affect key landscape characteristics on which the distinctive qualities of the landscape character type rely and/or for which it is valued, and thus result in a loss of landscape resource;
- The nature of the change in relation to landscape characteristics and whether this is beneficial or adverse; and
- The duration of the change and whether this is temporary or permanent.

3.2 The magnitude of change to the visual resource arising from the proposed development at any particular viewpoint is described as ***high, medium, low, negligible*** or ***none***. The considerations which have been taken into account during the assessment of the effect on visual amenity at individual viewpoints can be grouped as follows:

- Information regarding the viewpoint location and the people using it;
- The existing visual amenity at the viewpoint; and
- The change to visual amenity caused by the introduction of the proposed development.

3.3 Within each of these groups, specific considerations have been examined for each viewpoint and these are described below. It should be noted that not all considerations are always relevant for every viewpoint.

Description of the Viewpoint and its Users

- Location;
- Direction of view to the proposed development scheme;
- The likely numbers and types of people visiting the viewpoint, the purpose of their visit to that viewpoint, and the nature of their activities;
- The likely duration of the view obtained by users;
- Scenic (landscape) designation.

Description of the Existing Visual Amenity at the Viewpoint

- The extent of view obtainable in terms of panorama and distance;
- The visual character of the view;
- The occurrence of existing visual foci in the view;
- The occurrence of any existing visual forces in the view ("visual force" occurs when a static image gives an illusion of energy or movement – visual forces in landform draw the eye down and up slopes);
- The nature of the skyline profile;
- The range of different landscape components comprising the view;
- The visual inter-relationship between the range of landscape components in terms of simplicity or complexity;
- Particularly prominent patterns discernible in the view;
- Colours present in the view;
- Motion present in the view;

- The impression of scale of the landscape resulting from the combination of landform, vegetation and other factors;
- A sense of remoteness;
- The presence or absence of man-made features in the view;
- The scenic attractiveness of the view;
- The potential for change in the future.

Description of the Change to Visual Amenity at the Viewpoint caused by the Proposed Development

- The number of elements comprising the development which will be visible;
- The extent of each element of the development which will be visible;
- The inter-relationship of the development's elements;
- The extent of ground/sky forming a backcloth;
- The extent of visual obstruction created by the development;
- The relationship of the development to skyline/horizon profile;
- Change in visual character;
- Creation of a new visual focus;
- Alteration to existing patterns in the view;
- Influence of the scale of the development on the impression of scale of the view;
- Alteration to sense of remoteness;
- Alteration as a result of the introduction of man-made elements;
- Change to scenic attractiveness of view;
- Potential for screening.

Definition of Magnitude of Change	
High	Fundamental change to the characteristics of the landscape or visual resource.
Medium	Considerable change to the characteristics of the landscape or visual resource.
Low	Noticeable change to the characteristics of the landscape or visual resource.
Negligible	Discernable change, but usually only in atypical circumstances, for example exceptional weather conditions, or not influencing the key characteristics of the landscape or visual resource. These impacts are thus classified as the 'no change' situation.
None	No change to the landscape or visual resource.

4 Adverse and Beneficial

4.1 When assessing effects on the landscape and visual resource, the following categorisation has been used:

- ***'Adverse'*** – the key characteristics of the landscape and visual resource are compromised;
- ***'No effect'*** – the key characteristics of the landscape and visual resource are not affected; and
- ***'Beneficial'*** – key characteristics of the landscape and visual resource are reinforced.

5 Significance

5.1 Significance of effects are based on two principal criteria - the magnitude of the change and the sensitivity of the location or person affected by the change (receptors). To comply with GLVIA, the definition of significance requires to be stated in relation to the specific circumstances of an individual

development and landscape.

5.2 To determine the significance of effect of the development on the landscape resource, the following factors are considered:

- The sensitivity of the landscape to the type of change proposed;
- The nature of the effect (i.e. whether the key characteristics of the existing landscape resource of the Study Area, and their consistency throughout that area, are reinforced or weakened as a result of the changes in landscape character brought about by the introduction of the proposed development);
- The quality of the landscape characteristics affected and the potential for enhancement;
- The value of landscape elements, feature or characteristics and the recognition of this by designation at various levels, such as local, regional, national and international and the affect of the change on the integrity of the designated area;
- The magnitude of the effect and whether the change would be positive, adverse, temporary or permanent; and
- The type and rate of other changes that are likely to occur in the landscape resource of the Study Area in the future.

5.2 To determine the significance of the effect of the development on the visual resource, the following factors are considered:

- The nature of the effect (i.e. whether the scenic qualities of the view are strengthened or weakened as a result of the changes to visual amenity brought about by the introduction of the proposed development;
- The magnitude of the change;
- The sensitivity of the visual resource and receptors;
- The number of people affected by the change (although, changes affecting large number of people are generally more significant, this is not necessarily the case in sensitive landscape, for example areas of wild land);
- The type and rate of other changes that are likely to occur in the visual amenity of the Study Area in the future.

5.3 Although assessment of effect significance, as described above, is based on professional judgment of a complex range of factors in relation to the sensitivity of receptors and magnitude of change, the following tables summarise and describe categories of significance to aid interpretation of this assessment. For individual effects, significance is measured in a scale of ***no effect, slight, moderate*** and ***substantial***. For the overall landscape effect and visual effect of the proposed development within the Study Area, a determination is made regarding whether the likely effect would be significant or not significant.

Summary of Categories of Landscape Effect Significance	
Substantial Effect	The proposed development becomes a key characteristic of the landscape and/or changes the intrinsic landscape character of the area. A fundamental change to the landscape resource or a considerable change to a very sensitive or valued landscape.
Moderate Effect	Change affects the character of the landscape, but of a nature, scale or extent that does not change the intrinsic landscape character of the area. A considerable change to the landscape resource or a noticeable change to a very sensitive or valued

	landscape.
Slight Effect	Change introduces new element(s) into the landscape, but this does not affect the intrinsic landscape character of the area. A noticeable change to the landscape resource or barely perceptible change to a very sensitive/valued landscape.
No Effect	Negligible or no change.

Summary of Categories of Visual Effect Significance	
Substantial Effect	The proposed development dominates or has a defining influence on views. A fundamental change to the visual resource or a considerable change to very sensitive or valued views.
Moderate Effect	The proposed development is prominent and forms a focal feature, but the visual resource remains defined by the baseline conditions. A considerable change to the visual resource or a noticeable change to very sensitive or valued views.
Slight Effect	The proposed development is clearly visible, but as a minor feature and the visual resource remains defined by the baseline conditions. A noticeable change to the visual resource or barely perceptible change to very sensitive/valued views.
No Effect	Negligible or no change.

5.4 Wherever possible, identified effects are quantified, but the nature of landscape and visual assessment often requires interpretation by professional judgment.

5.5 EIA Regulations require judgment on the acceptability of a scheme to occur in the full knowledge of the likely significant effects on the environment. However, GLVIA explains that "in the context of EIA, however, 'significance' varies with the type of project and the topic under assessment" and "it may be helpful to define levels or categories of significance (including 'not significant') appropriate to the nature, size and location of the proposed development". To satisfy these requirements, it is stated that, where landscape or visual effects of either ***moderate*** or ***substantial impact*** are identified by this LVIA, as described within the tables above, these should be considered as a significant effect as per the EIA Regulations. Accordingly, slight or no effects are considered as not significant.

6 Nature of the Impact

6.1 Determination of the nature of the impact is essentially a matter of judging whether the key landscape or visual characteristics are strengthened, weakened or not affected as a result of any changes brought about by the proposed development. Therefore, the impact of a proposed development can be **adverse** or **beneficial**, or there can be **no impact**.

6.2 The following system of categorisation is used for the nature of the impact:

Adverse The key characteristics are weakened by the introduction of the proposed development.

No Effect The key characteristics are not affected by the introduction of the proposed development.

Beneficial The key characteristics are strengthened by the introduction of the proposed development.

7 Sequential Impacts

7.1 Sequential impacts occur when an observer moves through a landscape along a linear route, in relation to a series or continuum of viewpoints/experiences. These views may include other developments in addition to the proposed wind farm.

8 Cumulative Landscape and Visual Impacts

8.1 Cumulative impacts result from a relationship between more than one wind energy development and are the summation which results from the effects accruing from a proposed wind energy development in conjunction with effects from other previous, present or reasonably foreseeable similar developments within or in close proximity to the Study Area. Cumulative impacts are affected by:

- The number and distance between the developments;
- Their inter-visibility and sequential visibility;
- The overall character of the landscape and visual resource and the sensitivity of this to numerous wind energy developments; and
- The siting and design of the different developments.

8.2 To comply with PAN 45 and other guidance, the assessment of the cumulative landscape and visual impacts of other wind energy developments in addition to the development proposal considers those "…in the vicinity that have been built, those which have permissions and those that are currently the subject of undetermined applications". Where operational wind farms and those under construction fall within the Study Area, these are considered as part of the baseline conditions against which the development proposal in isolation is assessed, as well as being considered as part of the cumulative assessment.

APPENDIX 5 ECOLOGY FIGURES

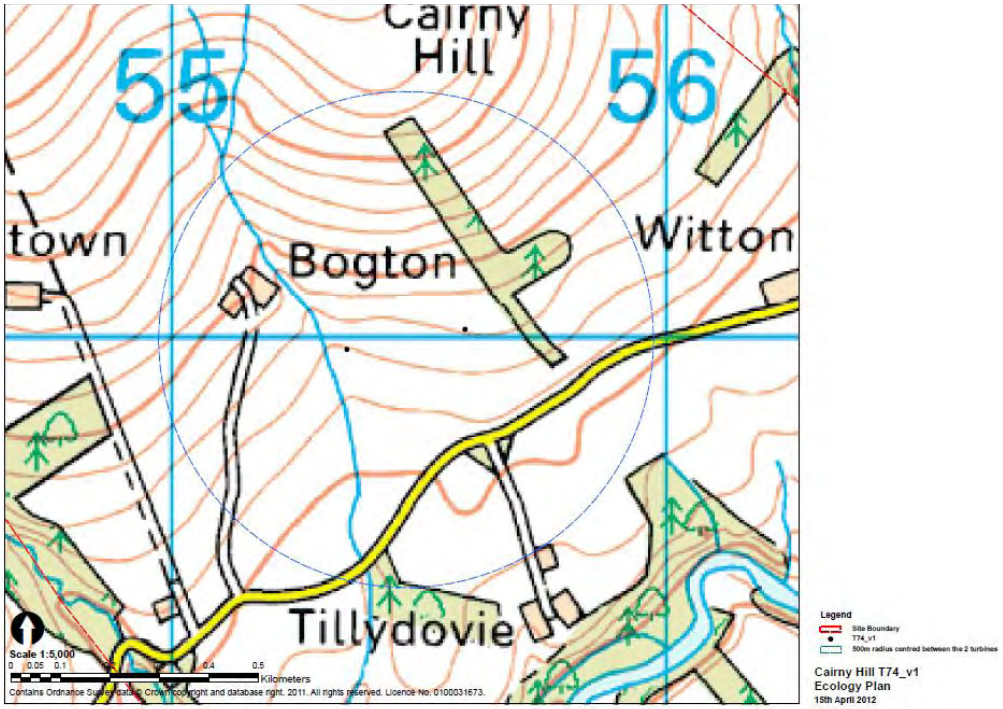


Figure 5.1 *Site Location and Survey Boundary*

Figure 5.2 *Bogton Steading from South East (Note trees along line of burn)*

Figure 5.3 Eastern Conifer Wood from North

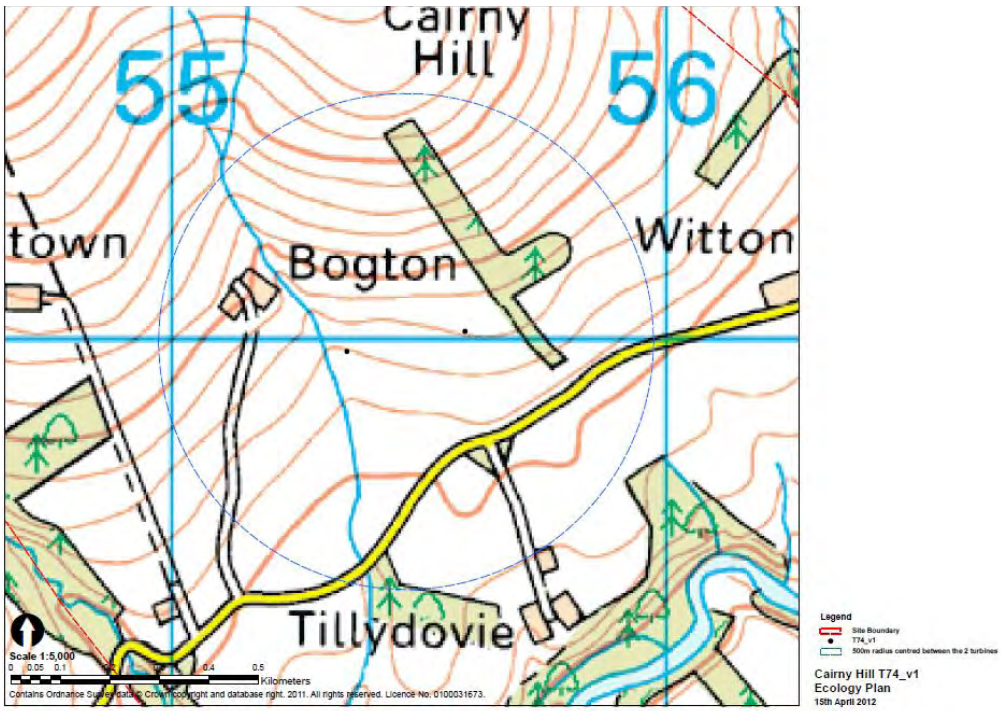


Figure 5.4 Approximate Location of Wader Territories

Blue=Lapwing; Red=Snipe; Green=Curlew; Black=Oystercatcher. White=buzzard nest

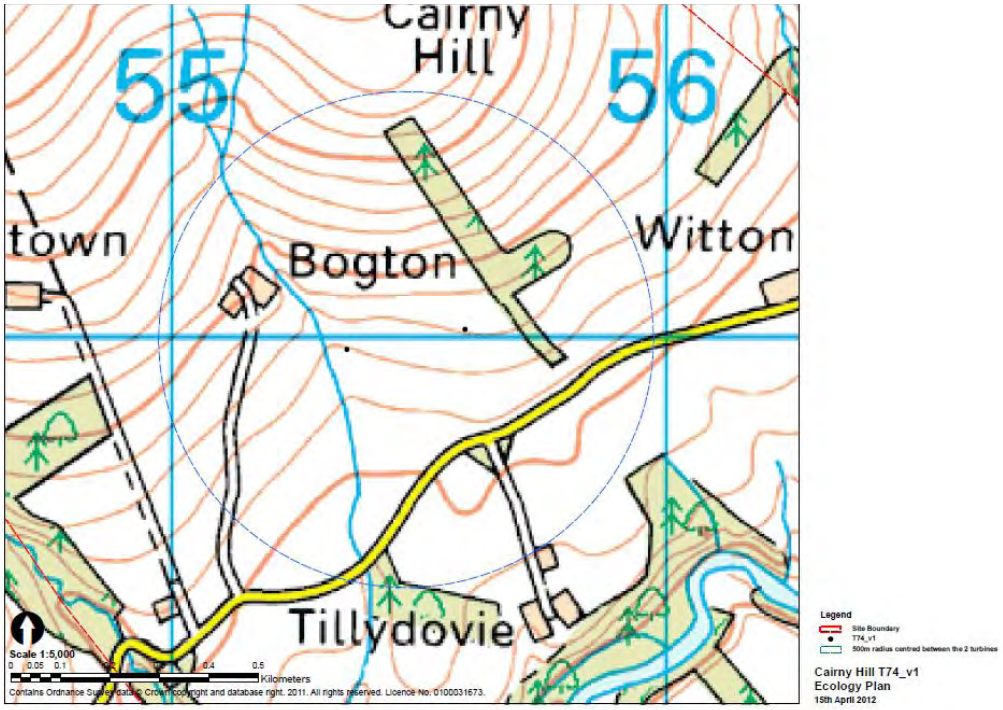


Figure 5.5 BoCC Red List Passerine Distribution Red=spotted flycatcher; Pink= skylark; Orange= lesser redpoll; Blue= song thrush; Yellow=yellowhammer

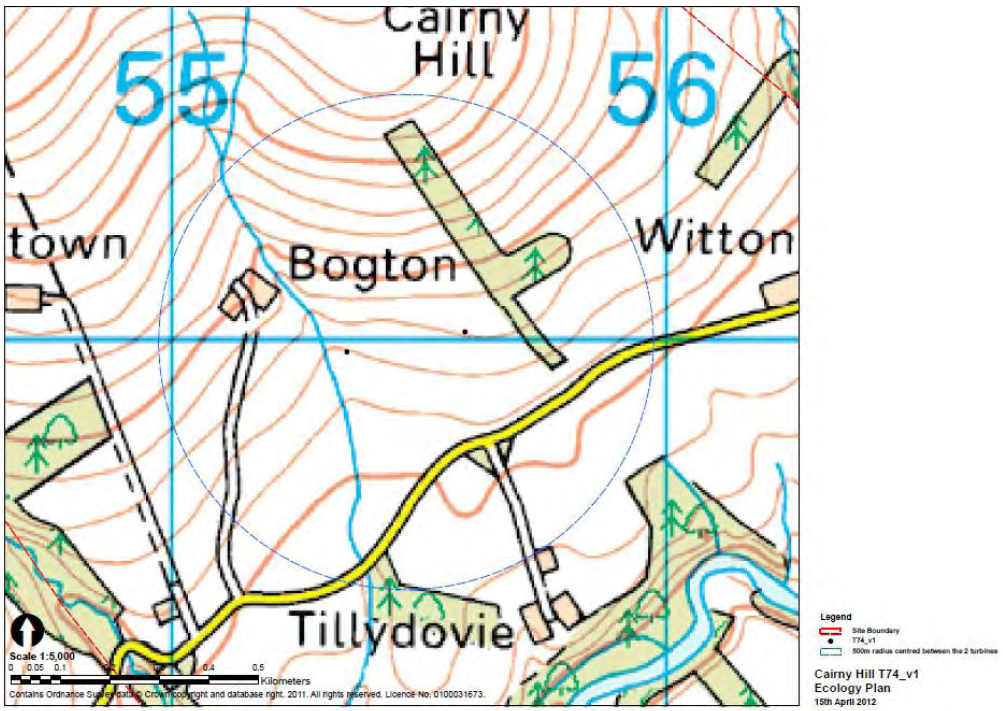


Figure 5.6 BoCC Amber Listed Species

Red= Swallow (min. 2 nests); Brown=meadow pipit; Orange=mallard; Pink= dunnock; Yellow=whitethroat; Green=willow warbler; Blue=reed bunting; Grey=mistle thrush

Figure 5.7 Summary of Emergence Survey Activity 12th July 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Brown long-eared bat	
Myotis sp.	
Flightlines	
Observers	
Anabat Detector (Remote Sensor)	

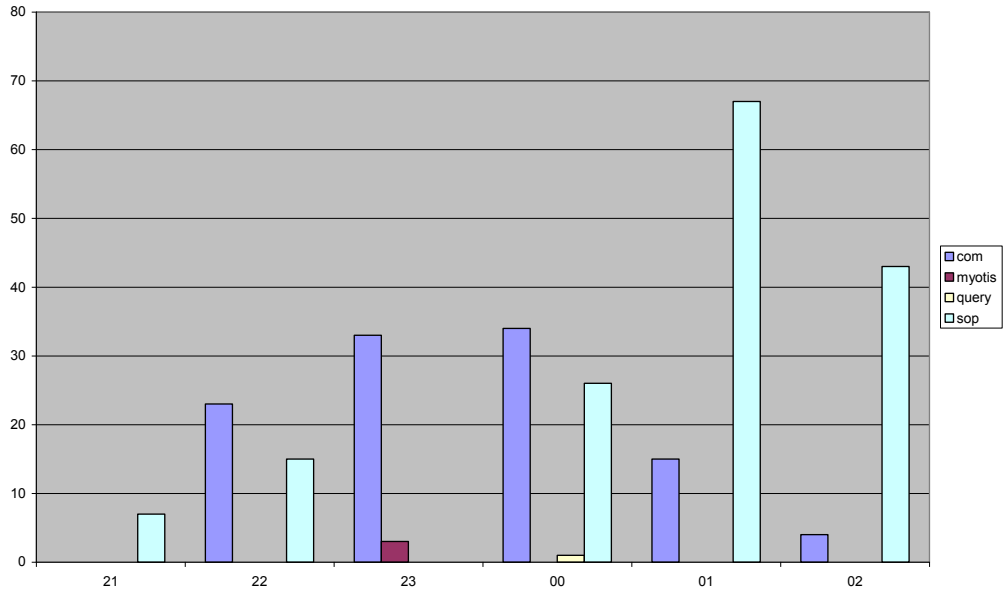


Figure 5.8 Anabat Files per Hour and Species at Bogton 12th July 2012

Figure 5.9 View of Abandonded House from South (Bats present in both buildings)

Figure 5.10 Emergence & Commuting Survey Summary 16th September 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Flightlines	
Observers	

Figure 5.11 Summary of Walked Transect 12th July 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Myotis sp.	
Flightlines	
Anabat Detector (Remote Sensor)	

Figure 5.12 Summary of Walked Transect 16th September 2012

Key to Figure

Common pipistrelle	
Soprano pipistrelle	
Unidentified pipistrelle	
Flightlines	
Anabat Detector (Remote Sensor)	

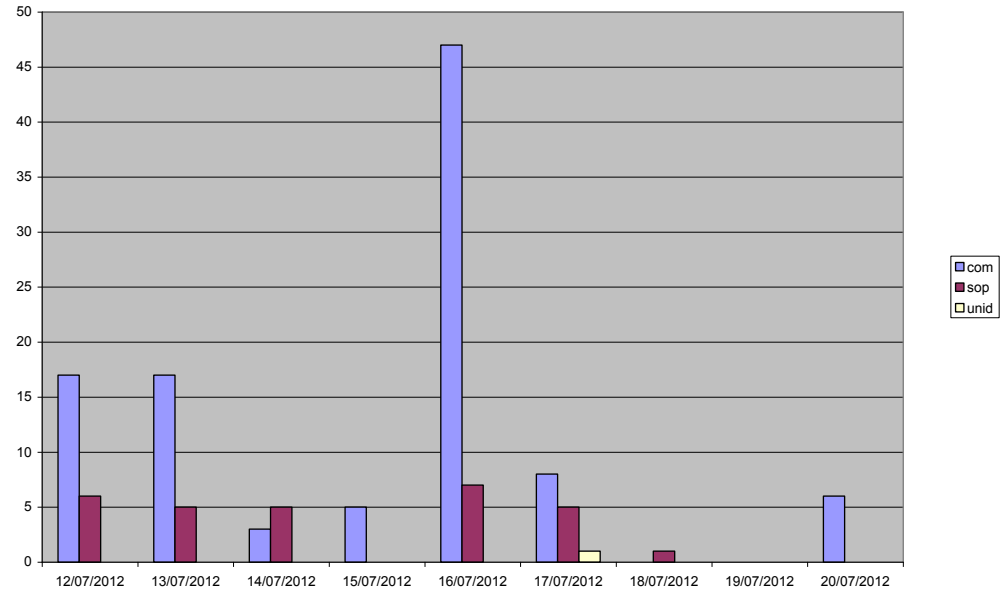


Figure 5.13 Anabat Files per Night and Species at E7 (Ditch Crossroads) July 2012

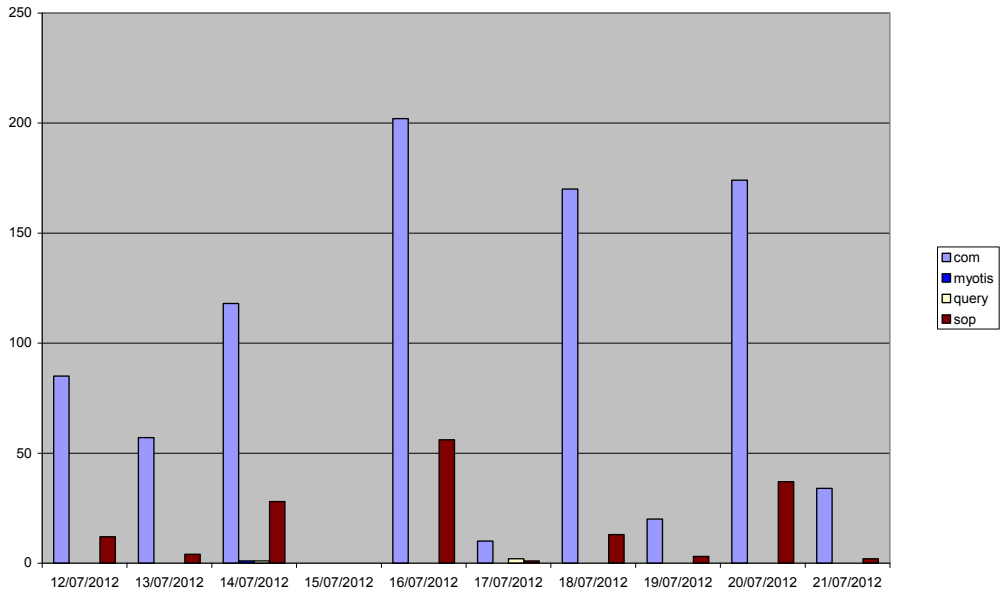


Figure 5.14 Anabat Files per Night and Species at E9 (Woodland Edge) July 2012

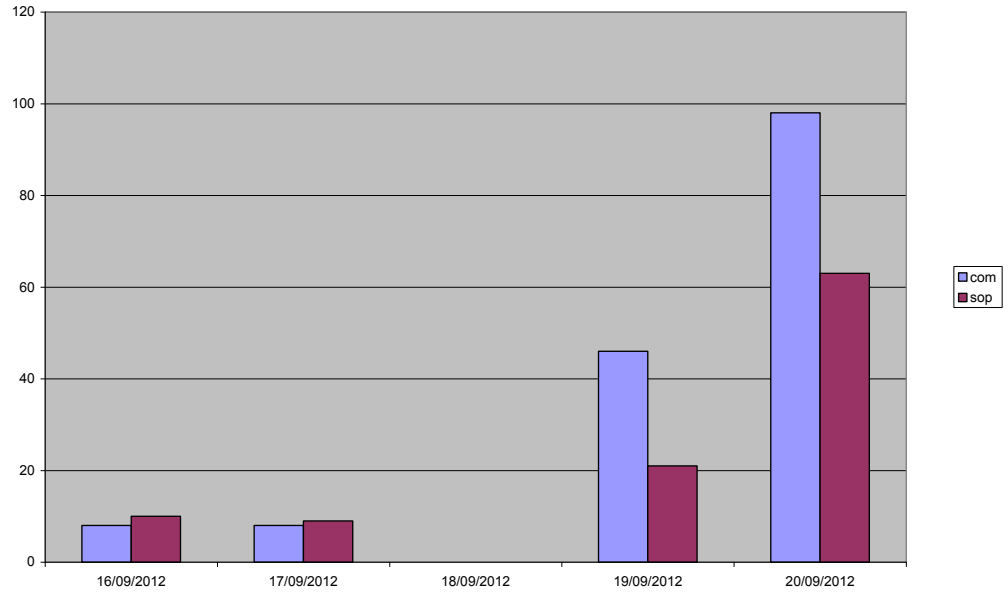


Figure 5.15 Anabat Files per Night and Species at E8 (Woodland Edge) Sept. 2012

APPENDIX 6 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

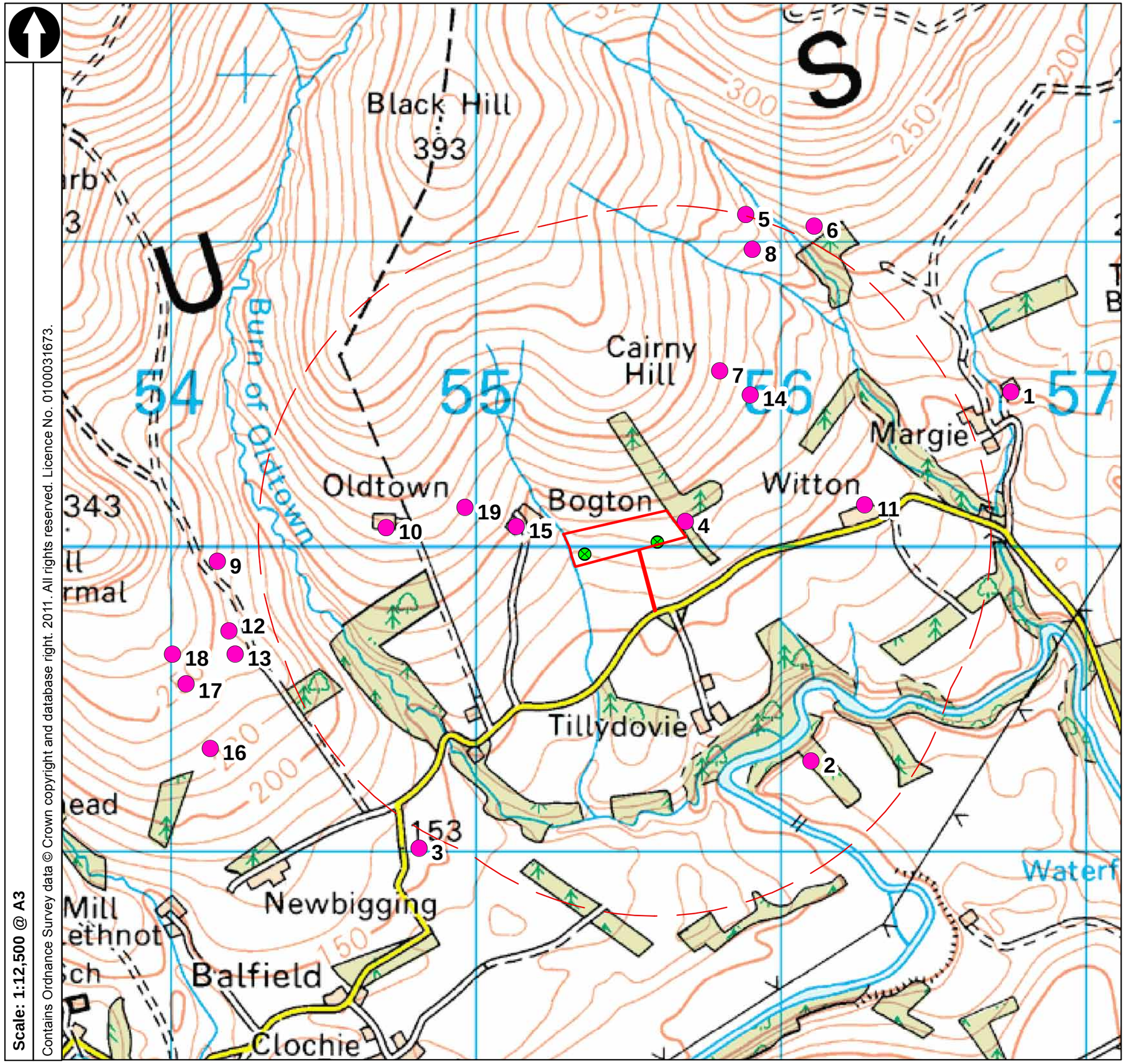
As a first step, a Site Environment Plan will be created to guide the contracting staff into the best practice measures to be observed and implemented on the site during the period of the construction works.

Table 1 Explanation of mitigation measures to be employed to reduce risk of surface and groundwater pollution

ASPECT	**MITIGATION MEASURE(S)**
Construction Phase	
1. Soil removal releasing high solids to runoff and Turbine Foundation Excavation	1. Ensure soil removal control measures are included within the Site Environment Plan. The Plan will include solutions that manage the entrapment of runoff water and solids removal by attenuation and filtration to control suspended solids levels. 2. Minimise where possible exposure of soil to rainfall by careful programme management. 3. Apply surface aggregate on roads and laydown areas to enable rainwater infiltration. 4. Protect edges of excavation from rainfall erosion by use of membranes or careful shuttering thus preventing release of solids. 5. Protect access to surface watercourse using simple effective barrier systems such as straw bales and sandbags. 6. Monitor site conditions carefully and make visual inspections on a regular basis.
2. Refuelling (diesel or oil) and other chemical spillage(s)	1. Ensure that all diesel, oil and chemical stores are bunded, locked and protected from the elements. 2. Spill kits will be provided to contain, and absorb any spillage. 3. Supervise refuelling operations.
3. Sewage disposal	1. Provide suitable portable toilets for staff and clean and service them on a routine basis.

Operational Phase	
• Increased runoff from additional temporary hardstand (roads, laydown areas etc)	1. Design roads to be compliant with SUDS best practice as defined under the relevant guidance.
Decommissioning Phase	
• Soil removal and replacement	1. Minimise where possible exposure of soil to rainfall by careful programme management.

APPENDIX 7 ARCHAEOLOGY AND CULTURAL HERITAGE



Scale: 1:12,500 @ A3

Figure No.7.1 *Revision No. -*

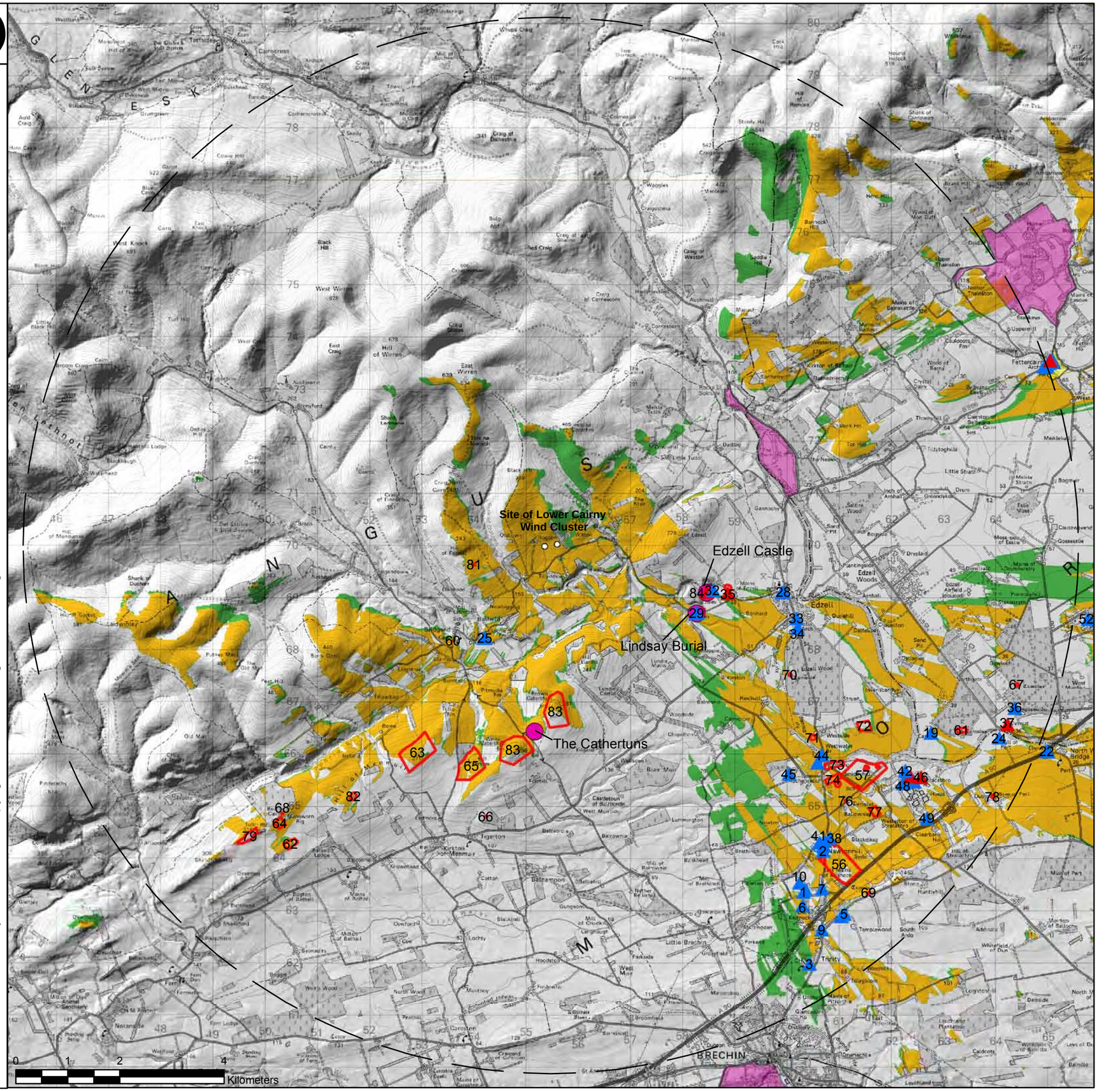
Sites and Monuments Record

All known cultural heritage sites located within the development site study area up to c. 1000m from the development site boundary.

Legend

- Turbine locations
- Site boundary and access
- 1000m Site boundary buffer
- Sites and Monuments Record (SMR)

Site Number	PRN	Site Name	Site Form
1	NO57SE0098	MARGIE	Standing Structure
2	NO56NE0042	KILGARIE	Findspot
3	NO56NW0157	DRUMFUARHOUSE	Documentary Record Only
4	NO57SE0096	BOGTON	Documentary Record Only
5	NO57SE0082	REDFAULDS	Standing Structure
6	NO57SE0058	MARGIE	Standing Structure
7	NO57SE66	WITTON	Standing Structure
8	NO57SE0063	REDFAULDS, MARGIE	Standing Structure
9	NO56NW0057	NEWBIGGING	Standing Structure
10	NO57SW0003	OLDTOWN	Standing Structure
11	NO57SE0079	WITTON	Standing Structure
12	NO56NW0056	NEWBIGGING	Standing Structure
13	NO56NW0046	NEWBIGGING	Standing Structure
14	NO57SE0067	WITTON	Standing Structure
15	NO57SE0078	BOGTON	Standing Structure
16	NO56NW0003	NEWBIGGING	Documentary Record Only
17	NO56NW0037	NEWBIGGING	Standing Structure
18	NO56NW0004	NEWBIGGING	Standing Structure
19	N/A	BOGTON (New site)	Standing Structure



Scale: 1:75, 000 @ A3

Figure No. 7.2 *Revision No. -*

Cultural Heritage Sites Within 10km

Designated cultural heritage receptors within 10km of the proposed Lower Cairny turbine cluster, overlain upon the ZTV.

Legend

10km buffer

Property In Care (of Historic Scotland) (PIC)

Listed Buildings

Category A

Category B

ID	LB Ref Num (HBNUM)	ID	LB Ref Num (HBNUM)
1	5005	27	11250
2	5006	28	11254
3	5029	29	11255
4	5047	30	11256
5	5048	31	11257
6	5050	32	11258
7	5052	33	11261
8	5053	34	11262
9	5054	35	12385
10	5055	36	16287
11	6755	37	16289
12	9475	38	17778
13	9476	39	17779
14	9478	40	17781
15	9483	41	17782
16	9485	42	17794
17	9488	43	17796
18	9490	44	17797
19	9502	45	17798
20	9509	46	17803
21	9509	47	17804
22	11174	48	17805
23	11175	49	17807
24	11176	50	17808
25	11238	51	17809
26	11248	52	18981
		53	19825

Conservation Areas

Gardens and Designed Landscapes

Scheduled Monuments

ID	Scheduled Monument (AMLINK)	ID	Scheduled Monument (AMLINK)
54	137	70	6366
55	991	71	6367
56	2303	72	6368
57	2829	73	6373
58	2989	74	6374
59	4316	75	6375
60	4416	76	6376
61	4444	77	6377
62	4459	78	6392
63	4464	79	6407
64	4465	80	6573
65	4571	81	6874
66	4755	82	8506
67	4823	83	90069
68	6360	84	90136
69	6364		

Zone of Theoretical Visibility

1 Turbine Visible

2 Turbines Visible

h+m

Lower Cairny Wind Cluster

Table x Lower Cairney: development site study area cultural heritage baseline and sensitivity

Site Number	Site name	Angus HER reference number	NMRS Numlink reference	Status	Period	Type	Description	Notes	Sensitivity
1	MARGIE	NO57SE0098			Post-Medieval (from 1560)	Standing Structure	Cottage depicted on the OS 2nd edition map with an attached enclosure. To the south is a group of conjoined enclosures, possibly sheepfolds and which may include at least one building, unroofed. None of these features appear on the OS 1st edition map. Current maps indicate that the cottage remains in use	No views of turbines, screened by trees	LOW
2	KILGARIE	NO56NE0042	83421		Unknown	Findspot	Findspot of a fishing or loom weight; discovered in a field above a gorge on West Water, Kilgarie Farm, near the Brown Caterthun (NO56NE0001). It is a circular piece of schist with a hole in the centre, 16cm diameter and the hole: 2cm diameter x 2cm depth. It was donated to Brechin Museum.	Findspot	NONE
3	DRUMFUAR HOUSE	NO56NW0157			Post-Medieval (from 1560)	Documentary Record Only	Site of a farmstead. On the (c.1846) 1st edition OS map it is shown as a small farmstead, consisting of two ranges almost forming an L-shape, with another range to the SE parallel to one of them. An attached enclosure lies to their west and another building also to the west. By 1888 only one small building is depicted with the name -Drumfouries Cottage-. The 2006 map shows that all features have been removed.	No remains visible	NONE
4	BOGTON	NO57SE0096			Post-Medieval (from 1560)	Documentary Record Only	Site of a rectangular building with attached enclosure depicted on the OS 1st edition map. Neither appear on the 1888 2nd edition OS map.	Site located within plantation shelter belt - no remains visible	NONE
5	REDFAULDS	NO57SE0082			Post-Medieval (from 1560)	Standing Structure	Boundary stone; it stands on the side of a gully c100m to the north of Redfaulds. It is depicted on the 2nd edition OS map of (c.1888) but not on the earlier (c.1846) 1st edition.	No views of turbines, screened by trees and altitude	LOW
6	MARGIE	NO57SE0058	35210		Post-Medieval (from 1560)	Standing Structure	Remains of a building; recorded by the RCAHMS during field survey published in 1984. On the N side of a small plantation, 800m NW of Margie, there are the remains of a rectangular building measuring 8.4m x 4.7m with rubble walls 0.6m thick; there is also an area of rig-and-furrow cultivation to the S and W of the building.	No views of turbines, screened by trees and altitude	LOW
7	WITTON	NO57SE66	35219		Post-Medieval (from 1560)	Standing Structure	Remains of a farmstead; recorded by the RCAHMS during field survey published in 1984. Situated 700m NW of Witton there are the remains of a farmstead comprising a two-compartment rectangular building (7m x 2.5m internally) which lies at the N end of an enclosure (27m x 10.5m internally). On the 1st edition OS map (c.1846) it is shown as roofed and annotated as a sheepfold, by the 2nd edition OS map the building is shown as disused and the enclosure is not shown.	No views of turbines, screened by trees	LOW
8	REDFAULDS, MARGIE	NO57SE0063	35216		Post-Medieval (from 1560)	Standing Structure	Remains of a farmstead; recorded by the RCAHMS during field survey published in 1984. The remains of the farmstead, depicted on Ainslie's Map in 1794 and abandoned by the (c.1888) 2nd edition OS map, lie 900m NW of Margie and comprise a four-compartment rectangular building (22.1m x 5.5m) situated on the S side of a rectangular enclosure.	No views of turbines, screened by trees and altitude	LOW
9	NEWBIGGING	NO56NW0057	68714		Unknown	Standing Structure	Remains of a group of about ten small cairns; recorded by the RCAHMS in 1989. They are situated on an ENE-facing heather covered slope 1km NNW of Newbigging. They measure from 2m to 5m in diameter and about 0.4m in height. At least three stony scarps are visible running along the contours.	Plough damaged, poor state of preservation. Probable clear view of turbines.	LOW

Table x Lower Cairney: development site study area cultural heritage baseline and sensitivity

Site Number	Site name	Angus HER reference number	NMRS Numlink reference	Status	Period	Type	Description	Notes	Sensitivity
10	OLDTOWN	NO57SW0003	78326		Post-Medieval (from 1560)	Standing Structure	Remains of a farmstead, depicted on the 1st edition OS map (c.1846) as an L-shaped steading with main orientation N/S with the range to the east at its northern end. Another building lies in the open court to the SE. A millpond lies to the west and another building with attached enclosure to the east at NO5477 7005. By the 2nd edition OS map (c.1888) only part of the N/S range is depicted along with the other building within the open court area. The pond still lies to the west but the building to the east has now gone. The 2006 map shows that the steading survives in ruinous condition, but the building within the court, probably a cottage, is still in use. The pond has been drained, but the site has not been redeveloped.	Inhabited. Probable clear view of turbines.	LOW
11	WITTON	NO57SE0079	78328		Post-Medieval (from 1560)	Standing Structure	Farmstead still in use. On the (c.1846) 1st edition OS map it is shown as having three buildings, two of which are L-shaped and a large pond with dam at the west. By the (c.1888) 2nd edition OS map the existing building at the south has been modified into a rectangular structure and a further building is shown to the north-west of the existing buildings. The 2006 map shows that all of the buildings, apart from the one at the north-west, are in use in modified condition and that the pond is still shown.	No view of turbines, screened by shelter belt on the eastern site boundary	LOW
12	NEWBIGGING	NO56NW0056	68713		Unknown Medieval (from 1100 - 1560 AD) Post-Medieval (from 1560)	Standing Structure	Remains of a group of about ten small cairns; recorded by the RCAHMS during field survey in 1989. They are situated on an ESE-facing grassy slope 800m NNW of Newbigging. They range from 2m to 3m in diameter and are up to 0.4m in height. The area between the cairns is cross-ridged, the settings of rig lying ENE to WSW and WNW to ESE respectively.	Plough damaged, poor state of preservation. Probable clear view of turbines.	LOW
13	NEWBIGGING	NO56NW0046	35039		Post-Medieval (from 1560)	Standing Structure	Remains of a plough-damaged rectangular building; recorded by J Sherriff during survey in 1984. The remains are represented by 0.3m high turf-covered wall footings. When revisited by the RCAHMS in 1989, the site, 720m NNW of Newbigging, lay in an area of improved pasture. The building is located on level ground immediately W of the fence and about 40m N of a major break of slope on the hill. This is likely to be the square building identified by Jervise (A Jervise 1853) as the Castle of Dennyfern (see also NO56NW0004). A grass-grown sinuous stone bank 1m thick and 0.3m high runs towards this structure from the E of the gate to the NE.	No clear remains on the ground. Probable clear view of turbines.	LOW
14	WITTON	NO57SE0067	35219		Post-Medieval (from 1560)	Standing Structure	Remains of buildings and rig and furrow; recorded by the RCAHMS during field survey published in 1984. In an area of rig-and-furrow cultivation, 550m NW of Witton, there are the remains of two rectangular buildings measuring 9.6m x 4.3m and 7.2m x 4.2m respectively over stone wall-footings up to 1m thick.	No view of turbines, screened by shelter belt on the eastern site boundary	LOW
15	BOGTON	NO57SE0078	78327		Post-Medieval (from 1560)	Standing Structure	Farmstead still in use. On the (c.1846) 1st edition OS map it is shown as eight roofed buildings, three attached enclosures, one unroofed building at the north and a pond with sluice to the west. By the (c.1888) 2nd edition OS map, the roofless building and one of the roofed buildings have been removed and three of the buildings at the north of the group have been roofed over to form a steading. The 2006 map shows that the steading is no longer roofed and is partially disused and that two other buildings are also disused. The pond is still shown.	Inhabited. The view eastwards towards the turbines is interrupted by trees, but due to their close proximity, the turbines would be clearly visible from points within the farmstead.	LOW

Table x Lower Cairney: development site study area cultural heritage baseline and sensitivity

Site Number	Site name	Angus HER reference number	NMRS Numlink reference	Status	Period	Type	Description	Notes	Sensitivity
16	NEWBIGGING	NO56NW0003	35021		Bronze Age (incl beakers) (2000 - 800 BC)	Documentary Record Only	Site of a cairn and possible surrounding stone circle. The cairn was about 12 m in diameter and surrounded by a double circle of 20-30 large stones, between 15-18 m in diameter, of which only one remained in 1843. 400 cart-loads of stones were taken from the cairn, according to Ramsay, who took them. According to Jervise the cairn was composed of small stones to a depth of about 1 m, under which lay a quantity of black, clammy earth mixed with charcoal, while a 0.6 m wide track of loose, red sandstone, a few centimetres deep, ran through this deposit to the outer circle on either side. When the OS visited the perimeter of the cairn was visible as a slightly raised area with the sole survivor of the encircling stones. This stood 1.62 m high and was about 2.7 m in circumference at the base, tapering to 1.9 m at the top. Many flint arrowheads were found in the vicinity prior to 1853. Cruickshank wrote in 1899 that the blasted remains of the other stones were visible in the foundation of the neighbouring field dyke. The remaining stone was removed before the OS re-visited in 1958 and no visible traces of the cairn or circle of stones was visible then, or on the later visit of the RCAHMS in 1989. At the time of the latter visit the site was under the plough. The shape of this cairn, with the double ring of stones and the tapering monolith, have suggested that this may have been a Recumbent Stone Circle.	Beyond 500m buffer. Included for context. No remains visible	NONE
17	NEWBIGGING	NO56NW0037	35029		Post-Medieval (from 1560)	Standing Structure	Remains of a building, possibly from the farmstead depicted on Ainslie's Map (1794), annotated -Touffat-, in this area. It is shown on the OS maps from the (c.1846) 1st edition map onwards as disused. A three-compartment building (19.3m x 5.2m over stone wall-footings up to 1m thick), situated 670m NNW of Newbigging, was recorded by J Sherriff in 1984. Further detail was recorded by the RCAHMS during a field visit in 1989. The turf covered, stone walls are clay-bonded. All three compartments have entrances to the SE, on the downslope side. A drain runs along the NW side of the building, and a second drain or lade runs in from the moorland to the N and continues to the SW. There is rig in the vicinity aligned approximately N-S. A rough bank of large boulders runs downslope to the S for a distance of 7.5m from the SE corner of the building. There is recent clearance in and around the building, presumably from the improvement of the field.	Beyond 500m buffer. Included for context. Clearly defined earthwork and stone footing remains of 3 bayed building within improved pasture. Probable clear views of turbines.	LOW

Table x Lower Cairney: development site study area cultural heritage baseline and sensitivity

Site Number	Site name	Angus HER reference number	NMRS Numlink reference	Status	Period	Type	Description	Notes	Sensitivity
18	NEWBIGGING	NO56NW0004	35032	SCHEDULED MONUMENT **6874**	Prehistoric period uncertain		Remains of a hut-circle. The site of the -Castle of Dennyfern- is marked by the foundation of a circular building, 10m in diameter, quite plan and considerably raised above the surrounding level. The site of the Castle of Dennyferne is marked by the foundation of a square building with traces of several cottages and cultivation ridges nearby. The castle is said to have been a residence of the Lindsays and the cottages to have been occupied by their retainers. A Jervise 1853. This is not the site of a building but of a probable robbed cairn although first impressions suggest a hut circle, 7.5m in diameter within a wall spread to 3.0m, composed of earth and stone with a break in the SE. It is 0.2m high on the N and 1.0m on the S, varying with the slope of the hill. The probability is that the cairn was robbed to build the steading c. 100m to the S. Revised at 1:2500. This hut-circle (previously identified as a cairn) measures 7m in diameter within a wall c 2.5m in thickness and 0.3m in height. The entrance, which is 2m wide, lies on the SE. RCAHMS 1983; 1984. This is a hut-circle located on a slight spur immediately inside the improved land on the S slope of the Hill of Formal. It measures 6m in diameter internally and the entrance is on the ESE. The wall has been reduced to a spread bank 3m thick and 0.4m high. Two external facing-stones are visible on the NW, and there are traces of robber holes continuing their line. Recent clearance has been deposited in the centre and entrance of the structure. Although the hut-circle is identified as the Castle of Dennyfern on the 1st edition OS 6 inch map (Forfar, (1865), xix. The Name Book c 1861 and A Jervise 1853 describes a square building and is more likely to have been referring to the remains of a building that stands 200m to the E (NO56NW 46). Scheduled monument **6874**	Beyond 500m buffer. Included for context. Clearly defined circular turf bank, within cultivated field. North side truncated by later(19th century?) boundary wall. The hollowed centre of the earthwork filled with modern clearance cairn. Ploughing right up to the edge of the monument is damaging the base of the earthwork. Possible rabbit burrowing as well. Probable clear views of the turbines.	HIGH
19	BOGTON (New site)				Unknown		Remains of 20+ possible small clearance cairns and a low relief D-shaped earthwork enclosure identified during walkover survey and inspection of satellite photo (Google earth) in September 2012. The remains cover an area of approximately 1Ha between the farmsteads of Bogton and Oldtown. The 1st Edition OS (1865) shows the area as a triangular piece of boggy and hummocky unimproved land adjacent to improved land to the south and west.	View towards the turbines is interrupted by trees, but due to their close proximity, the turbines would be clearly visible.	LOW

Table : Summary of assessment of significance of indirect impacts upon all designated cultural heritage receptors within 10km of Lower Cairny

Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
4316	Lindsay Burial Aisle	SCHEDULED PIC	HIGH	2	3	NONE	NONE	No actual visibility due to screening by topography and trees.	No description given in Scheduling documents or NMRS Summary of description from Angus HER Remains of a church; a fragment of the former Parish Church of St. Lawrence, being a south aisle or transept with a simply moulded depressed archway opening into the church. Its dimensions are 7.5m x 5.9m. It contains a Piscina of 16th century date, set into the east wall, and a collection of grave slabs and fragments. Documentary evidence, in the form of a Panmure estate plan of 1766, shows that the church was a classic T-shape. St Lawrence's name has also been given to a spring near the churchyard. A burial aisle of the Edzell family was added to the south wall of the church in the 16th century. Connected by an archway to the nave, it is about 9' square internally with a modern slated roof. One of the stones making the western doorway has a mason's mark.
90069	The Caterthuns, hillforts	SCHEDULED PIC	HIGH	2	3.5	SLIGHT	MODERATE	Brown Caterthun The development site comes into view from the summit northwards. The turbines would be clearly visible but back dropped by higher ground behind them. Because of their position at a relatively low altitude in relation to the view from the summit, they would appear as features below your natural line of sight. White Caterthun The development site is clearly visible along the path up to the summit and from the ramparts around their north and east end. There would be clear views of the turbines from these areas. There are no theoretical or actual views of the turbines from the west and southern stretches of rampart.	The monument comprises two substantial hillforts, known as the Brown and White Caterthuns. The two forts are in the care of the Secretary of State for Scotland and are being re-scheduled to extend protection to encompass all of the known archaeological remains. The forts occupy the summits of two adjacent hills, commanding much of the fertile farmland of Strathmore and rising to between 260m and 300m OD. The Brown Caterthun is a multi-period fort, remodelled throughout the 1st millennium BC, and defined by multiple lines of earth and stone ramparts and ditches. The White Caterthun is similar in form, but capped by a massive stone-walled fort, which encloses an area of the summit measuring some 140m by 60m. There are a number of ring-ditches, representing the remains of timber roundhouses, both within and outwith the defences. Recent excavations have also demonstrated the presence of prehistoric cultivation remains on and around the White Caterthun. The area to be scheduled encompasses the remains described and an area around them in which related deposits may be expected to survive. It is divided into two irregularly-shaped areas. That on the Brown Caterthun measures 530m between its E and W-most points, and 690m between its N and S-most points. That on the White Caterthun measures 680m between its E and W-most points, and 560m between its N and S-most points. Both areas are

Table : Summary of assessment of significance of indirect impacts upon all designated cultural heritage receptors within 10km of Lower Cairny

Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
90136	Edzell Castle	SCHEDULED PIC	HIGH	0-1 (tip only)	3	NONE	NONE	No part of the scheduled area has actual visibility of the turbines because the Castle lies in the lee of a heavily wooded hill immediately to its west, which restricts all views westwards to the wider landscape.	The monument comprises the remains of Edzell Castle, a property in the care of the Secretary of State for Scotland. The monument comprises a series of well-preserved structural remains, dominated by a tower house of early 16th century date, to which a courtyard and ranges of associated buildings were later added. It also encompasses a walled garden surrounded by an elaborately decorated architectural framework dating to the early 17th century. Smaller buildings thought to represent the remains of a bathhouse and summer house are built onto the SW and SE corners of the garden respectively. The area to be scheduled encompasses the castle and its garden, together with an area around them in which traces of associated activity may be expected to survive. It is approximately rectangular with maximum dimensions of 140m NNW-SSE by 100m as marked in red on the accompanying map extract. The scheduling excludes above-ground features associated with a modern sheepfold in the SW part of the site, and above-ground elements of modern field boundaries. National Importance The monument is of national importance as an outstanding example of late medieval domestic and defensive architecture. Of particular importance is the unique architectural framework around the garden. Its importance is reflected in its status as a property in the care of the Secretary of State for Scotland.
137	Castle Hillock, motte	SCHEDULED	HIGH	1 (tip only)	3	NONE	NONE	Local topography and conifer tree belt completely obscures views from the site and it's environs.	No description given in Scheduling document. Field description Substantial earthwork motte, oval in shape, oriented WNW - ESE and measuring approximately 140m by 75m. Grazed.
991	Fettercairn, market cross	SCHEDULED	HIGH	2 (tips only)	10	NONE	NONE	No actual visibility of turbines within anywhere Fettercairn.	No description given in Scheduling document. Field description Octagonal red sandstone shaft, rising from a circular stepped basement. It bears the arms of John, first Earl of Middleton with the Scottish lion and the date 1670. The cross incorporates a sundial. On the west side of the shaft is a groove that is 37.5 inches (or one Ell) in length. This served as a standard length for traders doing business here.

Table : Summary of assessment of significance of indirect impacts upon all designated cultural heritage receptors within 10km of Lower Cairny

Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
2303	Keithock, Roman camp	SCHEDULED	HIGH	2	8	NONE	NONE	Crop mark, below ground	No description given in Scheduling document. Description from NMRS The camp at Keithock was one of the camps discovered by Captain Robert Melville while travelling through Strathmore in August 1754 (Balfour-Melville 1917: 123n), and planned by Roy the following year (Roy 1793: Pl. XIV; Jones and Maxwell 2008; see above, Chapter 3). It is now known only through cropmarkings on air photographs. The camp lies just to the south of the Cruick Water, across which, about 1.5km to the NNE , lies the fort and camp at Strathcaro. It is situated on ground that slopes gently from the south-east to the north-west. The camp measures 640m from north-east to south-west by about 410m transversely, with the south-east side longer than that on the north-east. It encloses a total area of about 26ha (64 acres). Tituli are visible on the south-east and south-west sides, with two on the north-east side suggesting that it had six gates in total. Both Roy and St Joseph also recorded a titulus on the north-west side, but this could not be confirmed on the available air photographs (1793: Pl. XIV; RCAHMS DC 37458). An annexe is visible to the north of the entrance gap on the north-west side. This measures some 117m by 109m and encloses 1.27ha (3 acres). St Joseph conducted a small excavation on the northeast side in 1967, recording that all but the bottom 13cm of the ditch had been ploughed away, but his section drawing indicated a ditch which was about 0.9m in width at the top.
2829	Stracathro, Roman fort and camp	SCHEDULED	HIGH	2	7	NONE	NONE	Crop mark, below ground	The monument comprises the remains of Stracathro Roman fort and camp, visible as cropmark images on oblique aerial photographs. The monument was first scheduled in 1969. It is being rescheduled in order to clarify the extent of the protected area. The monument lies about 800m E of Inchbare, on the S side of the West Water, at approximately 45m OD. It comprises a large Roman fort, which was originally one of a series of auxiliary forts screening the Agricolan legionary fortress at Inchtuthill. The fort is defended on the NW and SW sides by two ditches and, on the SE side, by three ditches. The steep river scarp above the bank of the West Water now cuts into the N angle of the fort. The dimensions of the fort interior (i.e.. within the ditches) are estimated at c.183m NE-SW by 145m NW-SE, enclosing an area of some 2.6ha. An enclosure measuring c.90m NW-SE by c.60m SW-NE is attached to the southern half of the SW front of the fort, and would appear to be an annexe defended by a single broad ditch. Much of the annexe lies within the area of the temporary camp. The temporary camp is situated to the SW of the fort and encloses an area of about 15.8ha. It comprises a rectangular parallelogram on plan, measuring c.425m NW-SE by 375m NE-SW (about 15.8ha). Its four clavicular gateways of the distinctive 'Stracathro' type, to which this monument has given its name, combined with its presumed relationship to the adjacent Flavian fort, suggest that it was constructed some time during the campaigns of Julius Agricola in AD 78-84. National Importance The monument is of national importance as an example of a Roman fort with associated annexe and temporary camp which has the potential greatly to enhance our understanding of the Roman military presence in Scotland, especially as it comprises different types of defensive structures (a fort, an annexe and a temporary camp). It is of particular interest as one of a group of forts believed to have been constructed during the short-lived occupation in the Flavian period under Agricola. The monument is also of national importance because of its potential to contribute to an understanding of the construction of Roman road networks.

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Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
2989	Church of Pert	SCHEDULED	HIGH	2	>10	NONE	NONE	No actual visibility due to screening by topography and trees.	Ruinous rectangular building with two lancets at the east end and having a Gothic bellcote. Also see **LB 11174 & 11175**
4416	Bridgend, cairn	SCHEDULED	HIGH	2	1.3	SLIGHT	MODERATE/MINOR	Only the upper western part of Cairny Hill is visible from the monument, so it is possible that the tips of the turbines may be seen as a worst case scenario.	The monument is a cairn with a heavy boulder kerb, measuring 9.2m overall and standing to a height of up to 1m. The largest boulders are in the SW. Several boulders have been displaced recently, presumably during ploughing. The monument is a well preserved example of a rare type. National Importance The monument is a well preserved example of a rare type. It is of particular interest because the boulders of its kerb are more massive to the SW implying a link with recumbent stone circle and the ring cairn of E Scotland. The underlying old ground surface may preserve pollen and other material allowing an insight into Bronze Age agriculture. It is of national importance to the theme of Bronze Age burial traditions in E Scotland.
4444	Capo Plantation, long barrow	SCHEDULED	HIGH	2	8.5	NONE	NONE	No actual visibility, long barrow located within dense woodland.	The monument is a well preserved and massive Neolithic long burial barrow. The barrow is oriented E-W and is 80m long, 25m wide at the E end and 10m wide at the W end. At the E end it is 2.5m high. It has a regular smooth profile. The area to be scheduled measures 100m (E-W) x 45m (N-S) and is likely to include traces of ritual and ceremonial activities associated with construction of the mound and with the burials in it. National Importance The monument is of national importance as an exceptionally fine field monument and because it has the potential to enlarge our understanding of Neolithic burial practices and rituals. Information from the well preserved old ground surface underneath could potentially tell us about Neolithic vegetation and land use in the area.

Table : Summary of assessment of significance of indirect impacts upon all designated cultural heritage receptors within 10km of Lower Cairny

Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
4459	Valhalla, fields and cup marked stone	SCHEDULED	HIGH	0-2	7	NONE	NONE	No actual visibility due to screening by topography and trees.	The monument comprises a stone with c. 30 small cup marks, small cairns, and banks forming at least 3 field systems. The most regular field system consists of a series of 15 roughly parallel banks forming open ended fields and a group of at least 3 similar banks on a similar alignment. It is of particular interest because the local succession appears to be cairns and curvilinear banks succeeded by an open ended field system which in turn is succeeded by later cairns and another curvilinear bank system. The latest bank system appears to be contemporary with a small sub rectangular house measuring roughly 5m x 3m. National Importance The monument is of national importance to studies of pre-improvement agriculture because it preserves stratigraphical relationships between 3 systems of banks and at least 2 periods of small cairn accumulation, because the middle bank system defines open ended field system of the type found at Hill of Menmuir and because the succession demonstrates chronological depth in an otherwise apparently unitary collection of small cairns.
4464	Hill of Menmuir, fields and cairns	SCHEDULED	HIGH	0-2	4	NEGLIGIBLE	MINOR	Development site back dropped by hills and difficult to make out from the scheduled area. Possible partial views of turbine tips from the higher ground in the north western part of the scheduled area.	The monument consists of a group of at least 21 low, roughly parallel banks, forming open ended fields averaging about 25m in width and up to 125m long, in a saddle between two low summits. There is no trace of cross banks closing the fields. The banks taper off above the uppermost improvement-period bank. They appear to be earlier than some of the c. 50 small cairns which concentrate in the centre of the system where the banks are weakest. Certain anomalous banks appear to be composed in part of cairns and elsewhere cairns appear to overlie banks. The monument measures 650m (NE-SW) x 400m (NW-SE). National Importance The monument is one of 4 similar systems of a type so far recognised only in central Angus, of particular interest because the fields are not closed at the end. This example is of further interest because its banks appear to underlie cairns similar to those forming groups elsewhere in the neighbourhood, and because of its contrast with the nearby field system W of White Caterthun. They are of national importance to studies of prehistoric to pre-improvement agriculture in E Scotland.
4465	Mansworn Rig, house, fields and cairn	SCHEDULED	HIGH	0-2	7.5	NONE	NONE	No actual visibility due to screening by topography and trees.	The monument comprises a round house, stony field banks, and a sample of the small cairns at the east end of the spread on Mansworn Rig. The house is on a partly natural platform and measures 14.5m across a 2.4m wide wall. Immediately to its NE are at least 4 long stony banks running NW-SE with 3 of them linked by 2 curvilinear stretches of bank forming one U shaped field open to the NW and one to the SE. A spur bank runs to the N of the house and stops at a cairn. A pair of banks at a different angle, and a fragment of another, appear to belong to an earlier system. The monument includes 17 small cairns of which 2 appear to overlie the early banks. National Importance The monument is of particular interest in that the 2 bank systems appear to be separated by a phase of cairns accumulation, arguing for at least 2 and perhaps 3 phases of farming. It is of national importance to the study of relationships of houses to fields, and to study of the prehistoric agriculture of E Scotland.

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4571	White Caterthun, houses, cairns and fields	SCHEDULED	HIGH	0-2	4	NEGLIGIBLE	MINOR	There are partial views of the development site from the northern edge of the scheduled area, and so possible fragmented and occasional views of turbines, but conifer tree belts screen most views north eastwards.	The monument is a farmstead and field system of the later Bronze Age or Iron Age; it comprises 3 ring-ditch houses, small cairns and a system of rectangular fields defined by slight turf banks. Two houses are up to 15m in diameter over ditches up to 2m wide and the third is up to 15m in diameter with a ditch up to 3m wide. The ditches, unlike those of Douglasmuir-type houses, are fairly uniform in depth. The cairns cover a wide area around the houses. To the south and south east on average the slope is a widespread pattern of strips and rectangular plots, the latter commonly about 30m x 20m, defined by slight banks visible only in good light. An area measuring up to 630m (N-S) by up to 510m transversely is proposed for scheduling. National Importance The field system is remarkably complete. It and the houses are just below the White Caterthun fort. They are of national importance as including an unusually well preserved system of rectangular prehistoric fields, and because of the proximity of the fields, the well preserved houses and the White Caterthun fort. The houses and fields together are nationally important to the theme of social and economic organisation in the Iron Age. Particularly when taken with Hill of Mon are of national importance to studies of agriculture in E Scotland
4823	Witch Hillock, burial mound and stone setting	SCHEDULED	HIGH	2	9	NONE	NONE	No actual visibility, burial mound located within dense woodland.	The monument comprises the remains of a burial mound of the Bronze Age, known as Witch Hillock and, 16m to the NE, a setting of three large squat stones. The mound is 18m in diameter and 2m high. It suffered some antiquarian excavation in the nineteenth century, when several cists were revealed. The stones are set on three corners of a rectangle, the "open" end facing towards the mound. The two outer stones are 3m from the third. The area to be scheduled measures 60m in diameter, to include the mound, the stone setting, a well, and an area around in which traces of activity associated with their use may survive, as marked in red on the attached map. National Importance The monument is of national importance as a burial mound which still, despite antiquarian interference, has the potential to enhance our understanding of prehistoric burial practices. The monument is of particular importance because of the presence nearby of a stone setting and the likely survival in the vicinity of contemporary burials. Its importance is further enhanced by the proximity of the Capo long barrow.
6360	Beattie's Cairn	SCHEDULED	HIGH	2	7	NONE	NONE	No actual visibility, located within woodland.	The monument comprises the remains of a burial cairn of prehistoric date. The monument lies in a clearing in woodland at around 310m OD. It is a mound some 8m in diameter by 0.5m high on which has been built a modern cairn. There is no record of the cairn having been excavated and it may be expected to contain undisturbed burials of Bronze Age or Neolithic date. The area to be scheduled encompasses the visible remains and an area around them in which traces of associated activity may be expected to survive. It is circular with a diameter of 30m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and funerary practices.

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6364	Templewood, cairn	SCHEDULED	HIGH	2	9	NONE	NONE	No actual visibility, located within tree belt.	The monument comprises the tree-covered remains of a burial cairn of prehistoric date. The cairn lies in a belt of trees on a prominent ridge at around 110m OD. It comprises a cairn some 13m in diameter by about 1.2m in height. There is evidence of stone within the body of the cairn. There is no evidence of substantial disturbance, suggesting that burials will survive in good condition within and around the cairn. The area to be scheduled encompasses the cairn and an area around it in which traces of associated activity may be expected to survive. It is a circle missing part of its N side, with a maximum cross dimension of 40m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and funerary practices.
6366	Gallows Knap, barrow	SCHEDULED	HIGH	2	5	NONE	NONE	No actual visibility, located within dense woodland.	The monument comprises the remains of a barrow of Later Neolithic or Bronze Age date. The monument lies in woodland at around 60m OD overlooking a steep slope to the E. It comprises a barrow, or burial mound, some 26m in diameter by 4.5m in maximum height, slightly truncated by a modern forestry track on its E side. The barrow appears to be largely of earthen construction and shows no sign of ever having been excavated. The area to be scheduled encompasses the visible remains and an area around them in which traces of associated activity may be expected to survive. It is a truncated circle with a maximum diameter of 50m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and funerary practices. It may be expected to contain burials and other ritual and funerary deposits.

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Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
6367	Westside, barrow and ring ditch	SCHEDULED	HIGH	2	6	NONE	NONE	Crop mark, below ground	The monument comprises the remains of a barrow and ring ditch of prehistoric date represented by cropmarks visible on oblique aerial photographs. The monument lies in arable farmland at around 40m OD. It comprises a square barrow some 8m across with a ditch some 1-2m wide, and a ring ditch, probably also a barrow, with a diameter of about 10m and a ditch some 1-2m wide. Square barrows are a characteristic form of later prehistoric or Early Historic burial site. There are numerous other, less distinct cropmarks in the vicinity which may represent the remains of further burials. The area to be scheduled encompasses the remains described and an area around them in which traces of associated activity may be expected to survive. It is circular with a diameter of 100m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric funerary practices. The remains of burials and associated deposits will be important in reconstructing funerary rituals in the later prehistoric and Early Historic periods.
6368	Westside, settlement	SCHEDULED	HIGH	2	6.5	NONE	NONE	Crop mark, below ground	The monument comprises the remains of an unenclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs. The monument lies in arable farmland at around 40m OD. It comprises two ring ditch houses with diameters of about 25m and 20m respectively, with ditches some 2-3m wide. Both apparently have souterrains (semi-underground cellars) projecting from their interiors. Further crescentic cropmarks appear to indicate the remains of several other souterrains in the vicinity, ranging from 20m long by 5m wide to approximately 8m long by 1m wide. The complex lies adjacent to a series of cropmarks apparently of natural origin, indicating a former course of the West Water. The area to be scheduled encompasses the remains described and an area around them in which traces of associated activity may be expected to survive. It is a quadrilateral with maximum dimensions of 160m WNW-ESE, 220m ENE-WSW, by 190m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric settlement and economy. The relationships between the various features will be important in establishing the function and chronology of souterrains and ring ditch houses.
6373	Inchbare, cursus	SCHEDULED	HIGH	2	6.7	NONE	NONE	Crop mark, below ground	The monument comprises the remains of a cursus of Neolithic date represented by cropmarks visible on oblique aerial photographs. The monument lies on level ground in arable farmland at around 40m OD. It comprises a pit-defined cursus, or elongated rectangular enclosure, some 250m long running approximately ENE-WSW. Further lines of pits flank the main line along either side and there are indications of small barrows within the complex. A further cursus lies close to the SE. Such monuments appear to represent ritual enclosures of the Neolithic period. The area to be scheduled encompasses the remains described above and an area around them in which traces of associated material may be expected to survive. It is irregular on plan with maximum dimensions of 370m WSW-ENE by 100m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of Neolithic ritual practices. Its importance is greatly enhanced by its proximity to several other structures of similar date.

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6374	Inchbare, cursus	SCHEDULED	HIGH	2	6.5	NONE	NONE	Crop mark, below ground	The monument comprises the remains of a cursus of Neolithic date represented by cropmarks visible on oblique aerial photographs. The monument lies on level ground in arable farmland at around 40m OD. It comprises a pit-defined cursus, or elongated rectilinear enclosure, some 300m long by 40m wide, running approximately ENE-WSW. Further lines of pits lie at the WSW end of the cursus and several possible barrows lie within the complex. Another cursus lies in a field to the NW. Such monuments appear to represent ritual enclosures of the Neolithic period. The area to be scheduled encompasses the remains described above and an area around them in which traces of associated activity may be expected to survive. It is irregular on plan with maximum dimensions of 340m WSW-ENE by 100m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of Neolithic ritual practices. Its importance is greatly enhanced by its close proximity to several potentially contemporary sites.
6375	Inchbare, cropmarks and ring ditch	SCHEDULED	HIGH	2	7.5	NONE	NONE	Crop mark, below ground	The monument comprises a group of cropmarks including the remains of a ring ditch house of prehistoric date visible on oblique aerial photographs. The monument lies in arable farmland at around 40m OD. It comprises a ring ditch some 15m in diameter with a ditch about 1-2m wide and, close to the E, a sub-rectangular feature aligned N-S, approximately 25m long and about 4m wide, with a ditch about 1-2m wide. About 15m to the NW is a group of linear features, all aligned N-S. The cropmarks lie close to two prehistoric cursus monuments and a round barrow, with which they may well be associated. The area to be scheduled encompasses the remains described and an area around them in which traces of associated activity may be expected to survive. It is circular with a diameter of 100m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric settlement and economy. Its importance is greatly enhanced by its proximity to several potentially contemporary sites.
6376	Ballownie, mound	SCHEDULED	HIGH	0-2	8	SLIGHT	MODERATE/ MINOR	Turbines would be visible as distant features , back dropped against high ground behind them, only from the north western boundary of the site.	The monument comprises the remains of a burial mound of prehistoric date. The monument lies in woodland at around 50m OD. It comprises the remains of a burial mound surviving as a turf-covered stony mound. It measures some 25m in diameter by about 4m in height. Quarrying has disturbed parts of the NW side, as has the construction of a modern road. Immediately outside the S arc is a denuded bank some 2m wide, possibly a later plantation dyke. To the NNW are the remains of two cursus monuments and associated features, possibly associated with the burial mound. The area to be scheduled encompasses the remains of the mound and an area around in which traces of associated activity may be expected to survive. It is a circle lacking parts of the W side, and has a diameter of 40m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric

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6377	Westerton, enclosure	SCHEDULED	HIGH	2	8	NONE	NONE	Crop mark, below ground	The monument comprises the remains of an enclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs. The monument lies in arable farmland at around 50m OD. It comprises a roughly oval enclosure some 140m NW-SE by approximately 70m NE-SW, with a ditch about 5m wide. There may be an entrance on the SW side. Several dark cropmarks within the enclosure may represent the remains of former internal buildings. The area to be scheduled encompasses the enclosure and an area around it in which traces of associated activity may be expected to survive. It is sub-rectangular with maximum dimensions of 180m NW-SE by 130m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric settlement and economy. The apparent survival of internal buildings further enhances the importance of the site.
6392	Brae of Pert, enclosure	SCHEDULED	HIGH	2	9.5	NONE	NONE	Crop mark, below ground	The monument comprises the remains of an enclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs. The monument lies on relatively level ground in arable farmland at around 65m OD. It comprises a roughly circular enclosure measuring approximately 20m in diameter within a ditch up to some 2m wide. The area to be scheduled encompasses the enclosure and an area round it in which traces of associated activity may be expected to survive. It is circular with a diameter of 50m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric settlement and economy.
6407	Tullo Hill, cairns	SCHEDULED	HIGH	0-1 (tip only)	8	NONE	NONE	Theoretical visibility only from extreme north western tip of scheduled area. No actual visibility due to screening by topography and trees.	The monument comprises a group of cairns of prehistoric date surviving as a series of grassed-over mounds. The cairns lie on the partially wooded SW slopes of Tullo Hill at around 305m to 310m OD. The group comprises at least 43 cairns varying between 1.5m and 8m in diameter lying in and around a series of linear field banks, some of which are probably of later date. The size and apparent structure of some of the larger cairns suggests that they may have been used for burial. The area to be scheduled encompasses the visible remains and an area around them in which traces of associated activity may be expected to survive. It is irregular in shape with maximum dimensions of 410m NE-SW by 130m as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and agricultural practice. Several of the cairns are likely to contain evidence for Bronze Age burial.

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6573	Mains of Edzell, fort	SCHEDULED	HIGH	2 (tips only)	3.3	NONE	NONE	Crop mark, below ground	The monument comprises the remains of a fort of later prehistoric date represented by cropmarks visible on oblique aerial photographs. The monument lies mainly in arable farmland, and partly in woodland, at around 70m OD. It comprises a D-shaped fort some 120m NW-SE by about 40m, defined by double ditches up to 4m wide, and about 10m apart. Within the interior is a possible third ditch. There are signs of an entrance on the NNE. The SW side of the fort was formed by a steep slope. The monument represents a high-status defended settlement considerably earlier than, but analogous to the nearby Castle Hillock motte and Edzell Castle. The area to be scheduled encompasses the remains described and an area around them in which traces of associated activity may be expected to survive. It is almost semi-circular with maximum dimensions of 140m NW-SE by 95m NE-SW, as marked in red on the accompanying map. National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric defensive settlements. Its importance is enhanced by its close proximity to later high-status settlements with which it forms a local sequence.
6874	Newbigging, hut circle	SCHEDULED	HIGH	2	1.3	MODERATE/ SLIGHT	MODERATE	Clear view of turbines looking eastwards.	The monument comprises a hut circle of prehistoric date, visible as turf-covered wall footings. The monument is situated in improved grassland at around 260m OD. It comprises a hut circle measuring about 9m in diameter, defined by a turf-covered wall measuring about 0.4m high and spread to a width of about 3m. The hut circle is situated on a low eminence that rises about 1m above the surrounding land. There is an entrance on the SE. Hut circles are characteristic of Bronze and Iron Age settlement sites and represent the remains of timber-roofed roundhouses. The area proposed for scheduling comprises the remains described and an area around them within which related material may be expected to be found. It is a truncated circle with a diameter of 45m, bounded on the NNW by a wall, the above-ground elements of which are specifically excluded from the present scheduling, as marked in red on the accompanying map extract. National Importance The monument is of national importance because of its potential to contribute to an understanding of prehistoric economy and environment.

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8506	Balhall Lodge, hut circle and field system	SCHEDULED	HIGH	2	6	NONE	NONE	No actual visibility due to local topography and trees.	The monument comprises a hut circle and field system of prehistoric date, visible as turf-covered wall footings and a series of low banks and cairns. The monument lies in rough grassland at around 265m OD. It comprises a hut circle measuring about 8m in internal diameter, defined by a low stony bank measuring about 0.2m high and between 2m and 3m wide. There is a possible entrance on the E. Hut circles are characteristic of Bronze and Iron Age settlement sites and represent the remains of timber-roofed roundhouses. The hut circle lies within a contemporary field system, visible a number of clearance cairns measuring up to about 5m in diameter, and 3 field banks measuring up to about 0.2m high. Also within the scheduled area is a rectilinear enclosure measuring about 14m by 15m, defined on three sides by a bank measuring about 2.5m wide and 0.3m high. This enclosure may relate to post-medieval activity in the area. The area proposed for scheduling comprises the remains described and an area around them within which related material may be expected to be found. It is irregular with maximum dimensions of 150m from its easternmost point to its westernmost point and 190m from its northernmost point to its southernmost point, as marked in red on the accompanying map extract. National Importance The monument is of national importance because of its potential to contribute to our understanding of upland prehistoric settlement and economy. Its importance is increased by its proximity to other monuments of potentially contemporary date.
5005	KEITHOCK, KEITHOCK HOUSE, BRIDGE	Listed (B)	MEDIUM	2	8.2	NONE	NONE	Not seen - on private road. Keithock Burn is lined with trees which obscure visibility.	Ornamental bridge on house approach. V-jointed ashlar with balustraded parapet, single semi-circular arch (c.1820)
5006	WARD END OF KEITHOCK	Listed (B)	MEDIUM	2	7.8	NONE	NONE	View to turbines obscured by trees.	Small single storey rubble cottage, wide-eaved peinded slate roof: wooden porch. Gothick latticed windows. (c.1840)
5029	BRECHIN RESERVOIR, COMMEMORATIVE PEDESTAL	Listed (B)	MEDIUM	1 (hub) 2 (tip)	9.4	NONE/ NEGLIGIBLE	NONE/ NEGLIGIBLE	Monument is adjacent to golf club car park. Distance to turbines mean that impact will be low.	Erected to commemorate the inauguration of Brechin reservoir in October 1874 (which was by J M Gale, Glasgow City Water engineer). Cast-iron, pedestal with pilastered angles, inscribed panel, ogee-domed top faintly "Thomsonesque" in appearance, very elaborate and delicate tall metal finial.
5047	TEMPLEWOOD HOUSE	Listed (B)	MEDIUM	2	9.0	NONE	NONE	House is behind a high wall. Screen of trees on other side of road, beyond which is a pylon (image 74) and further away, the A90.	2-storey asymmetrical, simple slated ashlar Tudor gothic with bay window features. c.1830 and (?) 1839 incorporating earlier parts.
5048	TEMPLEWOOD HOUSE, STABLES	Listed (B)	MEDIUM	2	9.0	NONE	NONE	Stables are behind a wall, which although not as large as for Templewood House, is still significant. Screen of trees on other side of road, beyond which is a pylon (image 74) and further away, the A90.	2-storey 8-window frontage, rubble-built and slated. 4-window centre portion slightly advanced with pediment, ball finials, centre weathervane and roundel. Square upper windows, ground floor openings in segmental arches. Side windows arched with 1st floor lunettes. Dated 1825.
5050	KEITHOCK, PACK BRIDGE	Listed (B)	MEDIUM	1 (hub) 2 (tip)	8.4	NONE	NONE	Not seen. Keithock Burn is lined with trees which obscure visibility.	Single small slender segmental arch; 6' wide; no parapets. Doubtful date, perhaps late 17th cent.
5052	KEITHOCK, MAIN GATES	Listed (B)	MEDIUM	2	8.4	NONE	NONE	View to turbines partly screened by trees. The orientation of the gatehouses is not aligned with the view to the turbines.	Pair of square 1-window ashlar lodges, severe classic with dentilled cornice. Plain square gate piers, also with dentilled cornice. Probably c.1820, modern w.i. gates.
5053	KEITHOCK	Listed (B)	MEDIUM	2	8.2	NONE	NONE	Private house, so not visited, but views towards turbines would be screened by trees.	Original part 3-storey: entrance doorway (now inside) has good armorial stone "DE 1680 RF": c. 1820 new 2- storey frontage added, with old and new gables linked by 2-storey bows, 3-window elevation, tripartite windows ground floor left and right and centre 1st, pediment over and couple-columned R-Doric porch below. Stuccoed, flush jointed quoin angles.
5054	LITTLE KEITHOCK, DOVECOT	Listed (B)	MEDIUM		9.0	NONE	NONE	Appears to have been converted into a private house. View to turbines screened by trees.	Dated 1634. Square beam whitewashed rubble with later pyramid slated roof. Swept pigeon entrances
5055	KEITHOCK, KEITHOCK HOUSE, FARMSTEADING	Listed (B)	MEDIUM	2	8.0	NONE	NONE	Not seen as down a Private road. The view towards the turbines will be screened by trees.	Quadrangular, rubble-built and slated: 1/2-storey; plain 2 storey 3 window farmhouse form centre of one elevation, fine pend tower with R-Doric pilastered doocot centre of another. c. 1820.

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9475	FETTERCAIRN, THE SQUARE, THE CORNER	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	When looking at the house, no view of the turbines (the house would block the view). The main aspect of the house faces the Square so turbines not visible from within house, except possibly the side windows on School Road.	Early 19th century. Two-storey rubble, 3 windows 2 doors (one now built up) alternately ground floor, 4 windows (1st and 2nd widely spaced) 1st floor, 4-pane sashes, slated roof with skews, chimney heads rebuilt in brick.
9476	FETTERCAIRN, THE SQUARE, HOUSES	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	Other buildings hide view, meaning there is no view of turbines either when looking at house or shop, or from within the building.	Later 18th/early 19th century. Originally single-storey. Later raised to two, 4-window rubble and stone slate, south house has 2 first floor windows raised in roof with swept dormer heads, north house has fore stair to 1st floor level. Mixed 8 and 12-pane sashes. Notes The raising of dormer heads in roof was carried out early in the present century Photos of the 1890s show identical windows throughout 1st floor. Now flatted.
9478	FETTERCAIRN, THE SQUARE, HOUSE AND SHOP	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	Other buildings hide view, meaning there is no view of turbines either when looking at house or shop, or from within the building.	Early 19th century. Two-storey with canted bay on each side of 3-window centre (left hand ground floor window at centre enlarged with central mullion, glazing mainly 12-pane sashes, coursed rubble, slated roof: canted bays have window on front face only at 1st floor.
9483	FETTERCAIRN, MAIN STREET, ROYAL ARCH	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	Main view frames the entrance into village - and faces in the opposite direction of the turbines. When leaving the village, view of turbines will be obscured by buildings.	John Milne (of St Andrews), 1864-5. Triumphal arch, Rhenish Romanesque, Aldbar stone, ashlar. Round arch between 60' high buttressed octagonal towers with short gabletted spirelets and wrought-iron finials. Top of arch finished with crenellated parapet with curvilinear gablet feature at centre. Built as memorial to the Prince Consort and to commemorate visit of Victoria and Albert in September 1861.
9485	FETTERCAIRN, MAIN STREET, SIR JOHN S FORBES MEMORIAL FOUNTAIN	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	View of turbines obscured by trees and buildings.	David Bryce, architect, John Rhind, sculptor, 1869. Gothic, square-plan, octagonal crocketted spirelet on stepped base, of Redhall sandstone.
9488	FETTERCAIRN, RAMSAY ARMS HOTEL	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	Building obscures view of turbine from outside. Principal aspect of the building faces away from the turbines, towards the village, so no views from within building at front. Possible view from rear of building (although there are few windows).	Late 18th century origin, completely recast and with large additions, Thomas Martin Cappon (of Dundee), 1896-97. Asymmetrical, 2 and 3 storeys English arts and crafts, harled with tiled roofs, small-paned mullioned & transomed fenestration, Jacobean open timber porch with semi elliptical arches on baluster shafts. Outbuildings at rear probably early 19th century.
9490	FETTERCAIRN, RAMSAY PLACE	Listed (B)	MEDIUM	1 (hub) 2 (tip)	10	NONE	NONE	Front aspect faces away from turbines, so might be possible to see the turbines when looking at the house, but the distance and the frequent tree cover between Fettercairn and turbines means that the impact will not be great.	Circa 1840. Rubble, 2 storeys, 3 windows alternated with 2 doors at ground floor, 3 windows and door fore stair forming porch at right hand ground floor door) at first floor, 8-pane sashes (1 altered) at ground floor, 12-pane sashes 1st floor. Slated roof, straight skews end stack and one ridge stack rebuilt in brick.
9502	CAPO	Listed (B)	MEDIUM	2	8.1	NONE	NONE	House down private road - not viewed. However, views to turbines would be screened by Edzell Wood.	Mid-18th century, harled and whitewashed with margins. Two-storey, 3-window (narrow centre 1st) front with right hand ground floor window enlarged and modern glazed porch enclosing centre door; small single-storey wing. Stone-slated roofs.
9509	FETTERCAIRN PARISH CHURCH	Listed (B)	MEDIUM	2	10	NONE	NONE	Turbines in opposite direction when facing front aspect. The building obscure views of turbine when looking at side and back. Church occupies the crest of a hill, so the main part of the graveyard (to the south west) is below hill crest.	Ecclesiastical building in use as such. Originally plain rectangle of 1804 with 4 Gothic windows on south-east flank. North-west transept aisle, slim tower and spire added at centre of south west gable, John Henderson (Edinburgh) 1838, pinnacles removed after storm and other damage 1879. Red rubble, white sandstone dressings, simple belfry lancets with gables over, plain octagonal spire. Recast G P K Young (Perth) 1924-25, broad sanctuary added to north east gable, simple chamfered chancel arch and flanking side arches, Y-tracery, hammer-beam roof and refurnishing. Approximately oval churchyard with Fasque, Balmain and Arnhall burial enclosures, good 17th and 18th century memorials. East part of churchyard wall rebuilt Walker and Duncan 1900.
9509	FETTERCAIRN PARISH CHURCH, CHURCHYARD	Listed (B)	MEDIUM	2	10	NONE/ NEGLIGIBLE	NONE/ NEGLIGIBLE	Turbines in opposite direction when facing front aspect. The building obscure views of turbine when looking at side and back. Church occupies the crest of a hill, so the main part of the graveyard (to the south west) is below hill crest.	Ecclesiastical building in use as such. Originally plain rectangle of 1804 with 4 Gothic windows on south-east flank. North-west transeptal aisle, slim tower and spire added at centre of south west gable, John Henderson (Edinburgh) 1838, pinnacles removed after storm and other damage 1879. Red rubble, white sandstone dressings, simple belfry lancets with gables over, plain octagonal spire. Recast G P K Young (Perth) 1924-25, broad sanctuary added to north east gable, simple chamfered chancel arch and flanking side arches, Y-tracery, hammer-beam roof and refurnishing. Approximately oval churchyard with Fasque, Balmain and Arnhall burial enclosures, good 17th and 18th century memorials. East part of churchyard wall rebuilt Walker and Duncan 1900.

Table : Summary of assessment of significance of indirect impacts upon all designated cultural heritage receptors within 10km of Lower Cairny

Amlink HBNum	Site name	Status	Sensitivity	Theoretical number of turbines visible	Distance from nearest turbine (km)	Impact Magnitude	Impact Significance	Other factors affecting visibility	Description
11174	PERT OLD PARISH CHURCH	Listed (B)	MEDIUM	2	10	NEGLIGIBLE	NEGLIGIBLE	It may be possible to see the turbines in the distance, but the setting of the church and graveyard is already substantially affected by its close proximity to the dual carriageway (A90) and to the electricity pylons that are beside the trunk road.	Rectangular: 13th cent, partially rebuilt 15th cent. E. end of 2 lancets with centre buttress, widely splayed rear arches. Flat-headed shouldered doorways. Rubble-built. Gothic bellcote of 1676, late N. addition. Very overgrown. Notes Scheduled Ancient Monument number **2989**
11175	PERT OLD PARISH CHURCH GRAVEYARD	Listed (B)	MEDIUM	2	10	NEGLIGIBLE	NEGLIGIBLE	It may be possible to see the turbines in the distance, but the setting of the church and graveyard is already substantially affected by its close proximity to the dual carriageway (A90) and to the electricity pylons that are beside the truck road.	Rectangular enclosure, rubble-walled part retaining. Interesting collection of gravestones, Adam & Eve stone to John Presiack, Buchanan Stone with bas relief of Death and a crowned angel blowing a serpentine trumpet and numerous others from 17th cent. onwards. Also see Scheduled Monument **2989**
11176	MILL OF PERT HOUSE	Listed (B)	MEDIUM	2	9.3	NONE	NONE	On low lying ground beside river, so views of turbines obscured by topography and by trees (including Edzell Wood that lies between buildings and turbines)	U-plan: centre block 2-storey 3-window harled without margins porch with R-doric columns block entablature and pediment. Single-storey cottage and outhouse building, enclosing S. forecourt. 18th cent.
11238	LETHNOT PARISH CHURCH BURIAL GROUND	Listed (B)	MEDIUM	2	2.1	NONE	NONE	Church and churchyard are low lying and it is probable that the turbines will not be visible due to local hills.	Walls partly retaining. 7 armorial stones and 2 table tombs of 18th century date with sculpture of real merit.
11248	LETHNOT PARISH CHURCH	Listed (B)	MEDIUM	2	2.1	NONE/ NEGLIGIBLE	NONE/ NEGLIGIBLE	Church and churchyard are low lying and it is probable that the turbines will not be visible due to local hills.	Rectangular, date uncertain perhaps mainly 1742; rebuilt 1827, walls raised and S. wall remodelled with 4 large round headed windows with round-headed doorways between 1st and 2nd, and 3rd and 4th windows. Bellcote at W. gable. Interior remodelled 1886 but now completely gutted except for mural tablets to ministers of 1747 and 1760.
11250	EDZELL, 36 CHURCH STREET, NORTH LODGE	Listed (B)	MEDIUM	0 (hub) 2 (tip)	4.5	NONE	NONE	When viewing façade, back would be towards the turbines. Trees and other buildings obscure view from the building.	2-storey red rubble villa in neo-Scots style: roundel corner feature: river boulder insets in masonry. Dated 1906: interiors of interest. James Salmon Jun, (Glasgow) archt.
11254	EDZELL, EDZELL JUNIOR SCHOOL HALL	Listed (B)	MEDIUM	0 (hub) 2 (tip)	4.5	NONE	NONE	Other buildings within village and surrounding trees obscure views.	Modern Movement neo-perpendicular with squat battered tower; bullfaced masonry with ashlar dressings, showing markedly the influence of C.R. Mackintosh. Thoms and Wilkie Dundee, archts., 1900. Interior gutted.
11255	EDZELL, OLD PARISH CHURCH, CHURCHYARD	Listed (B)	MEDIUM	2	3.0	NONE	NONE	Trees in and around graveyard obscure views towards the turbines.	Walled enclosure with baronial toolshed of c.1900 at gate. Several tombstones of considerable sculptural interest.
11256	EDZELL, OLD PARISH CHURCH, LYNDSAY BURIAL VAULT	Listed (B)	MEDIUM	2	3	NONE	NONE	Trees in and around graveyard obscure views towards the turbines.	Fragment of the former Parish Church of St. Lawrence, being a S. aisle or transept with a simply moulded depressed archway opening into the church. Piscina 16th cent. Collection of grave slabs and fragments.
11258	EDZELL CASTLE, CUSTODIANS HOUSE	Listed (B)	MEDIUM	0	3.2	NONE	NONE	View to turbines obscured by Castle and Castle Garden wall, and hill and trees immediately beyond.	L-plan: single storey and attic snecked rubble crow-stepped with stone slates; angle turret at E. angle: detail of early 17th cent. pattern to match garden house. Dated 1901.

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11261	EDZELL, HIGH STREET, INGLIS MEMORIAL HALL	Listed (B)	MEDIUM	2	4.9	NONE	NONE	When viewing main façade, back would be to turbines. Possible turbines may be visible from the upper floor of the building, although other buildings in Edzell would block view.	C & L Ower, 1897-8. 2-storey, 3-bay, rectangular-plan, crow-step gabled, Scots Baronial hall and library with prominent, central, 5-stage clock tower to principal elevation at W. Red sandstone ashlar. Base course, band courses, cornice, crennelated parapet. Bartizans to corners. Multi-pane window openings with stone transoms and mullions. Piended roof halls to rear (E) with ridge ventilation lantern and triangular ventilation openings. W (PRINCIPAL) ELEVATION: symmetrical. Central projecting open sided porch with broken segmental arched pediment with INGLIS MEMORIAL HALL depicted in mosaic in tympanum. Porch with round-arched openings; piers with engaged Corinthian columns and pilasters. Steps lead to timber panelled vestibule with tiles to ground with INGLIS MEMORIAL HALL depicted. Timber 2-leaf doors with timber side panels and large, decorative semi-circular fanlight above lead to inner part-glazed timber swing doors. 5-stage round tower above with stone slated octagonal pinnacled spire with lucarnes; Octagonal, corbelled 4th stage with alternate clock faces and balconied bays; Dentilled cornice. Symmetrical gabled bays flanking tower. S ELEVATION: asymmetrical. 6-bay with lower single bay to far right; 4-light bowed bay to lower ground at left with small, square 8-lights to upper section. Central 3 bays with tall, 3-light window openings with 9-square, smaller window openings above. N ELEVATION: asymmetrical. 4-light bowed bay to lower ground at right with small, square 8-lights to upper section. Off-centre crow-stepped gable to left. Predominantly fixed glazing with stained glass. Some casement windows with diamond pane leaded glass to upper storey. Graded grey slates. Corniced apex stacks to gables. Cast iron rainwater goods. INTERIOR: high-quality decorative interior with original room layout intact and containing 2 public halls, separate library and a number of other rooms. Entrance hall with decorative glazed tiles to walls and tesserae tiled floor. Main hall with timber gallery and stage; segmental arches to ceiling divide bays; Clerestorey windows to N. Panelled timber doors throughout. Number of rooms with simple cornicing, high skirtings and decorative timber fire surrounds. Stained glass throughout depicting flora, fauna, family crests and some with Scots mottos. LIBRARY: to left of entrance. Rectangular room with tight iron spiral staircase to right leading to bracketted iron mezzanine level with metal railing and to upper floor. Integral timber bookcases. Timber panelling with part-glazed timber screen with door and integral timber and glass Cotgreave Indicator. BOUNDARY WALL AND GATEPIERS: to W and S. Low, coped ashlar wall to W with pairs of gatepiers to N and S. Round gatepiers with base courses, and pyramidal caps, surmounted by lamp standards. Taller coped wall to S.
11262	EDZELL, DALHOUSIE MEMORIAL ARCH	Listed (B)	MEDIUM	2	5.0	NONE	NONE	Arch frames entrance into village, and the road is not aligned with the turbines. Surrounding trees block view to the turbines.	High wide gothic arch with crowstepped gable over roadway enclosed between stout piers; small footpath arch with stepped parapets. 1888. Hay & Henderson, archt.
16287	INGLISMALDIE CASTLE	Listed (B)	MEDIUM	2	9.4	NONE	NONE	View to turbines screened by two woods, including Edzell Wood.	Nucleus L-plan turreted tower house of 3-storeys and attic dated 1636, lower parts possibly order: long 3-storey and attic W wing with NW angle turret added probably later 17th century, filling re-entrant angle at NW, 2-storey SE wing with piended roof added mid 18th century. W addition demolished, new 2-storey W wing with dormerheads on W flank, turret tops restored (higher than original) new front door, SE wing re-roofed with crowstepped gables, 2/3-storey building linking to old tower house. James Matthews (of Aberdeen) 1882; further alterations to SE wing later, circular SW tower, S crowstepped gable and corbelled chimney, E addition etc.
17778	NEWTONMILL, BRIDGE	Listed (B)	MEDIUM	2	7.7	NONE	NONE	Monument no longer survives	Low single segmental arch, rubble. Probably late 18th cent.
17779	STRACATHRO HOUSE, ORNAMENTAL FOOTBRIDGE	Listed (B)	MEDIUM	2	8.2	NONE	NONE	No visibility of turbines due to tree cover around structure.	3 segmental spans, cast iron with gothic detail. Slim, quadrefoil columns c.1820
17781	NEWTONMILL HOUSE, LODGE AND GATES	Listed (B)	MEDIUM	2	7.6	NONE	NONE	Trees around the Lodge and around Newtonmill House screen view to turbines.	Channelled piers surmounted by swagged urns. Small pyramid roofed lodge, harled with margins, attractive wooden porch. c.1800.
17782	NEWTONMILL HOUSE, GARAGES AND FARMSTEADING	Listed (B)	MEDIUM	2	7.6	NONE	NONE	Trees around Newtonmill House screen view to turbines.	Plain single storey functional, rubble built: but having 2-storey frontage to house with quoin angles circular 1st floor windows and ashlar centre-piece with flat shouldered arch, left window flanked by circular recesses and pediment above: harled piend roof: c.1745.
17794	STRACATHRO, MILLDEN COTTAGE	Listed (B)	MEDIUM	2	7.9	NONE	NONE	View will be screened by trees, including the corner of Edzell Wood.	2-storey 3-window rubble built with piend roof and centre chimney, consoled doorway: 1-window end elevation. c.1830.
17796	INCHBARE, LADESIDE MILL	Listed (B)	MEDIUM	2	6.5	NEGLIGIBLE	NEGLIGIBLE	Possible to see turbines from site, but structure 'spoiled by recent additions'	Large rubble-built 2/3 storey, early 19th cent. Finely constructed brick kiln. 18' overshot iron waterwheel, still working, now generates electricity; buildings otherwise semi-derelict and spoiled by recent additions.
17797	INCHBARE, WEST WATER BRIDGE	Listed (B)	MEDIUM	2	6.5	NEGLIGIBLE	NEGLIGIBLE	Road bridge with no pavement - so pedestrians using it would not stop to admire views. No public footpath beside river for general walkers - and river is tree-lined, so unlikely that anyone would see both bridge and turbines from riverside.	3 segmental arches, heavy outwaters: 1771 panel on approaches. West side refaced at spandrels with bull faced masonry and widened on E. side mid 19th cent.

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17798	AUCHENREOCH HOUSE	Listed (B)	MEDIUM	2	6.2	NONE	NONE	Private house, surrounded by trees that would obscure view of turbines.	2-storey mansion: 5 window E. frontage with centre projecting and pedimented, architraved doorway flanked by windows, single window above (originally pair) late 18th cent rubble-built: early 19th cent 3-window S. frontage formed, centre projects and pedimented, pinned ashlar, and E frontage partly remodelled. S. centre porch c.1845. No special interior features.
17805	STRACATHRO HOUSE, WALLED GARDEN AND BELVEDERE	Listed (B)	MEDIUM	0	8.0	NONE	NONE	Within walled garden, wall would obscure views. The entrance faces turbines, so main façade is viewed with back to turbine. Trees in Estate also obscure views to turbine.	Half-moon plan, hot-houses against N Wall with belvedere tower rising above, near-symmetrical ashlar range of sheds flank belvedere tower on N. side. Archibald Simpson, archt., c.1827 or shortly thereafter.
17807	STRACATHRO HOUSE, GATE PIERS	Listed (B)	MEDIUM	2	8.8	NONE	NONE	Setting to gate piers already compromised by proximity to A90, a service station, NHS signage and modern hospital buildings. Views to turbines also obscured by trees.	2 piers: monoliths: finely detailed cornices: surmounted by swagged urns. Archibald Simpson architect, c.1827.
17808	NEWTONMILL HOUSE	Listed (B)	MEDIUM	2	7.6	NONE	NONE	Trees around the Lodge and around Newtonmill House screen view to turbines.	2-storey and attic 5 window harled with margins, 2-window gables: all margins splayed: probably mid 17th cent, remodelled at various dates 18th cent. 2 back wings added that on E c.1740 and that on W perhaps slightly later giving twin gable N. frontage. Moulding of doorway and elliptical window at centre 1st, Robert Hurd architect 1959 (originals destroyed mid 19th cent). Good interior work of various dates between 1700 and 1810. Rubble wall with ball finials on W.
17809	NEWTONMILL HOUSE, COTTAGE	Listed (B)	MEDIUM	2	7.6	NONE	NONE	Trees around the Lodge and around Newtonmill House screen view to turbines.	2-storey whitewashed rubble with margins, piend roof. Perhaps intended to be one of a pair of symmetrical wings to house. Early 18th cent.
18981	LUTHERMUIR, MAIN STREET, TELEPHONE CALL BOX	Listed (B)	MEDIUM	2	10	NONE	NONE	Monument no longer at this location.	Standard K6 telephone kiosk. Designed by Sir Giles Gilbert Scott, 1935.
19825	NEWTONMILL HOUSE, WALLED GARDEN, DOVECOT	Listed (B)	MEDIUM	2	7.7	NONE	NONE	Views to turbine hidden by wall of garden and by trees that surround Newtonmill House	Small and square, whitewashed rubble: pyramid roof with swept dormer feature having single row of pigeon holes. 18th cent.
6755	FETTERCAIRN, THE SQUARE, MARKET CROSS	Listed (A)	HIGH	1 (hub) 2 (tip)	10	NONE	NONE	No visibility as view to turbines screened by neighbouring buildings.	Dated 1670, originally at Kincardine, brought here 1730. Square stop-chamfered shaft with ell measure, moulded capital, cubical head with arms of Scotland, initials and arms of Earl Middleton. Sundials and date; stands on 5-step base with built plinth.
11257	EDZELL CASTLE	Listed (A)	HIGH	0	3.1	NONE	NONE	View to turbines from within garden blocked by wall. View from castle blocked by hill and trees.	Ruin: courtyard castle with large Pleasance or walled garden. Oldest part tower-house at S.W. angle of court, early 16th cent. 3-storey basement and attic with corbelled parapet walk; later in 16th cent. large courtyard added with pend to court in W. range and hall in N. with circular N.W. tower having circular stair turret in N.E. angle. Large rectangular garden, laid out to S. in 1604 with summer house at E. angle and bath-house (reduced to foundations) at W, elaborately finished: walls have coped tops with niched features, and divided into compartments by pilasters, treatment of compartments alternates chequer of flower boxes (having heraldic significance) and large recess for flower box with vesica panels above having sculpture representing Planetaru Deities, Liberal Arts and Cardinal Virtues, based on German engravings by Meister I.B. published in 1528. Garden house 2-storey with circular stair tower and vaulted ground floor, west compartment groined. Stone-slab roof. Collection of fragments. Castle gutted 1764.
12385	MAINS OF EDZELL, DOVECOT	Listed (A)	HIGH	1 (hub) 2 (tip)	3.5	NONE	NONE	Within working farmyard. Views to turbines almost certainly obscured by hill beside Edzell Castle and trees.	Square plan, rubble-built and white-washed with turrets (roofs now swept) at diagonally opposite angles. Doorway with panel above on W. face, moulding runs right round. Ruins of later N. compartment, built at angle to original. Probably c.1600.
16289	INGLISMALDIE CASTLE, DOVECOT	Listed (A)	HIGH	2	9.3	NONE	NONE	View to turbines screened by two woods, including Edzell Wood.	18th century. Large double-chamber rectangular (29'5" x 15'8") lean-to, no crowsteps, 3 conical finials on back wall, red rubble with rat course: 760 nests each chamber.
17803	STRACATHRO HOUSE	Listed (A)	HIGH	2	8.2	NONE	NONE	Private house, not visited, but views to turbine obscured by trees in Estate.	Large symmetrical Graeco-Roman ashlar faced mansion 2 storey on S.E. and 2-storey (later) attic and basement on N.W. with single storey and basement wings: segmentally-arched terrace at main block on N.W. S.E. frontage: 6-bay fluted corinthian colonnade set in pilasters between balustraded 2 window ends: centre 3 bays advanced with pediment as porte cochere after manner of Carlton House London. Wings have tetrastyle anta order with pediment: 7/8 window N.W. front with centre tripartite at ground floor. Rusticated terrace and basement. Interior: central hall, dome on pendentives marble corinthian columns yellow scagliola walls: 3 notable N. rooms, centre room has segmentally-arched ceiling and scagliola columns; ceilings painted and stencilled; staircase Pompeian red with decorative panels. Archibald Simpson (Aberdeen), archt., begun 1827.
17804	STRACATHRO HOUSE, STABLES	Listed (A)	HIGH	2	8.1	NONE	NONE	View to turbines obscured by trees within Estate.	2-storey ashlar with very low 1st floor quadrangular plan (quadrangular roofed later). Centre arched gateway at centre of S. front, channelled, coupled antae with triglyph frieze: end features pedimented; octagonal doocot tower at centre of N front. Archibald Simpson archt., c.1827, or shortly thereafter.
	FETTERCAIRN	CA	HIGH	2	>10	NONE	NONE	No actual visibility	

APPENDIX 8 NOISE

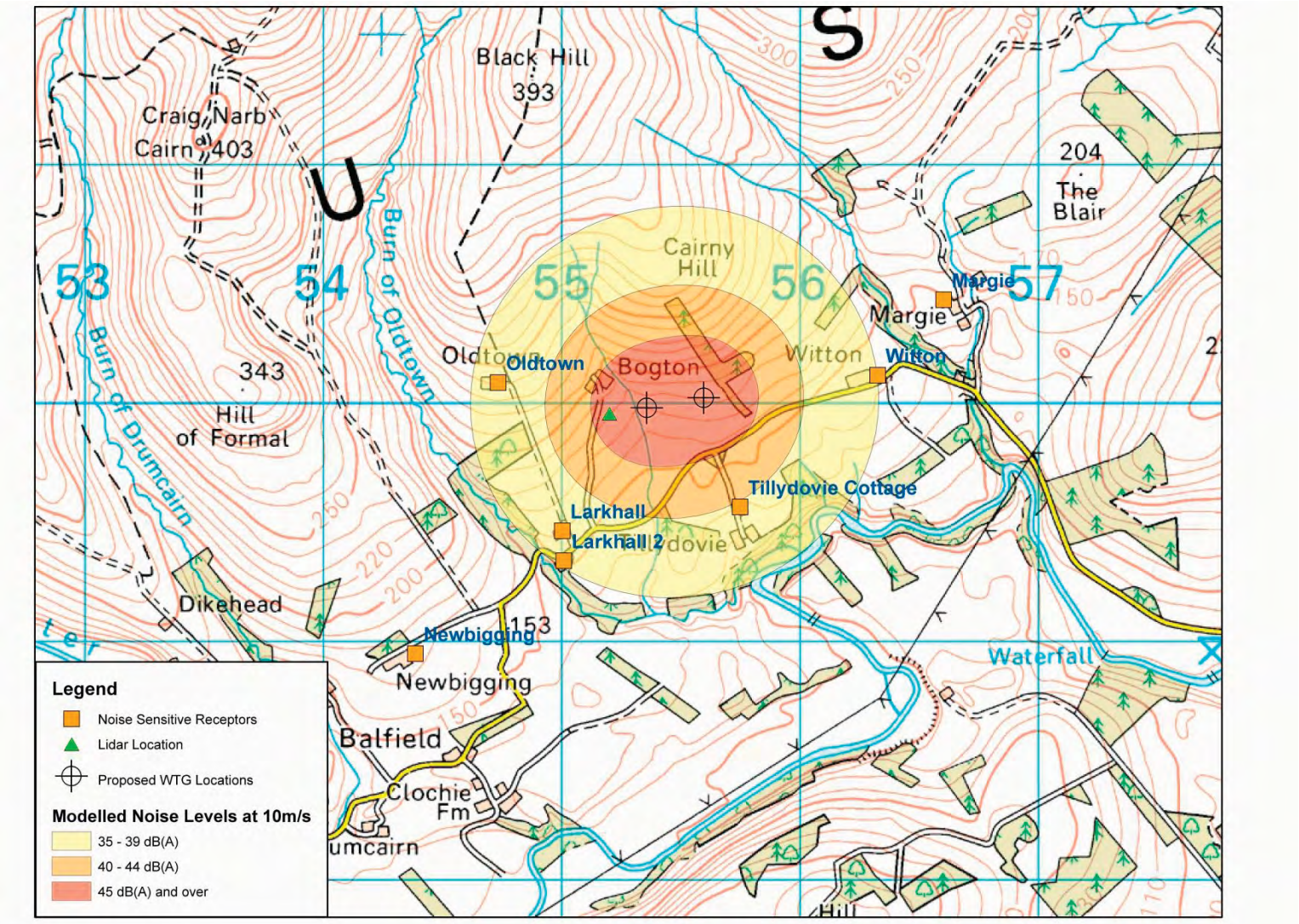

Figure 8.1: Map showing WTG locations, Receptors and Noise Contours at 10 m/s wind speed

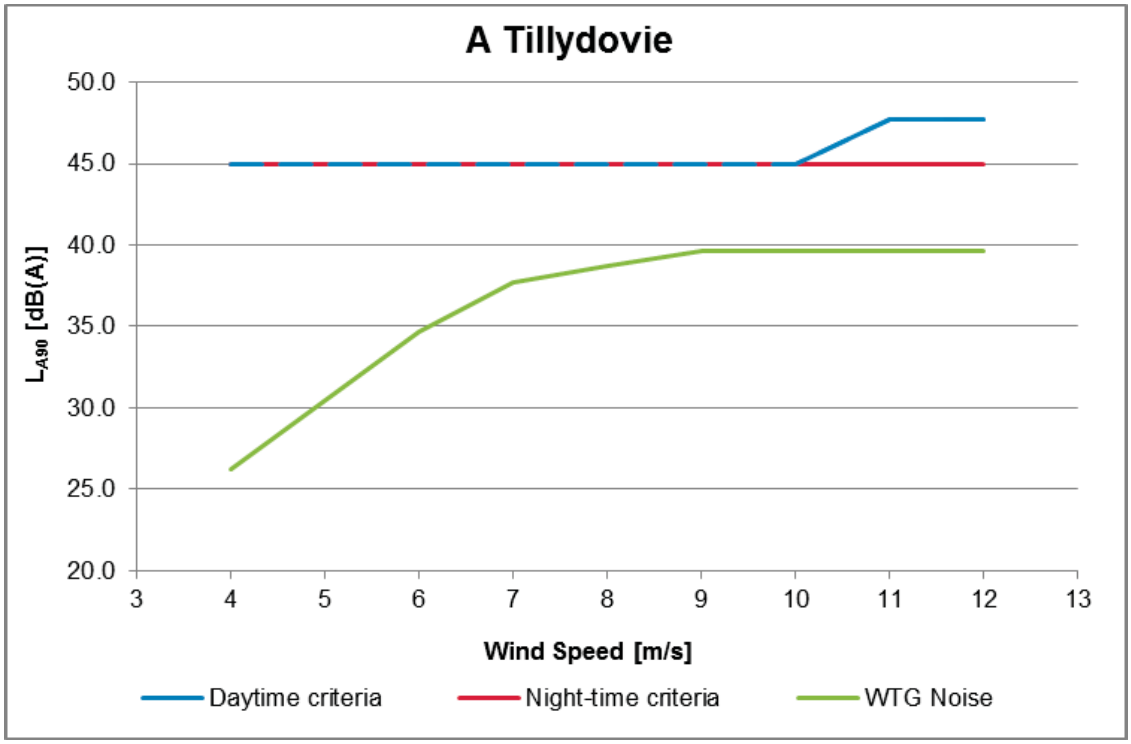

Figure B1: Predicted noise, compared with quiet daytime and night-time criteria, Tillydovie Cottage (Receptor A)

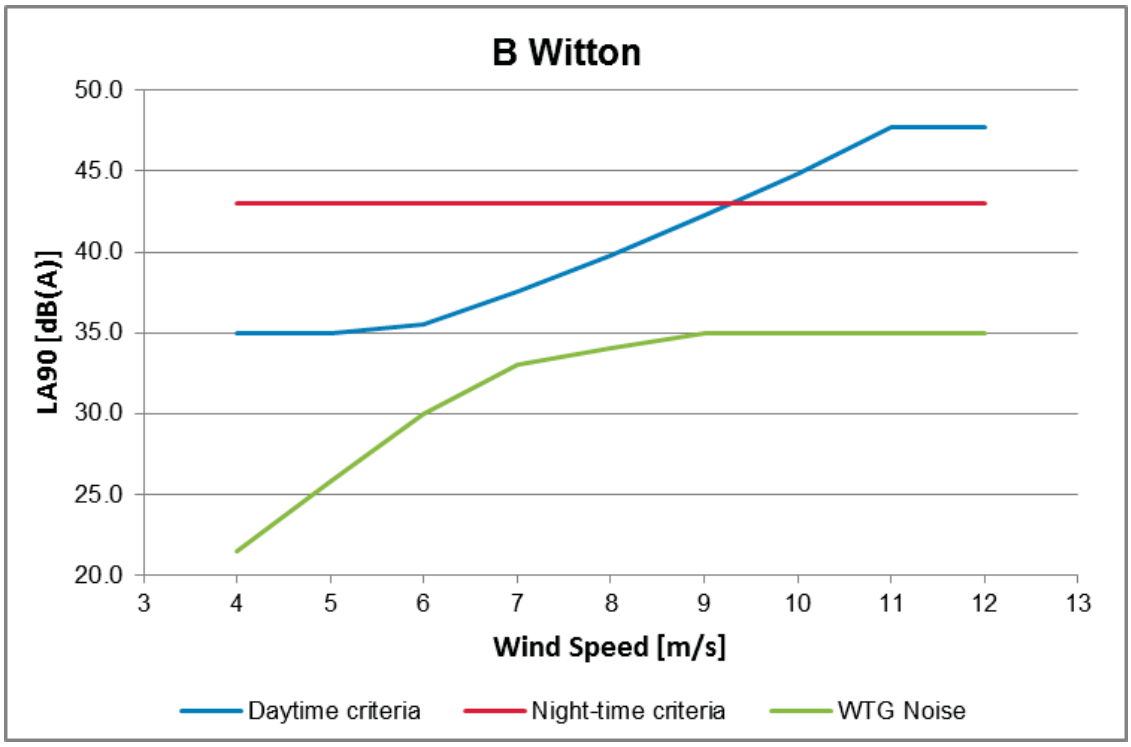

Figure B2: Predicted noise, compared with quiet daytime and night-time criteria, Witton (Receptor B)

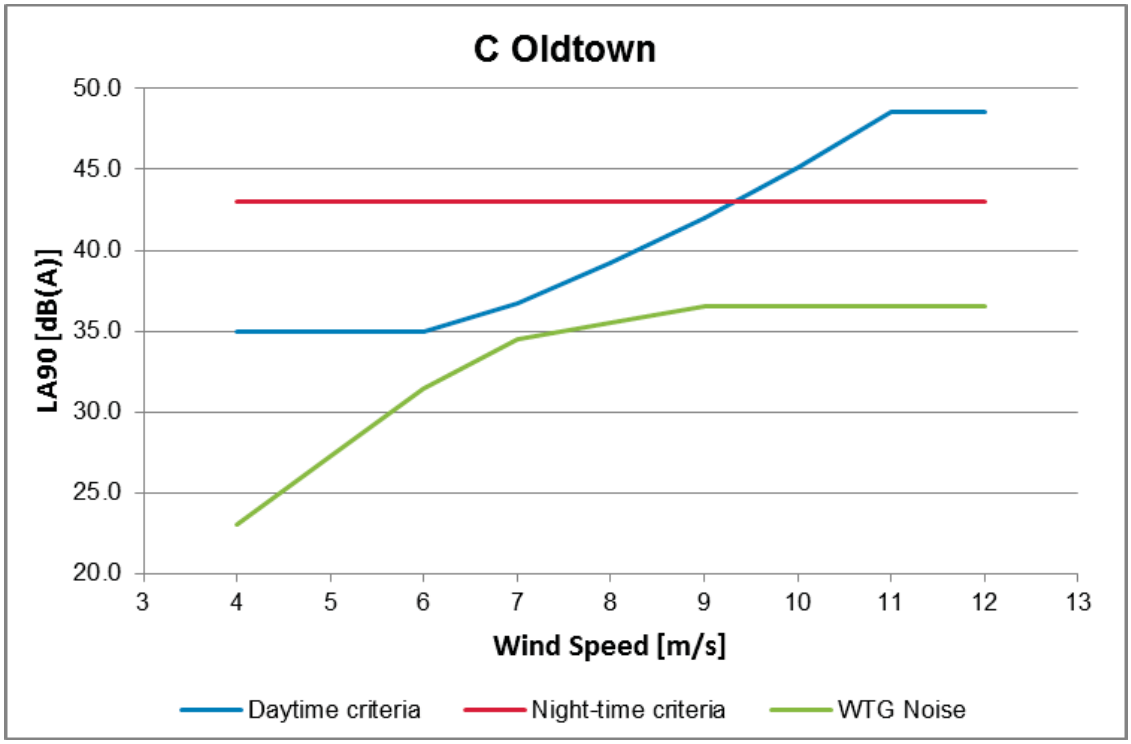

Figure B3: Predicted noise, compared with quiet daytime and night-time criteria, Oldtown (Receptor C)

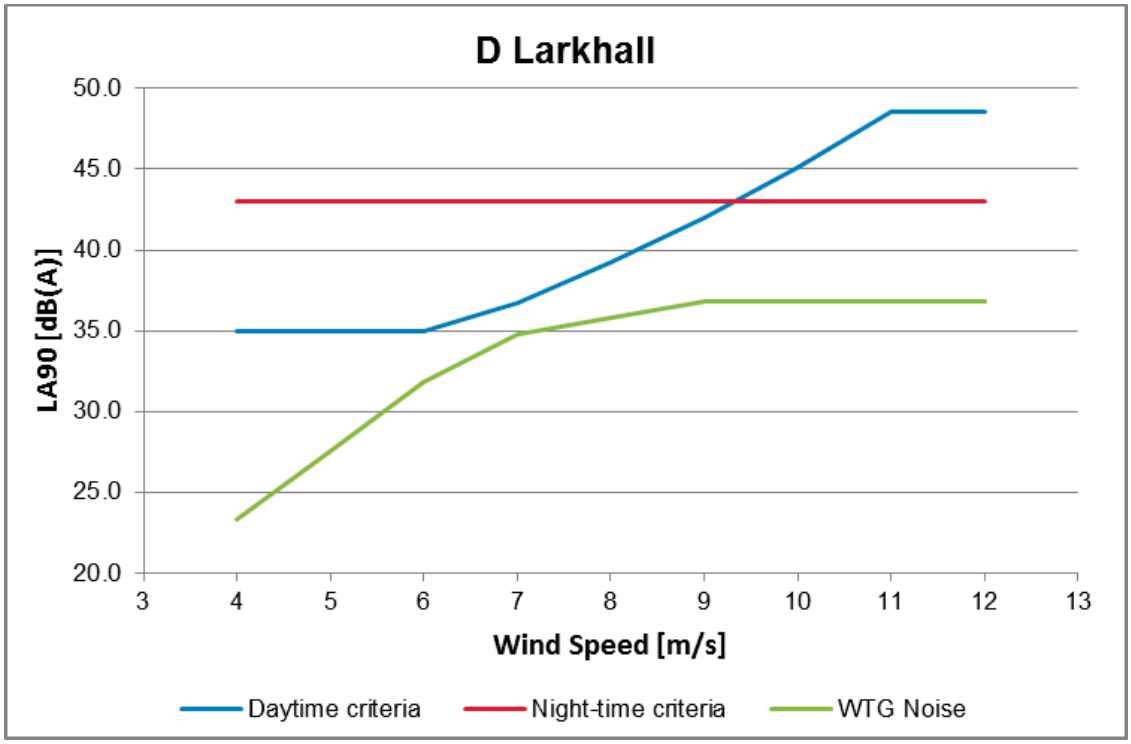

Figure B4: Predicted noise, compared with quiet daytime and night-time criteria, Larkhall (Receptor D)

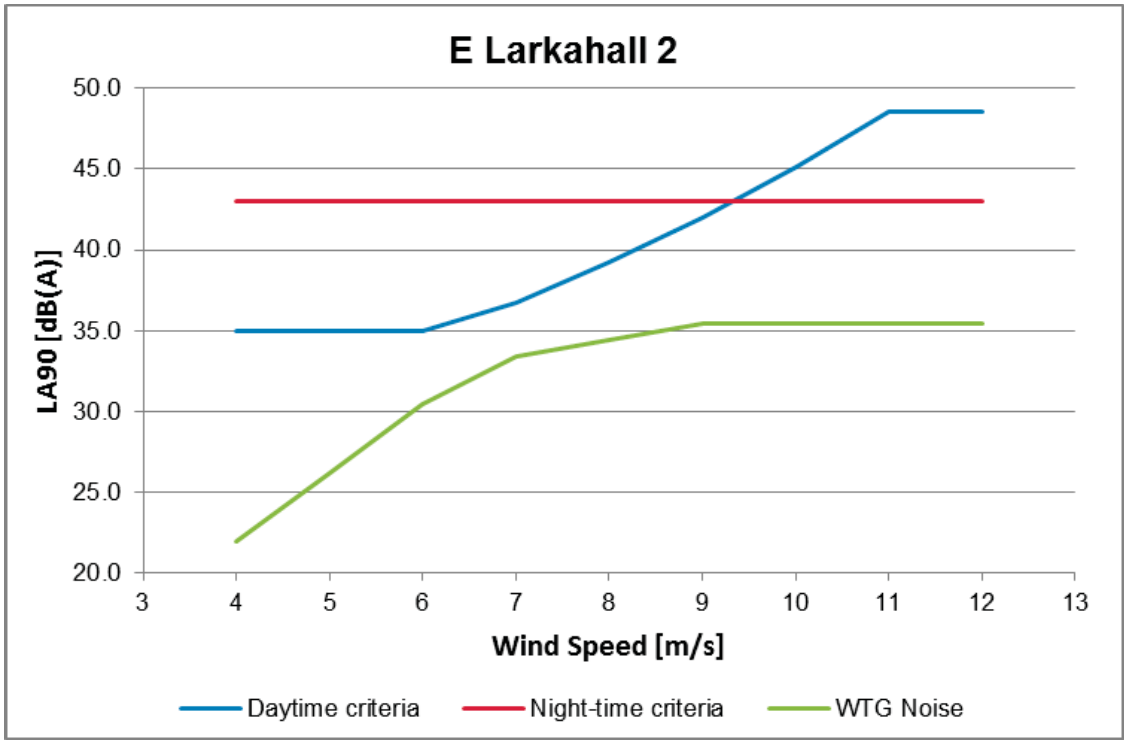

Figure B5: Predicted noise, compared with quiet daytime and night-time criteria, Larkhall 2 (Receptor E)

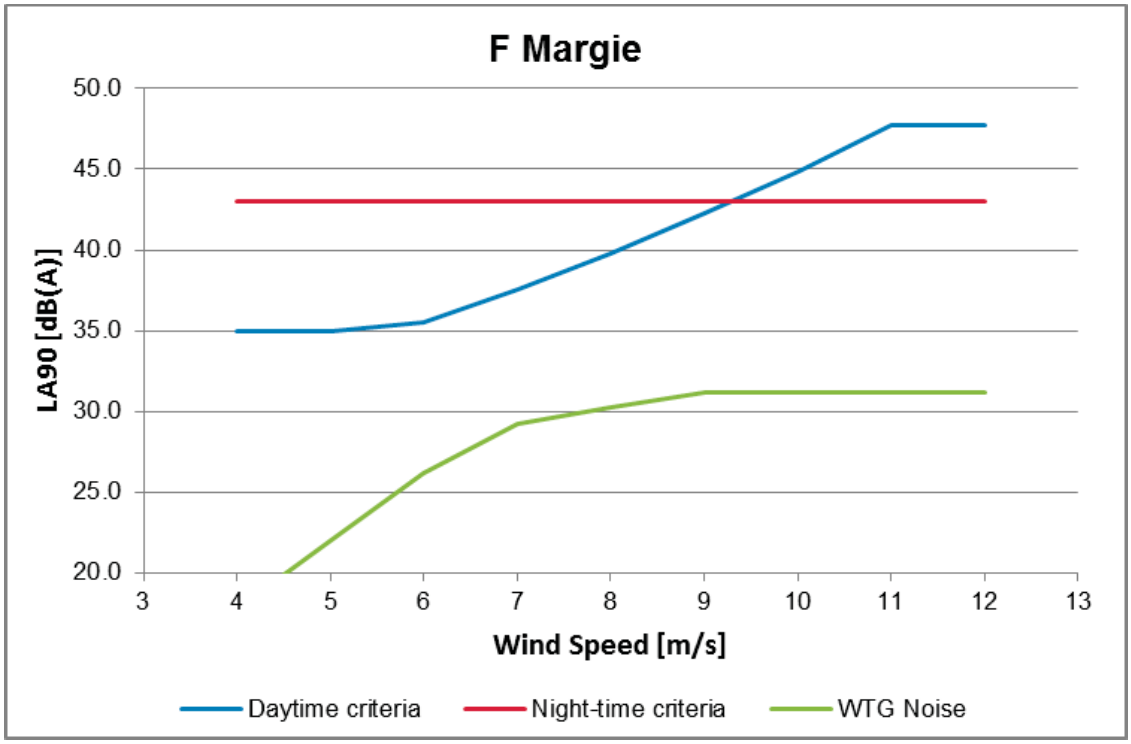

Figure B6: Predicted noise, compared with quiet daytime and night-time criteria, Margie (Receptor F)

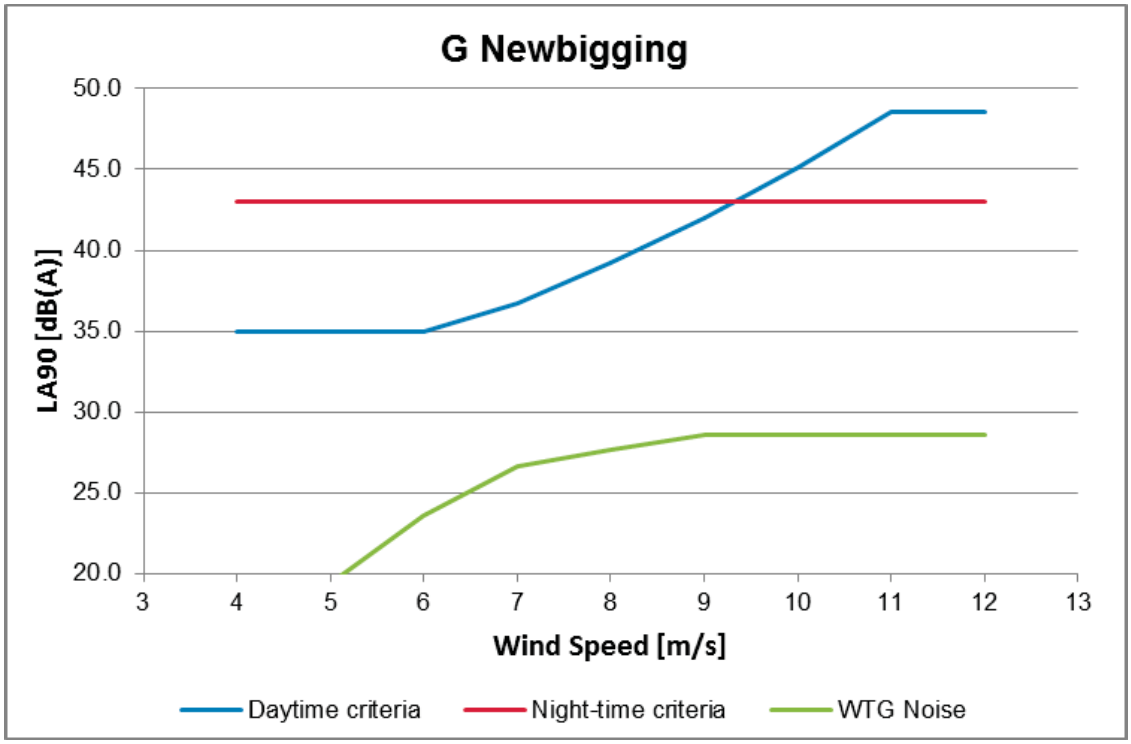

Figure B7: Predicted noise, compared with quiet daytime and night-time criteria, Newbigging (Receptor G)

HAYES MCKENZIE

PARTNERSHIP LTD

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Lower Cairny
Noise Predictions and Mitigation

Report HM: 2877_R01

31 July 2014

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LOWER CAIRNY,

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Report HM: 2877_R01,

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1. INTRODUCTION

1.1 Hayes McKenzie Partnership Ltd (HMPL) has been commissioned to assess predicted noise levels from the proposed Lower Cairny Wind Farm against noise limits derived from the results of a background noise survey carried out by Sgurr Energy at two residential locations neighbouring the proposed wind farm site. HMPL have also been asked to devise a mitigation strategy for the proposed wind farm site where predicted noise levels do not meet the limits.

2. PREDICTION AND ASSESSMENT MODEL INPUT DATA

2.1 The national grid coordinates of the proposed wind turbines have been taken from Sgurr Energy's report: 12/6326/001/GLA/O/R/001 (included in Appendix A) and can be found in Table 1 below.

Table 1 - Proposed Wind Turbine Coordinates

Turbine ID	Easting	Northing
T1	355356	769976
T2	355594	770017

2.2 The noise limits are based on background noise monitoring carried out at two residential dwelling neighbouring the wind farm site, called Tillydovie Cottage and Oldtown. The details of the noise monitoring and its methodology can be found in Appendix A. The noise limits were derived by HMPL by calculating the prevailing background noise levels using the coefficients of the regression lines given in Sgurr Energy's report. The resultant limits were then derived by taking the greater of the background noise level plus 5 dB or the lower fixed limits of 35 – 40 dB for the daytime limit, and 43 dB at night. The derived noise limits can be found in Table 2 below, with both the lower and upper limits, of 35 – 40 dB respectively, presented in the table and subsequent assessment charts. It should be noted that the daytime noise limit at 11 m/s has also been applied to 12 m/s to be consistent with that presented in Sgurr Energy's report.

Table 2 - Derived Noise Limits (dB L_{A90})

		Standardised 10 m Height Wind Speed (m/s)												
Dwelling	**Limit**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Tillydovie Cottage	**Lower Daytime**	35.0	35.0	35.0	35.0	35.0	35.0	35.3	37.2	39.3	41.6	44.1	46.8	46.8
	Upper Daytime	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.6	44.1	46.8	46.8
	Night-time	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Oldtown	**Lower Daytime**	35.0	35.0	35.0	35.0	35.0	35.0	35.0	36.4	38.7	41.2	44.0	47.1	47.1
	Upper Daytime	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	44.0	47.1	47.1
	Night-time	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0

2.3 Assessments have been carried out the seven receiver locations, detailed in Appendix A. These can be found in Table 3 below as well as detailing which noise limits have been taken to be applicable to each of the assessment locations.

Table 3 - Assessment Locations

Receptor	Easting	Northing	Representative Noise Limits
Tillydovie Cottage	355747	769564	Tillydovie Cottage
Witton	356324	770117	Tillydovie Cottage
Oldtown	354732	770086	Oldtown
Larkhall	355001	769464	Oldtown
Larkhall 2	355007	769339	Oldtown
Margie	356601	770433	Tillydovie Cottage
Newbigging	354385	768949	Oldtown

2.4 Operational noise predictions have been carried out based on the use of an Enercon E-48 800 kW wind turbine with a hub height of 50 m. The declared apparent sound power level values for the turbine have been calculated in line with Hayes McKenzie guidance document, *Best Practice Guide for the use of Wind Turbine Noise data: Calculation of Confidence Level*, Rev:3_1 (2013) (included in Appendix B). In this case they are based on likely warranted noise data presented in Enercon document SIAS-04-SPL E48 OM I Rev3_0-eng-eng (included in Appendix C).

2.5 The declared apparent sound power level vs standardised 10 m height wind speed can be found in Table 4 below. The octave band data (normalised to 10 m/s standardised 10 m height wind speed) can be found in Table 5, also below.

Table 4 - Turbine Source Sound Power Levels

Turbine Model	Standardised 10 m Height Wind Speed (m/s)	4	5	6	7	8	9	10	11	12
Enercon E-48 800 kW (OM I) 50 m hub-height	Warranted Sound Power Level (dB L_{WA})	89.0	93.3	97.5	100.5	101.5	102.5	102.5	102.5	102.5
	K (95%)	2	2	2	2	2	2	2	2	2
	Declared Sound Power Level (dB L_{WA})	91.0	95.3	99.5	102.5	103.5	104.5	104.5	104.5	104.5

Table 5 - Octave Band Noise Levels for Standardised 10 m height wind speed of 10 m/s

Turbine Model	Overall (dB L_{WA})	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Enercon E-48 800 kW (OM I)	104.5	81.0	86.8	95.7	99.2	100.3	94.8	90.0	87.0

2.6 The prediction methodology used to carry out the turbine noise predictions can be found in Appendix D.

3. ASSESSMENT RESULTS

3.1 The predicted noise level and margins by which each of the noise limits are met at each receiver location can be found in Table 6 below.

3.2 Assessment charts showing the noise limits and predicted turbine noise levels against wind speed are found in Figure 1 – Figure 14 in Appendix E.

3.3 It can be seen in Table 6 that the predicted turbine noise levels are below the night and lower daytime noise limits at all assessment locations by a minimum margin of 1.8 dB, with the exception of Tillydovie Cottage where there is an exceedance of the lower daytime noise limit of 0.5 dB at 7 m/s standardised 10 m height wind speed, however predicted noise levels are below upper daytime noise limit.

Table 6 - Assessment Results (dB L_{A90})

		Standardised 10 m Height Wind Speed (m/s)								
Dwelling		4	5	6	7	8	9	10	11	12
Tillydovie Cottage	Predicted Noise Level	26.2	30.5	34.7	37.7	38.7	39.7	39.7	39.7	39.7
	Night-time Margin	16.8	12.5	8.3	5.3	4.3	3.3	3.3	3.3	3.3
	Upper Daytime Margin	13.8	9.5	5.3	2.3	1.3	1.9	4.4	7.1	7.1
	Lower Daytime Margin	8.8	4.5	0.6	-0.5	0.6	1.9	4.4	7.1	7.1
Witton	Predicted Noise Level	21.3	25.6	29.8	32.8	33.8	34.8	34.8	34.8	34.8
	Night-time Margin	21.7	17.4	13.2	10.2	9.2	8.2	8.2	8.2	8.2
	Upper Daytime Margin	18.7	14.4	10.2	7.2	6.2	6.8	9.3	12.0	12.0
	Lower Daytime Margin	13.7	9.4	5.5	4.4	5.5	6.8	9.3	12.0	12.0
Oldtown	Predicted Noise Level	22.8	27.1	31.3	34.3	35.3	36.3	36.3	36.3	36.3
	Night-time Margin	20.2	15.9	11.7	8.7	7.7	6.7	6.7	6.7	6.7
	Upper Daytime Margin	17.2	12.9	8.7	5.7	4.7	4.9	7.7	10.8	10.8
	Lower Daytime Margin	12.2	7.9	3.7	2.1	3.4	4.9	7.7	10.8	10.8
Larkhall	Predicted Noise Level	23.1	27.4	31.6	34.6	35.6	36.6	36.6	36.6	36.6
	Night-time Margin	19.9	15.6	11.4	8.4	7.4	6.4	6.4	6.4	6.4
	Upper Daytime Margin	16.9	12.6	8.4	5.4	4.4	4.6	7.4	10.5	10.5
	Lower Daytime Margin	11.9	7.6	3.4	1.8	3.1	4.6	7.4	10.5	10.5
Larkhall 2	Predicted Noise Level	21.7	26.0	30.2	33.2	34.2	35.2	35.2	35.2	35.2
	Night-time Margin	21.3	17.0	12.8	9.8	8.8	7.8	7.8	7.8	7.8
	Upper Daytime Margin	18.3	14.0	9.8	6.8	5.8	6.0	8.8	11.9	11.9
	Lower Daytime Margin	13.3	9.0	4.8	3.2	4.5	6.0	8.8	11.9	11.9
Margie	Predicted Noise Level	17.2	21.5	25.7	28.7	29.7	30.7	30.7	30.7	30.7
	Night-time Margin	25.8	21.5	17.3	14.3	13.3	12.3	12.3	12.3	12.3
	Upper Daytime Margin	22.8	18.5	14.3	11.3	10.3	10.9	13.4	16.1	16.1
	Lower Daytime Margin	17.8	13.5	9.6	8.5	9.6	10.9	13.4	16.1	16.1
Newbigging	Predicted Noise Level	14.5	18.8	23.0	26.0	27.0	28.0	28.0	28.0	28.0
	Night-time Margin	28.5	24.2	20.0	17.0	16.0	15.0	15.0	15.0	15.0
	Upper Daytime Margin	25.5	21.2	17.0	14.0	13.0	13.2	16.0	19.1	19.1
	Lower Daytime Margin	20.5	16.2	12.0	10.4	11.7	13.2	16.0	19.1	19.1

4. MITIGATION

4.1 The Enercon E-48 turbine can be programmed to run at noise reduced modes, whereby the rotational speed of the wind turbine is restricted with a resultant reduction in noise level and energy production. The declared apparent sound power levels for the reduced noise modes are detailed in Table 7 below, and the datasheet they are based on is included in Appendix C.

Table 7 - Reduced Noise Mode Turbine Source Sound Power Level (dB L_{WA})

	Standardised 10 m Height Wind Speed (m/s)								
Reduced Noise Mode	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
800 kW (standard mode of operation)	91.0	95.3	99.5	102.5	103.5	104.5	104.5	104.5	104.5
700 kW	91.0	95.3	99.5	102.5	103.5	103.5	103.5	103.5	103.5
600 kW	91.0	95.3	99.5	102.5	102.6	102.6	102.6	102.6	102.6
500 kW	91.0	95.3	99.5	102.0	102.0	102.0	102.0	102.0	102.0
400 kW	91.0	95.3	99.5	100.5	100.5	100.5	100.5	100.5	100.5
300 kW	91.0	95.3	99.5	99.5	99.5	99.5	99.5	99.5	99.5

4.2 In this case there is an exceedance of the lower daytime noise limit at 7 m/s standardised 10 m height wind speed, and so a mitigation strategy has been developed to enable this limit to be met. The lower daytime limit can be met by running turbine T2 in the 400 kW mode during the daytime hours of 0700-2300 for standardised 10 m height wind speeds of 6 – 8 m/s. The 400 kW mode has a source sound power level 2 dB lower than the normal 800 kW operating mode at that wind speed. The turbine source sound power level for T2 including this mitigation can be seen in Table 8 below.

Table 8 - Mitigated T2 Source Sound Power Levels

Turbine Model	**Standardised 10 m Height Wind Speed (m/s)**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Enercon E-48 800 kW (OM I) 50 m hub-height	**Warranted Sound Power Level (dB L_{WA})**	89.0	93.3	97.5	98.5*	101.5	102.5	102.5
	K (95%)	2	2	2	2	2	2	2
	Declared Sound Power Level (dB L_{WA})	91.0	95.3	99.5	100.5	103.5	104.5	104.5

**mitigated to 400 kW noise reduced mode.*

4.3 A revised assessment has been carried out based on this mitigation strategy, the results of which can be seen in Table 9 below. The predicted noise levels at Tillydovie Cottage with the mitigation implemented and the noise limits can be seen plotted against wind speed in Figure 15 in Appendix E.

Table 9 - Mitigated T2 Assessment Results (dB L_{A90})

		Standardised 10 m Height Wind Speed (m/s)								
Dwelling	**Data**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Tillydovie Cottage	**Predicted Noise Level**	26.2	30.5	34.7	36.6	38.7	39.7	39.7	39.7	39.7
	Lower Daytime Margin	8.8	4.5	0.6	0.6	0.6	1.9	4.4	7.1	7.1

4.4 It can be seen in Table 9 and Figure 15 in Appendix E that with the mitigation strategy implemented, the predicted noise levels are below the lower daytime noise limit at Tillydovie Cottage by a minimum margin of 0.6 dB. It should be noted that in practice T2 would only need to be operated in the 400 kW mode for wind speeds of 6 – 8 m/s and wind directions of 255 – 45 degrees when the property would be downwind of the wind turbines. In should be noted that when T2 is operating with mitigation, operational noise levels would also be reduced at other properties.

5. CONCLUSIONS

5.1 An assessment of the likely noise impact of the proposed Lower Cairny Wind Farm has been carried out.

5.2 Noise predictions have been carried out for the closest residential locations to the site based, on declared sound power level data for an Enercon E-48 wind turbine.

5.3 The predicted noise levels have been assessed against noise limits calculated using the background noise data in Sgurr Energy's report, 12/6326/001/GLA/O/R/001.

5.4 The noise assessment showed an exceedance of the lower daytime noise limit at Tillydovie cottage under certain wind conditions, and the mitigation required to enable the limit to be met has been calculated.

5.5 The assessment of the proposed development with the mitigation strategy implemented shows that the predicted noise levels at all of the assessment locations meet the derived night and lower daytime noise limits by a minimum margin of 0.6 dB.

Appendix A

Sgurr Energy Noise Assessment Report

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sgurr energy

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Lower Cairny Wind Farm Noise Impact Assessment

November 2012

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Lower Cairny Wind Farm Noise Impact Assessment

SUMMARY:

This report presents an assessment of the noise impact of the Lower Cairny wind farm development on nearby noise sensitive receptors (NSRs). This assessment considers noise impact during operation.

The noise impact of the proposed wind farm development on nearby noise sensitive receptors has been modelled in accordance with ETSU-R-97, ISO 9613-2 and the guidance in the Institute of Acoustics' Acoustics Bulletin, assuming a candidate WTG.

The proposed two WTG layout is predicted to meet the relevant criteria at all wind speeds at all noise sensitive receptors.

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1 INTRODUCTION

This report presents an assessment of the noise impact of the Lower Cairny wind turbine development on nearby noise sensitive receptors (NSRs). This assessment considers noise impact only during operation.

Wind turbine generator (WTG) operational noise is assessed, as a function of wind speed, against existing background noise levels at the same wind speed, with fixed lower noise limits that typically only affect the lowest wind speeds. The operational noise assessment has been carried out in accordance with the recommendations of ETSU-R-97 *The Assessment and Rating of Noise from Wind Farms*[1], (the methodology recommended to assess noise from wind turbines in the Scottish Government's online planning policy[2] and in particular, the page on onshore wind turbines[3]).

Background noise monitoring was undertaken at two locations between the following dates:

- Tillydovie Cottage 24 September to 9 October 2012;
- Oldtown 24 September to 9 October 2012;

Noise levels have been predicted for Lower Cairny wind farm, based on the proposed WTG locations and the predicted sound power level for a candidate WTG (Enercon E48).

2 SITE DETAILS

In this case, the operational noise impact assessment considered seven receptors, covering a range of directions from the wind farm location. The Lower Cairny wind farm coordinates and receptors for which the operational noise impact has been assessed are listed in Table 1 and Table 2 and shown in Appendix A.

Table 1: Noise Sensitive Receptors

Receptor	Name	Easting	Northing
A	Tillydovie Cottage	355747	769564
B	Witton	356324	770117
C	Oldtown	354732	770086
D	Larkhall	355001	769464
E	Larkhall 2	355007	769339
F	Margie	356601	770433
G	Newbigging	354385	768949

Table 2: WTG Locations

[1] ETSU-R-97 (2007) *The Assessment and Rating of Noise from Wind Farms*, ETSU for the Department of Trade and Industry

[2] *Renewable Energy,* http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables (Scottish Government, last viewed 15 March 2012)

[3] *Onshore wind turbines,* http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore (Scottish Government, last viewed 15 March 2012)

ID	Easting	Northing
T1	355356	769976
T2	355594	770017

3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

3.1 LEGISLATION, POLICY AND GUIDANCE

An overview of key guidance with respect to operational noise is outlined below, and further details of legislation, policy and guidance specifically for operational noise (ETSU-R-97[1]) are set out in Section 3.2.

Noise propagation has been modelled in accordance with International Standard ISO 9613-2: 1996 Acoustics – Attenuation of Sound Propagation Outdoors – Part 2: General Method of Calculation[4].

PAN 1/2011: Planning and Noise[5] provides advice on how the planning system can be used to reduce the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.

The Scottish Government's online planning policy[6] and in particular, the page on onshore WTGs, recommends the framework set out in the report *The Assessment and Rating of Noise from Wind Farms (ETSU-R-97)* for the measurement of WTG noise. It gives indicative noise levels calculated to offer a reasonable degree of protection to those living near to WTGs, without placing unreasonable restrictions on wind farm development. It also states that well-specified and well-designed wind farms should be located so that increases in ambient noise levels around noise sensitive receptors are kept to acceptable levels in relation to existing background noise. This will normally be achieved through good design of the WTGs and through allowing sufficient distance between the WTGs and any existing noise-sensitive development so that noise from the wind farm will not normally be significant. Noise levels from WTGs are generally low, and under most operating conditions it is likely that WTG noise would be completely masked by wind-generated background noise.

The impact of operational noise has been assessed in accordance with ETSU-R-97, taking cognisance of the most recent best-practice guidelines of Bowdler et al (2009)[7]. In October 2009, The Rt Hon Lord Hunt of Kings Heath OBE (Minister of State, DECC) wrote to Environmental Protection UK in response to their claim that a review of ETSU was due. He states[8]:

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[4] International Standard ISO 9613-2: 1996, *Acoustics – Attenuation of Sound during Propagation Outdoors*

[5] Planning Advice Note 1/2011, *Planning and Noise*, http://www.scotland.gov.uk/Resource/Doc/343210/0114180.pdf, (Scottish Government, last viewed 15 March 2012)

[6] *Renewable Energy,* http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables (Scottish Government, last viewed 15 March 2012)

[7] *Prediction and assessment of wind turbine noise - agreement about relevant factors for noise assessment from wind energy projects*. D Bowdler, AJ Bullmore, RA Davis, MD Hayes, M Jiggins, G Leventhall, AR McKenzie. Institute of Acoustics, Acoustics Bulletin, Vol 34, No 2 March/April 2009

[8] http://www.environmental-protection.org.uk/news/detail/?id=2300

'You're quite right that modern turbines are generally larger than those on which the ETSU-R-97 guidance was based. Noise outputs from these larger turbines have also, however, reduced in that time. Since the ETSU-R-97 derived noise limits are a function of background noise, there is currently no evidence to suggest that the larger turbines are any more likely to cause a noise impact than earlier and smaller designs. Similarly, there is currently no evidence to suggest that the small incidence of Amplitude Modulation (AM) that is reported to occur at a few sites is as a result of turbine size.'

In essence, therefore, we continue to support the approach set out in Planning Policy Statement (PPS) 22 - Renewable Energy, including the use of ETSU-R-97 to "ensure that renewable energy developments have been located and designed in such a way to minimise increases in ambient noise levels".

3.1.1 CONSULTATION

Consultations were carried out as outlined in Table 3.

Table 3: Summary of Consultations

Consultee: Louise Akroyd; Angus Council Environmental Health Officer
Response: Email on 31 August 2012 confirming that: • Lidar would appear to be an acceptable method for gathering wind speed data and would therefore be accepted by this department for the site at Lower Cairny. ***Response:*** Email on 12 September 2012 confirming that: • In relation to the methodology suggested for the noise and wind monitoring I am happy with what is being proposed… ***Response:*** Meeting on the proposed wind farm site confirming that: • The noise measurement locations are suitable and representative of the surrounding area.

3.2 OPERATIONAL NOISE

The assessment of operational noise effects was undertaken following the guidance of ETSU-R-97. Details of the ETSU guidance are set out below.

The current practice on controlling WTG noise imposes noise limits at the nearest noise sensitive properties. Noise limits should be applied to external locations and should apply only to those areas frequently used for relaxation or activities for which a quiet environment is highly desirable.

Noise limits set relative to the background noise are more appropriate than fixed limits in the majority of cases. Generally, the noise limits should be set relative to the existing background noise at the nearest noise-sensitive properties and the limits should reflect the variation in both WTG source noise and background noise with wind speed.

Separate noise limits should apply for day-time and for night-time as during the night the protection of external amenity becomes less important and the emphasis should be on preventing sleep disturbance. Absolute noise limits and margins above background should relate to the cumulative impact of all WTGs in the area contributing to the noise received at the properties in question. Any existing WTGs should not be considered as part of the prevailing background noise.

The $L_{A90,10min}$ descriptor should be used for both the background noise and the wind farm noise, and when setting limits it should be borne in mind that the $L_{A90,10min}$ of the wind farm is likely to be about 1.5-2.5 dB(A) less than the L_{Aeq} measured over the same period. The use of the $L_{A90,10min}$ descriptor for wind farm noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

For single WTGs or wind farms with very large separation distances between the WTGs and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to a $L_{A90,10min}$ of 35 dB(A) up to wind speeds of 10 m/s at 10 m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary.

3.2.1 OPERATIONAL NOISE ASSESSMENT CRITERIA

The operational noise criteria, above which noise levels would be considered a significant impact, are derived as set out in ETSU-R-97. They have been consistently applied by planning authorities to wind energy developments since 1997 and have a high level of general acceptance[9]. In assessing impact, the day is divided into quiet day-time hours and night-time hours.

- Night-time: (2300-0700) limit 43 dB(A) L_{90} (10 minutes) when measured in free field conditions outside dwellings or up to 5 dB above background, whichever is the greater.
- Quiet day-time: (All evenings 1800-2300, Saturdays 1300-1800, Sundays 0700-1800) but in rating terms covering all daytime. When backgr3ound levels do not exceed 30 dB(A), L_{90} (10 minutes) absolute level limit of between 35 dB(A) and 40 dB(A) L_{90} (10 minutes) the precise level depending on location factors or up to 5 dB above background level, whichever is the greater.

Both day- and night-time lower fixed limits can be increased to 45 dB(A) if the occupier has some financial involvement in the wind farm.

These criteria include an allowance for that character of WTG noise generally described as ‘blade swish’.

The actual absolute level selected for low background noise conditions depends on a number of factors. These factors include the number of dwellings in the neighbourhood, the impact of noise limits on the energy yield of the wind farm and the duration and level of exposure.

3.2.2 WTG EMISSION DATA

A-weighted octave band noise levels for a candidate WTG have been used to predict the noise levels at sensitive receptors. The sound power level of the candidate machine, the Enercon E-48, is representative for an 800 kW machine[10]. The noise emission curve of the WTG is understood to be based on theoretical modelling, rather than a warranted level that the manufacturer is prepared to contract not to exceed. This has been accounted for in the model by the use of a ground absorption factor of 0.0, as recommended by Bowdler et al (2009)[7].

[9] HM: 2293/R1 Analysis of How Noise Impacts are Considered in the Determination of Wind Farm Planning Applications Hayes McKenzie Partnership, 6 April 2011

[10] SIAS-04-SPL E48 OM I Rev3_0eng-eng.doc Sound Power level of the Enercon E-48 Operational Mode 1, 04/02/2011

3.2.3 WIND FARM OPERATIONAL NOISE PROPAGATION MODEL

The sound propagation over distance, including the effect of atmospheric absorption, was calculated using the WindPRO model based on ISO 9613-2.

3.2.4 CUMULATIVE EFFECTS

ETSU-R-97 states that noise limits should be set relative to the pre-development background noise levels at the nearest noise sensitive receptor and that other existing wind farms should be taken into consideration. It is understood that there are no operational or consented nearby wind farms at this stage.

4 BASELINE CONDITIONS

4.1 BACKGROUND NOISE SURVEY

The operational noise of wind farms is assessed by comparison with existing background noise. Background noise is usually measured in the external amenity of nearby noise sensitive receptors. Measurements are made in ten-minute intervals over an extended period. For this impact assessment, background noise measurements were obtained between 24 September and 9 October 2012.

Background noise monitoring was undertaken at two locations. The monitoring locations were discussed with the Angus Council Environmental Health Officer (Table 3). During a site visit on the 24 September SgurrEnergy personnel installed the noise monitoring equipment in the presence of the Environmental Health Officer.

Measurements were made in accordance with best practice set out in ETSU-R-97, (i.e. at a height of 1.2 m to 1.5 m above ground level and not less than 3.5 m from any reflective façade). Care was also taken to position the microphones as far as reasonably practicable from potentially noisy trees and bushes. Periods of heavy rainfall were excluded from the analysis.

Ten minute consecutive noise measurements of L_{A90} were undertaken throughout the measurement period. Noise levels were measured in conjunction with wind speed data in order to correlate background noise levels with changes in wind speed.

Figure 1 and Figure 2 show the microphone positions in the environment of the background noise monitoring receptors.

Figure 1: Measurement Location at Tillydovie Cottage (A)

Figure 2: Measurement Location at Oldtown (C)

4.2 WIND SPEED DATA

Wind speed measurements were also carried out over the duration of the noise measurements, using a Zephir lidar remote sensing device. The measurement location was agreed with the Angus Council Environmental Health Officer and is shown in Table Table 4 and Appendix A. The measured height, amongst others, was 50m65 m which matches the proposed hub height of the two Lower Cairny WTGs. The wind speed was then referenced back to 10 m using a hypothetical surface roughness length of 0.05 m, as recommended by Bowdler *et al*[7]. As sound power levels of WTGs are always referenced to 10 m with a 0.05 m surface roughness, this ensures a consistent treatment of wind speeds and noise levels.

Table 4: Lidar Measurement Location	
Easting (m)	Northing (m)
355200	769956

4.3 CURRENT CONDITIONS

The survey results have been analysed in accordance with the procedures outlined in ETSU-R-97.

The measured L_{A90} noise levels at 10-minute intervals have been correlated with the wind speed measurements at 10 minute intervals (standardised to a height of 10 m) for the period of the noise measurement survey.

Any 10-minute interval in which rainfall was logged has then been discarded, as have any periods of unusually high noise levels for a given wind speed.

The measurement results have then been separated into the different time periods for day and night-time limits.

A two-hour period around dawn was removed each day to eliminate the effect of the dawn chorus.

The LA90,10-minute noise levels have been plotted against the corresponding wind speeds at the reference height of 10 m. For each period a second order polynomial "best-fit" regression curve is fitted to the data. The resultant background noise levels against wind speed at the two measurement locations are shown in Figure 3 to Figure 6 and in Table 5.

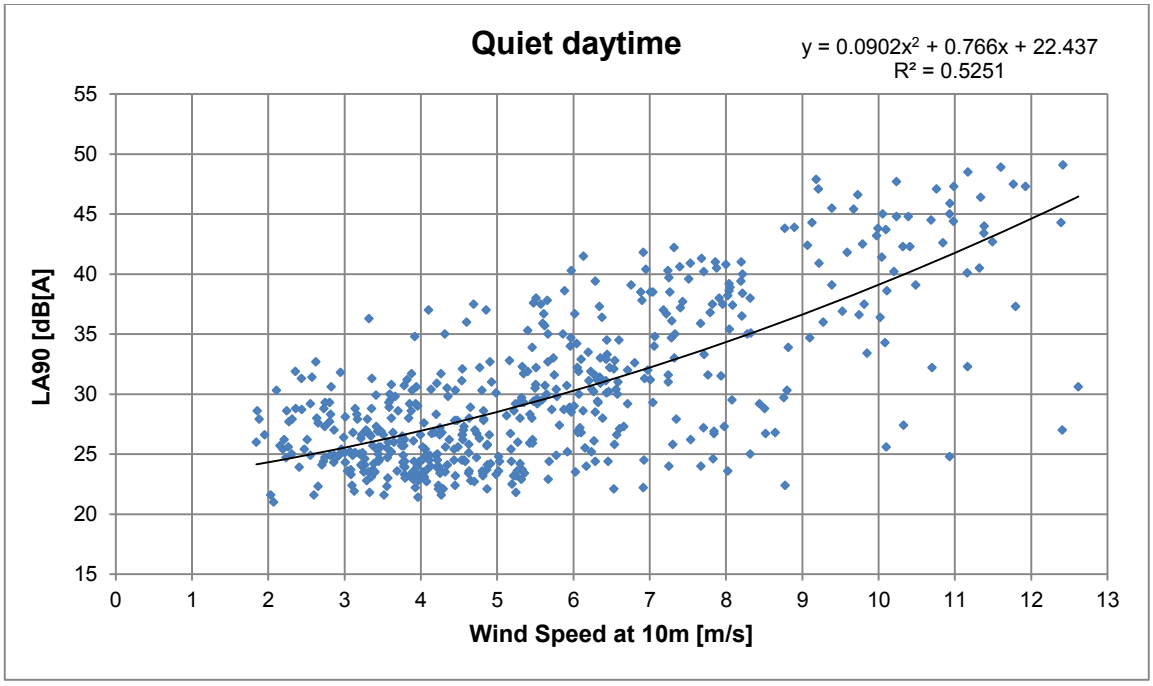


Figure 3: Polynomial fit to the background noise at Tillydovie Cottage (A) - Quiet daytime

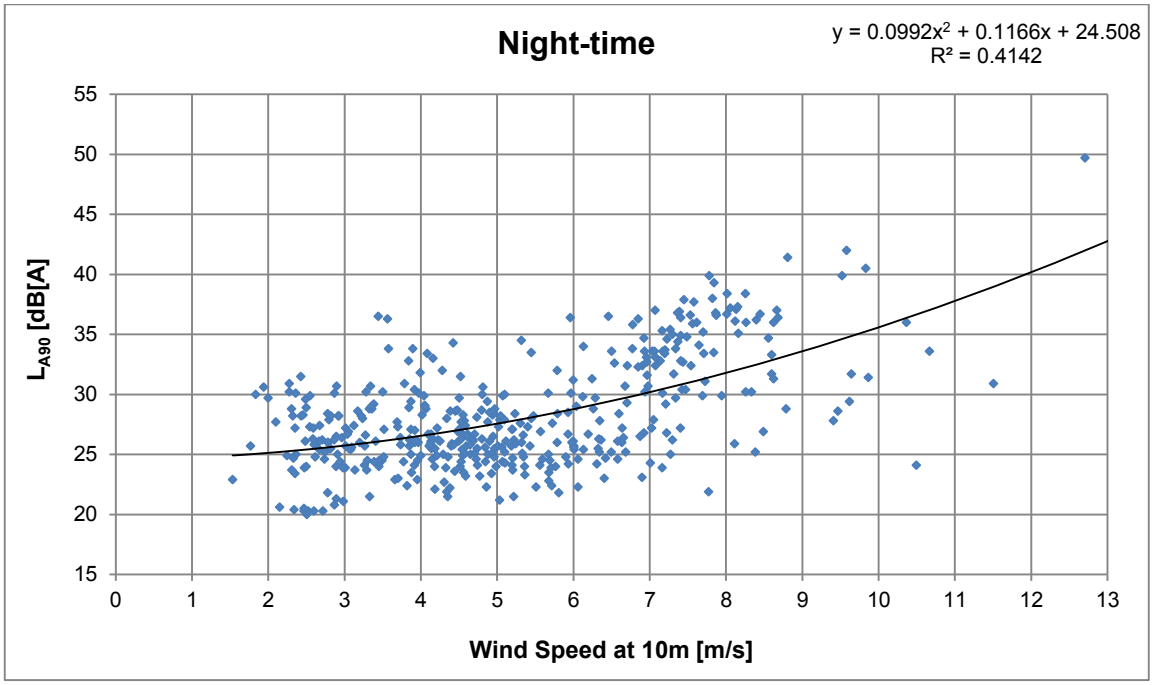


Figure 4: Polynomial fit to the background noise at Tillydovie Cottage (A) – Night-time

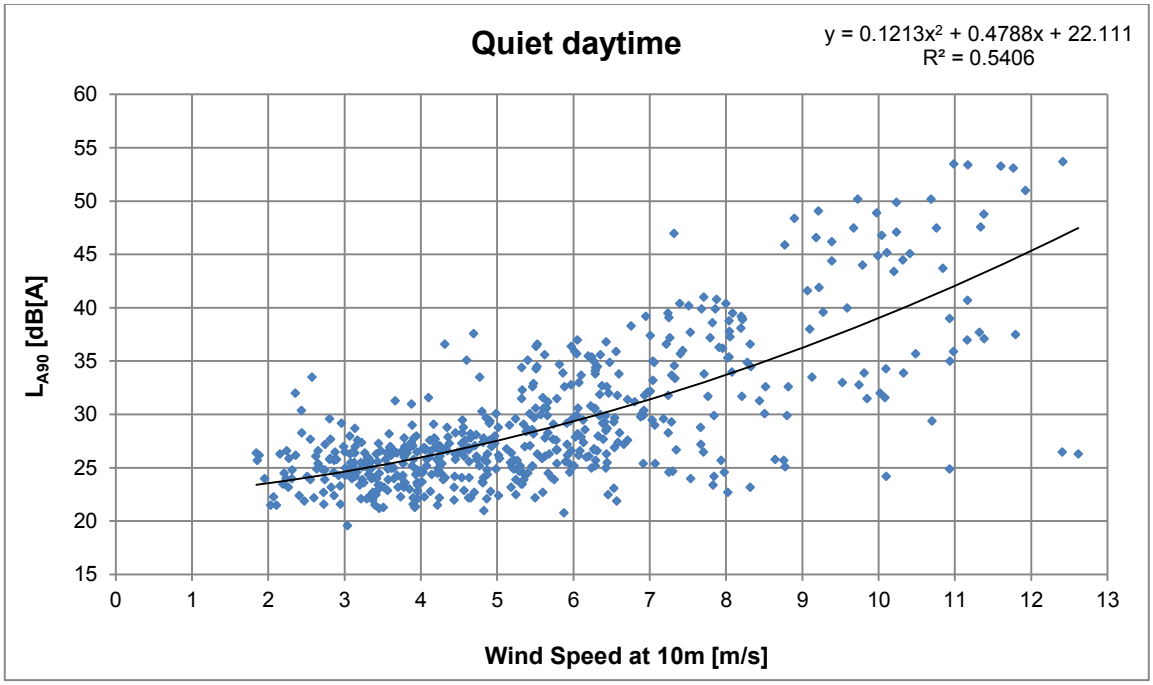


Figure 5: Polynomial fit to the background noise at Oldtown (C) – Quiet daytime

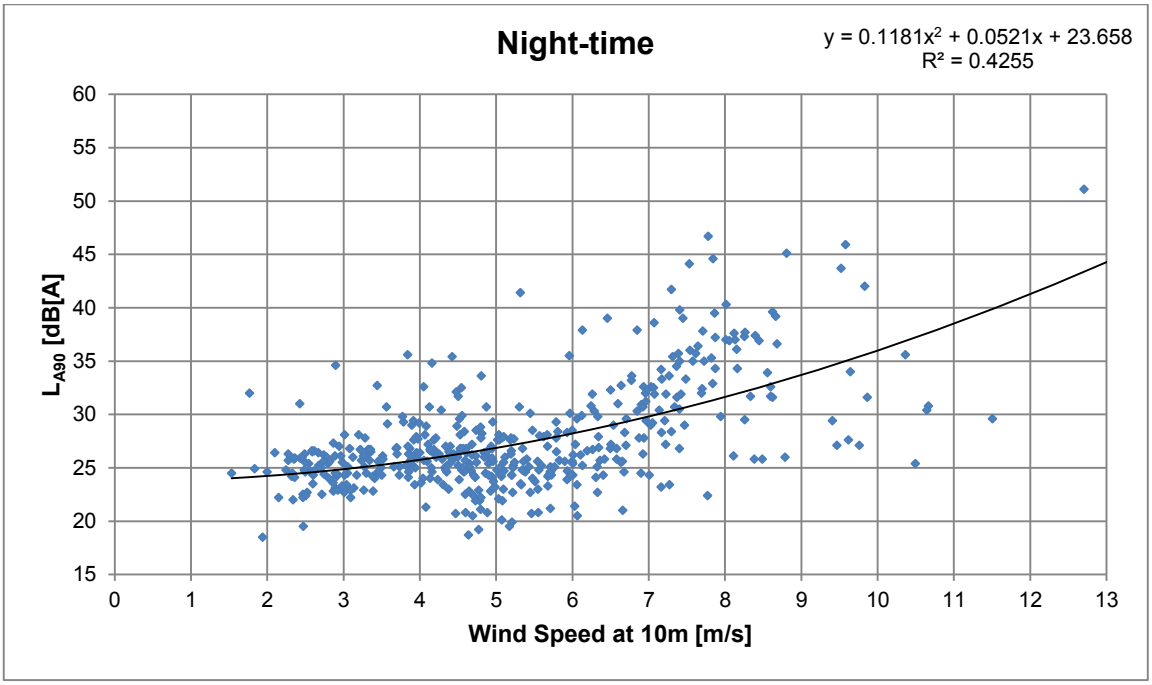


Figure 6: Polynomial fit to the background noise at Oldtown (C) – Night-time

Table 5: Ambient Background Noise Levels, L_{90}, dB(A)

Wind speed (m/s)	Tillydovie Cottage		Oldtown	
	Quiet daytime	Night-time	Quiet daytime	Night-time
4	26.9	26.6	26.0	25.8
5	28.5	27.6	27.5	26.9
6	30.3	28.8	29.4	28.2
7	32.2	30.2	31.4	29.8
8	34.3	31.8	33.7	31.6
9	36.6	33.6	36.2	33.7
10	39.1	35.6	39.0	36.0
11	41.8	-	42.1	-
12	-	-	-	-

5 ASSESSMENT OF POTENTIAL EFFECTS

5.1 DERIVATION OF NOISE LIMITS FOR WTG NOISE

The criteria for operational noise are based on existing background noise, subject to fixed lower limits. The results of the background noise survey are presented in Table 5.

The measurements at Tillydovie Cottage (Receptor A) are taken to represent itself as well as Receptors B and F. Those at Oldtown (C) are taken to represent itself and Receptors D, E and G.

Based on the ETSU guidance, criteria are 5 dB above local background noise, subject to various lower limits. Where background noise levels are not available at high wind speeds, a constant background noise level is assumed; this assumption is very conservative. At levels above criteria the noise emissions from the development would be considered a significant impact.

The choice of 35 dB or 40 dB as the noise criterion in the limit of low wind speeds depends on the number of sensitive receptors and the power output of the development. A worst-case value of 35 dB has been assumed. At Tillydovie Cottage (A) the low wind-speed limit is taken to be 45 dB because the owners have a financial interest in the wind turbine cluster. The resulting criteria are shown in Table 6.

5.2 OPERATIONAL EFFECTS

The noise impact assessment assumes that the sound energy propagates in all directions from the WTG. Some energy will be absorbed in the air and some by the ground. On that basis, the predicted levels received at the sensitive receptors, as a function of wind speed, referenced to 10 m above ground level, are as shown in Table 6.

Table 6: Noise Immission and Criteria, L_{90}, dB(A)

Receptor		Wind Speed								
		4	5	6	7	8	9	10	11	12
A Tillydovie Cottage	Daytime criteria	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.8	46.8
	Night-time criteria	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	WTG Noise	26.6	31.2	35.3	38.0	38.9	39.5	39.5	39.5	39.5
B Witton	Daytime criteria	35.0	35.0	35.3	37.2	39.3	41.6	44.1	46.8	46.8
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	22.0	26.7	30.8	33.5	34.3	35.0	35.0	35.0	35.0
C Oldtown	Daytime criteria	35.0	35.0	35.0	36.4	38.7	41.2	44.0	47.1	47.1
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	23.5	28.2	32.3	35.0	35.8	36.5	36.5	36.5	36.5
D Larkhall	Daytime criteria	35.0	35.0	35.0	36.4	38.7	41.2	44.0	47.1	47.1
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	23.7	28.4	32.5	35.2	36.0	36.7	36.7	36.7	36.7
E Larkhall 2	Daytime criteria	35.0	35.0	35.0	36.4	38.7	41.2	44.0	47.1	47.1
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	22.3	27.0	31.1	33.8	34.6	35.3	35.3	35.3	35.3
F Margie	Daytime criteria	35.0	35.0	35.3	37.2	39.3	41.6	44.1	46.8	46.8
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	18.2	22.9	27.0	29.7	30.5	31.2	31.2	31.2	31.2
G Newbigging	Daytime criteria	35.0	35.0	35.0	36.4	38.7	41.2	44.0	47.1	47.1
	Night-time criteria	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	WTG Noise	15.6	20.3	24.4	27.1	27.9	28.6	28.6	28.6	28.6

From the results in Table 6 it is clear that the criteria are met at all sensitive receptors at all wind speeds.

The levels shown in Table 6 are also presented graphically compared with the daytime and night-time criteria in Appendix B.

5.3 INFRA-SOUND

Infra-sound is defined as noise occurring at frequencies below that at which sound is normally audible, i.e. at less than 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it has to be at very high amplitude and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance.

WTGs have been cited as significant producers of infra-sound. This has, however, been due to the high levels of such noise, as well as an audible, low frequency, thumping noise, occurring on older 'downwind' WTGs of which many were installed in the USA prior to the large-scale take up of wind power production in the UK. Downwind WTGs are configured with the blades downwind of the tower such that the blades pass through the wake left in the wind stream by the tower resulting in a regular audible thump, with infra-sonic

components, each time a blade passes the tower. All modern WTGs are of the upwind design, with the blades upwind of the tower, such that this effect is eliminated.

The DTI Low Frequency Noise Study concluded that 'Infrasound noise emissions from WTGs are significantly below the recognised threshold of perception for acoustic energy within this frequency range. Even assuming that the most sensitive members of the population have a hearing threshold which is 12 dB lower than the median hearing threshold, measured infrasound levels are well below this criterion'. It goes on to state that, based on information from the World Health Organisation, that 'there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects' it may be concluded that 'infrasound associated with modern wind WTGs is not a source which may be injurious to the health of a wind farm neighbour'.

5.4 LOW FREQUENCY NOISE

Noise from modern WTGs is essentially broad band in nature in that it contains similar amounts of noise energy in all frequency bands from low to high frequency. With increasing distance from a wind farm site, the noise level decreases as a result of the spreading out of the sound energy, but also due to air absorption which increases with increasing frequency. This means that although the energy across the whole frequency range is reduced, higher frequencies are reduced more than lower frequencies with the effect that as distance from the site increases, the ratio of low to high frequencies also increases. This effect may be observed with road traffic noise or natural sources such as the sea where higher frequency components are diminished relative to lower frequency components at long distances. At such distances, however, overall noise levels from WTGs are so low that this effect is not significant.

6 CONCLUSIONS

The noise impact of the proposed wind turbine cluster on nearby noise sensitive receptors has been modelled in accordance with ETSU-R-97, ISO 9613-2 and the guidance in the Institute of Acoustics' Acoustics Bulletin, assuming a candidate WTG, the Enercon E-48.

The proposed wind turbine cluster is predicted to meet the relevant criteria at all wind speeds at all noise sensitive receptors.

APPENDIX A

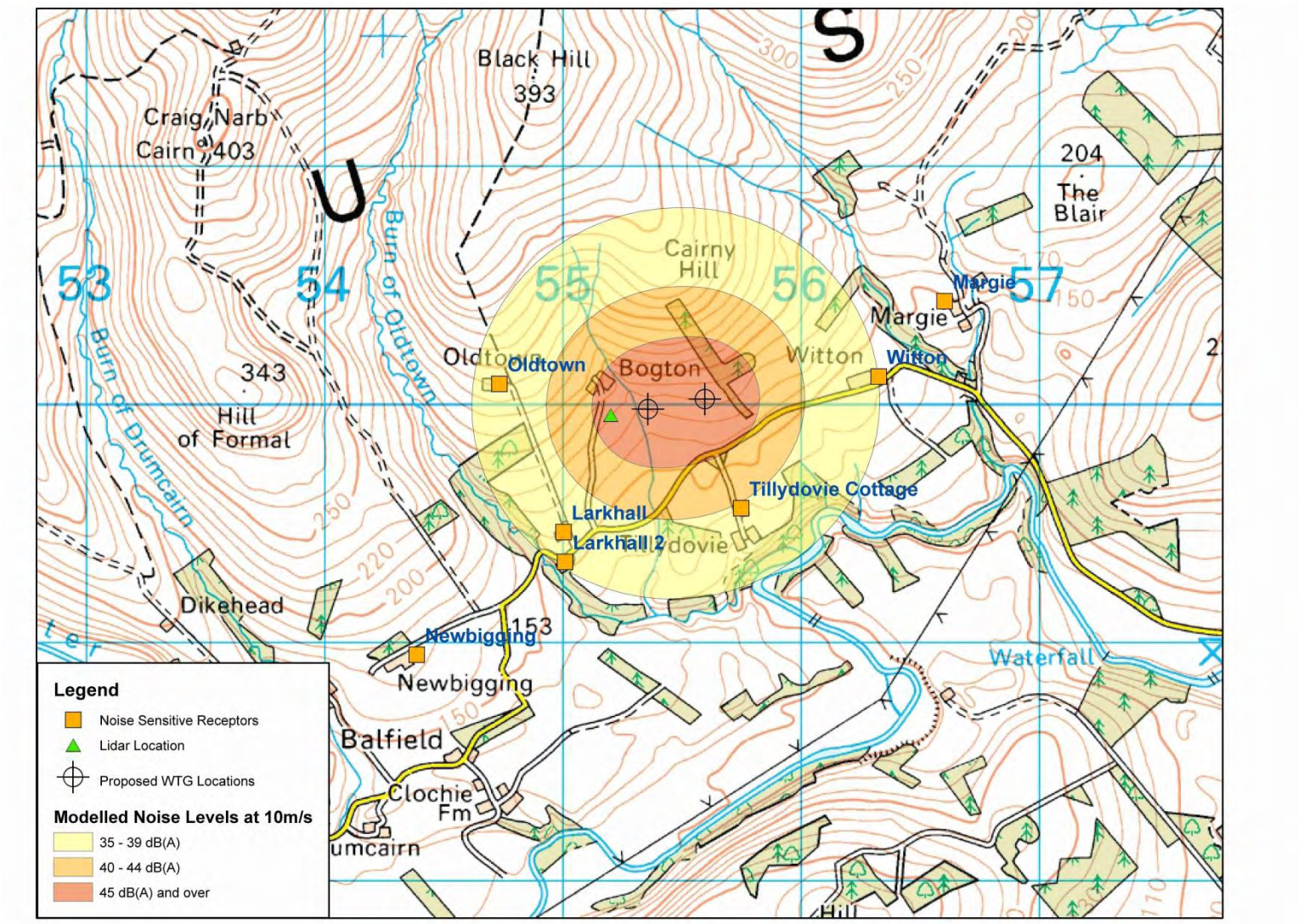


Figure A1: Map showing WTG locations, Receptors and Noise Contours at 10 m/s wind speed

APPENDIX B

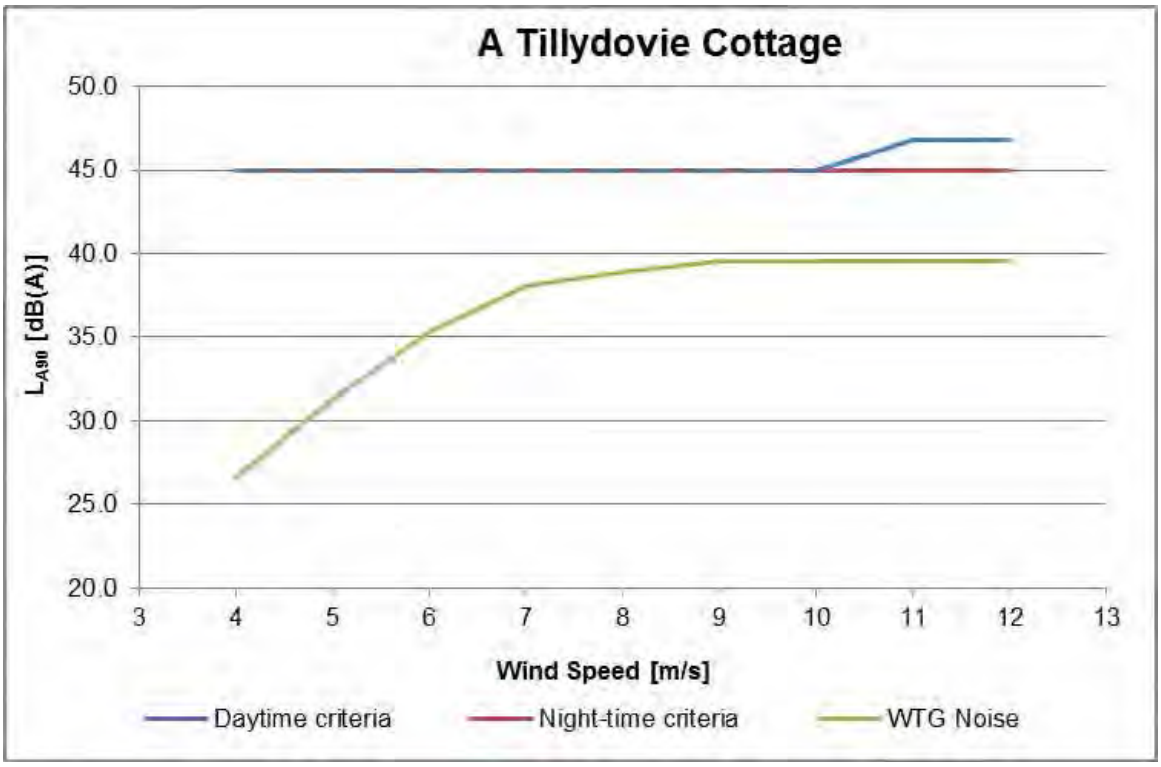


Figure B1: Predicted noise, compared with quiet daytime and night-time criteria, Tillydovie Cottage (Receptor A)

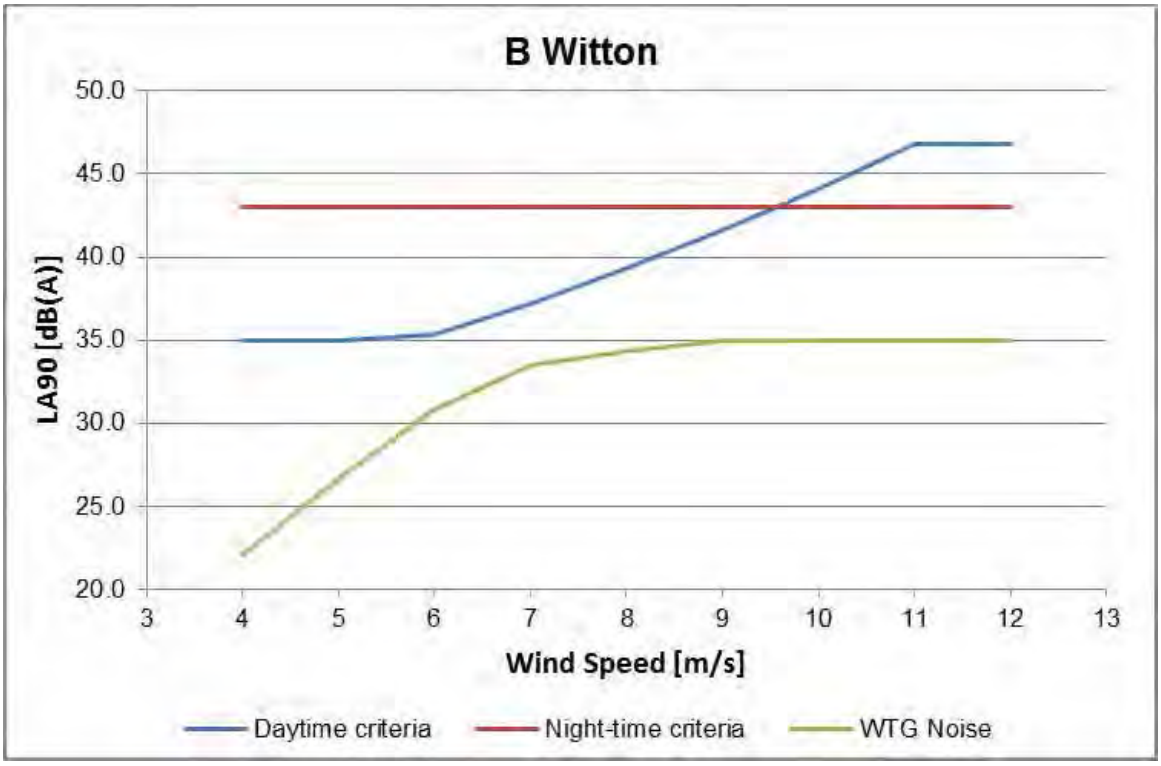


Figure B2: Predicted noise, compared with quiet daytime and night-time criteria, Witton (Receptor B)

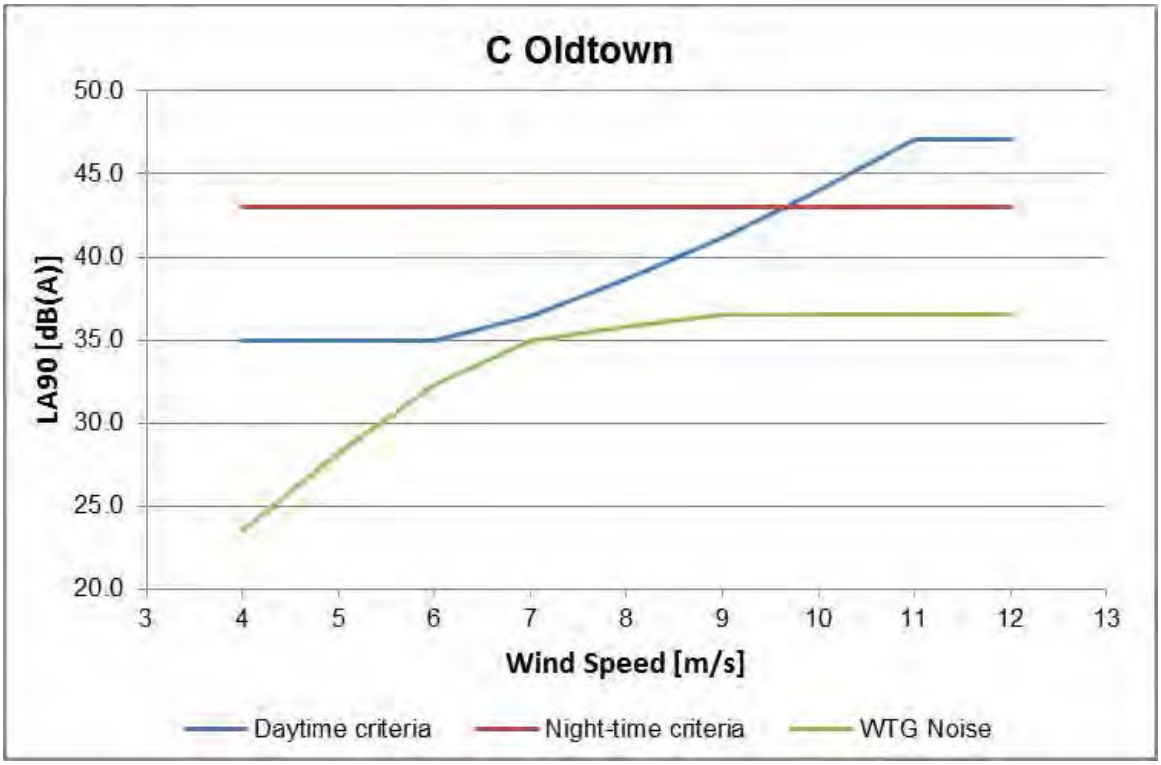


Figure B3: Predicted noise, compared with quiet daytime and night-time criteria, Oldtown (Receptor C)

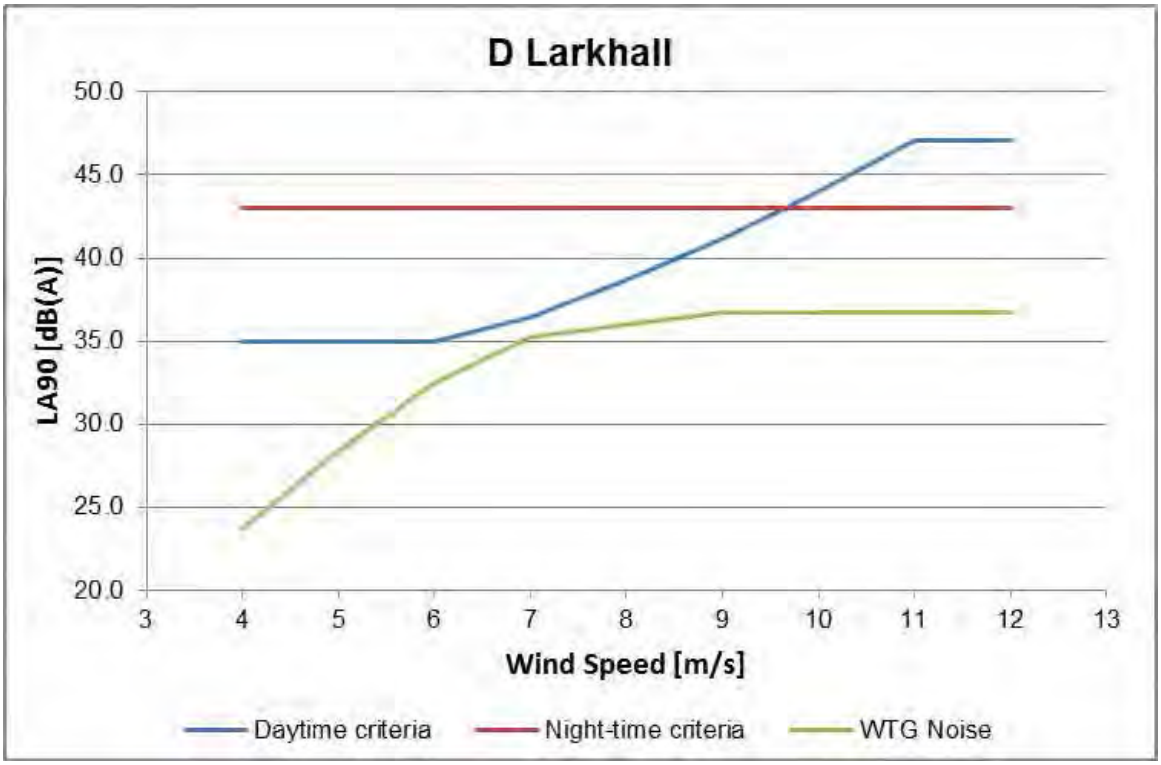


Figure B4: Predicted noise, compared with quiet daytime and night-time criteria, Larkhall (Receptor D)

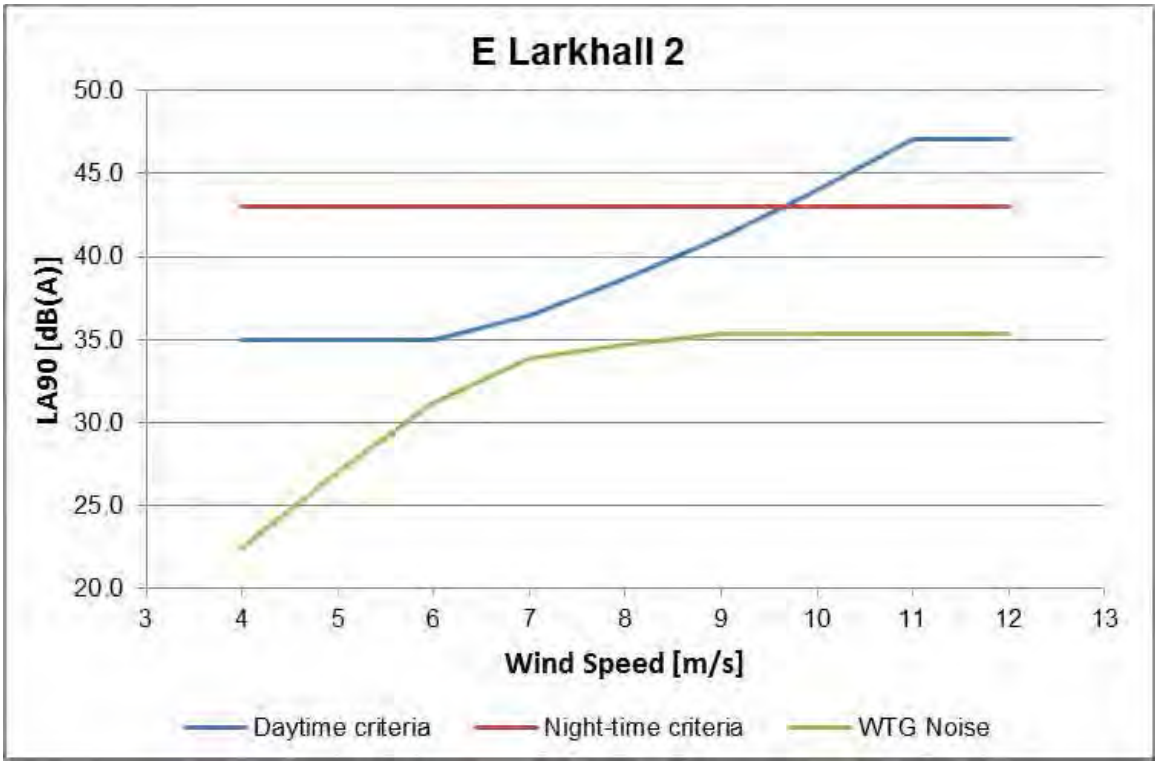


Figure B5: Predicted noise, compared with quiet daytime and night-time criteria, Larkhall 2 (Receptor E)

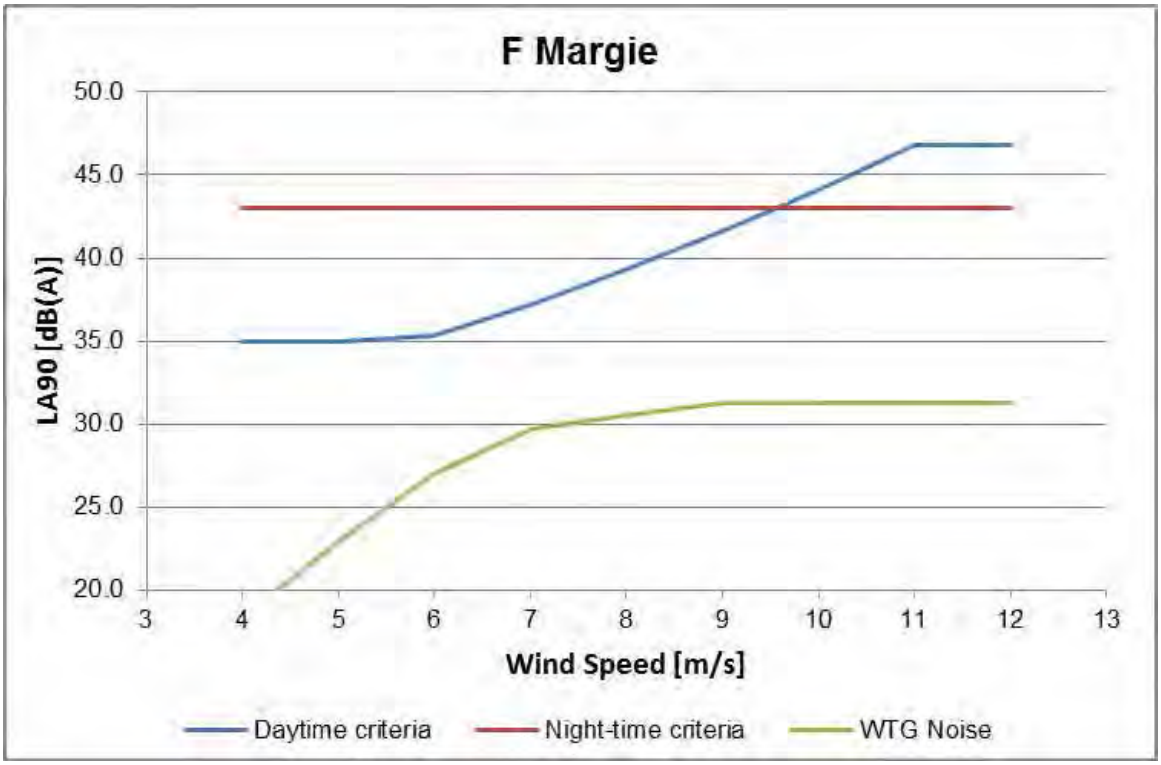


Figure B6: Predicted noise, compared with quiet daytime and night-time criteria, Margie (Receptor F)

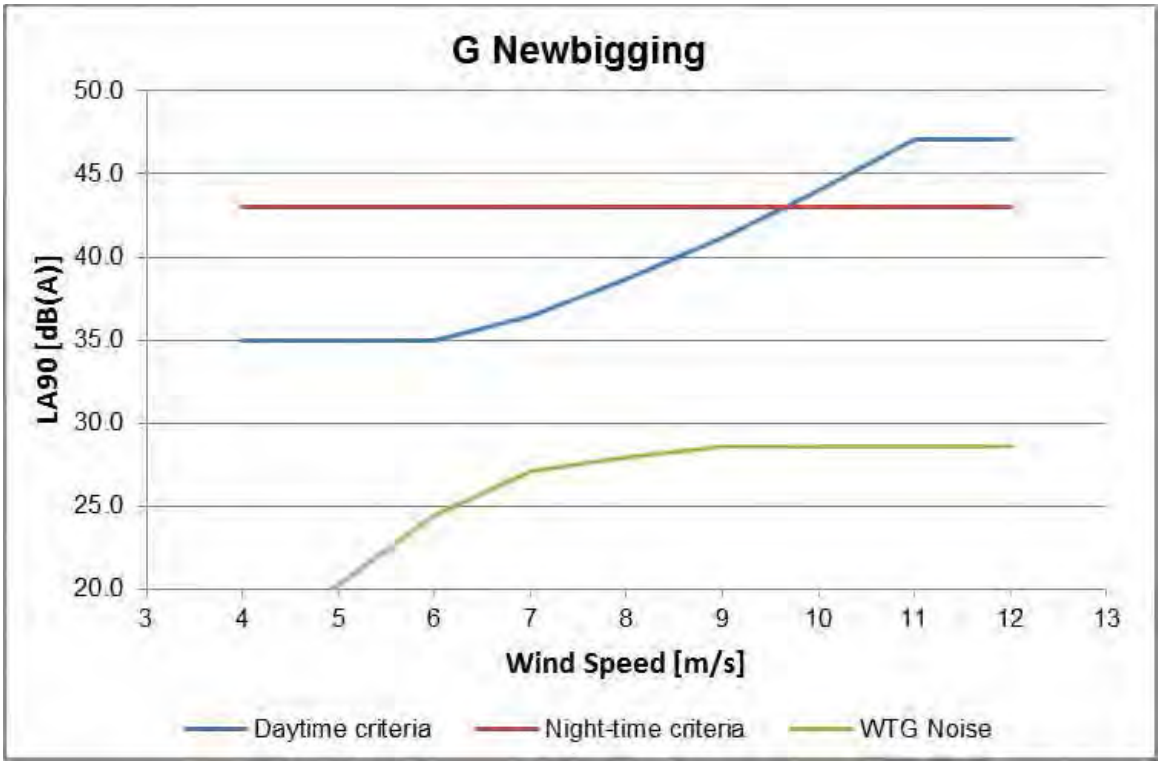


Figure B7: Predicted noise, compared with quiet daytime and night-time criteria, Newbigging (Receptor G)

Appendix B

Best Practice Guide for the use of Wind Turbine Noise data:

Calculation of Confidence Level

Aim: Explain how to use wind turbine data based on measurement report(s), warranted or unwarranted data provided by the manufacturer.

Action: Contact wind turbine manufacturer and ask for as many turbine test reports in accordance with IEC 61400-11 [1] as available.

Calculate the K value in accordance with IEC 61400-14 [2] with the amount of measurement reports available. The methods are detailed in the order of preference.

How WT noise data are declared:

1. At least **3 measurement reports** available

Check hub heights in measurement report. If they are for different hub heights, carry out a hub height conversion according to [2] Annex A first. Data can only be averaged for the same hub height unless it is the sound power level at rated power. Results suitable for deriving the declared sound power level need to have been obtained from measurements of the same wind turbine type with the same hub height and operational mode, and components from the same blade and gear-box manufacturer.

Declaration of apparent sound power level:

For wind turbines of the same type, tower (steel or concrete, tubular or lattice) and same hub height, the mean value is calculated with

$$\bar{L}_W = \frac{1}{n}\sum_{i=1}^{n} L_i \qquad (1)$$

$\bar{L}_W$: mean sound power level of *n* measurement results on *n* individual wind turbines

n: number of individual measurement results

L_i: individual sound power level

The standard deviation of the average is calculated with equation (2).

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(L_i - \bar{L}_W)^2} \qquad (2)$$

s: standard deviation

The standard deviation σ used for the declaration is determined by

$$\sigma = \sqrt{\frac{1+n}{n}\left(\sigma_R^2 + \sigma_P^2\right)} \qquad (3)$$

σ: standard deviation of declaration

σ_P: standard deviation of production (here σ_P = s)

σ_R: standard deviation of reproducibility (here σ_R = 0.9 dB)

An estimate of σ_R is 0.9 dB as suggested in [2], based on typical uncertainties given in [1] Annex D.

σ_P is taken to be equal to the standard deviation s.

Declared sound power level L_{Wd}:

$$L_{Wd} = \bar{L}_W + K = \bar{L}_W + 1.645 \cdot \sigma \quad (4)$$

L_{Wd}: declared sound power level

K: confidence level (using K=1.645*σ represents a probability of 95% that results from sound power level measurements performed in accordance with [2] do not exceed the declared sound power level L_{Wd}).

(K=1.28*σ for a 90% probability)

Declaration of Tonality:

Results of the tonality assessment cannot be declared in the same way as the sound power level. Tonality and the frequency at which the tone occurs have to be reported for each measurement.

2. Only **1 or 2 measurement report(s)** available

If only one or two measurement reports are available, the confidence level is estimated using the following procedure:

- a typical standard deviation of reproducibility of **σ_R = 0.9 dB** and
- an average maximum standard deviation of production of **σ_P = 1 dB** and an assumed number of measurement reports of 3, derived from a number of calculations carried out under paragraph 1 above for various turbine types. The calculated maximum standard deviation from 15 considered declarations of apparent sound power level ranged from 1.4 dB at 6 m/s to 0.8 at 9 m/s.
  Using the average maximum standard deviation is a conservative assumption to allow for the uncertainty when there is only one or two measurement reports available.

Thus it follows that:

σ = 1.6 dB and K(95%) = 2.6 dB

K(95%) is added to the measured sound power level as stated in the acoustic performance test.

Declaration of Tonality:

Results of the tonality assessment cannot be declared in the same way as the sound power level. Tonality and the frequency at which the tone occurs have to be reported for each measurement.

3. **No measurement report** available but **Manufacturer's Warranty**

If warranted data is available, use the warranted data plus the uncertainty as declared by the manufacturer to allow for measurement uncertainty and production variability. In the absence of a statement about uncertainty, use 2 dB. This is now also considered good practice by the Institute of Acoustics Wind Turbine Noise Working Group [4]. This is to allow for the usual practice of a wind turbine manufacturer subtracting the measurement uncertainty from the measured sound power level when assessing compliance with the warranty.

4. **No measurement report** available

If no warranty is issued, use data supplied by the manufacturer for predictions plus an uncertainty margin of 3 dB as derived above, treating it as if one acoustic performance test is available.

Preferred Method:

To determine the declared sound power level it is preferred to use method 1. If an insufficient number of measurement reports are available, the further approach is detailed in the order of preference above.

Update:

-

Reference:

[1] BS EN 61400-11:2003 Incorporating Amendment A1:2006 *Wind turbine generator systems - Part 11: Acoustic noise measurement techniques*, International Electrotechnical Commission

[2] IEC/TS 61400-14:2005 *Wind turbine - Part 14: Declaration of apparent sound power level and tonality values*, International Electrotechnical Commission

[3] pr EN 50376:2001 *Declaration of sound power level and tonality values of wind turbines*, European Committee for Electrotechnical Standardization

[4] *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*, Institute of Acoustics, 2013

Appendix C

Enercon E-48 Noise Documentation

Sound Power Level

of the

ENERCON E-48

Operational Mode I

(Data Sheet)

Imprint

Publisher: ENERCON GmbH ▪ Dreekamp 5 ▪ 26605 Aurich ▪ Germany
Phone: +49 4941 927-0
Fax: +49 4941 927-109

Revision

Revision: 3.0

Department: ENERCON GmbH / Site Assessment

Glossary

WEC	means an ENERCON wind energy converter.
WECs	means more than one ENERCON wind energy converter.

Sound Power Level of the E-48 with 800 kW rated power

hub height / V_s in 10 m height	50 m	56 m	60 m	65 m	76 m
4 m/s	89.0 dB(A)	89.2 dB(A)	89.4 dB(A)	89.5 dB(A)	89.9 dB(A)
5 m/s	93.3 dB(A)	93.7 dB(A)	93.9 dB(A)	94.2 dB(A)	94.7 dB(A)
6 m/s	97.5 dB(A)	97.9 dB(A)	98.1 dB(A)	98.3 dB(A)	98.8 dB(A)
7 m/s	100.5 dB(A)	100.7 dB(A)	100.8 dB(A)	101.0 dB(A)	101.3 dB(A)
8 m/s	101.5 dB(A)	101.7 dB(A)	101.7 dB(A)	101.8 dB(A)	101.9 dB(A)
9 m/s	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)
10 m/s	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)
95% rated power	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)	102.5 dB(A)

Measured value at 95% rated power					***101,9 dB(A)*** *WICO 439SEC04/06* ***101,1 dB(A)*** *KCE 29349-1.003* ***102,2 dB(A)*** *MBBM 64 550/7*

in relation to wind speed at hub height									
wind speed at hub height [m/s]	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Sound Power Level [dB(A)]	**95.0**	**98.1**	**100.2**	**101.4**	**101.8**	**102.4**	**102.5**	**102.5**	**102.5**

1. The relation between the sound power level and the standardized wind speed v_S in 10 m height as shown above is valid on the premise of a logarithmic wind profile with a roughness length of 0.05 m. The relation between the sound power level and the wind speed at hub height applies for all hub heights. During the sound measurements the wind speeds are derived from the power output and the power curve of the WEC.

2. A tonal audibility of $\Delta L_{a,k} \leq 2$ dB can be expected over the whole operational range (valid in the near vicinity of the turbine according to IEC 61 400 -11 ed. 2).

3. The sound power level values given in the table are valid for the **Operational Mode I** (defined via the rotational speed range of 16 – 30 rpm). The respective power curve is the calculated power curve E-48 dated November 2009 (Rev. 2.x).
4. The values displayed in the tables above are based on official and internal measurements of the sound power level. If available the official measured values are given in this document as a reference (in italic print). The extracts of the official measurements can be made available upon request. The values given in the measurement extracts do not replace the values given in this document. All measurements have been carried out according to the recommended German and international standards and guidelines as defined in the measurement reports, respectively.
5. Due to the typical measurement uncertainties, if the sound power level is measured according to one of the accepted methods the measured values can differ from the values shown in this document in the range of +/- 1 dB.

   Accepted measurement methods are:

   a) IEC 61400-11 ed. 2 („Wind turbine generator systems – Part 11: Acoustic noise measurement techniques; Second edition"), and

   b) the FGW-Guidelines („Technische Richtlinie für Windenergieanlagen – Teil 1: Bestimmung der Schallemissionswerte", published by the association "Fördergesellschaft für Windenergie e.V.", 18th revision).

   If the difference between total noise and background noise during a measurement is less than 6 dB a higher uncertainty must be considered.
6. For noise-sensitive sites it is possible to operate the E-48 with reduced rotational speed and reduced rated power during night time. The sound power levels resulting from such operational mode can be provided in a separate document upon request.
7. The sound power level of a wind turbine depends on several factors such as but not limited to regular maintenance and day-to-day operation in compliance with the manufacturer's operating instructions. Therefore, this data sheet can not, and is not intended to, constitute an express or implied warranty towards the customer that the E-48 WEC will meet the exact sound power level values as shown in this document at any project specific site.

estimated
Sound Power Level
of the
ENERCON E-48
Reduced Modes
(Data Sheet)

Imprint

Publisher: ENERCON GmbH ▪ Dreekamp 5 ▪ 26605 Aurich ▪ Germany
Phone: +49 4941 927-0
Fax: +49 4941 927-109

Revision

Revision: 1.0

Department: ENERCON GmbH / Site Assessment

Glossary

WEC	means an ENERCON wind energy converter.
WECs	means more than one ENERCON wind energy converter.

estimated Sound Power Levels for the E-48 with reduced rated power

estimated Sound Power Levels for the E-48 with reduced rated power					
	$P_{N,red}$=700 kW $n_{N,red}$=29,0 U/min	$P_{N,red}$=600 kW $n_{N,red}$=28,5 U/min	$P_{N,red}$=500 kW $n_{N,red}$=28,0 U/min	$P_{N,red}$=400 kW $n_{N,red}$=26,5 U/min	$P_{N,red}$=300 kW $n_{N,red}$=25,0 U/min
95% rated power	101.5 dB(A)	100.6 dB(A)	100.0 dB(A)	98.5 dB(A)	97.5 dB(A)

1. The respective SPL is given for 95% $P_{N,red}$ and is therefore valid for all hub heights.
2. An estimated tonal audibility of $\Delta L_{a,k}$ ≤ 2 dB can be expected over the whole operational range (valid in the near vicinity of the turbine according to IEC 61 400 -11 ed. 2).
3. The estimated sound power level values given in the table are valid for the respective reduced Modes (defined via the reduced rated power $P_{N,red}$ and the reduced rated rotational speed $n_{N,red}$).
4. The power curves for the respective reduced modes are given in a separate document which can be made available upon request.
5. Due to the typical measurement uncertainties, if the sound power level is measured according to one of the accepted methods the measured values can differ from the values shown in this document in the range of +/- 1 dB.

   Accepted measurement methods are:

   a) IEC 61400-11 ed. 2 („Wind turbine generator systems – Part 11: Acoustic noise measurement techniques; Second edition“), and

   b) the FGW-Guidelines („Technische Richtlinie für Windenergieanlagen – Teil 1: Bestimmung der Schallemissionswerte“, published by the association “Fördergesellschaft für Windenergie e.V.”, 18th revision).

   If the difference between total noise and background noise during a measurement is less than 6 dB a higher uncertainty must be considered.
6. Estimated Sound Power values for further reduced modes can be provided upon request.
7. The sound power level of a wind turbine depends on several factors such as but not limited to regular maintenance and day-to-day operation in compliance with the manufacturer’s operating instructions. Therefore, this data sheet can not, and is not intended to, constitute an express or implied warranty towards the customer that the E-48 WEC will meet the exact sound power level values as shown in this document at any project specific site.

Appendix D

Prediction Methodology

D.1. The ISO 9613-2 propagation model calculates the predicted sound pressure level by taking the source sound power level for each turbine in separate octave bands and subtracting a number of attenuation factors according to the following:

Predicted Octave Band Noise Level =

$Lw + D - A_{geo} - A_{atm} - A_{gr} - A_{bar} - A_{misc}$

These factors are discussed in detail below. The predicted octave band levels from the turbine are summed together to give the overall 'A' weighted predicted sound level.

L_W - Source Sound Power Level

D.2. The sound power level of a noise source is normally expressed in dB re:1pW. Noise predictions are based on sound power levels detailed in the main body of the report.

D.3. The octave band noise spectra used for the predictions have been taken from the results of a measurement on a sample turbine with the results shown in the main body of the report.

D – Directivity Factor

D.4. The directivity factor allows for an adjustment to be made where the sound radiated in the direction of interest is higher than that for which the sound power level is specified. In this case the sound power level is measured in a down wind direction, corresponding to the worst case propagation conditions considered here and needs no further adjustment.

A_{geo} – Geometrical Divergence

D.5. The geometrical divergence accounts for spherical spreading in the free-field from a point sound source resulting in an attenuation depending on distance according to:

$A_{geo} = 20 \times \log(d) + 11$

where d = distance from the turbine

The wind turbine may be considered as a point source beyond distances corresponding to one rotor diameter.

A_{atm} - Atmospheric Absorption

D.6. Sound propagation through the atmosphere is attenuated by the conversion of the sound energy into heat. This attenuation is dependent on the temperature and relative humidity of the air through which the sound is travelling and is frequency dependent with increasing attenuation towards higher frequencies. The attenuation depends on distance according to:

$A_{atm} = d \times \alpha$

where d = distance from the turbine
α = atmospheric absorption coefficient in dB/m

Values of 'α' from ISO 9613 Part 1[1] corresponding to a temperature of 10°C and a relative humidity of 70%, the values specified in the Institute of Acoustics, *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbines Noise* (IoA GPG), which give relatively low levels of atmospheric attenuation and correspondingly worst case noise predictions, as given below.

Table D1 - Frequency dependent atmospheric absorption coefficients

Octave Band Centre Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Atmospheric Absorption Coefficient (dB/m)	0.000122	0.000411	0.00104	0.00193	0.0037	0.00966	0.0328	0.117

A_{gr} - Ground Effect

D.7. Ground effect is the interference of sound reflected by the ground with the sound propagating directly from source to receiver. The prediction of ground effects are inherently complex and depend on the source height, receiver height, propagation height between the source and receiver and the ground conditions. The ground conditions are described according to a variable G which varies between 0 for 'hard' ground (includes paving, water, ice, concrete &

[1] ISO 9613-1, Acoustics - Attenuation of sound during propagation outdoors, Part 1: Method of calculation of the attenuation of sound by atmospheric absorption, International Organization for Standardization, 1992

any sites with low porosity) and 1 for 'soft' ground (includes ground covered by grass, trees or other vegetation). The IoA GPG states that where wind turbine source noise data includes a suitable allowance for uncertainty, a ground factor of G = 0.5 and a receptor height of 4m should be used.

A_{bar} - Barrier Attenuation

D.8. The effect of any barrier between the noise source and the receiver position is that noise will be reduced according to the relative heights of the source, receiver and barrier and the frequency spectrum of the noise. The barrier attenuations predicted by the ISO 9613 model have, however, been shown to be significantly greater than that measured in practice under down wind conditions. The results of a study of propagation of noise from wind farm sites carried out for ETSU[2] concludes that an attenuation of just 2 dB(A) should be allowed where the direct line of site between the source and receiver is just interrupted and that 10 dB(A) should be allowed where a barrier lies within 5 m of a receiver and provides a significant interruption to the line of site.

D.9. The IoA GPG states that screening effects '*should be limited to a reduction of no more than 2 dB, and then only if there is no direct line of sight between the highest point on the turbine rotor and the receiver location*' and goes on to state: '*If significant screening from a landform barrier is present in close proximity to the receiver, higher barrier attenuation values of up to 10 dB(A) may be appropriate, but any such cases are uncommon and should be fully justified in the assessment*'. No barrier correction has been made to the predicted noise levels here.

A_{misc} – Miscellaneous Other Effects

D.10. ISO 9613 includes effects of propagation through foliage, industrial plants and housing as additional attenuation effects. These have not been included here and any such effects are unlikely to significantly reduce noise levels below those predicted.

D.11. The predicted turbine noise L_{Aeq} has been adjusted by subtracting 2 dB to give the equivalent L_{A90} as suggested in ETSU-R-97 and this IoA GPG.

[2] ETSU W/13/00385/REP, A Critical Appraisal of Wind Farm Noise Propagation, DTI 2000

Appendix E

Assessment Figures

Figure 1 - Tillydovie Cottage Night Hours Noise Assessment Chart

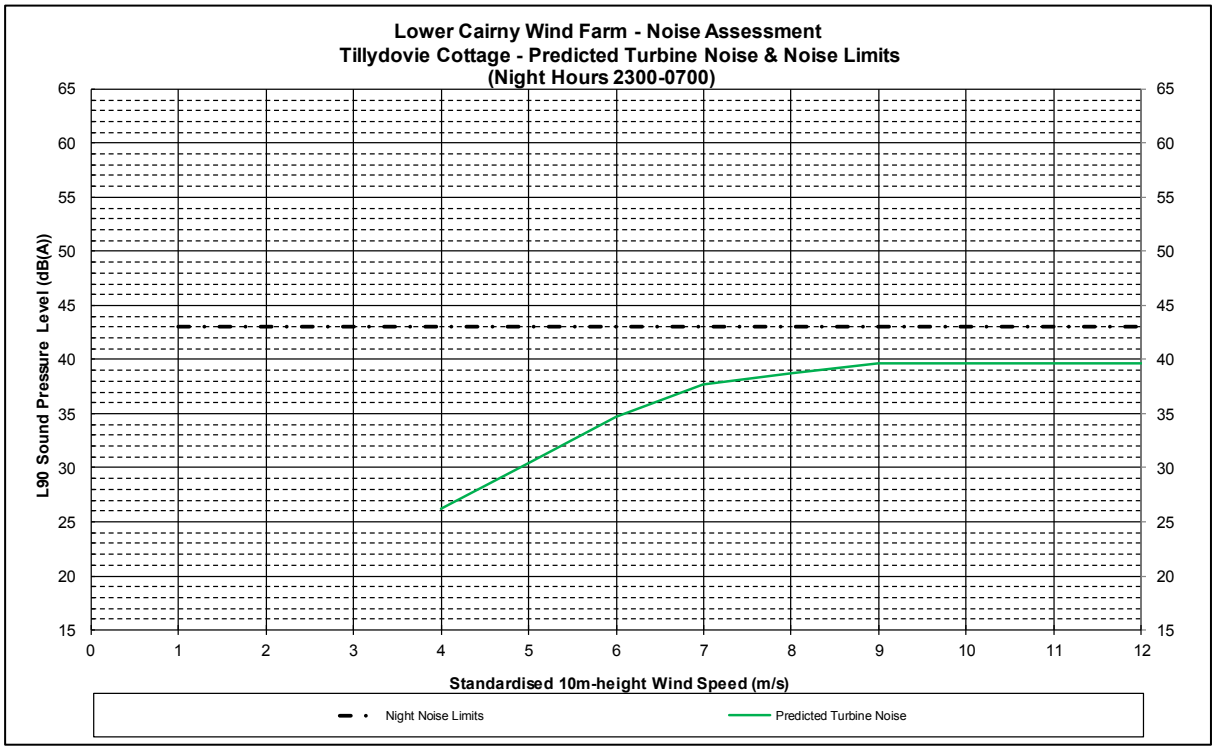


Figure 2 - Tillydovie Cottage Day Hours Noise Assessment Chart

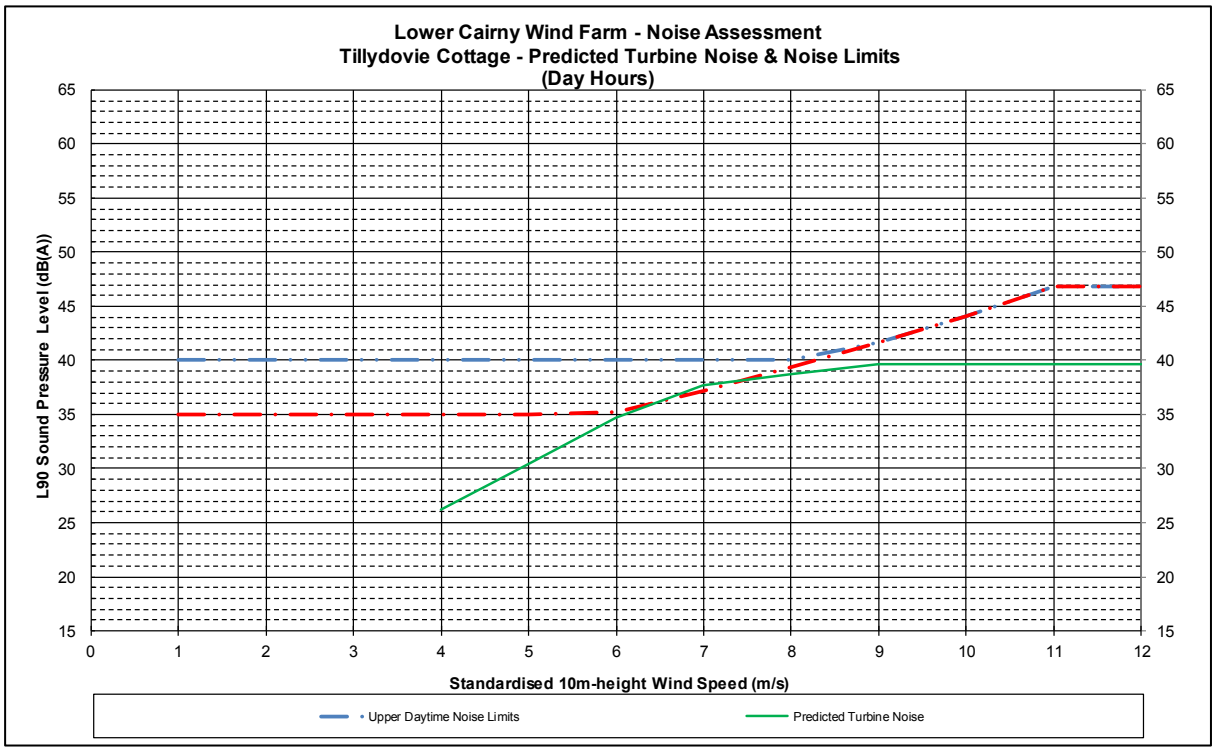


Figure 3 - Witton Night Hours Noise Assessment Chart

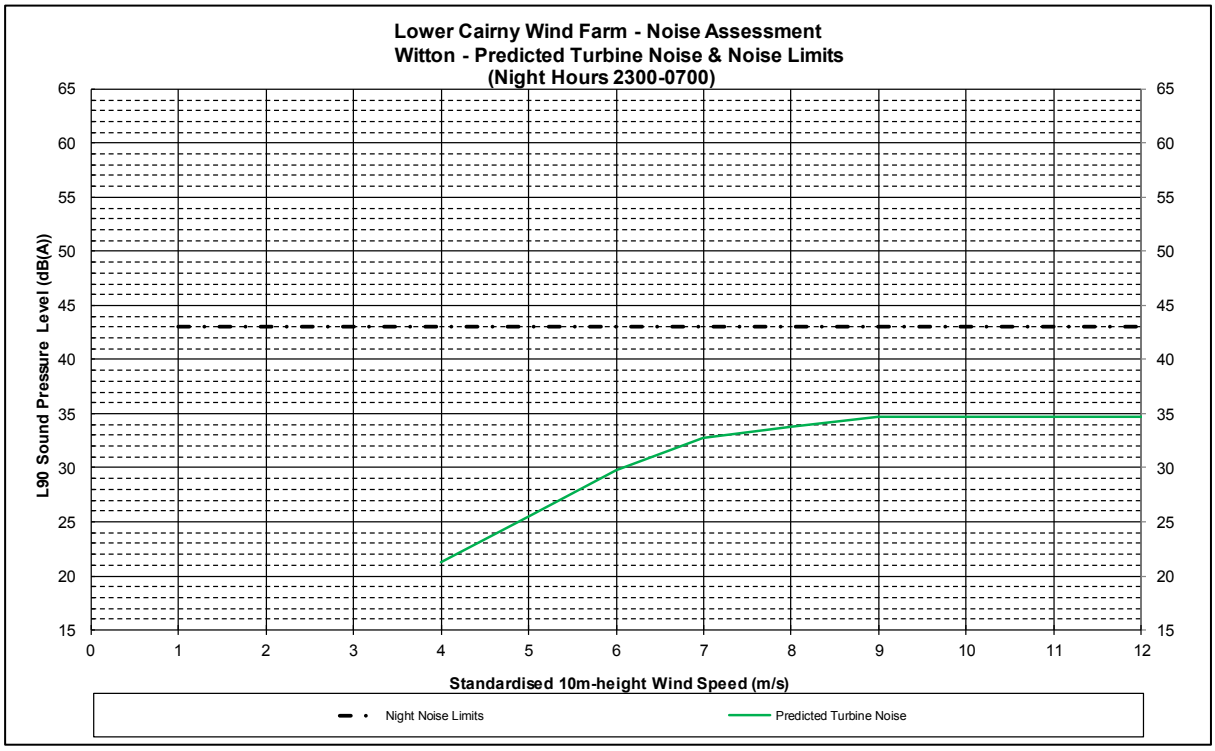


Figure 4 - Witton Day Hours Noise Assessment Chart

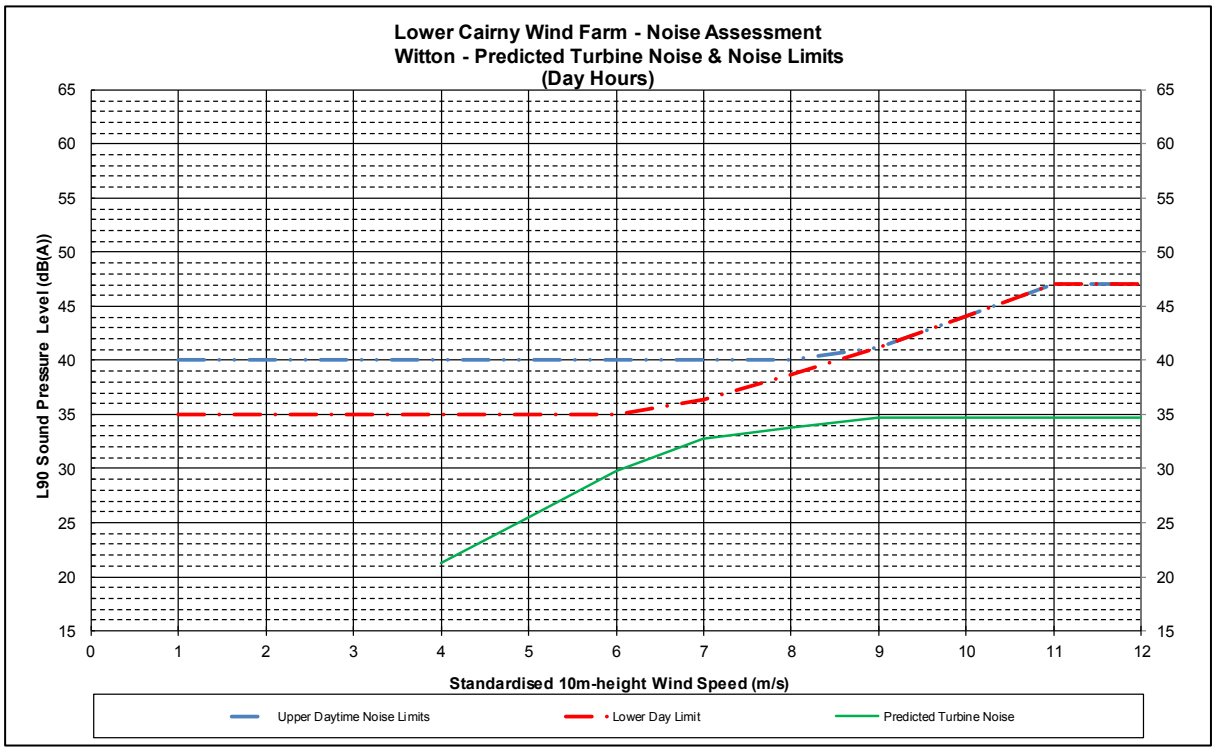


Figure 5 - Oldtown Night Hours Noise Assessment Chart

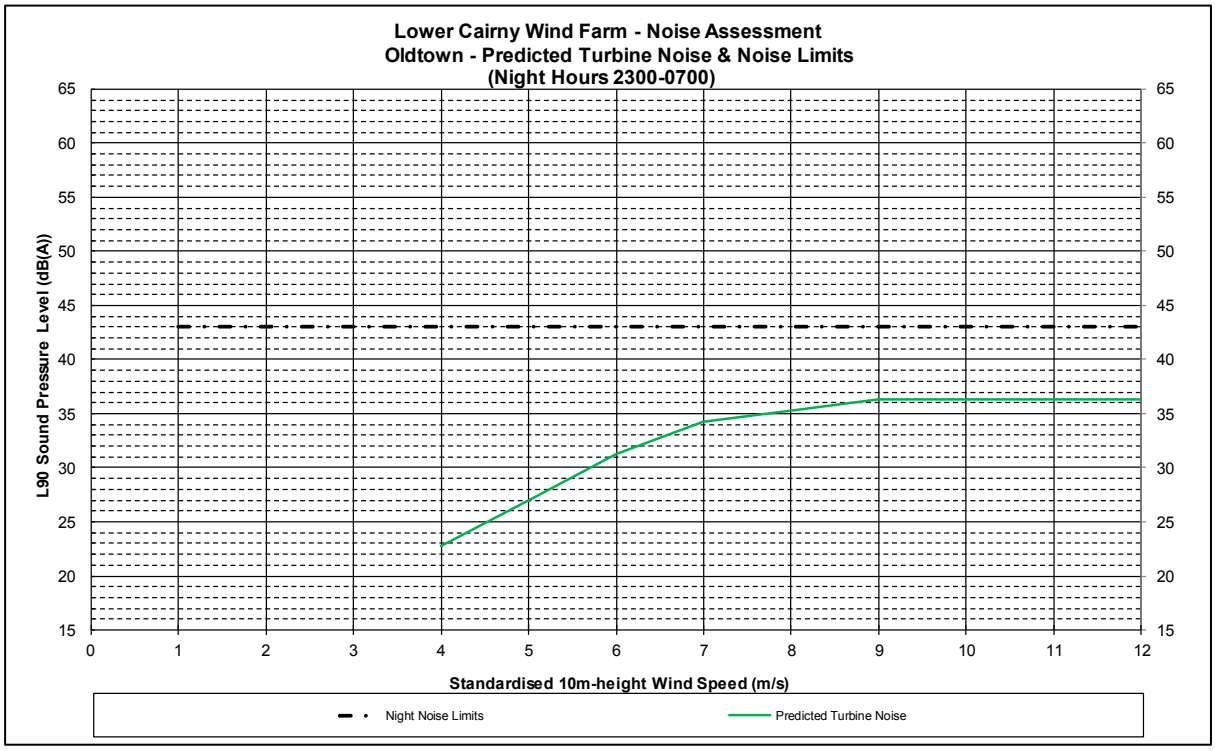


Figure 6 - Oldtown Day Hours Noise Assessment Chart

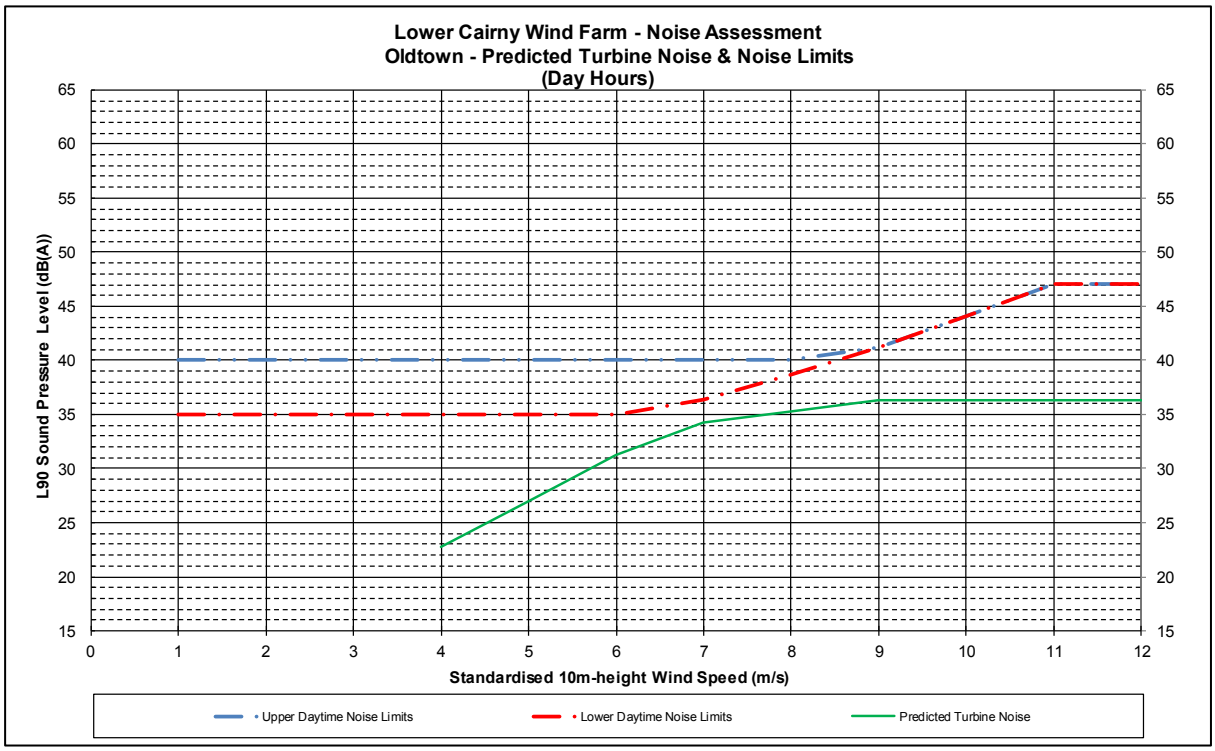


Figure 7 - Larkhall Night Hours Noise Assessment Chart

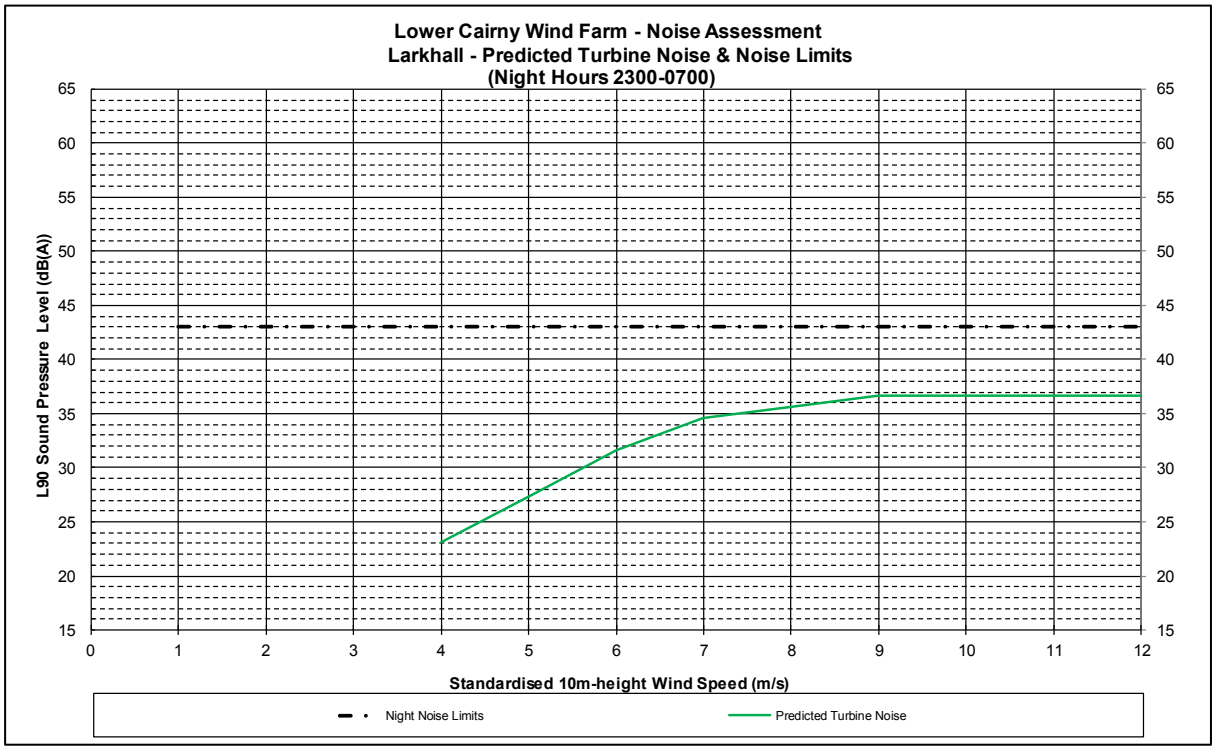


Figure 8 - Larkhall Day Hours Noise Assessment Chart

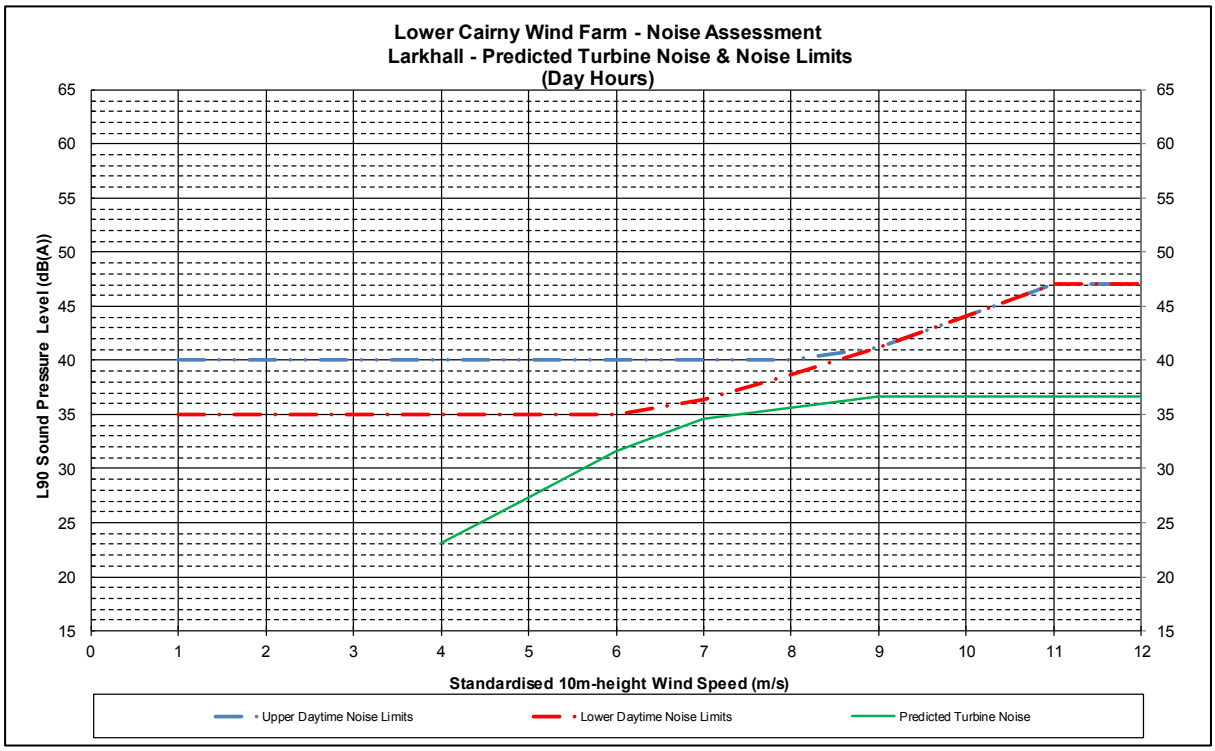


Figure 9 - Larkhall 2 Night Hours Noise Assessment Chart

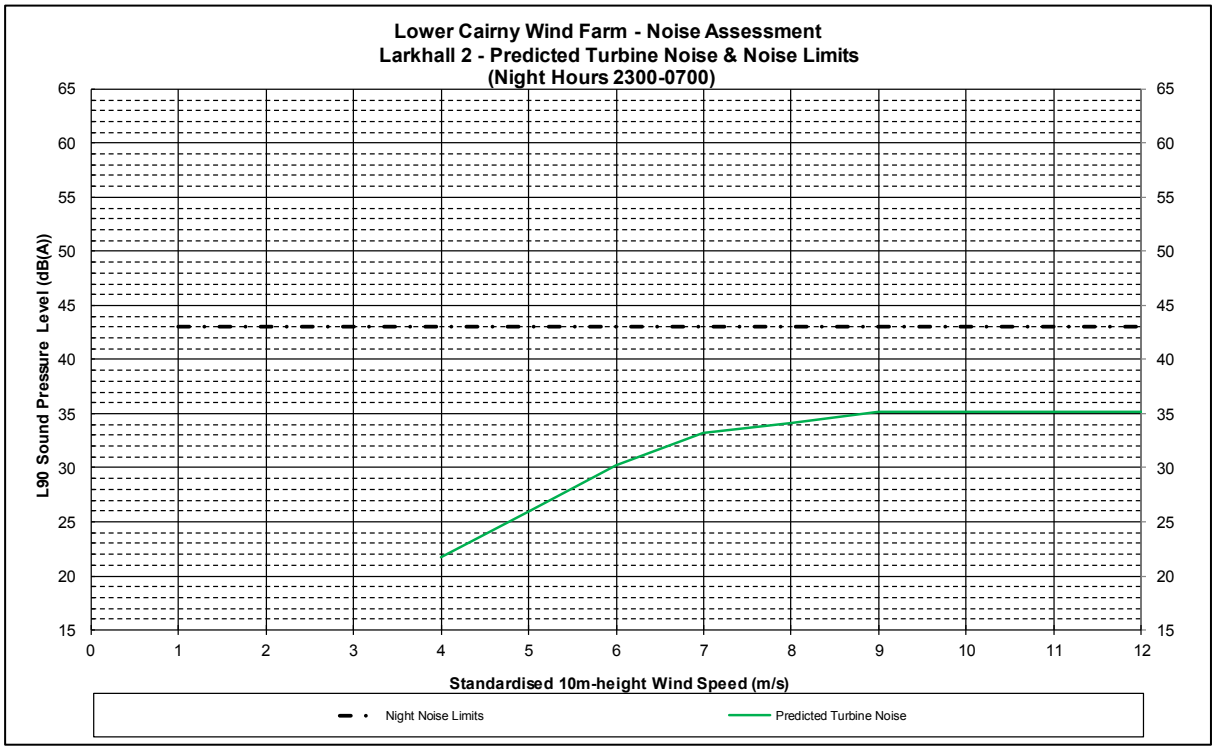


Figure 10 - Larkhall 2 Day Hours Noise Assessment Chart

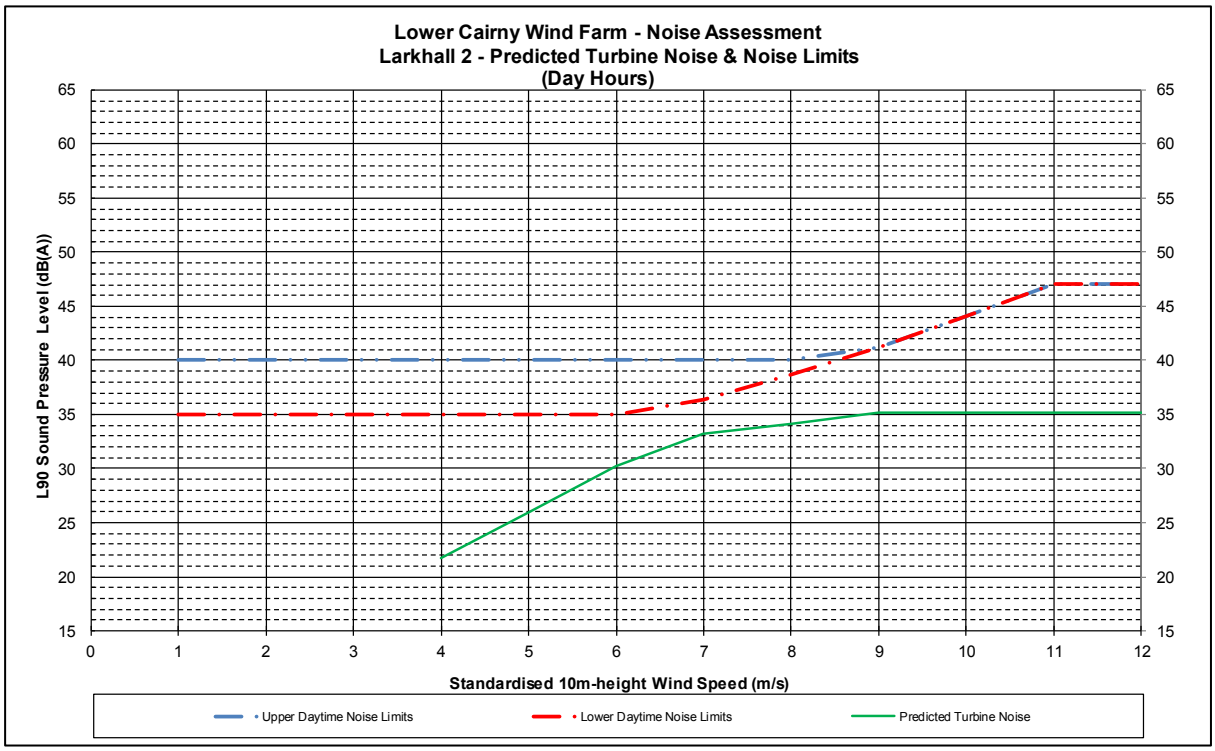


Figure 11 - Margie Night Hours Noise Assessment Chart

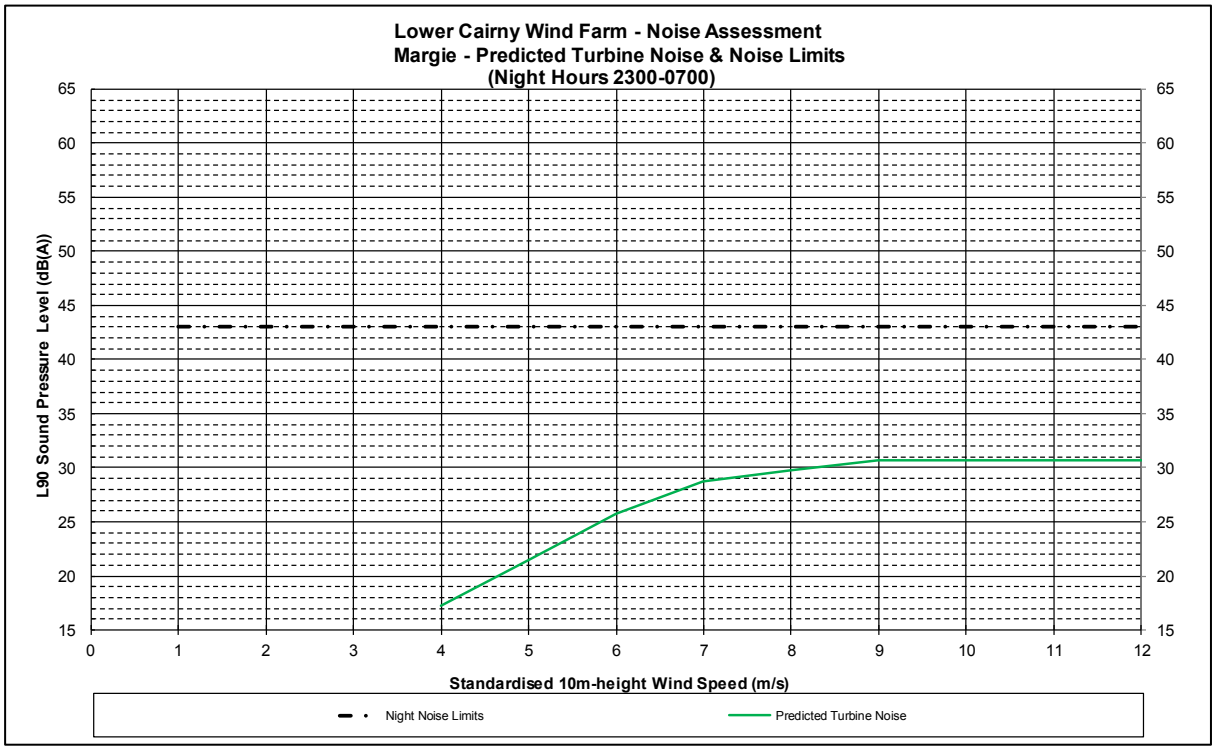


Figure 12 - Margie Day Hours Noise Assessment Chart

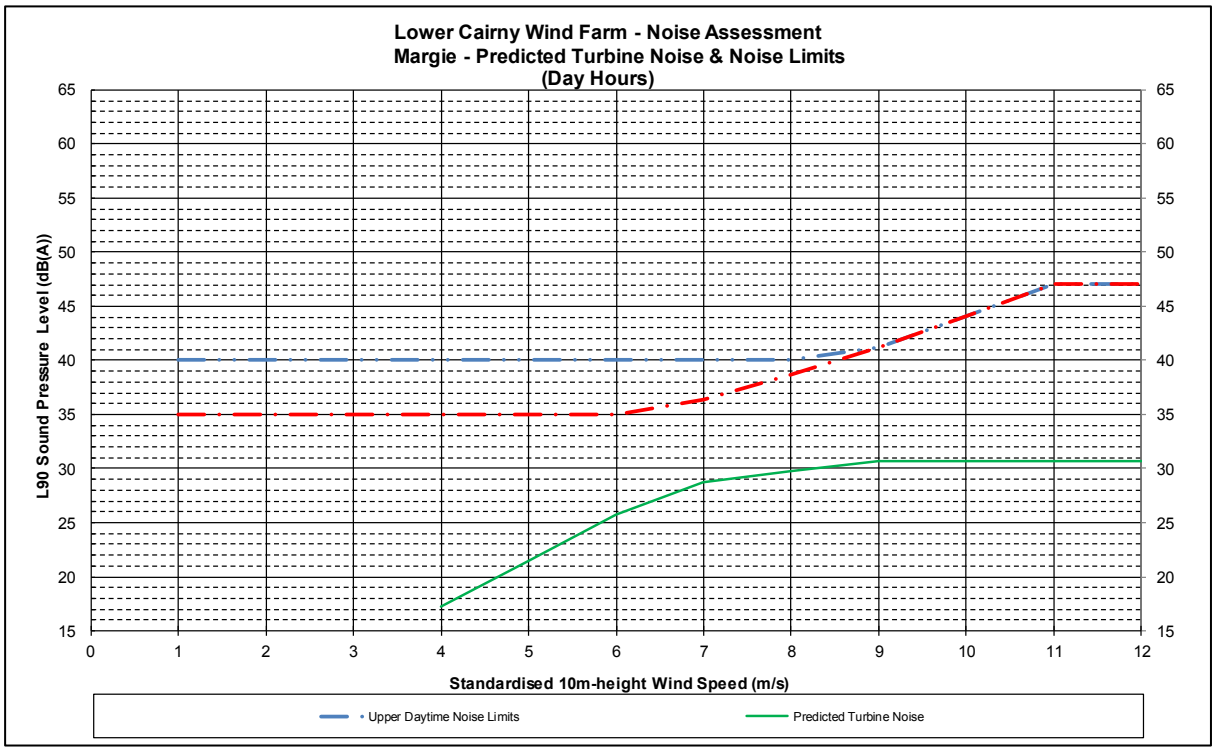


Figure 13 - Newbigging Night Hours Noise Assessment Chart

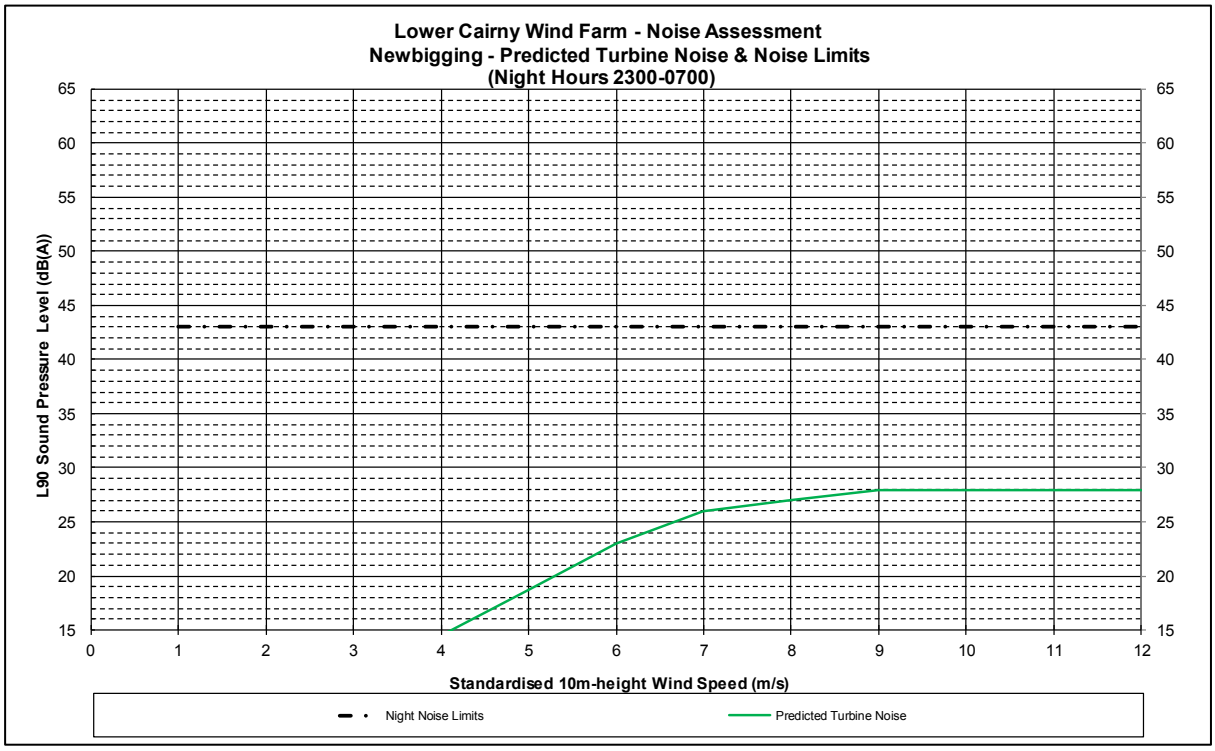


Figure 14 - Newbigging Day Hours Noise Assessment Chart

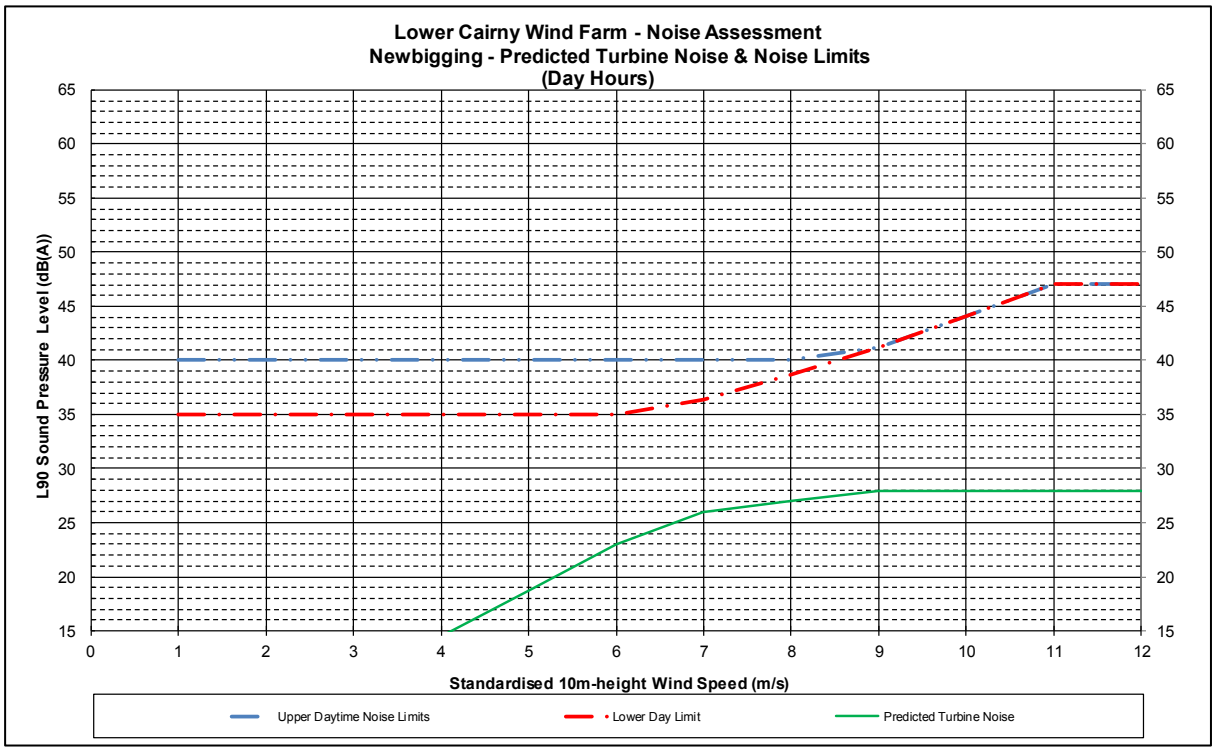
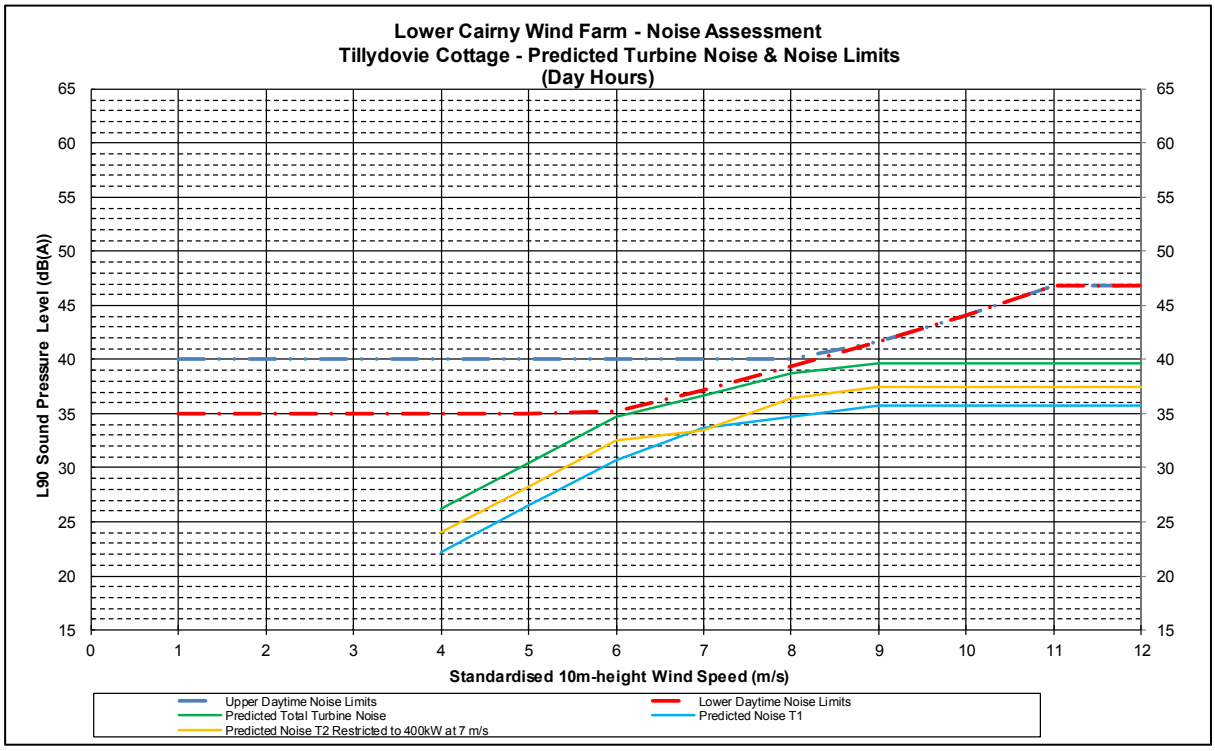


Figure 15 - Tillydovie Cottage Day Hours Mitigated Noise Assessment Chart



Bell Ingram

Dr Roddy Yarr
Roddy Yarr Consulting Limited

MJT/SRS/V6010/VALS

9 December 2013

Dear Dr Yarr

Bogton Farmhouse

I refer to your instructions dated 17 November to carry out a brief report on the condition of Bogton Farmhouse.

I visited the site on 6 December 2013. The site is known to me as I carried out a valuation of it probably 10 years ago when the Gannochy Estate was being marketed.

As you know the site well, this letter concentrates on the main findings of my visit.

Location

Bogton Farmhouse is located approximately 5½ kilometres to the west of the town of Edzell.

Access

Access to the property is by way of an unmade farm track which is in very poor condition.

Property

Bogton Farmhouse has been a traditional small two storey Angus farmhouse, constructed of dressed and random stone under a slate roof.

On the day of inspection the house was totally uninhabitable. The house has been virtually destroyed by fire leaving only the four walls intact with no roof or internal walls or ceilings.

As well as being uninhabitable, in my opinion the structure of the farmhouse is dangerous as there is a large structural crack in the east gable, running from ground level to the chimneyhead.

Manor Street, Forfar, Angus DD8 1EX
Telephone 01307 462 516 Fax 01307 466 920
bellingram.co.uk forfar@bellingram.co.uk

Chartered Surveyors

It is my recommendation that a demolition warrant is applied for as the structure will become increasingly unsafe.

The attached photographs show the state of disrepair and the structural crack in the gable.

Summary

There is no possibility of this property being habitable or made habitable, especially as there is no roof and the integrity of the stonework has been completely compromised by the fire.

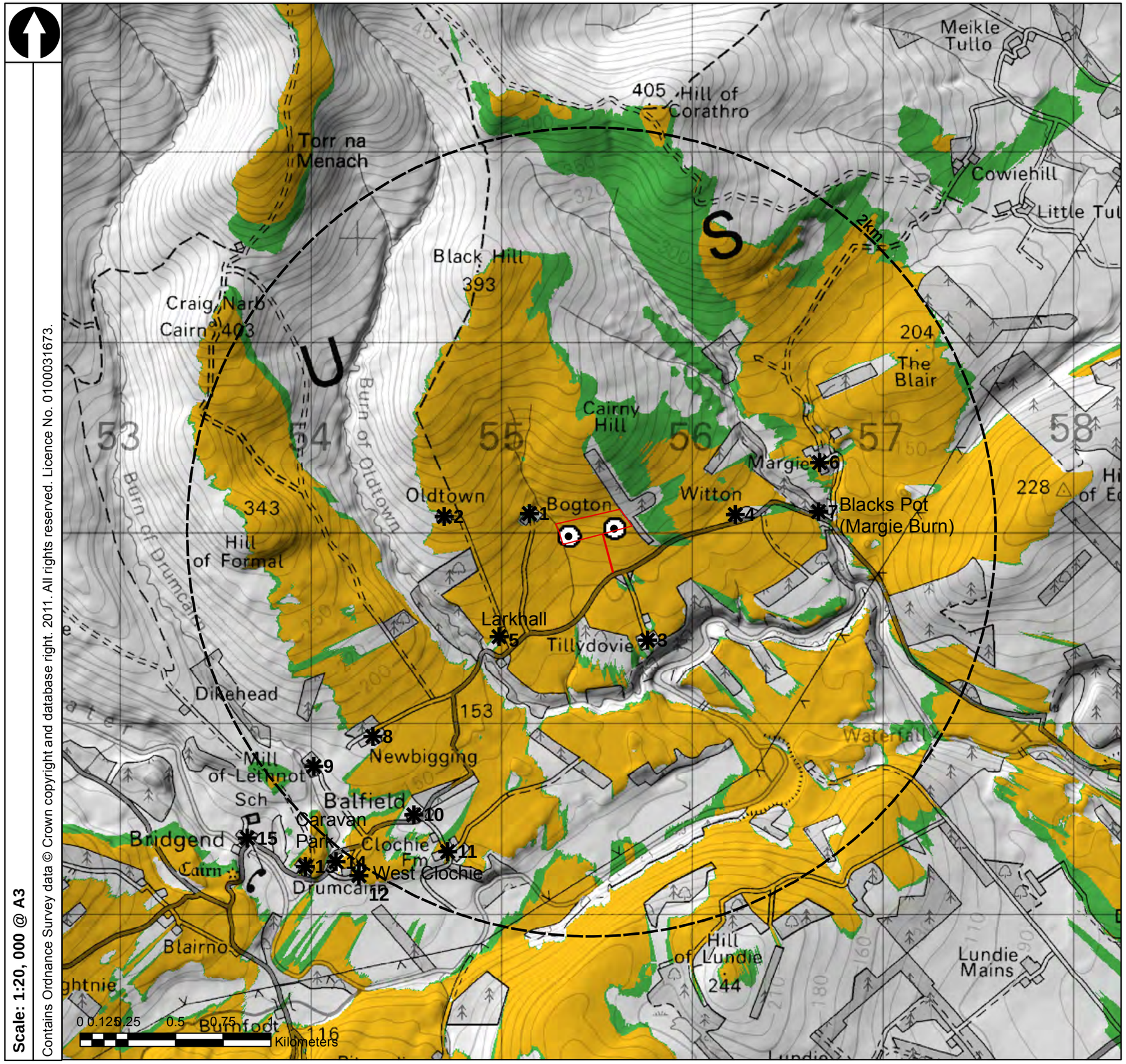
I trust this is of assistance but if you require any further information or assistance, please do not hesitate to contact me.

Yours faithfully

[redacted]

M J Taylor TD MA FRICS ACIArb
Director
Email: malcolm.taylor@bellingram.co.uk

APPENDIX 9 SHADOW FLICKER AND RESIDENTIAL AMENITY



Scale: 1:20, 000 @ A3

Figure No. 9.1 *Revision No. -*

Residential Assessment of Properties on 'With Trees Blade Tip ZTV' within a 2km Radius of the Site

Legend

2km Buffer of Site

Site of Lower Cairny Wind Cluster

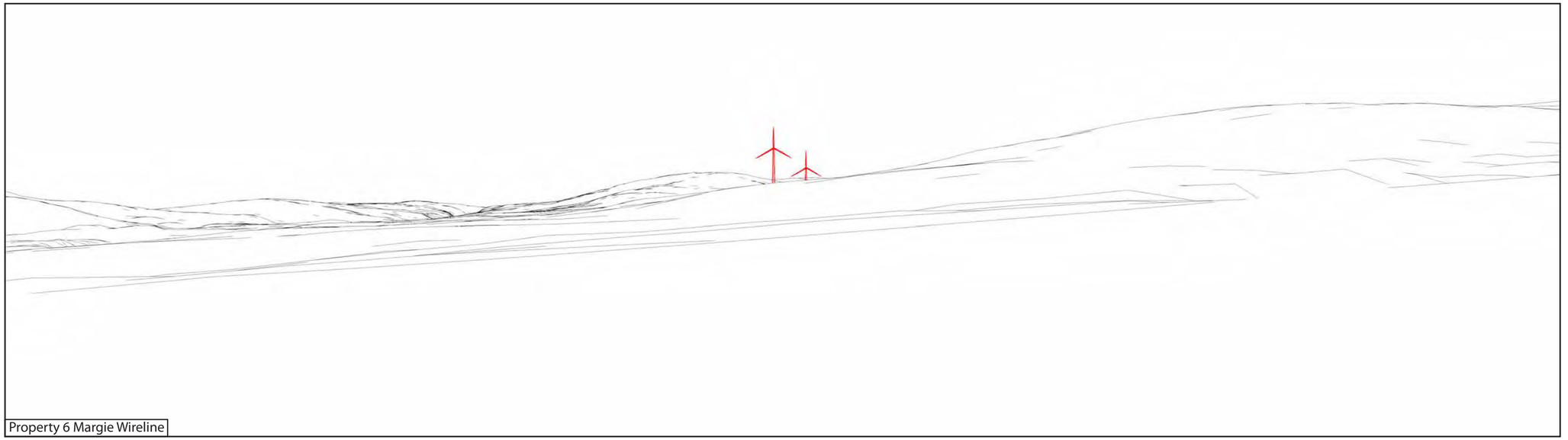
Property locations

1. Bogton 355150mE 770100mN
2. Oldtown 354702mE 770084mN
3. Tillydovie 355770mE 769436mN
4. Witton 356230mE 770094mN
5. Larkhall 354990mE 769454mN
6. Margie 356673mE 770367mN
7. Blacks Pot (Margie Burn) 356667mE 770110mN
8. Newbigging Farm 354328mE 768930mN
9. Mill of Lethnot 354019mE 768773mN
10. Balfield 354544mE 768519mN
11. Clochie Farm 354722mE 768327mN
12. West Clochie 354256mE 768200mN
13. Drumcairn 353975mE 768249mN
14 Caravan Park 354135mE 768274mN
15. Bridgend 353670mE 768397mN

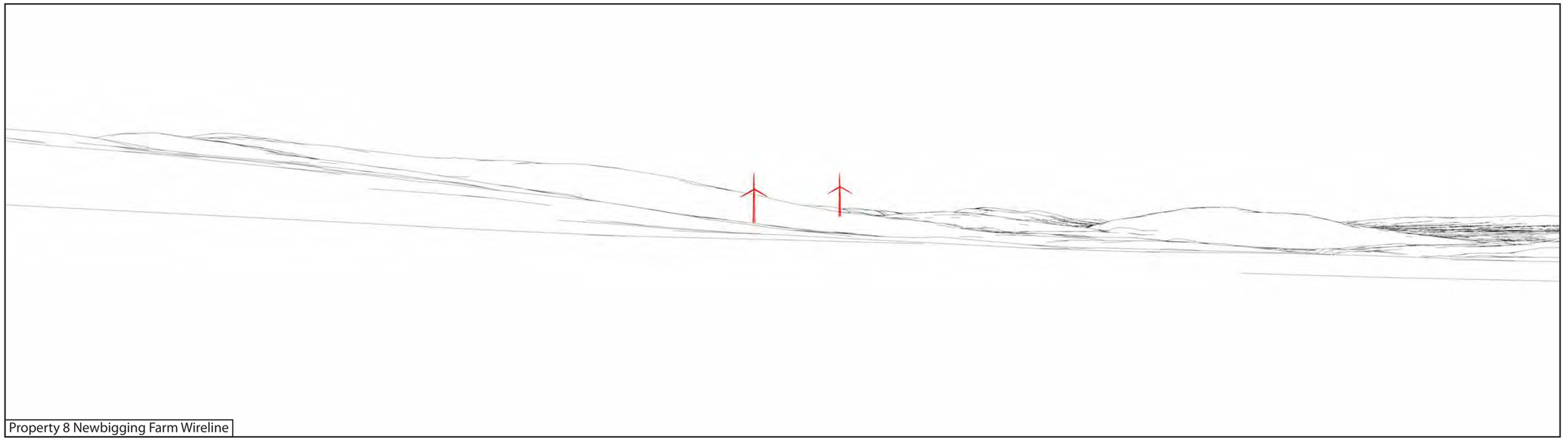
Zone of Theoretical Visibility

1 Turbine Visible

2 Turbines Visible



Property 6 Margie Wireline



Property 8 Newbigging Farm Wireline

Note:
If this sheet is held at a distance of 35cm from the eye, this visualisation will show the exact position and scale of the existing visual elements /proposed wind turbines as would be seen from this viewpoint, based on a computer generated digital terrain model. Nevertheless, neither photographs or visualisations can convey a view exactly as it would be seen by the human eye in reality.

Figure No. 9.2 *Revision No. -*

Property 6 Margie & Property 8 Newbigging Farm - Wirelines

Property 6 OS Grid Reference: NO 356673 770367

Elevation of Viewpoint: 146m +/- 5m

Direction to Centre of wind farm: 106°

Horizontal field of view of both illustrations: 90°

Approximate distance to the nearest proposed wind turbine: 1.1km

Property 8 OS Grid Reference: NO 354328 768930

Elevation of Viewpoint: 175m +/- 5m

Direction to Centre of wind farm: 47°

Horizontal field of view of both illustrations: 90°

Approximate distance to the nearest proposed wind turbine: 1.5km

To ensure the scale of the features are illustrated correctly, this sheet must be viewed / printed at a size of 59cm by 29.7cm

For further information on visualisations and how to use them as a tool for assessment please refer to the 'Visual Representation of Windfarms Good Practice' Scottish Natural Heritage, The Scottish Renewables Forum and the Scottish Society of Directors of Planning

h+m

Lower Cairny Wind Cluster

APPENDIX 10 TELECOMMUNICATIONS

Television reception – output from BBC Windfarm Assessment Tool (via e-mail)

If you were to place turbines in the following locations:

NO355770

You would be likely to affect 0 homes for whom there is no alternative off-air service.

In addition, you may affect up to 0 homes for whom there may be an alternative off-air service.

The transmitters likely to be affected are:

DURRIS CH5
ANGUS

This information is provided for the guidance of Wind Farm developers. The results of this query are a rough estimate of populations that may suffer interference from wind farms built at the locations specified. The information is not intended to be a substitute for an on-site survey where the potential for disruption to television services may more accurately be assessed.

The BBC does not accept liability for the consequence of any use of the information provided by this web site. All television reception difficulties caused by the erection of wind turbines are the responsibility of the wind farm developer.

This email was automatically generated in response to a query at the BBC Windfarms Tool website. Please do not reply to this address.

If you wish to contact the BBC, please visit: http://www.bbc.co.uk/feedback/

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APPENDIX 11 AVIATION AND DEFENCE

MINISTRY OF DEFENCE

Louise Dale
Assistant Safeguarding Officer
Safeguarding - Wind Energy
Defence Estates
Kingston Road
Sutton Coldfield
West Midlands
B75 7RL

Cyranne Taylor: 0121 311 2195
Claire Duddy: 0121 311 3714
Facsimile: 0121 311 2218
E-mail: cyranne.taylor@de.MOD.uk
E-mail: claire.duddy@de.MOD.uk
Internet Site: www.defence-estates.MOD.uk

Lawson Doe
Hayes Macfarlane**
Royal Bank Building
Market Square
Alyth
PH11 8AA

Your Reference: HAYES MACFARLANE
Our Reference: DE/C/SUT/43/10/1/11107

13 December 2010

Dear Mr Lawson Doe

DE Reference Number: 11107

Site Name: Witton

I am writing to tell you that the Ministry of Defence (MOD) has no concerns with the proposal as set out in your pro-forma dated 28/10/10.

The application is for 1 turbine at 66.12 metres to blade tip. This has been assessed using the grid reference below as submitted in your pro-forma.

Turbine	100km Square Letter	Easting	Northing
1	NO	5631	7019

An initial assessment has not identified any Line Of Sight issues to any RAF ATC Radar. MOD expects to have no concerns (pending assessment of a full planning application should this proposal progress).

In the interests of air safety, the MOD requests that the turbine is fitted with aviation lighting. All turbines should be fitted with 25 candela omni-directional red lighting or infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point.

If the application is altered in any way we must be consulted again as even the slightest change could unacceptably affect us.

DE
DEFENCE ESTATES
Delivering Estate Solutions to Defence Needs

If you apply for planning permission you must ensure that the relevant planning authority consults this office to ensure that no concerns have arisen since the date of this letter. If planning permission is granted you must tell us;

- the date construction starts and ends;
- the maximum height of construction equipment;
- the latitude and longitude of every turbine.

This information is vital as it will be plotted on flying charts to make sure that military aircraft avoid this area.

It should be noted that this response is based on current levels of wind farm development in the area. If additional wind farms are consented or built prior to this development being submitted for planning consent, our position may change.

Defence Estates Safeguarding wishes to be consulted and notified of the progression of planning applications and submissions relating to this proposal to verify that it will not adversely affect defence interests.

I hope this adequately explains our position on this matter. If you require further information or would like to discuss this matter further please do not hesitate to contact me.

Yours sincerely

Louise Dale
Assistant Safeguarding Officer – Wind Energy
Defence Estates

SAFEGUARDING SOLUTIONS TO DEFENCE NEEDS

DEFENCE ESTATES
Delivering Estate Solutions to Defence Needs

APPENDIX 12 ECONOMY AND TOURISM

APPENDIX 13 TRAFFIC AND TRANSPORT

Part 1 Diagrams

Diagram 1 Routes from Ports of Entry to Site Plan

Diagram 2 Local Route (A90) to Site Plan

Diagram 3 Construction Material Routes

Diagram 4 Route Condition Survey

Swept Path Analysis Diagrams (assorted)

APPENDIX 13

Abnormal Loads and Construction Traffic Trip Generation

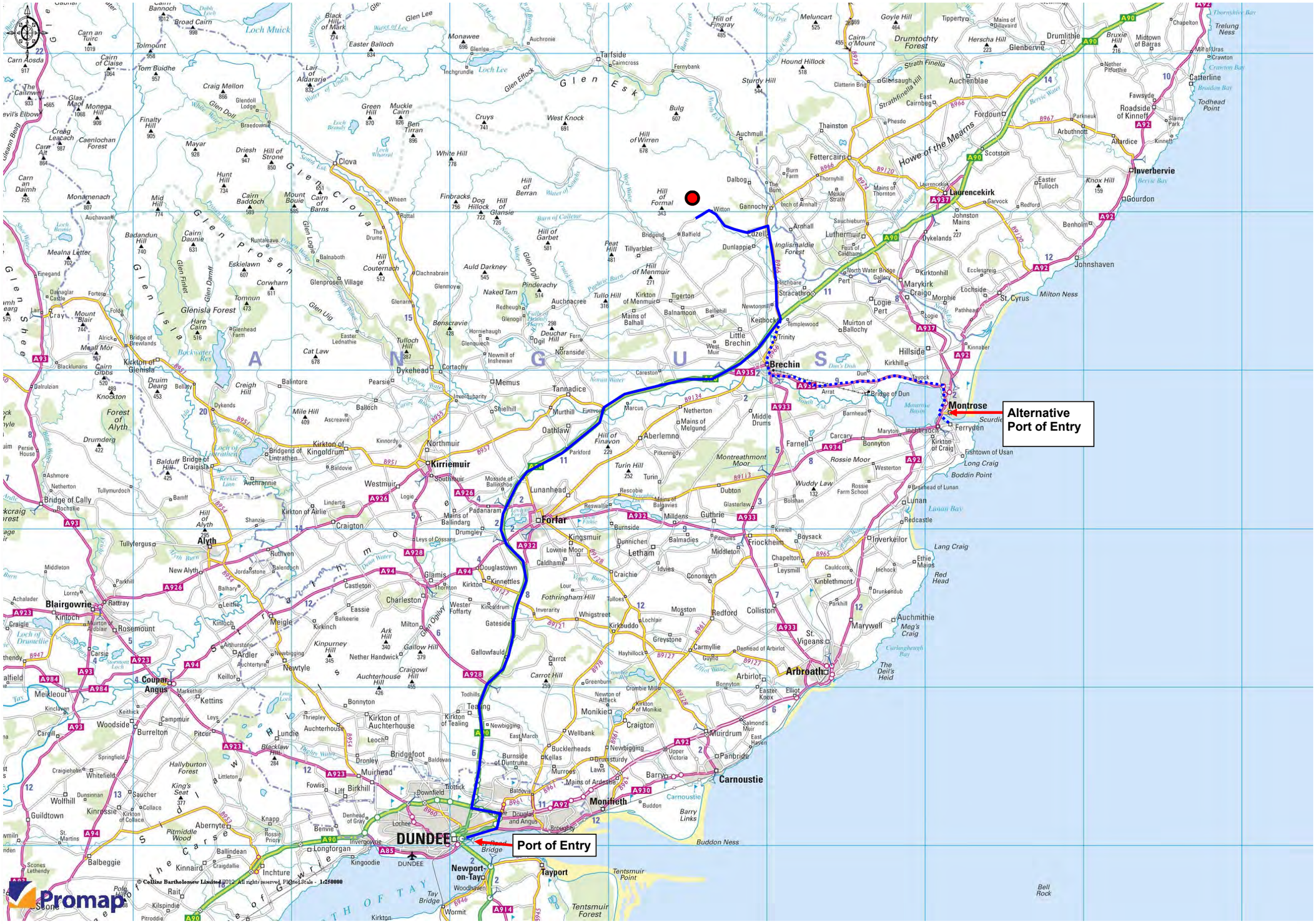
97659 Lower Cairny Wind Farm						
Data Entry Sheet						
Enercon E-48 Turbine						
Number of Turbines						2
Steel	(per base)			tonnes		18.2
Concrete	(per base)			m3		165
Hard Standing Area		(per base)		m2		1050
Site Access Tracks		Estimated		m		1000
Compound Area		40m x 40m		m2		1600
Laydown Area		100m x 100m		m2		10000
Substation Area		Estimated		m2		100
Turbine Base			Height	m		1.6
Turbine Base			Diameter	m		15
Site Perimeter Track		Estimated		m		500
Cabling Links		Estimated		m		500
Cabling Trough Width				m		0.5
Cabling Trough Depth				m		0.225
Non HGV Movements		Estimated		Monthly		15

97659 Lower Cairny Wind Farm
Average Daily Vehicle Movements

HGV and Abnormal	Total HGV		Mth 1	Mth 2	Mth 3	Mth 4	Mth 5	Mth 6	Mth 7	Mth 8	Mth 9	Mth 10	Mth 11	Mth 12		Check
Mobilisation - Machinery	13		7	7												13
Abnormal Loads	13						3	3		3	3					13
Police Escorts	26						7	7		7	7					26
Assembly Cranes	3					3										3
Substation and Building	17		9	9												17
Crushed Stone	1698			283	283	283	283	283	283							1698
Culverts/Geotextiles	1					1										1
Steel and Concrete	57					10	10	10	10	10	10					57
Cabling	33					6	6	6	6	6	6					33
Commissioning and Demobilisation	13												7	7		13
Total HGV Movements	1874		15	298	283	302	308	308	298	25	25	0	7	7		1874
Daily Average HGV Movements	20 day month		1	15	14	15	15	15	15	1	1	0	0	0		8
Daily Average non HGV movements	20 day month		15	15	15	15	15	15	15	15	15	15	15	15		15
Total Average vehicle movements			16	30	29	30	30	30	30	16	16	15	15	15		23

97659 Lower Cairny Wind Farm							
Crushed Stone Requirements							
	Depth	**Width**	**Length**	**Area m2**		**Turbines**	**Qty m3**
Site Access Tracks	0.5	5	1000				2500
Compound Area	1.5			1600			2400
Laydown Area	1.5			10000			15000
Substation Area	1.5			100			150
Hard Standing Area	1.5			1050		2	3150
	Height m				**Diameter m**	**Turbines**	
Turbine Bases	1.6				15	2	565
Total Crushed Stone Requirements							23765
Assumed average load							14
Total Number of Loaded Vehicle Movements							**1698**
Geotextile Requirements			**Width m**	**Length m**	**Area**	**Turbines**	**Quantity m2**
Site Access Tracks			5	1000			5000
Compound Area					1600		1600
Laydown Area					10000		10000
Substation Area					100		100
Hard Standing Area					1050	2	2100
Total Geotextile Requirements							18800
10% allowance for overlap and wastage							1880
Total Requirement		Assume 20000m2 per load					20680
Total Geotextile Loads							**1**
Turbines and Bases - Steel and Concrete							
Turbines		**2**					
	Per Base				**Per Load**		**Loads**
Steel	18.2	tonnes	36.4	tonnes	20	tonnes	2
Concrete	165	m3	330	m3	6	m3	55
Total HGV Movements Steel and Concrete							**57**
Note: Crushed Stone for Bases forms part of total Crushed Stone calculation							
Cabling			**Length m**	**per Drum**	**Drums**	**per Load**	**Loads**
Trefoil Cabling on Perimeter Access Road			500				
Cabling Links to Turbine Sites			500				
CSA Bare Copper Earth Tape			1000	250	4	12	1
Cabling		Cables	Length m				
Parallel to Access Road		3	1500				
Links to Turbine Bases		3	1500				
Total			3000	150	20	3	7
Cable Covering		Width m	Length m				
All cable runs		0.5	3000				
Total			1500			20000	1
Sand		Width m	Length m	Depth m	Total m3	per Load m3	Loads
Sand		0.5	3000	0.225	337.5	14	24
Total Cabling HGV Movements							**33**

97659 Lower Cairny Wind Farm								
Abnormal Load Movements				**Number**	**Per Base**	**Total**	**per Load**	**Loads**
Turbines				2				
Blades					3	6	2	3
Bolting Rings					1	2	2	1
Tower Sections					3	6	1	6
Nacelle					1	2	1	2
Hub					1	2	2	1
Total Abnormal Loads								**13**
Police Escorts			Per Load	2				**26**
Assembly Cranes - two loads Crawler Crane, one load Pilot Crane								**3**
Mobilisation								
Machinery Requirements for Track Laying								
Excavators								2
Drilling Rigs								1
Dumpers (40t)								2
Rollers								1
Assume 1 HGV per machine								6
Compound Offices, Storage, Generators, Toilets and Septic Tank								
3 diesel storage units (1 load)								1
3 diesel generator units (1 load)								1
2 offices, 1 store and 1 canteen (1 per load)								4
2 toilets and 1 septic tank (one load)								1
Total loads								7
Total HGV Movements Mobilisation								**13**
Commissioning and Demobilisation								
Removal of all above								**13**
Substation & Operations compound building								
(Estimates based on experience elsewhere)								
Blocks								5
Slates								3
Foundations								4
Internal Fit out, Windows and Doors								4
Transformer								1
Substation and Building Loads								**17**



FAIRHURST

Project Title:

Lower Cairny Wind Farm

Client:

Mr G Yarr

Diagram Title:

Diagram 1

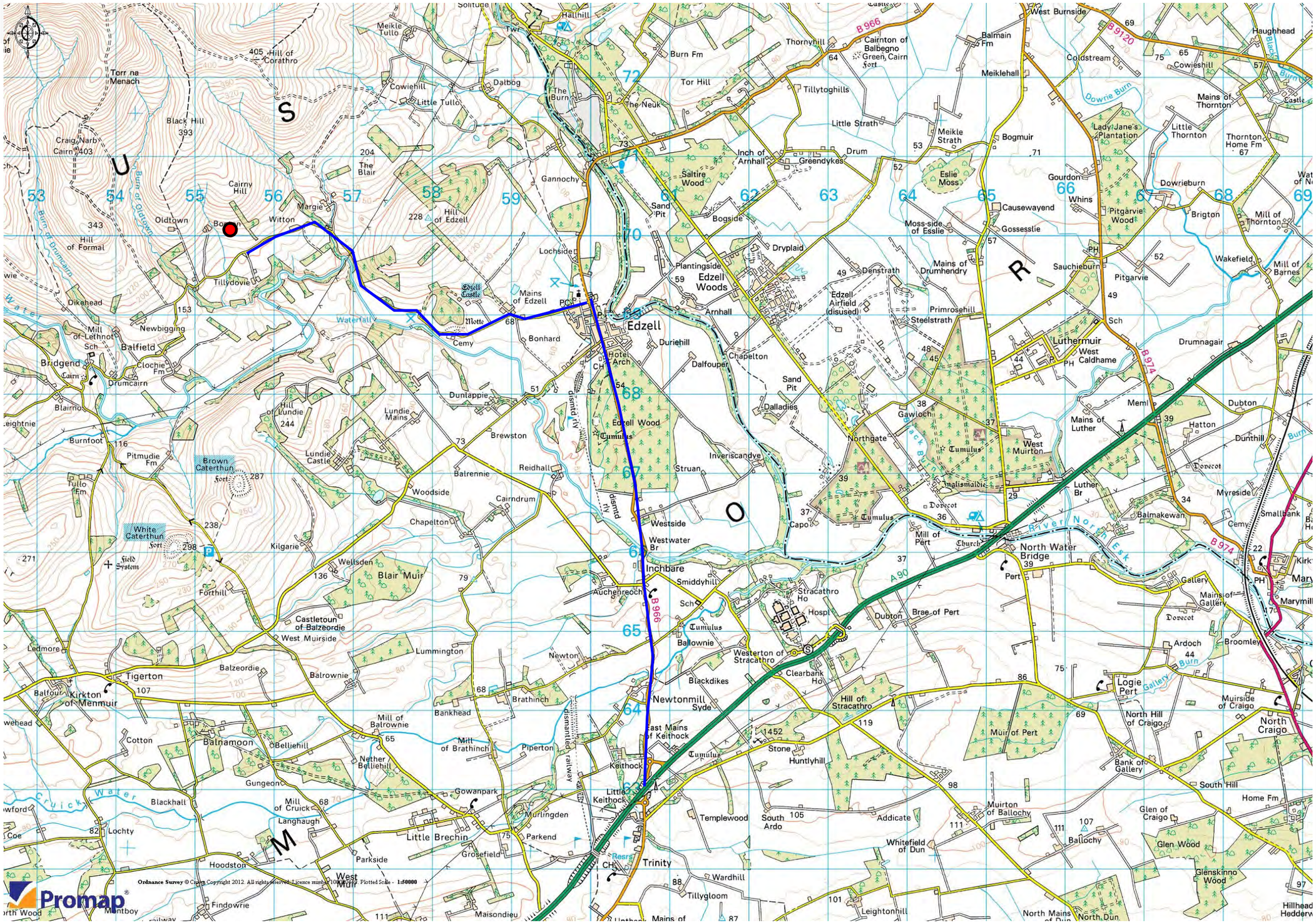
Port of Entry to Site Plan

Key:

- Proposed Route for Abnormals
- Alternative Route for Abnormals
- Lower Cairny Windfarm

43 George Street
Edinburgh
EH2 2HT

T. 0131 225 6741
F. 0131 225 6830



FAIRHURST

Project Title:

Lower Cairny Wind Farm

Client:

Mr G Yarr

Diagram Title:

Diagram 2

Local Road Connections to Site

Key:

- Proposed Route for Abnormals
- Windfarm site

43 George Street
Edinburgh
EH2 2HT

T. 0131 225 6741
F. 0131 225 6830

FAIRHURST

Project Title:

Lower Cairny Wind Farm

Client:

Mr G Yarr

Diagram Title:

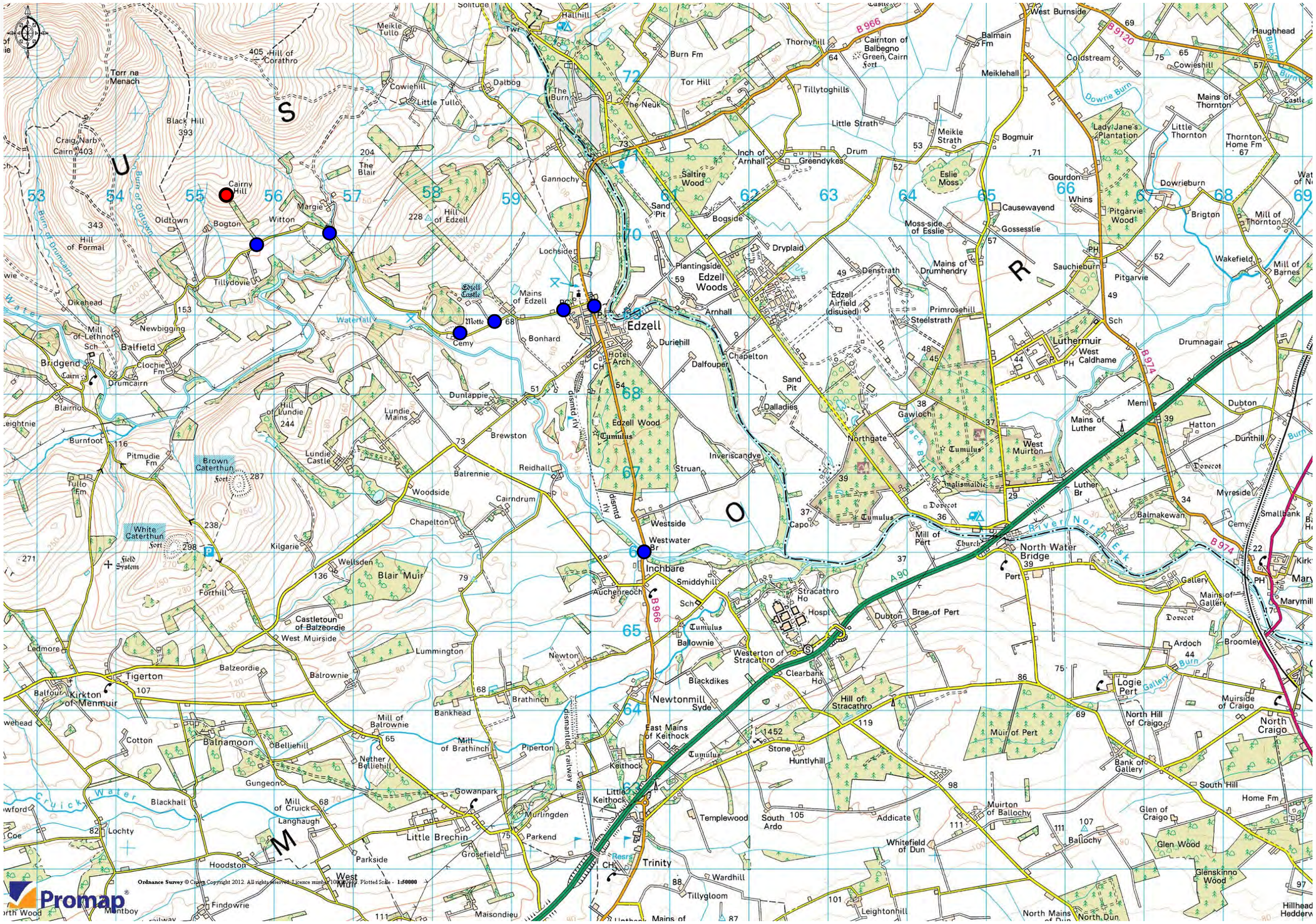
Diagram 3
Construction Materials Routes

Key:

- Windfarm Site
- Crushed Stone and Sand
- Sand
- Crushed Stone
- Possible Delivery Route
- Alternate Routes

43 George Street
Edinburgh
EH2 2HT

T. 0131 225 6741
F. 0131 225 6830



FAIRHURST

Project Title:

Lower Cairny Wind Farm

Client:

Mr G Yarr

Diagram Title:

Diagram 4
Route Condition Survey

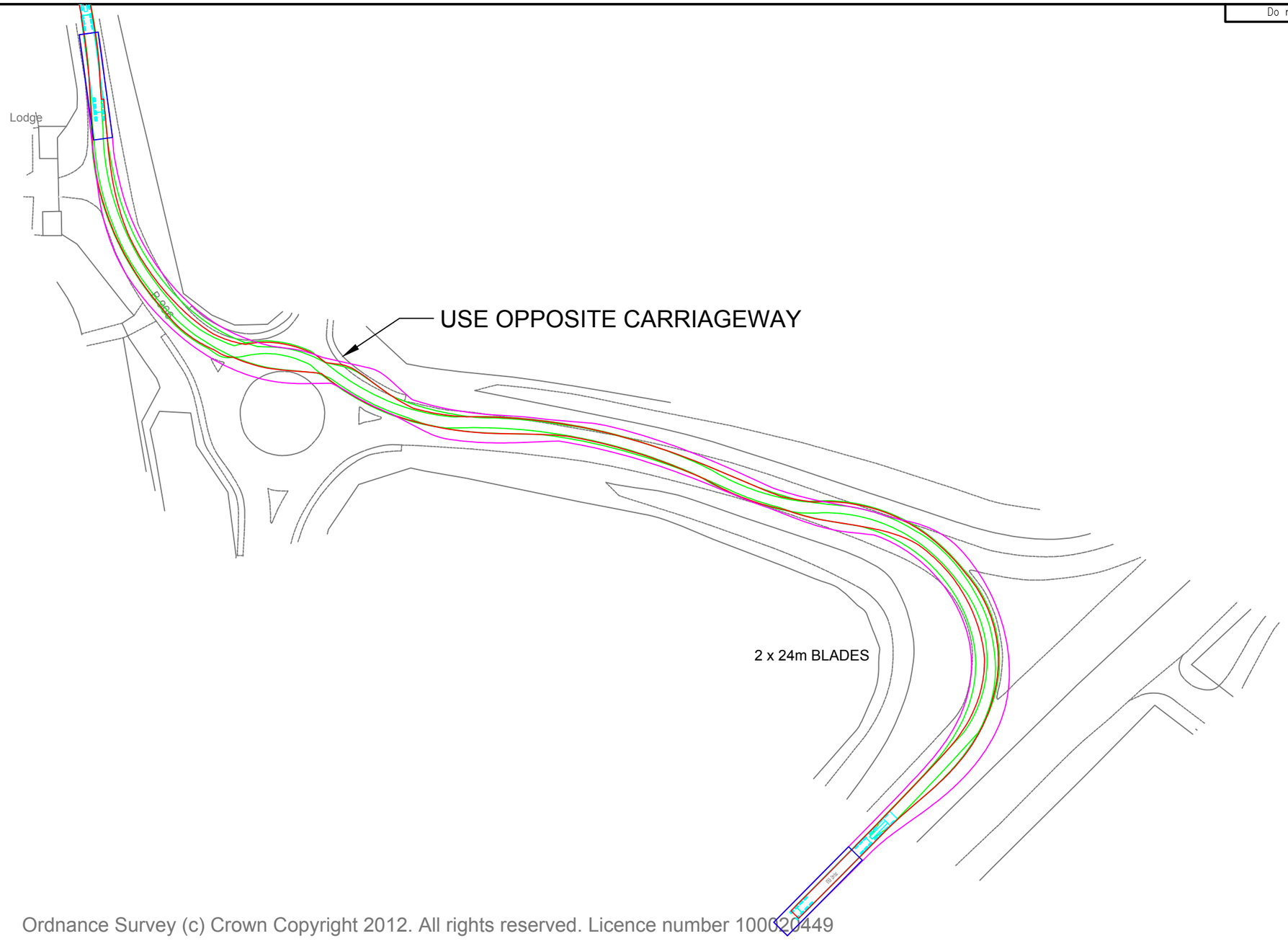
Key:

- Windfarm Site
- Location of Dilapidation

43 George Street
Edinburgh
EH2 2HT

T. 0131 225 6741
F. 0131 225 6830

Do not scale from this drawing.



Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 1
A90 \ B966

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
1:1000	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
19/12/12			
Drawing No.:			Revision:
97659/8001			–

Do not scale from this drawing.

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 2
B966 WESTWATER BRIDGE

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
1:1000	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
20/12/12			
Drawing No.:			Revision:
97659/8002			–

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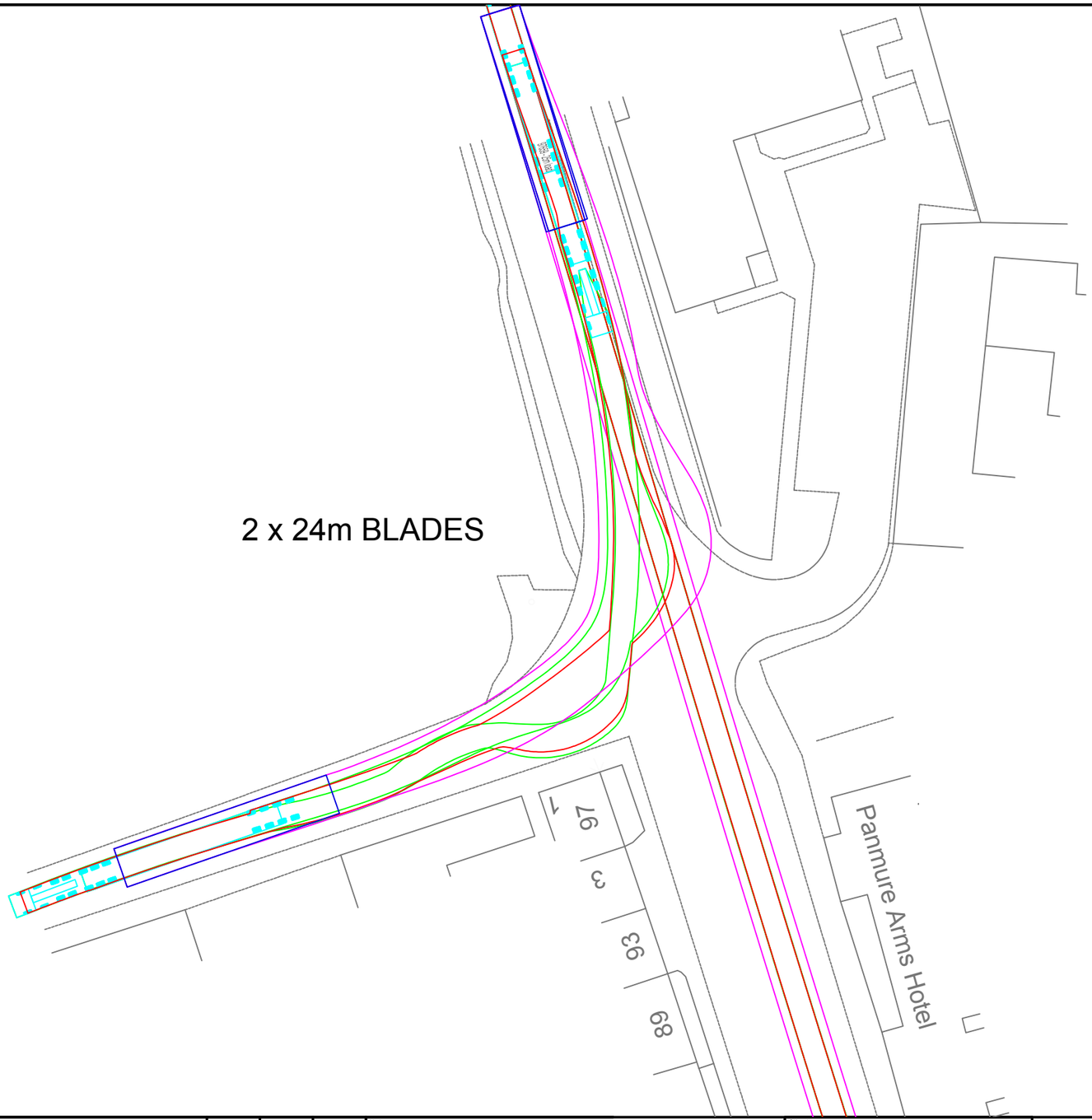

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 3
B966 \ EDZELL VILLAGE

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
1:1000	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
20/12/12			
Drawing No.:			Revision:
97659/8003			–

Do not scale from this drawing.

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 4
LETHNOT ROAD AT CEMETERY

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
1:1000	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
20/12/12			
Drawing No.:			Revision:
97659/8004			–

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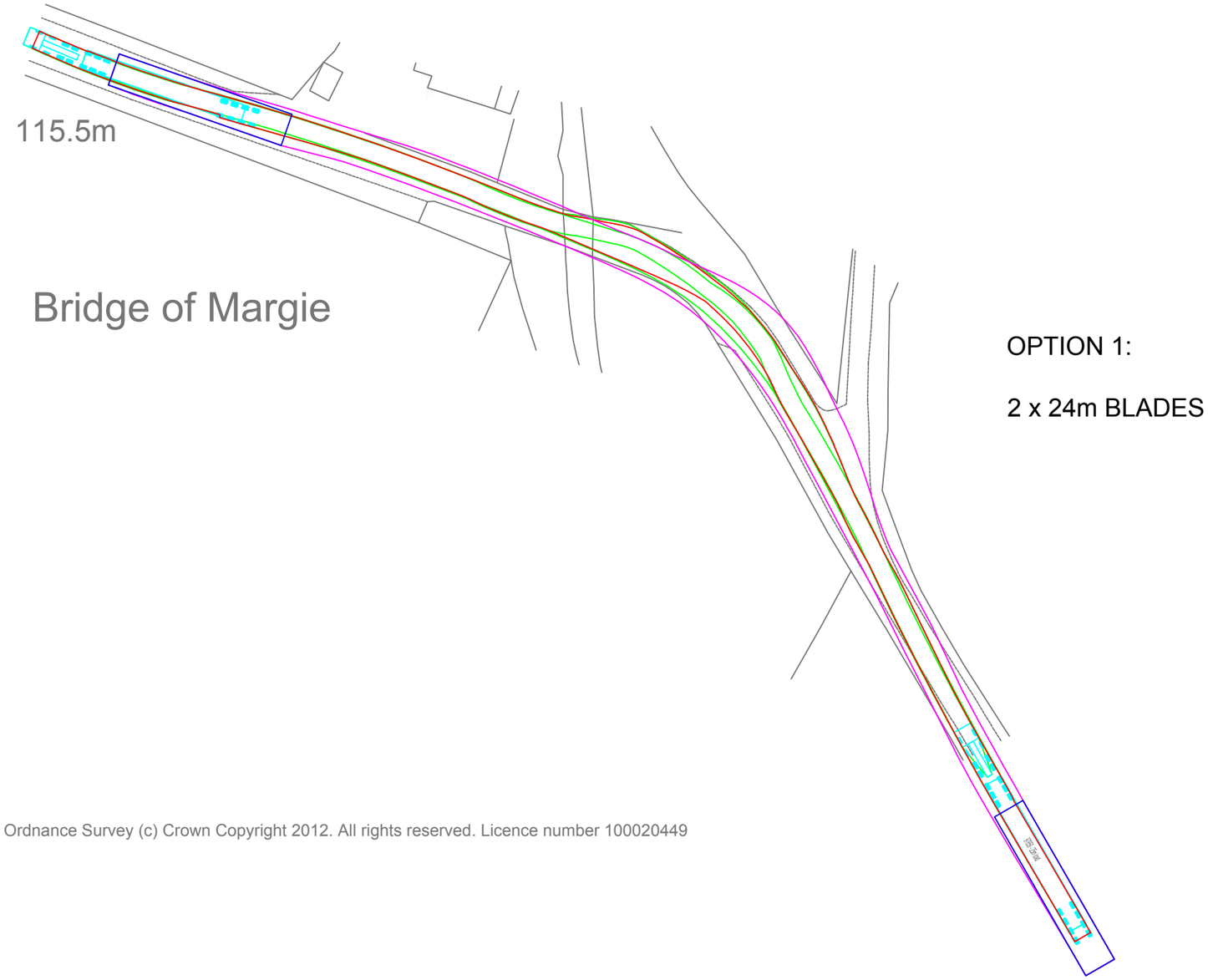

OPTION 1:

2 x 24m BLADES

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 5
BRIDGE OF MARGIE – OPTION 1

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
1:1000	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
20/12/12			
Drawing No.:			Revision:
97659/8005			–

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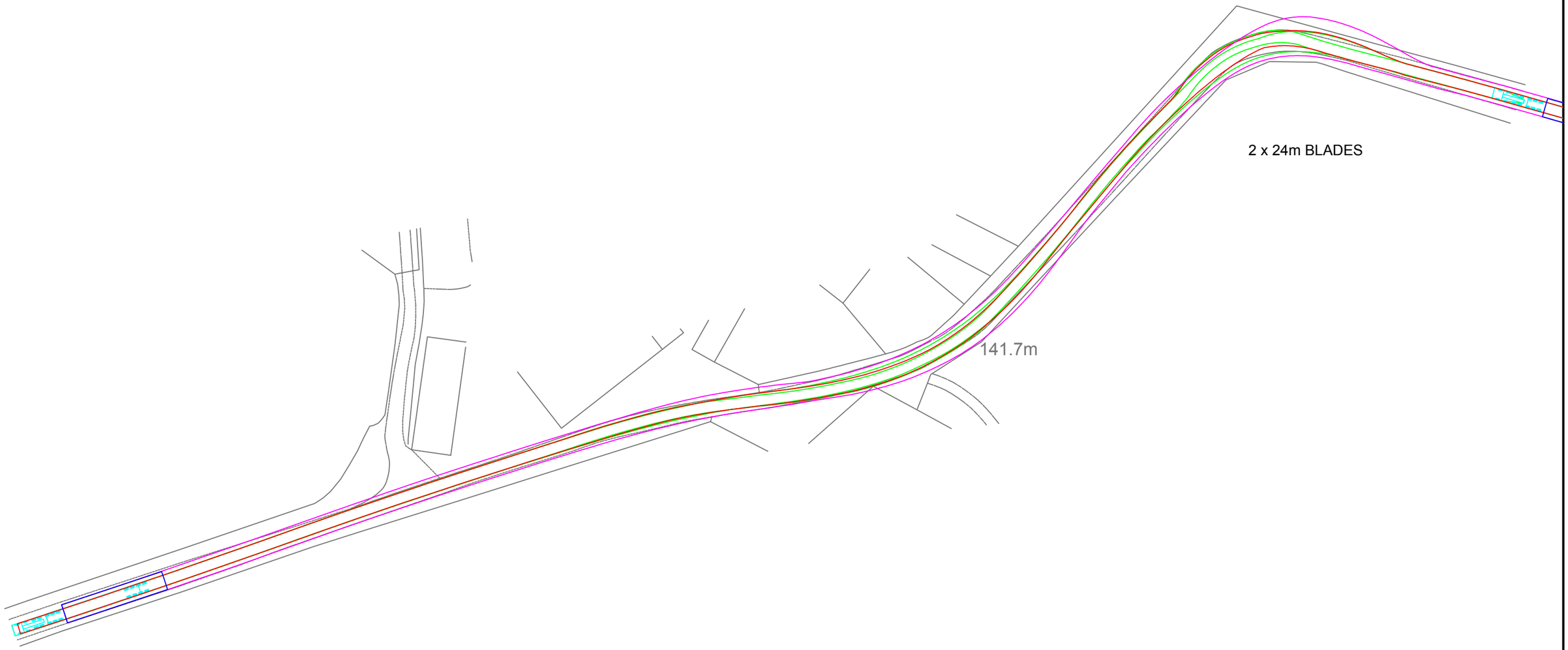

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 6
WITTON FARM

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:	
1:1000	For Information	
Drawn:	Checked:	Approved:
NR		
Date:	Date:	Date:
20/12/12		

Drawing No.: 97659/8006

Revision: –

Do not scale from this drawing.

OPTION 2:

SINGLE 24 M BLADE

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 5
BRIDGE OF MARGIE – OPTION 2

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
NTS	For Information		
Drawn:	Checked:	Approved:	
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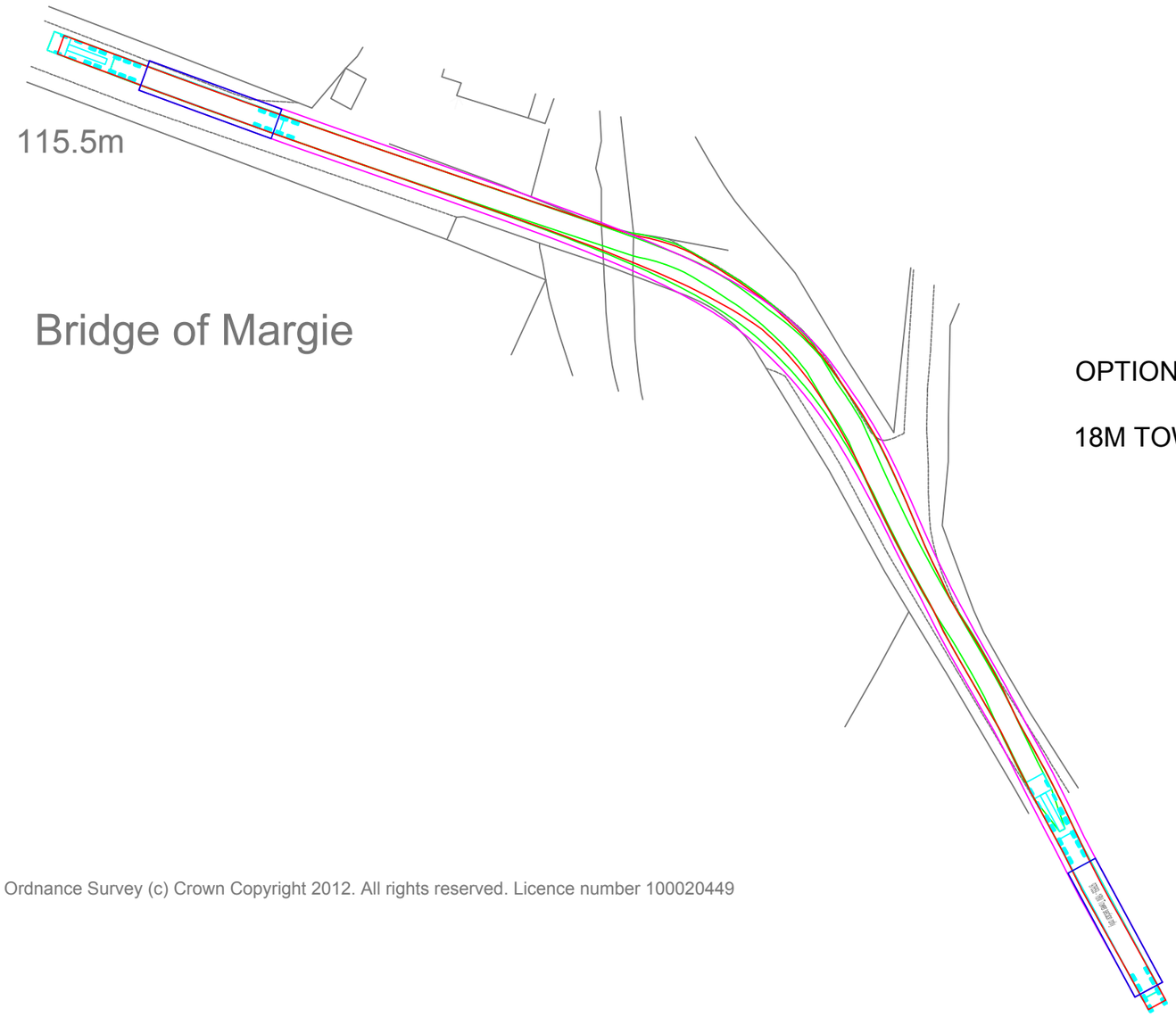
Date:	Date:	Date:	
22/01/13			
Drawing No.:			Revision:
97659/8007			–

Do not scale from this drawing.



OPTION 3:

18M TOWER SECTION ONLY

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 5
BRIDGE OF MARGIE – OPTION 3

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
AS SHOWN	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
22/01/13			
Drawing No.:			Revision:
97659/8008			–

Do not scale from this drawing.

OPTION 4:

2 x 24m BLADES
REPOSITIONED TO FRONT OF TRAILER

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 5
BRIDGE OF MARGIE – OPTION 4

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:	
AS SHOWN	For Information	
Drawn: NR	Checked:	Approved:
Date: 23/01/13	Date:	Date:
Drawing No.: 97659/8009		Revision: –

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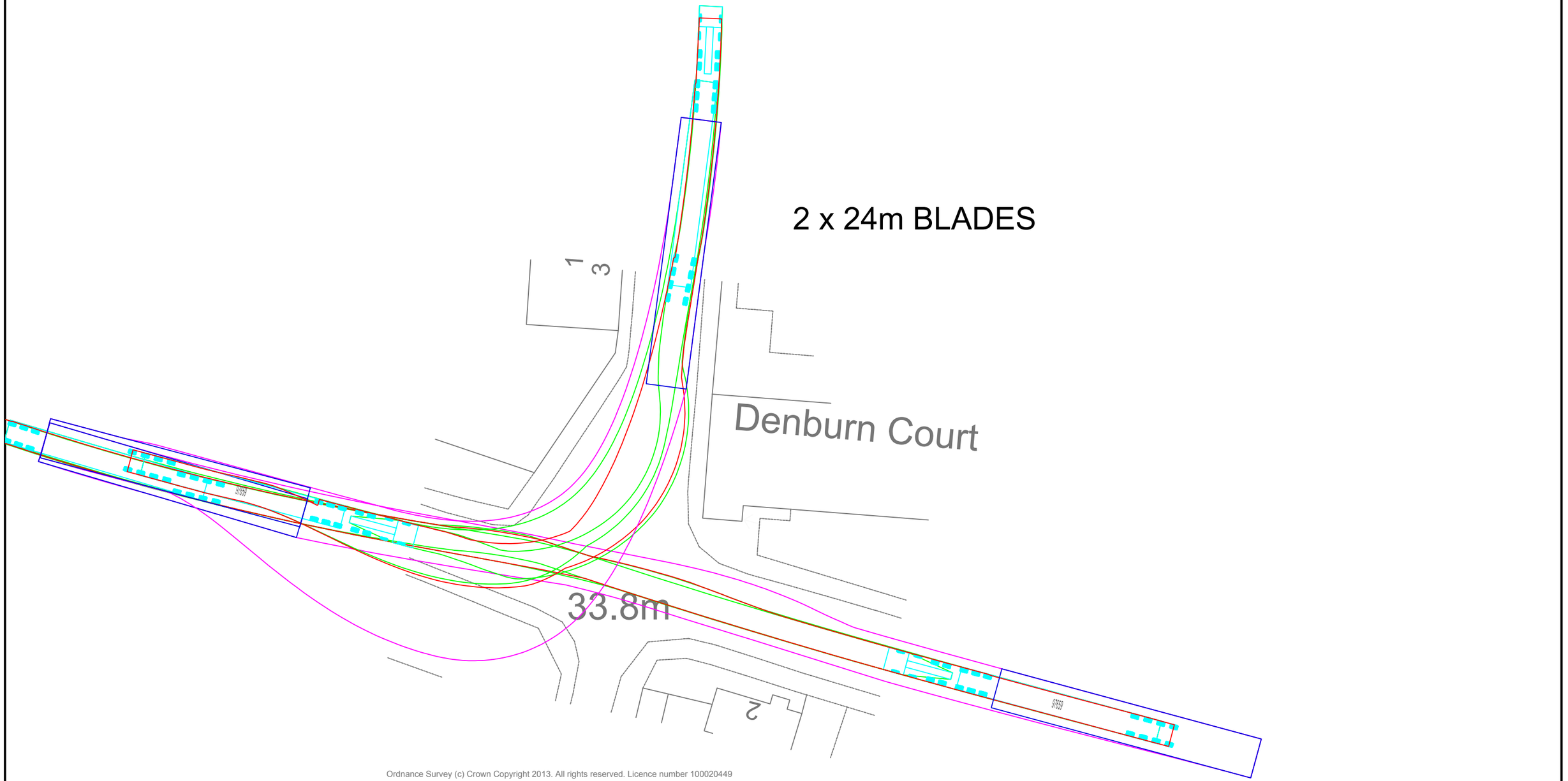

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 7
A935 \ BRECHIN

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
NTS	For Information		
Drawn:	Checked:	Approved:	
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Date:	Date:	Date:	
19/12/12			
Drawing No.:			Revision:
97659/8010			–

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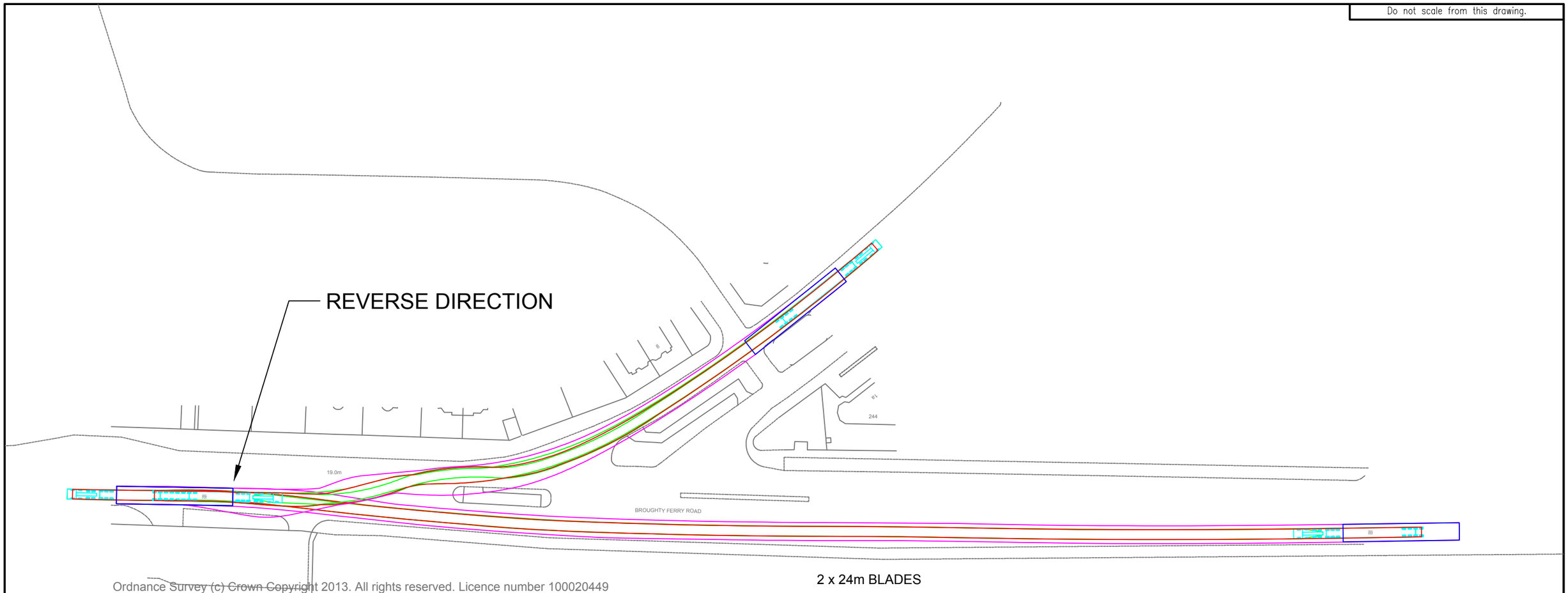

THIS REGISTER IS A NON-EXHAUSTIVE LIST OF RESIDUAL HAZARDS RELATING TO THE WORKS SHOWN ON THIS DRAWING THAT HAVE BEEN IDENTIFIED DURING THE DESIGN STAGE

SIGNIFICANT RESIDUAL HAZARDS	DETAILS

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
SWEPT PATH ANALYSIS
LOCATION 8
DUNDEE A930 \ A92

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
NTS	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
24/01/13			
Drawing No.:			Revision:
97659/8011			–

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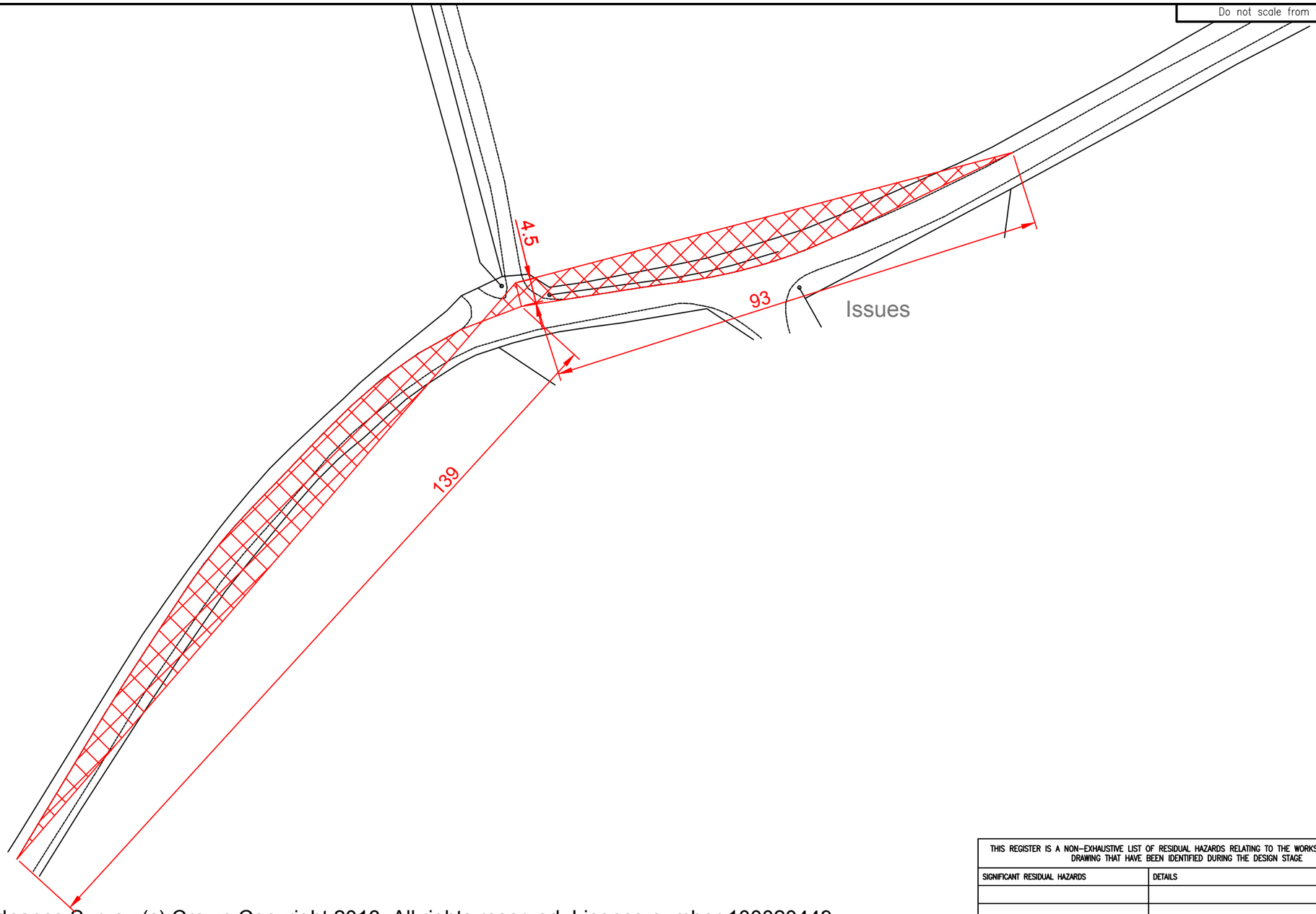

THIS REGISTER IS A NON-EXHAUSTIVE LIST OF RESIDUAL HAZARDS RELATING TO THE WORKS SHOWN ON THIS DRAWING THAT HAVE BEEN IDENTIFIED DURING THE DESIGN STAGE	
SIGNIFICANT RESIDUAL HAZARDS	DETAILS

Rev.	Date	Description	Drawn	Checked	Approved

Notes:

Client:

Project Title:
CAIRNY WINDFARM

Drawing Title:
COMPONENT TRANSPORT
VISIBILITY SPLAY
SITE ACCESS
LETHNOT ROAD

FAIRHURST
43 George Street,
EDINBURGH, EH2 2HT
Tel: 0131 225 6741 Fax: 0844 381 4412

Scale at A3:	Status:		
AS SHOWN	For Information		
Drawn:	Checked:	Approved:	
NR			
Date:	Date:	Date:	
24/01/13			
Drawing No.:			Revision:
97659/8012			–

Donald Stirling

From: BarnesA [BarnesA@angus.gov.uk]

Sent: 18 December 2012 12:59

To: Donald Stirling

Subject: RE: 97659 Lower Cairny Wind Farm

Donald,

The bridges spanning over 1.5m on the proposed route are suitable for use by the abnormal load described as long as the vehicle is driven slowly over the centreline of the bridges.

This is particularly important at Westwater Bridge, Inchbare (GR 360672, 765978). ***Gannochy Bridge (GR 360018, 770895) on the alternative route it is not suitable for the load.***

I am not sure about the state of culverts crossing the route but the axle loads are not too high and they should be ok if in good condition or well buried. I have contacted my Roads Maintenance colleague in respect of the culverts and will let you know if any problems are anticipated in that area.

Meantime, I trust the above is of assistance.

Regards,

Andy Barnes
Senior Traffic Engineer
Roads Division
Tel: ext. 3391
Fax: 473388
e-mail: barnesa@angus.gov.uk

-----Original Message-----
From: Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
Sent: 10 December 2012 12:33
To: BarnesA
Cc: Filecopy - Edin
Subject: 97659 Lower Cairny Wind Farm

Andy

You may recall our recent discussion in respect of proposals for Lower Cairny Wind Farm.

I would be obliged if you advise suitability of bridge structures and culverts on the attached plan for the passage of Abnormal Loads. I will confirm suitability of the proposed route for components by swept path analysis as part of our report.

Supplier specifications for the Enercon E-48 turbine confirm maximum axle loads of 12t – it is anticipated that the maximum gross vehicle weight will arise with the conveyance of the Nacelle (hub) component with an allowance of 100t suggested. There will be two movements of this weight as the site proposes installation of two turbines.

I will contact Transport Scotland Abnormal Loads in respect of movements via the Trunk Road, and Dundee City Council in respect of movements from Port of Dundee to A90 at Kingsway.

I shall look forward to hearing from you

Kind regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
Transportation Division
43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

Donald Stirling

From: BarnesA [BarnesA@angus.gov.uk]

Sent: 20 December 2012 11:22

To: Donald Stirling

Subject: RE: 97659 Lower Cairny Wind Farm

Donald,

I confirm that the bridges on the proposed route from Montrose Port are capable of carrying the loads expected.

I would hazard a guess that the couple of locations you mention would be A935 Arrat Bridge and the corner at A935 Montrose Street/Southesk Street. The parapets of Arrat Bridge may be lowered and rebuilt if required.

I trust the above is of assistance.

Regards,

Andy Barnes
Senior Traffic Engineer
Roads Division
Tel: ext. 3391
Fax: 473388
e-mail: barnesa@angus.gov.uk

> -----Original Message-----
> **From:** Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
> **Sent:** 18 December 2012 14:24
> **To:** BarnesA
> **Cc:** Filecopy - Edin
> **Subject:** RE: 97659 Lower Cairny Wind Farm
>
> Andy
>
> Many thanks for your response – I appreciate that further confirmation is required in respect of culverts on the route.
>
> The use of an alternative Port of Entry at Montrose was suggested by Transport Scotland, as they have recently issued Special Orders for movement of wind farm components to a site near Stonehaven from there.
>
> I have driven the route from Montrose:
>
> Harbour – A92 – A935 Medicine Well Drive – A935 Brechin Road to brechin thence B966 towards A90 and forward as previously, and would be grateful of your consideration of this additional routeing – I did not identify any particular issues although there are a couple of locations which will require swept path analysis.
>
> Apologies for making this additional information request.
>
> Kind regards
>
> Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
Transportation Division
43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

From: BarnesA [mailto:BarnesA@angus.gov.uk]
Sent: 18 December 2012 12:59
To: Donald Stirling
Subject: RE: 97659 Lower Cairny Wind Farm

Donald,

The bridges spanning over 1.5m on the proposed route are suitable for use by the abnormal load described as long as the vehicle is driven slowly over the centreline of the bridges.

This is particularly important at Westwater Bridge, Inchbare (GR 360672, 765978). ***Gannochy Bridge (GR 360018, 770895) on the alternative route it is not suitable for the load.***

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Meantime, I trust the above is of assistance.

Regards,

Andy Barnes
Senior Traffic Engineer
Roads Division
Tel: ext. 3391
Fax: 473388
e-mail: barnesa@angus.gov.uk

> -----Original Message-----
> **From:** Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
> **Sent:** 10 December 2012 12:33
> **To:** BarnesA
> **Cc:** Filecopy - Edin
> **Subject:** 97659 Lower Cairny Wind Farm
>
> Andy
>
> You may recall our recent discussion in respect of proposals for Lower Cairny Wind Farm.
>
> I would be obliged if you advise suitability of bridge structures and culverts on the attached

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I will contact Transport Scotland Abnormal Loads in respect of movements via the Trunk Road, and Dundee City Council in respect of movements from Port of Dundee to A90 at Kingsway.

I shall look forward to hearing from you

Kind regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
Transportation Division
43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

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A full list of partners is available for inspection at any of the firm's offices.

Donald Stirling

From: Matt North [Matt.North@forthports.co.uk]
Sent: 10 January 2013 18:09
To: Donald Stirling
Cc: Filecopy - Edin; Mark Gaffney
Subject: RE: 97659 Lower Cairny Wind Farm
Attachments: 5 Wind Turbine AR.jpg; Scharhoern - Michelin Wind Farm 022.jpg; 16 Wind Turbine AR.jpg

Dear Donald,

The components are well within the Ports Operational capability. We have suitable storage within the port also.

I've attached a couple of pictures which highlight the Port Operational Quay for this type of project cargo, these were for two ENERCON E90's.

The Port has also recently upgraded its East Port Entrance which provides greater scope and flexibility for overlengthed project cargoes exiting to the Trunk Road Network. This would alter your plan slightly with an exit route more towards the East of the Port.

Very much look forward to hearing from you and in the meantime if I can be of any further assistance then please do not hesitate to let me know.

Kind regards
Matt

Matthew North - Port Manager - Dundee
Forth Ports Limited
PORT OF DUNDEE
Stannergate Road
Dundee
SCOTLAND, UK
DD1 3LU

matt.north@forthports.co.uk
Internal: 8130
External: 00 44 (0) 1382 878 130
Mobile: 00 44 (0) 7739 655 309
Fax: 00 44 (0) 1382 200 834
www.forthports.co.uk

From: Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
Sent: 10 January 2013 16:58
To: Matt North
Cc: Filecopy - Edin
Subject: 97659 Lower Cairny Wind Farm

Matt

Trust this finds you well

You may recall previous correspondence from me in respect of the shipment of wind turbine components through Port of Dundee to a site in Fife at Upper Kenly.

I am currently involved in proposals for a wind farm at Lower Cairny by Edzell, and am considering using

Port of Dundee as Port of Entry. A route plan is attached for information.

Key maximum metrics of components are as undernoted:

Turbine Blades	25m length	8t	(3 per turbine)
Tower sections	20m length x 4m x 4m	24t	
Hub Unit	5m length x 5m x 3m	30t	

Proposals are for two turbines.

I would appreciate confirmation that Port of Dundee has the capability to accommodate these components.

I will liaise with Dundee City Council in respect of the route from Port of Dundee to A90 at Kingsway.

Look forward to hearing from you

Kind regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
Transportation Division
43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

Scotland No 155442 Forth Estuary Towage Limited, Registered Office: 1 Prince of Wales Dock, Edinburgh, EH6 7DX, Registered in Scotland No 76746 Forth Properties Limited, Registered Office: 1 Prince of Wales Dock, Edinburgh, EH6 7DX, Registered in Scotland No 124730 Forth Property Developments Limited, Registered Office: 1 Prince of Wales Dock, Edinburgh, EH6 7DX, Registered in Scotland No 223863 Forth Property Holdings Limited, Registered Office: 1 Prince of Wales Dock, Edinburgh, EH6 7DX, Registered in Scotland No 223868 Forth Property Investments Limited, Registered Office: 1 Prince of Wales Dock, Edinburgh, EH6 7DX, Registered in Scotland No 102967 Nordic Limited, Leslie Ford House, Tilbury Freeport, Essex RM18 7EH Registered in England No 5396187 Nordic Holdings Limited, Leslie Ford House, Tilbury Freeport, Essex RM18 7EH Registered in England No 3118969 Nordic Recycling (Lincoln) Limited, Leslie Ford House, Tilbury Freeport, Essex RM18 7EH Registered in England No 06232146 Nordic Recycling Limited, Leslie Ford House, Tilbury Freeport, Essex RM18 7EH Registered in England No 2963790 Nordic Forest Terminals Limited, Leslie Ford House, Tilbury Freeport, Essex RM18 7EH Registered in England No 03112560 Nordic Data Management Limited, Leslie Ford House, Tilbury Freeport, Essex RM18 7EH Registered in England No 3033517 Tilbury Container Services Limited, Northfleet Hope House, Site 41, Tilbury Freeport, Essex RM18 7HX Registered in England No 01249844

Donald Stirling

From: Brian Forrest [Brian@montroseport.co.uk]
Sent: 11 January 2013 15:28
To: Donald Stirling
Cc: John Paterson; Jim Raeper
Subject: FW: 97659 Lower Cairny Wind Farm
Attachments: PICT1027.jpg; PICT1067.jpg

Attention: Donald Stirling

Thank you for your interest in Montrose Port. Currently we are assisting a number of onshore Wind-farm Developers. The components you indicate easily are within our operating parameters. By close liaison and co-operation with other developers we have been able to best meet their particular requirements including temporary storage etc. See photos attached.

We would be happy to discuss your own particular project needs and hopefully agree logistics etc as soon as possible.
Best Regards

Brian Forrest
Harbour Master
Montrose Port Authority

From: John Cattigan **On Behalf Of** Port Control
Sent: 11 January 2013 09:26
To: Brian Forrest; Pilot
Subject: FW: 97659 Lower Cairny Wind Farm

Best Regards,

John Cattigan
Montrose Port Control
Tel: +44 (0)1674 679916
Montrose Port Authority

From: Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
Sent: 11 January 2013 09:23
To: Info
Cc: Filecopy - Edin
Subject: 97659 Lower Cairny Wind Farm

Sirs

I am currently involved in proposals for a wind farm at Lower Cairny by Edzell, and am considering using Montrose as Port of Entry.

Key maximum metrics of components are as undernoted:

Turbine Blades	25m length	8t	(3 per turbine)
Tower sections	20m length x 4m x 4m	24t	

Hub Unit	5m length x 5m x 3m	30t

Proposals are for two turbines.

I would appreciate confirmation that Montrose Port has the capability to accommodate these components.

I have confirmed suitability of the route from Montrose to the wind farm site with Angus Council.

Look forward to hearing from you

Regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
Transportation Division
43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

Donald Stirling

From: Paul.Winn@transportscotland.gsi.gov.uk
Sent: 15 January 2013 08:30
To: Donald Stirling
Subject: RE: 97659 Lower Cairny Wind Farm

Hi

The route from Dundee has been approved in principle, but the police have said that there are arches at Edzell with a minimum height of 4.5m and they are not sure if the loads would be able to get under them

Regards,
Paul

Paul Winn
Administrative Officer
Trunk Road Network Administration Team
Trunk Road and Bus Operations

T: 0141 272 7339
F: 0141 272 7350

Transport Scotland
Buchanan House
8th Floor North
58 Port Dundas Road
Glasgow
G4 0HF

*For agency and travel information visit our **website***

From: Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]

Sent: 15 January 2013 07:54
To: Winn P (Paul)
Cc: Filecopy - Edin
Subject: RE: 97659 Lower Cairny Wind Farm

Paul

Could you advise when I can anticipate a response on this enquiry please?

Client is pressing me for a completed report and I would be very grateful of an early reply.

Look forward to hearing from you

Kind regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
Transportation Division
43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

From: Paul.Winn@transportscotland.gsi.gov.uk [mailto:Paul.Winn@transportscotland.gsi.gov.uk]
Sent: 12 December 2012 15:31
To: Donald Stirling
Subject: RE: 97659 Lower Cairny Wind Farm

Also, do you know what the maximum length of the vehicles would be?

Paul

Paul Winn
Administrative Officer
Trunk Road Network Administration Team
Trunk Road and Bus Operations

T: 0141 272 7339
F: 0141 272 7350

Transport Scotland
Buchanan House

8th Floor North
58 Port Dundas Road
Glasgow
G4 0HF

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Transport Scotland, the national transport agency
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Strike it Out: preventing bridge strikes

- Plan your route to avoid low bridges www.freightscotland.org/lowbridges or 0800 028 1414

Do not rely upon SAT NAV – it may not hold accurate bridge height information.

From: Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
Sent: 12 December 2012 15:18
To: Winn P (Paul)
Cc: Filecopy - Edin
Subject: RE: 97659 Lower Cairny Wind Farm

Paul

Further to my telephone call, could I ask that you proceed with consideration of the route outlined below please?

I will consider Montrose as an alternative Port of Entry – the most obvious route avoids the Trunk Road network entirely, passing under the A90 at the B966 junction.

Many thanks indeed for your guidance in this.

Kind regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

Fairhurst
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43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

From: Paul.Winn@transportscotland.gsi.gov.uk [mailto:Paul.Winn@transportscotland.gsi.gov.uk]
Sent: 12 December 2012 14:54
To: Donald Stirling
Subject: RE: 97659 Lower Cairny Wind Farm

Hi

Thanks for this. Have you considered using Montrose as the port of entry? We recently issued Special Orders for wind turbine components coming from there

Paul

Paul Winn
Administrative Officer
Trunk Road Network Administration Team
Trunk Road and Bus Operations

T: 0141 272 7339
F: 0141 272 7350

Transport Scotland
Buchanan House
8th Floor North
58 Port Dundas Road
Glasgow
G4 0HF

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- Plan your route to avoid low bridges www.freightscotland.org/lowbridges or 0800 028 1414

Do not rely upon SAT NAV – it may not hold accurate bridge height information.

From: Donald Stirling [mailto:donald.stirling@fairhurst.co.uk]
Sent: 12 December 2012 14:47
To: Winn P (Paul)
Cc: Filecopy - Edin
Subject: 97659 Lower Cairny Wind Farm

Paul

Trust this finds you well. I am keen to establish suitability in principle of the possible undernoted Trunk Road routes towards the proposed wind farm site which is located at Lower Cairny, Witton by Edzell. This information is to be used within a Transport Statement in support of a Planning Application in Principle.

I have contacted Angus Council suitability of access from the local road network to the site from A90 via B966, and Edzell Woods route. I have still to contact Dundee City Council in respect of their connection from the Port to A92 but as this has already been considered in the context of a previous application, I do not anticipate any issues in that regard.

Clearance Requirements

Clearance width 5m

Clearance height 4.6m

Maximum Axle Load 10t

GVW 100t – still to be confirmed but I would not anticipate it exceeding this level based on previous experience of larger turbines

Proposals are for the construction of 2 turbines so there would be up to 7 loads per turbine. Delivery would be phased - it is envisaged that no more than three loads would move at any one time.

Routes

I would appreciate if you could confirm the suitability in principle of the undernoted routes to accommodate vehicles within the above envelope. I am principally concerned with the capability of structures along the route and the principle of use of the route for such loads, as we will perform our own "swept path" analyses as necessary as part of our submission and identify any road furniture (signs/lamp standards) which would require to be temporarily removed to accommodate the movements along the route.

- A92 East Dock Street – Broughty Ferry Road – Greendykes Road
- A972 Kingsway
- A90 Forfar Road to A966 junction
- Possible further requirement on A90 north as far as Northwater Bridge junction with Edzell Woods road

I appreciate that this confirmation is at the current date and that the position may change.

I would appreciate if you could acknowledge receipt of this note and indicate your expected timescale for response.

I shall look forward to hearing from you in early course – please advise if you require clarification on any points.

Kind regards

Donald

Donald Stirling MA MSc CMILT MCIHT
Senior Transport Planner

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43 George Street
EDINBURGH EH2 2HT

Tel: 0131 225 6741 Fax: 0844 381 4412 Mob: 07789 743493
Email: donald.stirling@fairhurst.co.uk
Website: http://www.fairhurst.co.uk

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horner + maclennan
landscape architects

APPENDIX A

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LOWER CAIRNY WIND ENERGY CLUSTER
DESIGN STATEMENT

1 Introduction

1.1 This report outlines the rationale for the design layout of a proposed wind cluster at Lower Cairny, near Edzell, Angus and describes the comprehensive design development process which has been undertaken to develop the detailed layout and design of the proposed project.

2 Background

2.1 The Applicant proposes to undertake a wind cluster project on a site at Lower Cairny, c3km to the west of the village of Edzell, on the unclassified road to Glen Lethnot. The Lower Cairny site is on land owned and farmed by Mr G Yarr, and forms part of the farm unit known as Witton Farm. The proposed site for the wind turbines lies on the western part of the farm unit.

2.2 The rising cost of energy, fuel, fertilizer and animal feed is a significant threat to the long-term finances of the farm operation. In addition to the rising cost of resources, the applicant wishes to develop the wind cluster as part of the farm's range of diversification options and to assist in reducing carbon emissions from energy generation.

2.3 Initial feasibility studies indicated that the topography of the land at Witton Farm has a good wind resource, based on the wind speeds recorded on the national wind database (NOABL). Subsequently, a small temporary meteorological mast was erected on site during 2011 to obtain a guide as to the wind environment on the site. Its collection of weather data supports the wind capacity conclusions of the initial studies.

2.4 Landscape studies of the farm unit, described in detail in the following section of this Report on Landscape Capacity, were initially undertaken for the highest areas of land within the farm unit, around the 300m contour and where the wind resource would be most likely to be greatest. These studies indicated various landscape and visual sensitivities associated with this elevated location, and suggested that the optimum location for a small scale wind energy development in landscape and visual terms lay towards the west of the farm unit, where the land comprises a combination of improved grazing and arable land which is generally located at the junction between lowland and foothills, around a height of 200m AOD.

2.5 As an individual landowner, it is not appropriate or feasible to consider other sites in the vicinity for a wind energy project which are not within the control and ownership of the Applicant. However, the following Landscape Capacity work considered the appropriateness of the whole of the farm unit for wind energy development as part of a

N°6 Darnaway Street Edinburgh EH3 6BG tel 0131 220 0878 fax 0131 220 0879
edin@hornermaclennan.co.uk www.hornermaclennan.co.uk also in Inverness

strategic siting and design exercise undertaken to inform the most appropriate location for the proposed development.

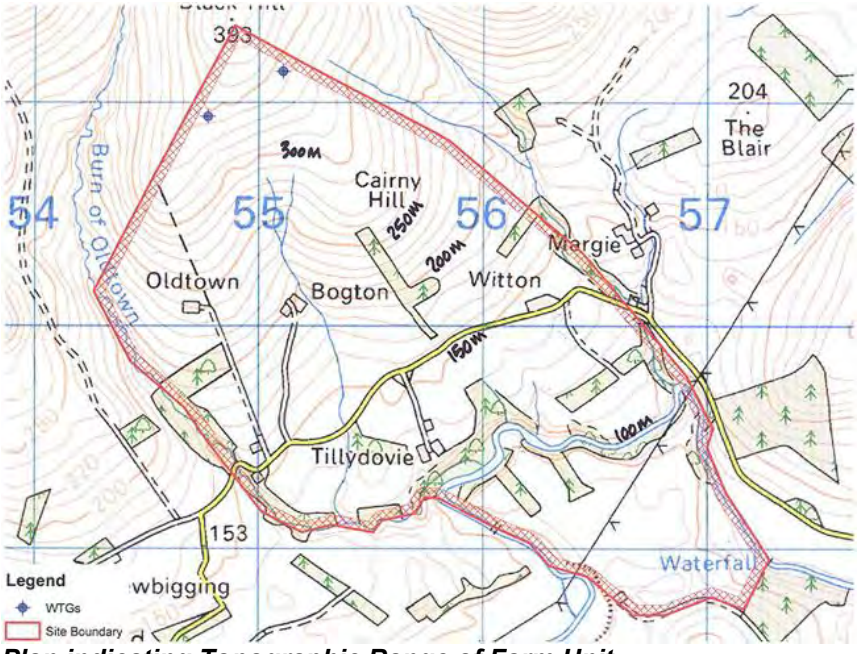
3 Landscape Capacity Study

General

3.1 The Applicant recognised from the outset the importance of landscape and visual considerations in relation to the potential development of a wind energy project at Lower Cairny, and commissioned a Landscape Capacity Study from horner + maclennan to assist in informing the proposed location and scale of any development proposal. This Study initially considered the highest areas of land within the farm unit, located approximately around the 300m contour level on the slopes of Cairny Hill. The study considered the following key issues:

- The existing landscape and visual character of the site
- How the site relates to its surroundings in landscape and visual terms
- The extent of visual prominence of the site within views from the surrounding landscape
- The general landscape and visual character of the surrounding landscape.

3.2 This landscape analysis was supplemented with consideration of Angus Council planning policy and other documents related to windfarm development in Angus, in order to reach conclusions on the landscape capacity for a wind cluster development on the Witton farm unit. In order to inform decisions on the landscape capacity of the site, consideration was given to the potential to introduce turbines of blade tip heights of 61m, 81m and 100m on the site.

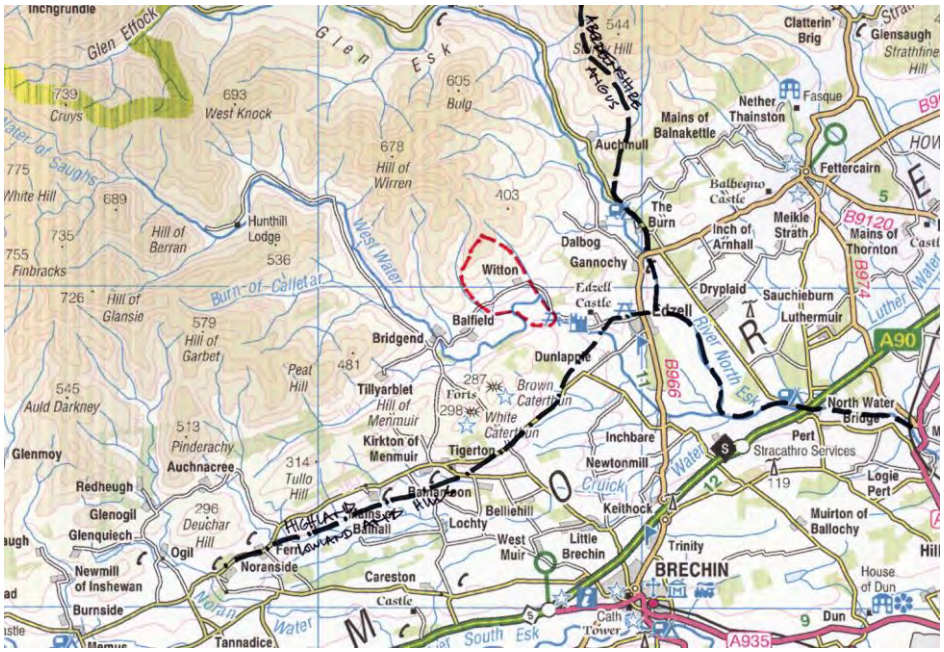


Plan indicating Topographic Range of Farm Unit

Landscape Context

3.3 The site of the proposed wind cluster project is located in north Angus, approximately 3.5km from the boundary with Aberdeenshire. Within Angus, there are three main regional landscape character areas, which inform the Angus Council Wind Energy Geographic Areas, namely:

- *Highland* – primarily the Angus Glens along and to the Highland Boundary Fault
- *Lowland and Hills* – mainly rolling farmland and low hills
- *Coast* – a mix of sand, cliffs and, around Montrose, lowland basin.



Site Location in relation to Regional Landscape Areas

3.4 The site occupies an area wholly located within the *Highland* region, although located towards its south-eastern boundary close to the *Lowland and Hills* region. In overall terms, the *Highland* region forms the important and highly visible backdrop to the settled lowland areas of Angus, as well as being an important recreational resource of high scenic quality, with remote and wilderness qualities within its northern section. Part of the *Highland* region is a designated National Park. It is noted that the Angus Local Plan Review identifies the *Highland* and *Coast* areas as having a greater potential sensitivity to the landscape and visual impact of large turbines.

The Landscape Character of the Site and its Surroundings

3.5 The site is an agricultural holding located on a south-easterly sloping hillslope of the Mounth Highlands rising above the valley of the West Water, and extending to the hill summit of Black Hill. The site encompasses a landscape transition from well drained arable and improved pasture in the lower areas, rising through unimproved pasture to open moorland and grassland on the upper slopes. This landscape transition is reflected along much of the hill slope edge which flanks the Howe of the Mearns, and is a recognisable landscape pattern in longer distance views to these hill slopes from the south and east, predominantly due to the changing colours which rise up the hillsides associated with this arable, improved pasture, unimproved pasture and moorland transition.

3.6 The landscape pattern is regular and ordered within the areas of the lower lying improved pastures, where rectilinear field patterns occasionally defined by geometric coniferous tree belts create a simple, organised layout. The coniferous tree belts form a series of separate, distinctive geometric shapes across the lower hillsides, which act as individual features along the lower slope areas rather than forming an interconnected broader scale pattern, except when seen from greater distances where they tend to visually merge into a more continuous tree cover pattern. The regular pattern of the lower slopes gradually gives way to the more informal layouts of the unimproved pastures further up the hill slopes, which lead to the diverse moorland and grassland mosaic of the upper slopes. Consequently, the site is strategically located at the interface between the humanised lowland agricultural landscape of the Howe of the Mearns with the more natural yet managed upland moorland landscape to the north.

3.7 Whilst the overall hillslopes which enclose the northern side of the Howe of the Mearns are extensive and generally large scale, at a more detailed level they predominantly comprise a sequence of inter-related smaller scale hill tops, of which Cairny Hill is one, which collectively form the wider hill massif. These smaller scale hill tops which fringe the lower slope areas generally comprise of individual summits or ridge shoulders where the vertical height gain above the fringes of the adjacent lowlands is in the vicinity of 100-150m. These relatively modest height changes allow these individual hilltops and ridge shoulders to be experienced as clearly separate and identifiable features at a local level.

3.8 Edzell Castle is included within the Inventory of Gardens and Designed Landscapes, and is located approx 2km to the east. The citation indicates that there are good views from the tower towards the northern hills, although it is noted that the tower is no longer open to the public. The intervening heavily wooded Hill of Edzell is likely to fully screen any views to the site from the car park.

Existing Visual Prominence of the Site

3.9 When seen from the surrounding landscape, the site appears as a small part of an extensive sequence of hills slopes and rounded ridges which form the important backdrop to the Howe of the Mearns.

3.10 In views from the south, the site is generally seen as a small component of the wider and higher hill slopes enclosing the north-western side of the Howe of the Means. The site does not form a prominent feature of these slopes, but is rather a part of a much more extensive range of rounded hills, ridges and shoulders extending to the north-east and south-west. The site is set well below one of the highest sections of the undulating skyline profile, particularly in more distant views and does not form part of the skyline profile in mid-long distance views.

3.11 The intervening ridgeline of the Caterthun hills, which reduces in height eastwards towards Edzell, frequently acts as an intermediate horizon and visual screen to the lower section of the site, particularly from the south-west, with only the upper section of the site being visible beyond and above the intermediate horizon. From certain directions, the Caterthun hills form locally prominent skyline features due to their distinctive profiles, having a visual significance considerably greater than their actual size and height. Additionally, from the east, Hill of Edzell plays a similar visual screening role from Edzell and its vicinities. A large-scale overhead transmission line passes along the valley of the West Water, between the site and the ridgeline of the Caterthuns and Hill of Lundie, where it forms a locally prominent feature in views in all directions.

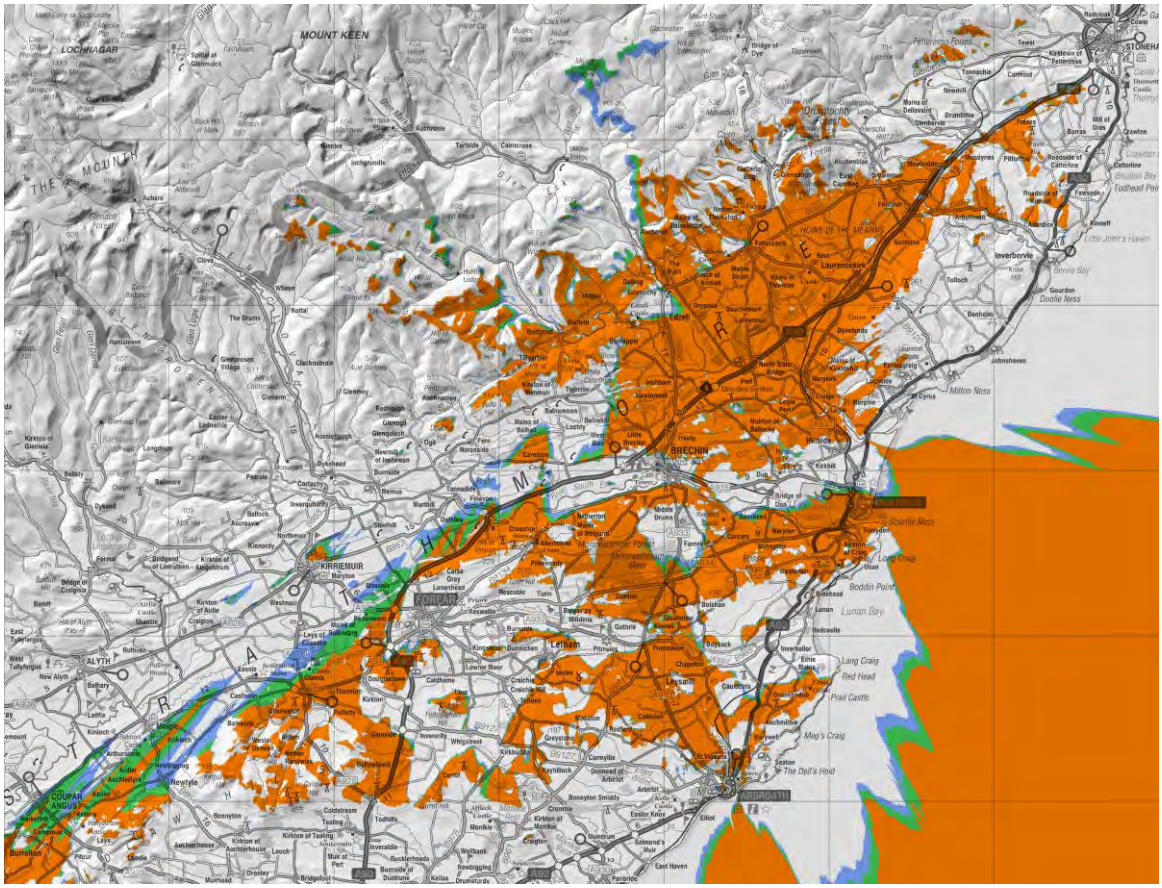
3.12 Views from the north would be predominantly from remote moorland summits and slopes which are relatively unfrequented, and comprise views largely over the site to the lowland agricultural landscape and the coastline of Angus beyond, rather than directly down onto the site.

3.13 Generally, the site does not comprise a prominent feature within the overall landscape but forms a small part of a more extensive, both horizontally and vertically, area of hills which form an important visual backdrop to the settled lowlands of the Howe of the Mearns.

Initial Zone of Theoretical Visibility Mapping

3.14 Initial Zone of Theoretical Visibility (ZTV) maps were prepared for introducing 61m, 81m and 100m blade tip height turbines onto the site in the vicinity of the 300m contour.

Each indicated a very similar pattern and spread of theoretical visibility. The ZTV pattern is primarily dictated by the elevation of the site on a hillside overlooking a lowland landscape. Much of the theoretical visibility pattern extends over the lowland agricultural landscape to the east and south of the site and is contained by rising ground of the coastal hinterland. Notably, the major settlement of Brechin indicates very little theoretical visibility, due to its low lying location in the river valley of the South Esk. The local hills of Hill of Edzell and the Caterthuns with their associated ridgeline provide some intervening screening of the turbines to their east and south/south-west respectively and are important in limiting the extent of visibility in these directions.



Composite ZTV map – orange indicates where 61, 81 and 100m turbines would be theoretically visible

Conclusions

3.15 The landscape capacity study concluded that the site is located in an area of landscape and visual sensitivity within Angus and would not have the landscape capacity to accept a wind cluster development in the location proposed at 300m AOD on the upper part of Cairny Hill, based on the following considerations:

- The elevated location of the proposed turbines at the 300m contour level, at the margins of the upland moorlands, would clearly relate the turbines to the *Highland* area of Angus, where they would be seen as an intrusion onto the undeveloped and open hill slopes which define the northern edge of the Howe of the Mearns
- The elevated location of the proposed turbines would be predominantly seen as a feature on the lower slopes of Hill of Wirren and its adjacent summits. These noticeably higher and distinctive summits form the central 'core' of the hills flanking the Howe of the Mearns and the close vicinity of the proposed turbines to

the skyline profiles of these hills would inherently detract from their current visual prominence in mid–long distance views from the south

- At a local level, the proposed height of the turbines, particularly at 81m and 100m tip height, located on relatively small scale hill summits and ridgeline shoulders, would dominate and overwhelm the scale of these landform features, leading to the potential for significant landscape and visual impacts on the local area.

3.16 Informed by the initial appreciation of the landscape and visual characteristics of the site and its surroundings, an alternative approach to the siting and design of a wind cluster development on the Witton Farm unit was proposed, which comprised the following design objectives:

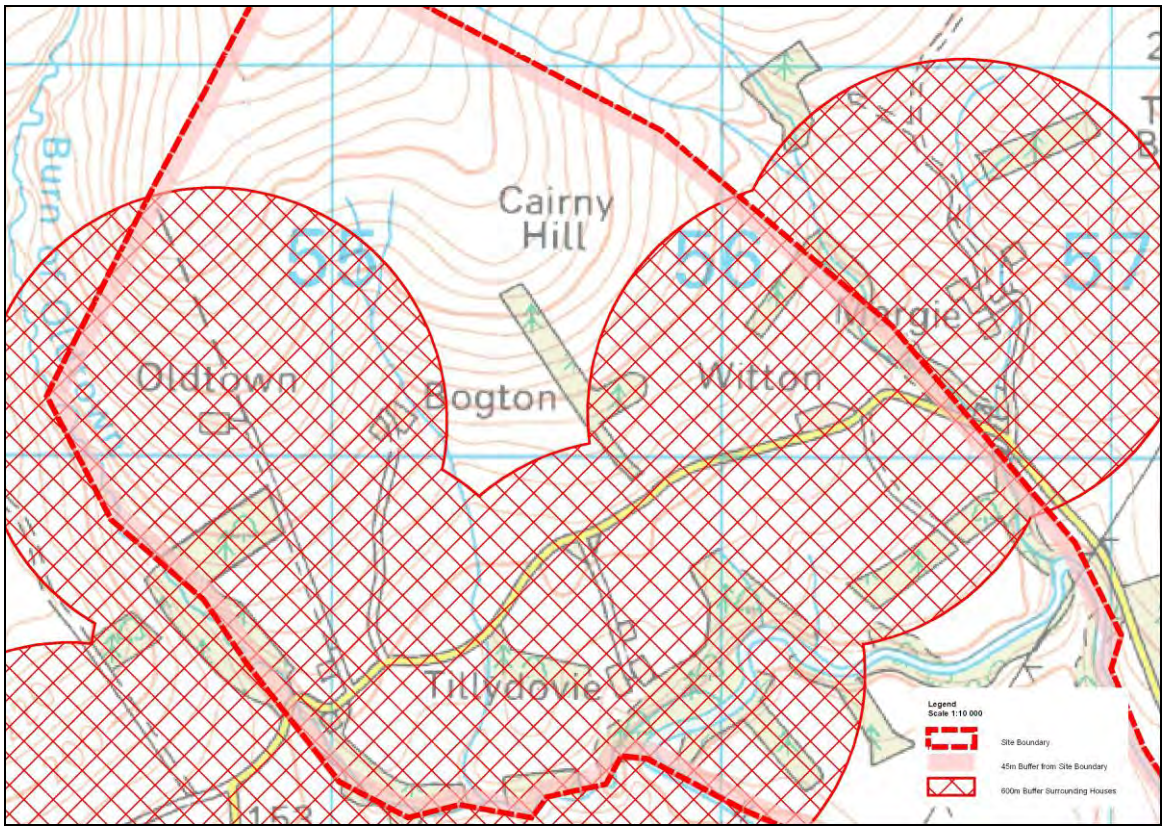
- Site the turbines at a lower elevation, around the 200m contour level, where they would be more directly related to the improved/unimproved agricultural landscape component of the site rather than to the upland moorland. This will create a better connection with the lowland agricultural landscape rather than the development appearing as part of the highland upland landscape
- Site the turbines on the south-west facing slope to the east of the derelict buildings at Bogton, which would remove them from the locally visually sensitive shoulder of Cairny Hill itself, particularly in views from the minor road to Edzell. In this way, the shoulder of Cairny Hill may act as a full or partial screen to views from the minor road and other local locations to the east of the site
- Siting turbines at a lower elevation would generally reduce the overall extent of theoretical visibility, particularly to the north in the more sensitive *Highland* area and also in relation to the boundary of the National Park
- Siting turbines at a lower elevation would allow the intervening ridgeline of the Caterthuns and Hill of Lundie to form a more effective visual screen and assist in limiting the overall spread of theoretical visibility to the south-west
- Turbines on any part of the Lower Cairny site would be fully backclothed by existing topography in most views except potentially those from directly adjacent to and below the site. Painting the turbines a grey colour would reduce the contrast with this backcloth – white painted turbines would contrast considerably with their backcloth and increase the visual perception of the turbines in the more frequently experienced mid – long distance views
- A reduced elevation of the turbines would limit the height gain needed for any access road and assist with reducing its visibility within the wider landscape
- Consider the detailed visual composition from the Caterthuns, as this is likely to be the most important viewpoint in the local area
- Seek to avoid or minimise visibility of turbines from Edzell Castle through a combination of layout and turbine height, although intervening tree cover may fully screen all views of the wind energy development, even from the top of the tower
- Whilst the initial ZTV plans indicate little overall difference in visibility pattern between 61, 81 and 100m high turbines, promote a turbine height which creates an appropriate scale relationship with the adjacent small scale local hills and ridges
- Brown and White Caterthun, two distinctive hill tops which lie approximately 3km to the south-west of the Cairny Hill site, are a Scheduled Ancient Monumment (SAM). The close proximity of this SAM, and its position on locally prominent hills, indicates that any proposed turbines on the site would clearly become visible new features within the view northwards from the forts. It would be important to consider the detailed visual composition of any wind energy development from the Caterthuns, as this is likely to be one of the most important viewpoints in any visual impact assessment.

3.17 Following acceptance of the siting and design approach included in the Landscape Capacity Study, further more detailed design development work was undertaken, to consider alternative layouts for different turbine heights, and to review these from a range of viewpoint locations, orientations and distances, to inform a recommendation on a preferred layout taking account of landscape and visual considerations.

4 Alternative Design Layouts

Constraints Mapping

4.1 In order to test a range of turbine heights and layouts, an initial constraints map was prepared, using 600m buffer zones around existing occupied properties, which identified areas of the site where turbines could be potentially positioned. This exercise indicated that considerable areas of the farm unit could not be considered for a wind cluster development.



Initial Constraints Map

4.2 An area at the south-west corner of the farm unit, south of the Glen Lethnot road, was indicated as being unconstrained; however it is noted that this area forms part of a geological/geomorphological SSSI where the possibility of excavating for turbine foundations and access tracks may prove problematic, and therefore this area was excluded from the design development process. The design development process therefore concentrated on the unconstrained area of the site to the east of the derelict buildings at Bogton which are in the ownership of the Applicant.

Design Principles

4.3 In developing the turbine design layouts, a series of more detailed design principles were utilised to supplement the siting and design strategy and to inform the development of the layouts and their evaluation. These design principles comprised:

1 The wind cluster development should appear as a similar and clearly identifiable form and composition of elements when seen from different orientations
2 There should be a clear arrangement of turbines incorporating a similar size and scale of visible spacings between them, avoiding or limiting occurrences of overlapping blades, to create a visually cohesive image and a balanced arrangement of elements. Overlapping of turbines themselves should be avoided from key viewpoints
3 The wind cluster should be concentrated to appear as a single isolated and contained feature, with a clearly legible and defined edge and extent
4 The arrangement of the turbines should present a simple clarity of visual composition, in relation to the turbines themselves, to the key landscape features of the site and the surrounding area and to the detailed landscape pattern of the site
5 Detailed turbine layout and arrangement should attempt to follow existing contour levels as much as possible, so that the turbines appear at a similar height and level on the site when seen within key views
6 Detailed arrangement of turbines should respond to existing land use patterns and geometries where possible, so that the turbines are either contained within and related to a single land use type, or are positioned in relation to land use boundaries and other landscape features
7 Generally, turbine base elevations/levels should be kept as low as possible within the site, to minimise their overall spread of visibility within the surrounding area, to maximise the potential screening effect of the eastern Caterthun ridgeline to the south and to create a better relationship with the 'lowland' landscape of the adjacent improved farmlands
8 The turbine layout and height should aim to avoid or minimise visibility from the Edzell Castle Garden and Designed Landscape.

Design Layouts

4.4 A series of alternative design layouts were generated for 61m, 81m and 100m high turbines, using the constraints mapping and their relevant separation ellipses, which sought to meet the siting and design strategy in order to establish the most appropriate scale and number of turbines for the site. Potential turbines were located on plan, and their positions incorporated into a 'Google Earth' browser, which allowed these layouts to be reviewed in three dimensions from key selected viewpoints. The key selected viewpoints, representing important local locations and different orientations and distances, included:

- Brown Caterthun
- Minor road near cemetery and Edzell Castle
- A90 Layby

4.5 For each alternative turbine height, various layouts were generated and reviewed against a range of criteria, particularly in relation to issues of visual composition, scale etc from the 3 key viewpoints, in order to select preferred layouts for each of the different turbine heights. This process established preferred layouts for each alternative turbine heights considered, and these were then compared against each other to establish an overall preferred layout in landscape and visual terms. The following layouts for each turbine height were preferred:

- *61m Blade Tip Height – T61v3*
- *81m Blade Tip Height – T81v4*
- *100m Blade Tip Height – T100v2*

Layout T61v3

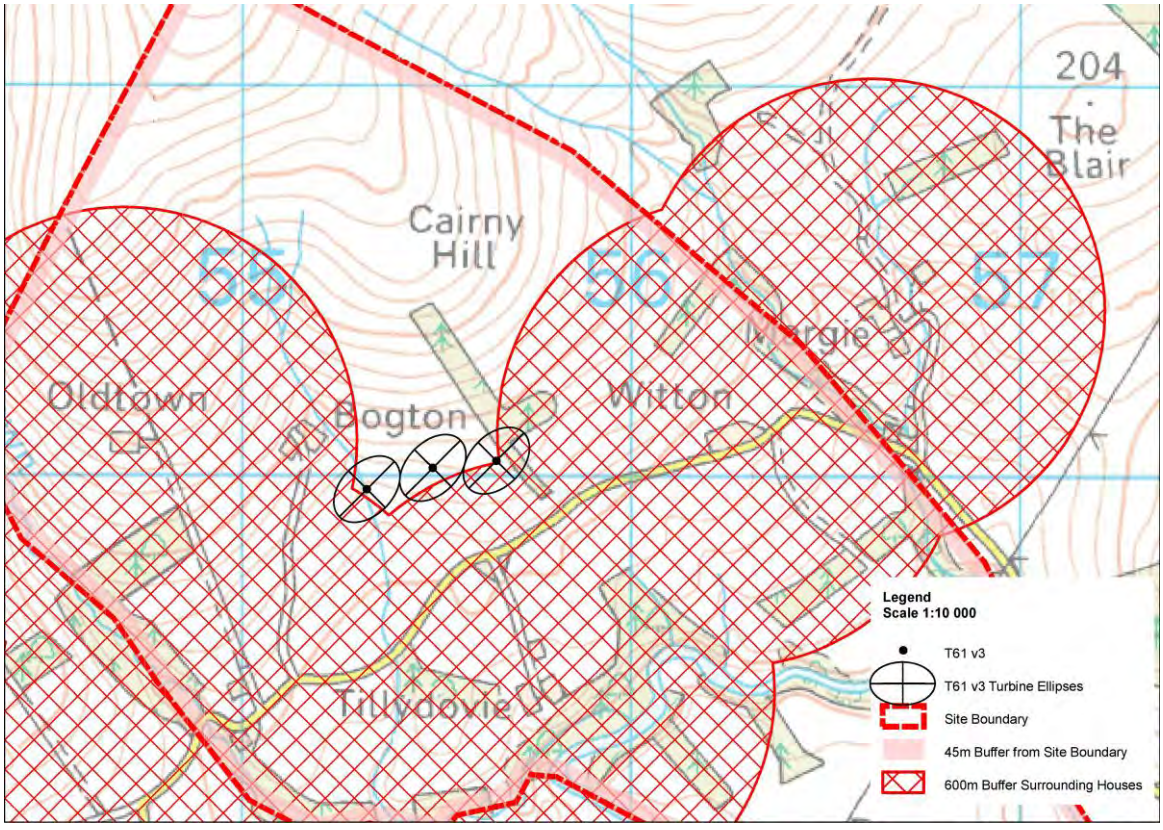
4.6 This layout positions three turbines in the southern section of the unconstrained area. Two turbines are located close to the western field boundary between improved and unimproved pasture, with the eastern turbine being fully located within the eastern field of improved pasture. There is approximately 20m of height difference in level between the western and eastern turbines, with 165m and 185m base levels respectively. There is generally a good equal spacing between the turbine positions.

4.7 From Brown Caterthun, the turbines would present a simple equally spaced grouping, with two turbines having a close relationship with the field boundary between improved and unimproved pasture.

4.8 From the minor road adjacent to the cemetery, the turbine layout has a good relationship with the landscape pattern, and the turbines have a generally equal spacing. Sections of blade tips would appear above the skyline but with towers and hubs backclothed.

4.9 From the A90 layby, the turbines would appear as a tight small scale grouping set fully against the backcloth of the higher hills behind. The turbines would have a clearly defined extent and simple visual composition.

4.10 T61v3 layout has a close relationship with the existing landscape pattern, and is set low down the hill, giving it a good connection with the lowland landscape character of improved pasture as well as reducing the extent of skylining in views from the east. The lower elevation assists in limiting the overall spread of visibility.



Layout - 61m Blade Tip Height – T61v3

Layout T81v4

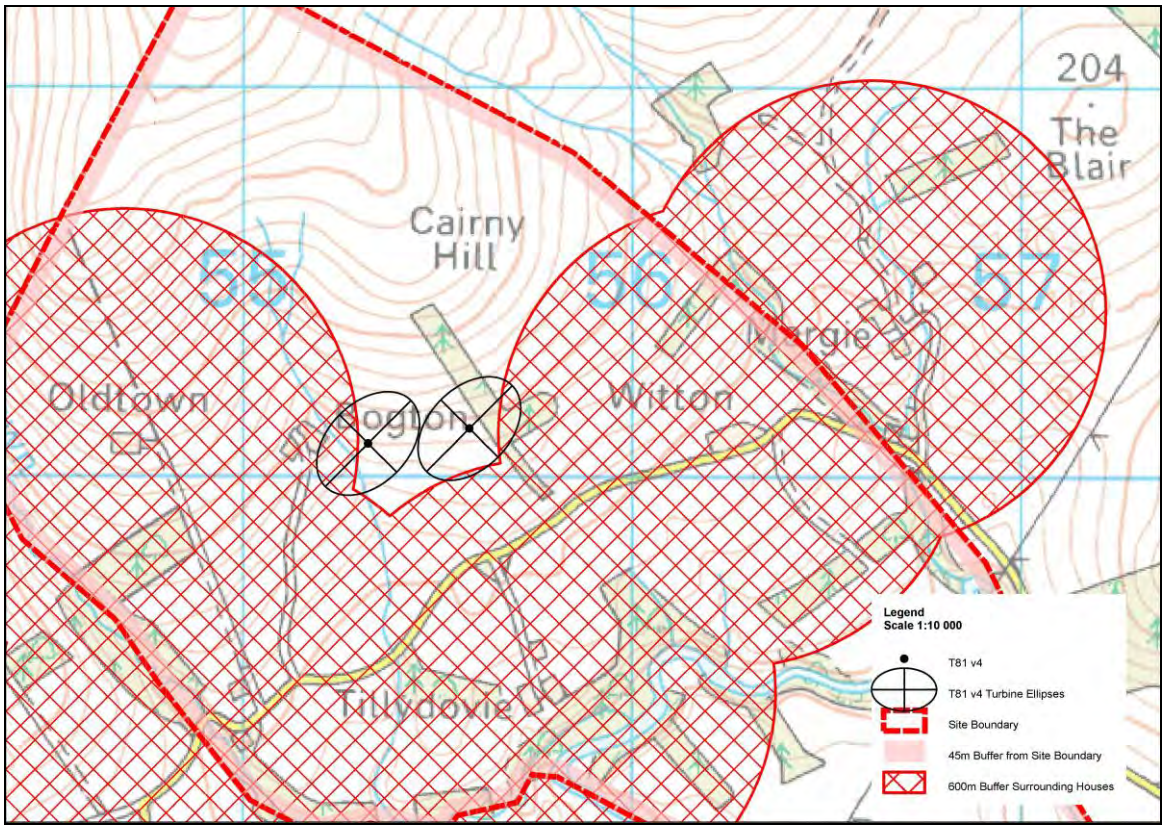
4.11 The layout introduces two turbines set at approximately the190m and 195m contour level, with both turbines located within the unimproved pasture.

4.12 From Brown Caterthun, the turbines have a close relationship to the landscape pattern, and the eastern turbine would be well positioned in relation to the adjacent tree block.

4.13 From the minor road adjacent to the cemetery, the turbines would be well grouped in relation to the landscape pattern. Sections of blades and hub would be skylined due to a slightly increased level.

4.14 From the A90 layby, the turbines would appear as a tight small scale grouping set fully against the backcloth of the higher hills behind. The turbines would have a clearly defined extent and simple visual composition.

4.15 T81v4 layout is considered to be located too high on the hillside to directly relate to the lower 'lowland' character, it extends considerably across the hillside increasing its landscape and visual influence in both closer and longer distance views, and the turbines would be prominent skylined features on the Cairny Hill ridge in close views from the east. In the view from Brown Caterthun, T81v4 indicates a reasonably good relationship with the field and landscape pattern of the site.



Layout - 81m Blade Tip Height – T81v4

Layout T100v2

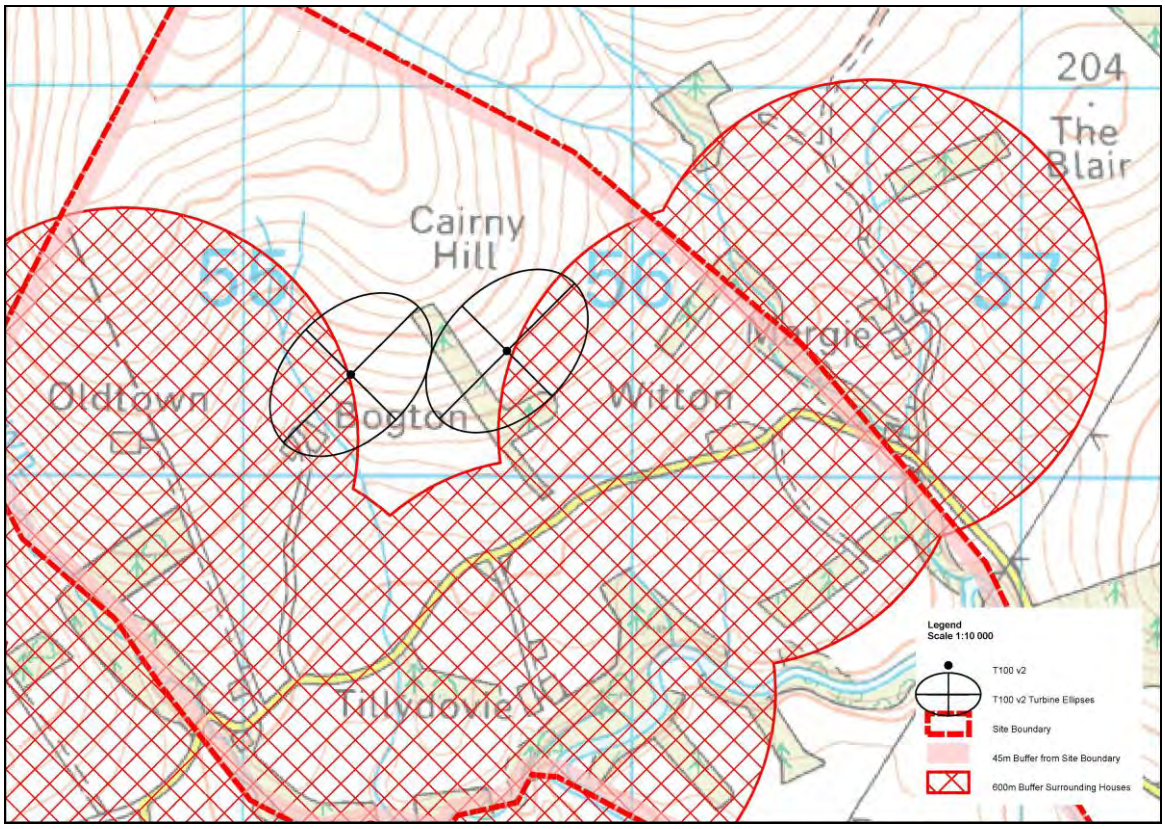
4.16 This layout introduces two turbines, located on the 225 contour. Both are located in unimproved pasture. The eastern turbine is located east of the former tree belt.

4.17 From Brown Caterthun, the turbines would sit well within the extent of unimproved pasture, although the blade tips of the eastern turbine would be seen close to the skyline profile of Cairny Hill. The turbines would be generally aligned level on the hillside.

4.18 From the minor road adjacent to the cemetery, the turbines would straddle the Cairny Hill ridge, with the eastern turbine appearing prominently on the eastern side of the ridge and being predominantly skylined.

4.19 From the A90 layby, the turbines would be set centrally against the highest backdrop of the hills beyond, being fully backclothed. Their spacing would be well related to the general landscape pattern.

4.20 T100v2 layout would have a good relationship to the land use pattern, and having the turbines at a consistent level results in better visual composition from different directions. However, T100v2 would be less satisfactory when seen from the east at close distances.



Layout - 100m Blade Tip Height – T100v2

5 Review and Selection of Preferred Layout

Landscape Recommendation of Preferred Layout

5.1 Each of the alternative layouts is well balanced and achieves a simple composition and clarity of image when seen from a range of viewpoints, and therefore each would meet the design objectives in this respect. It is likely that all layouts would be visible, to some degree, from the top of Edzell Castle tower, unless intervening tree belts screen the view entirely. If this is the case, as is suspected, then the view from the top of the tower, nor the Garden, will not be a determining factor in selecting a preferred layout. In addition, it is understood that there is currently no public access to the top of the Edzell Castle Tower.

5.2 In general, the ZTVs for each layout indicated very similar patterns of theoretical visibility throughout the Study Area, with only very subtle and minor changes between alternative layouts. This indicated that turbine height and numbers proposed didn't significantly alter the overall spread and pattern of theoretical visibility between alternative layouts, and therefore was not considered a major factor in selecting a preferred layout.

5.3 The key issues which the layouts need to respond to relate to relationship to landscape pattern and land use, and in terms of their general elevation within the site, which affects their overall visibility and their locational relationship with the 'lowland' landscape character of the surrounding farmland area. The view from Brown Caterthun is also considered crucial to achieving the optimum visual composition in terms of turbine location and layout.

5.4 T61v3 is considered to comprise the best overall visual composition when seen from Brown Caterthun. The turbines are equally spaced, their spacing generally accords with the scale of associated fields, they relate well to the clearly visible field boundary and their overall scale responds well to the general scale of field patterns and layout within the view. The turbines of the T81v4 and T100v2 layouts appear slightly over-scaled and dominant in relation to the scale of the field patterns, as well as being slightly less well related to the general landscape pattern. Additionally, the spacing of turbines for layout T100v2 appears visually too far apart in terms of visual composition and balance in relation to the turbine height.

5.5 T61v3 adopts the lowest elevation within the site, which gives the turbines a closer relationship to the 'lowland' landscape of the improved pasture, and this, together with the lower turbine height, will assist in limiting the overall extent of visibility of the turbines. T100v2 specifically, with its higher elevation and higher turbine height, results in the turbine blades being seen in a closer relationship to the skyline profile from Brown Caterthun, which links them more to the skyline profile than relating them to the central backdrop of the overall backcloth of hills. The T61v3 layout results in the turbines being set well away from the skyline profile when seen from Brown Caterthun.

5.6 In views from the east at close distances, the turbines of layout T61v3 will appear less skylined, whereas the eastern turbine of layout T100v2 would appear particularly dominant on the eastern flank of Cairny Hill. In the more distant views from the south, layout T61v3 will sit lower in the landscape, and obtain a greater level of potential intervening screening from the eastern Caterthun ridgeline.

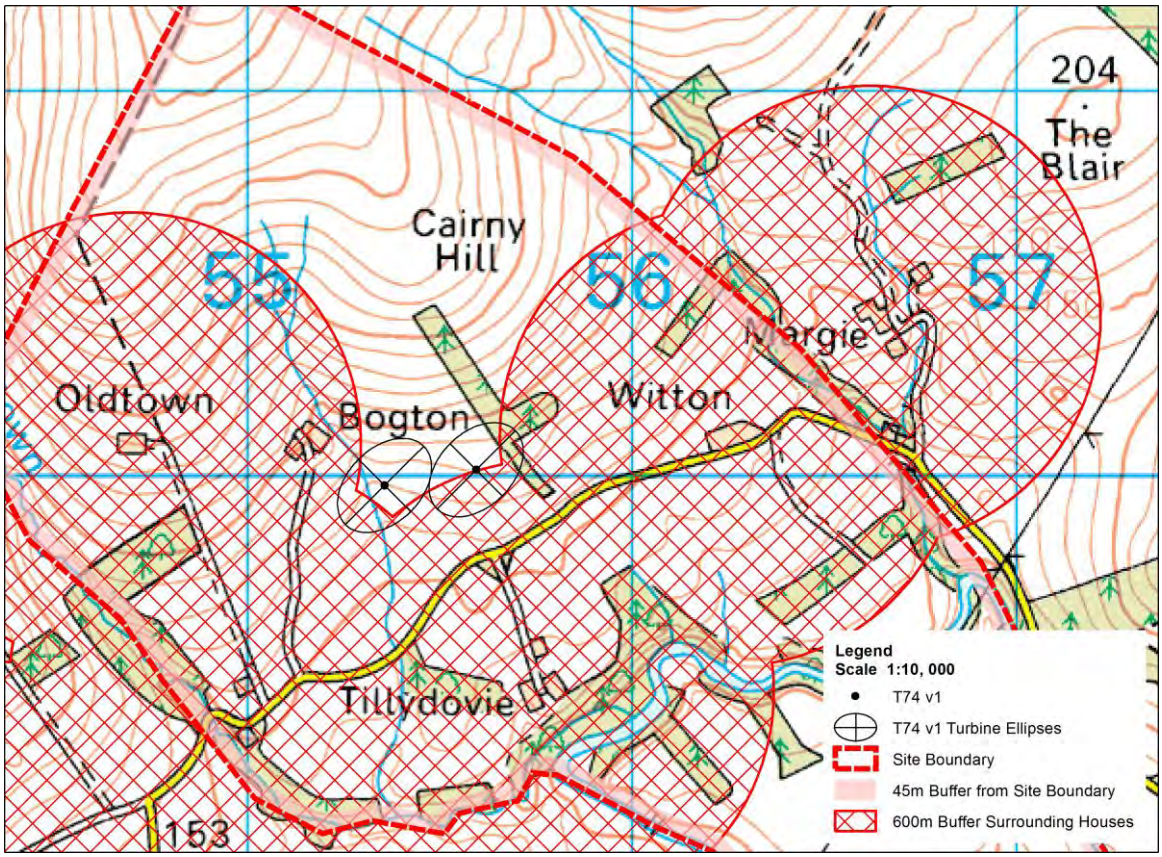
5.7 Taking all the above considerations into account, it is considered that layout T61v3 offers the most appropriate combination of characteristics and is preferred on landscape and visual issues.

Consideration of Generating Issues

5.8 Following the recommendation that layout T61v3 was preferred in landscape terms, further discussions with the Applicant and his advisors indicated that, in terms of generating output and economic considerations, 2 x 74m blade tip turbines would comprise a more effective proposal than a 3 x 61m blade tip turbine option. Consequently, further consideration was given to developing a 2 x 74m layout option, following the same design approach as previously developed. This process indicated that 2 turbines could be positioned in a layout which incorporated the following characteristics:

- The layout could be achieved without incurring into areas of constraints
- The turbines could be located at the junction between improved and unimproved pasture, and so would be well located to the existing landscape pattern of the site

- The turbines could be located close to the 170-180m contours, and so would relate well to the 'lowland' landscape of the improved pasture, and would sit low on the site to assist in reducing their overall extent of visibility within the wider landscape
- The turbines would create a simple balanced composition when seen from the Brown and White Caterthuns
- Whilst the turbines would be higher than the 61m option, they would remain visually separate from the skyline profile when seen from the Brown and White Caterthuns, and the slight increase in height would not result in any noticeable extension of the ZTV pattern within the wider area.



Layout - 74m Blade Tip Height – T74v1

5.9 Given that it was considered that a layout of 2 x 74m turbines could be developed which accorded with the design principles established, and which did not result in increasing the general levels of overall landscape and visual impact compared to a 3 x 61m turbine option, it was concluded that a 2 x 74m turbine option represented the optimum balance of generating output whilst relating well to the landscape and visual context and minimising potential landscape and visual impacts. Therefore, the 2 x 74m option was selected as the proposed layout for the Lower Cairny wind cluster.

6 Site Infrastructure and Associated Issues

6.1 The site would be accessed from the unclassified road to Glen Lethnot by an existing farm access track. This track leads directly to the site of the proposed turbines, and would require only minor upgrading.

6.2 The wind turbine generators would be connected via an underground cable route into a local suitably sized control building, located adjacent to the existing shelterbelt to the

immediate east of their location. Electricity generated from the wind cluster would then be exported into the existing local grid, via an underground or overhead connection. There has been an initial grid connection assessment carried out which has identified a potential connection option on land to the north west of the site. The connection to the grid will be the subject of a separate application.

6.3 None of these infrastructure provisions are considered to be likely to give rise to any significant landscape and visual impacts.

7 Finalised Wind Cluster Layout

7.1 The design development process has been primarily led by landscape and visual considerations, aiming to achieve a series of design principles whilst optimising energy generation and output, to achieve the best balance of considerations.

7.2 Consideration of landscape capacity issues have influenced the strategic approach to the design development of the wind cluster layout and landscape and visual issues have been at the forefront of the design development process, seeking to establish a layout of an appropriate scale to its landscape and visual context, avoid or minimise potential visibility from the surrounding area and establish balanced visual compositions of turbines when seen from the key local viewpoints, specifically Brown Caterthun.

Scottish Planning Policy, February 2010

RENEWABLE ENERGY

182. The commitment to increase the amount of electricity generated from renewable sources is a vital part of the response to climate change. Renewable energy generation will contribute to more secure and diverse energy supplies and support sustainable economic growth. The current target is for 50% of Scotland's electricity to be generated from renewable sources by 2020 and 11% of heat demand to be met from renewable sources. These targets are not a cap. Hydro-electric and onshore wind power are currently the main sources of renewable energy supplies.

This is expected to continue but will increasingly be part of a wider renewables mix as other technologies become commercially viable. Other technologies which may contribute include biomass, solar, energy from waste and landfill gas and offshore wind, wave and tidal power generation. Production of heat and electricity from renewable sources will also make an important contribution both at a domestic scale and through decentralised energy and heat supply systems including district heating and biomass heating plants for businesses, public buildings and community/housing schemes.

FILENOTE – MEETING WITH ANGUS COUNCIL PLANNERS (JAMES WRIGHT AND STUART ROBERTS), THURSDAY 9TH FEBRUARY 2012

Present – James Wright, Stuart Roberts, Keith Horner, Greg Yarr, Roddy Yarr

Purpose of Meeting

The meeting was held to discuss and obtain the Local Authority's opinions on the Pre-Application submitted at end of 2011 and to also discuss the assessment of a layout using larger WTGs up to 74m high.

Landscape and Visual Impact Assessment

KH asked for clarification on VIA v LVIA. SR noted that this is used when assessing smaller (25m up to 65m high) and medium/larger machines (>65m high). LVIA is based EIA Regs. VIA would require submission of appropriate visualisations to allow the Local Authority to determine levels of likely impact.

SR noted that the site is located in the Highland Foothills area and would need to be carefully sited. By siting the machines lower down the slope, the development could be considered to be generally in line with Angus policy in their SPG. It will be important to demonstrate that the turbines can be back-clothed against the hills behind and also consider impact from key viewpoints.

The current proposal for 3 x 61m high machines was discussed. KH presented the ZTV plans as requested by the planners. KH presented some wireline images including the A90 and Brown Caterthun. SR noted that the composition used and the approach taken to date appeared robust and sympathetic to the landscape setting.

KH to forward ZTVs on a CD to SR.

If proposing machines >65m in height, single frame photomontages would also be required.

SR noted that the wireline views from the A90 look acceptable. RY explained the context of the Caterthuns based on pre-application discussions with HS.

Cumulative Impact

SR suggested using 'filters' to help Angus Council to determine the cumulative impact. These filters could be based on size and scale of machine as well as landscape based filters e.g. 20km taking in the Strathmore Valley plus local turbine developments in the foothills area.

GY asked how Nathro would impact on other developments. The general indication was given that Nathro did not meet the criteria used by the Council in assessing the acceptability of windfarm proposals. Nathro will be an important consideration in a cumulative LVIA for Lower Cairny. JW indicated that several smaller scale developments to the west of the Caterthuns had recently been withdrawn following advice from HS.

Request for Screening Opinion

Once a design has been decided upon, a screening request should be submitted. The response to this would take 3 weeks. It is highly likely that an EIA would be required for the larger 74m height machines. This would then require the submission of a Scoping Report to establish the scope of the Environmental Assessment.

Roddy Yarr 9th February 2012

FILENOTE – MEETING WITH HISTORIC SCOTLAND AT EDINBURGH OFFICE TO DISCUSS PROPOSED WIND TURBINE DEVELOPMENT AT LOWER CAIRNY (BOGTON) BY EDZELL, ANGUS. 3RD NOVEMBER 2011

Present – Keith Horner, horner + maclennan; Roddy Yarr, representing client; Robin Campbell, Historic Scotland. Rory McDonald, Historic Scotland

The purpose of the meeting was to discuss the proposal to develop a wind turbine cluster at land in the area west of Witton Farm by Edzell, Angus, henceforth now known as Lower Cairny. In advance of the meeting, a Pre-Application Request was submitted to Historic Scotland and Historic Scotland had responded with a letter outlining detailed aspects to be addressed. The meeting went through the applicant's response to these issues.

KH introduced the landscape capacity report and design layout methodology and findings. KH noted the attention that the work carried out by horner + maclennan paid to the cultural heritage aspects and in particular the view from the Caterthuns to the proposed site, in terms of turbine scale and overall visual composition. KH presented the Google Earth visualizations and went through the iterations of the design layout in relation to the aspects raised in the Historic Scotland letter, namely, the Caterthuns, Edzell castle, Newbigging and Bridgend, views into site from the hillforts at Hill of Turin and Finavon. KH explained that wherever possible one of the key objectives of the design layout was to ensure that the turbines would be 'backclothed' against the larger hills from key viewpoints, and that turbines were positioned as far away from the skyline profile as possible. KH noted that the turbines would not be visible from several of the viewpoints such as Careston, Hill of Turin, Finavon etc, due to the combination of siting the turbines low on the site and using a smaller size of turbine. It was noted that the overall design approach has sought to avoid or minimise adverse landscape and visual impacts on cultural heritage and other features.

RM explained the local and wider settings of the Brown and the White Caterthuns. The local setting is focused on the immediate area and bounded by features including the West Water and Hill of Lundie. The wider setting is concerned with the linkages of the Caterthuns to the large scale hills as a backdrop; the views into the area from the south and the views outwards to the south and east to the coastal plain.

RM noted that the setting of the proposed site in relation to the Caterthuns and other assets should consider an appreciation of the monuments/features and their function. The other important aspect is to be able to understand the function of the monuments/features i.e. what they did then and do now. Both aspects are to some degree subjective.

RM and RC noted that the features at Newbigging and Bridgend are focused on the river valley at a local level.

RM and RC noted that the option of 3 machines at a maximum tip height of 61m was preferred in terms of size and scale in relation to the varius cultural heritage features in the area.

RY noted that these aspects would be included within subsequent discussions with Angus Council and thanked RC and RM for their helpful comments and feedback.

Roddy Yarr 10 Nov 2011

Roddy
We are content that this fairly reflects the discussion at the meeting.

Regards

Robin

From: Roddy Yarr [mailto:roddy@thewindfarmer.co.uk]
Sent: 12 November 2011 18:31
To: Campbell R (Robin)
Subject: Filenote of our meeting

Robin

I hope all is well. I attach a copy of a filenote of our meeting that I have made to try to accurately record the discussion that we had. I would like you to be happy with the content and wonder could you forward this to Rory as I didnt get his e-mail. Let me know if this is OK or any comments you would like to add or change.

Many thanks

Roddy

E-Mails Confirming Viewpoint Details
Fri 18/05/2012 14:22
Dr Yarr,

I refer to your e-mail below and our telephone conversation this afternoon. To confirm we discussed that the ZTV and viewpoints proposed are generally ok and that the comments in the table are also acceptable.

To confirm we had also discussed the requirement for the assessment of nearby housing and possible viewpoints form the most affected, another potential viewpoint within the glen to the north east and possible viewpoints from the road approaching the site to the south west and north east.

As discussed myself and Stewart Roberts would be happy to discuss any queries you may have on this.

Regards
James
Tel: 01307 473244

From: RODDY YARR [mailto:roddy@thewindfarmer.co.uk]
Sent: 09 May 2012 11:34
To: WrightJ
Cc: StewartLS; Keith Horner
Subject: RE: Revised Viewpoints

James

Can you see this?

Thanks

Roddy

18.04.12

LOWER CAIRNY WIND CLUSTER, ANGUS LANDSCAPE AND VISUAL IMPACT ASSESSMENT

LIST OF SELECTED VIEWPOINTS FOR ASSESSMENT

Viewpoint Number	Grid Reference	Location	Purpose for selection	Comments	Photomontage	Photowireline	Wireline
1	58243 68769	Cemetery west of Edzell	Close view to SE	Alternative at picnic site to NW	Yes		
2	58553 69169	Edzell Castle Gardens	Designed landscape	Tower not accessible to public	Yes		
3	59793 68839	Edzell – western edge	Local community and core path		Yes		
4	60603 65589	Inchbare – west edge	Local community		Yes		
5	59583 68209	Minor road SW of Edzell, at junction with path	Typical view from SE and core path		Yes		
6	55583 66829	Brown Caterthun summit	SAM		Yes		
7	54763 66049	White Caterthun summit	SAM				Yes
8	c61473 63759	A90 Layby	Major road	Precise location determined by actual			Yes

				layby location			
9	65292 66379	A90 junction	Major road			Yes	
10	65512 72759	South of Fettercairn	Local community/ road to E				Yes
11	50723 55709	Hill of Finavon fort	SAM to SW	Fort used rather than summit to SW to ensure full view of windfarm			Yes
12	53573 68029	Bridgend road junction	Local community to W		Yes		

Dr Roddy Yarr
Director
Roddy Yarr Consulting Ltd
roddy@thewindfarmer.co.uk
www.thewindfarmer.co.uk
tel: 07881247955

From: WrightJ [mailto:WrightJ@angus.gov.uk]
Sent: 09 May 2012 11:23
To: RODDY YARR
Subject: RE: Revised Viewpoints

Dr Yarr,

I confirm receipt of the e-mail but the table does not appear to be in a format I can open. Do you have this in PDF or word document?

Thanks
James

From: RODDY YARR [mailto:roddy@thewindfarmer.co.uk]
Sent: 09 May 2012 11:21
To: WrightJ
Cc: Keith Horner; StewartLS
Subject: Revised Viewpoints

James

Attached table of revised viewpoints. You can compare these to those shown on the CD that I sent you when we discussed the revised application. I will also resend the CD with the ZTV burned onto it.

When we met with you on 29th February, we shared a ZTV plan with proposed viewpoints shown. Having reflected on some of these viewpoints, a revised list has been produced (see attached table) which I feel still facilitates an effective assessment for LVIA purposes. I am looking for your guidance on whether you approve of the new revised list and also on the nature of the viewpoint imagery i.e. whether each image is a photomontage/photowireline/wireline. Would you and colleagues mind taking a look at the revised list of viewpoints and giving me some feedback before we commit to them.

Let me know if you receive this OK.

Thanks

Roddy

Dr Roddy Yarr
Director

E-Mail Confirmation of Screening Opinion Details

From: WrightJ [mailto:WrightJ@angus.gov.uk]
Sent: 13 April 2012 11:20
To: Roddy Yarr
Subject: 12/00234/EIASCR

Screening Request for 2 x 74m High Wind Turbines at Lower Cairny, Witton Farm, Edzell

Dear Dr Yarr,

I refer to the above and to your request for a screening opinion which was received by this Division on 07 March 2012 and our recent discussions. For your information, please note that the EIA regulations (1999) have now been replaced by The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 on 1 June 2011 and for the avoidance of doubt I can confirm my Council's response is based on the new legislation.

My Council has considered the type of development proposed; its nature, scale, location and impact on the environment. Account has also been taken of the criteria outlined in Circular 3/2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011. Schedule 2 of the 2011 Regulations states that the likelihood of significant effects will generally depend upon the scale of the development, and its visual impact, as well as potential noise impacts. EIA may be required for developments of two or more turbines, or where the hub height of a turbine exceeds 15 metres.

In this case the proposal is for two wind turbines and from the information provided these would have heights to blade tip of 74 metres.

The Regulations and supplementary guidance indicate that EIA should only be required where it is judged that a development is likely to have significant environmental effects. In screening the proposal regard has been had to the location and characteristics of the development and the potential impacts as required by Schedule 3 of the Regulations. The screening opinion follows the flow chart for establishing whether a proposed development requires EIA found within Planning Circular 3/2011. In this instance I am satisfied that the proposal will not lead to significant environmental effects in terms of the EIA Regulations*.
(*The recipient should be aware that this view is taken for the purposes of screening the application in terms of EIA regulations only and should not be interpreted as indication that the environmental impacts of the proposed development are not significant in terms of any subsequent assessment of a planning application under the Section 37(2) of the Town and Country Planning (Scotland) Act 1997 as amended.) My reasons for this conclusion that an EIA is not required are summarised below. From the information provided and a brief desktop study of the area I consider that:

- The development does not give rise to any unusually complex or potentially hazardous environmental effects; and

- The likely impacts are localised and from the initial information provided do not appear to affect any particularly environmentally sensitive or vulnerable locations in the immediate area.

Accordingly, in terms of Regulation 6(4) of the 2011 Regulations my Council is of the opinion that the proposal does not constitute Environmental Impact Assessment development and will not require the submission of a full Environmental Statement as required by regulation 2(1) and Schedule 4 of the Regulations.

Prior to the submission of a formal application I would request that agreement is reached with this Authority in respect of the scope of the supporting information required to support the proposed development. Specifically I would suggest that early contact be made with Iain Graham from EDECP re: noise assessments (tel: 01307 473906). Obviously with regards to the landscape, visual and cumulative requirements you will be aware of these given these have been detailed in the response by Isabelle Davies to your initial pre app enquiry (11/00678/PREAPP) and the discussions at our meeting on 09 February 2012. In relation to any future application full consideration will need to be given to the impacts the proposal may have specifically on the settlement of Edzell, Edzell Castle and the Caterthuns and I note that viewpoints have been proposed from these which should enable a full assessment to be made. In addition to the details discussed I would ask you to ensure that an assessment of all housing within 2km of the site be provided and viewpoints / visualisations proposed from housing which may be affected. Viewpoints from Core Paths should also be considered. Unfortunately I cannot give any indication at this time of the likely outcome of any planning application given that detailed supporting information will be required to be submitted and assessed along with the relevant consultee responses.

I trust the above proves helpful and clarifies the situation for you. However please do not hesitate to contact me should you wish to discuss.

Regards

James Wright
Planning Officer (Development Standards)
Planning & Transport Division
Infrastructures Services
Angus Council
County Buildings
Market Street
FORFAR
DD8 3LG

T: 01307 473244
E: WrightJ@angus.gov.uk
W: www.angus.gov.uk

ANGUS COUNCIL

TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997
(AS AMENDED)
TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE)
(SCOTLAND)
REGULATIONS 2013

APP7

Angus Council

PLANNING PERMISSION REFUSAL
REFERENCE 14/00669/FULL

To **Mr Greg Yarr**
c/o Roddy Yarr Consulting Ltd
Roddy Yarr
61 Spottiswoode Gardens
St Andrews
KY16 8SB

With reference to your application dated 18 August 2014 for planning permission under the above mentioned Acts and Regulations for the following development, viz.:-

Erection of 2 wind turbines of 50 metres to hub height and 74 metres to blade tip, temporary anemometer mast and ancillary development at **Land 600M West Of Witton Farm Lethnot Edzell** for **Mr Greg Yarr**

The Angus Council in exercise of their powers under the above mentioned Acts and Regulations hereby **Refuse Planning Permission (Delegated Decision)** for the said development in accordance with the particulars given in the application and plans docqueted as relative hereto in paper or identified as refused on the Public Access portal.

The reasons for the Council's decision are:-

1 That the proposed turbines by virtue of their height and location would result in unacceptable landscape and visual impacts and accordingly the siting and appearance of the turbine has not been chosen to minimise impact on amenity. As such the proposal is contrary to Policy 3 of TAYplan and policies ER5, ER34 and S6 of the Angus Local Plan Review 2009.

2 That the proposed turbines by virtue of their height and proximity to the Caterthun Hillforts would have an adverse and unacceptable impact on the setting of a Scheduled Ancient Monument. As such, the proposal is contrary to Policy 3 of TAYplan and Policies ER18 and ER34 of the Angus Local Plan Review 2009.

Amendments:
The application has not been subject of variation.

Informatives:

Dated this **5 February 2015**

Iain Mitchell - Service Manager
Angus Council
Communities
Planning
County Buildings
Market Street
FORFAR
DD8 3LG

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
Contract No:	SE967(18)

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

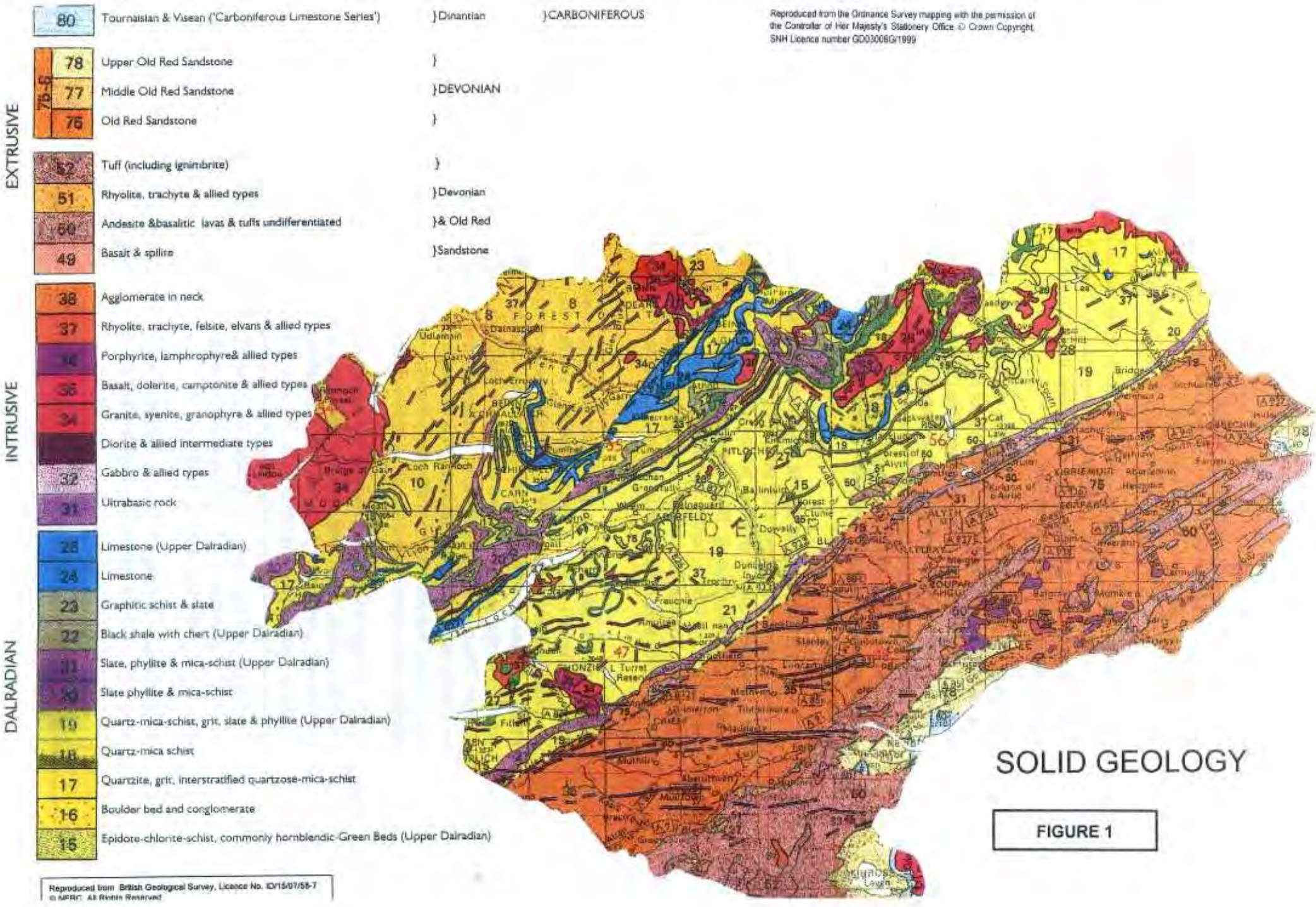
2.6. South and east of the Highland Boundary Fault, the lowlands form part of a structural rift valley. The valley lies between the two fault lines of the Highland Boundary Fault and the Southern Upland Fault. Both faults were initiated during the period of Caledonian mountain building in early Palaeozoic 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 }
75-6
EXTRUSIVE
52 Tuff (including ignimbrite) }
51 Rhyolite, trachyte & allied types }Devonian
50 Andesite &basalitic lavas & tuffs undifferentiated }& Old Red
49 Basalt & spilite }Sandstone
INTRUSIVE
38 Agglomerate in neck
37 Rhyolite, trachyte, felsite, elvans & allied types
Porphyrite, lamphrophyre& allied types
Basalt, dolerite, camptonite & allied types
34 Granite, syenite, granophyre & allied types
Diorite & allied intermediate types
32 Gabbro & allied types
31 Ultrabasic rock
DALRADIAN
28 Limestone (Upper Dalradian)
24 Limestone
23 Graphitic schist & slate
22 Black shale with chert (Upper Dalradian)
Slate, phyllite & mica-schist (Upper Dalradian)
Slate phyllite & mica-schist
19 Quartz-mica-schist, grit, slate & phyllite (Upper Dalradian)
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)
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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.

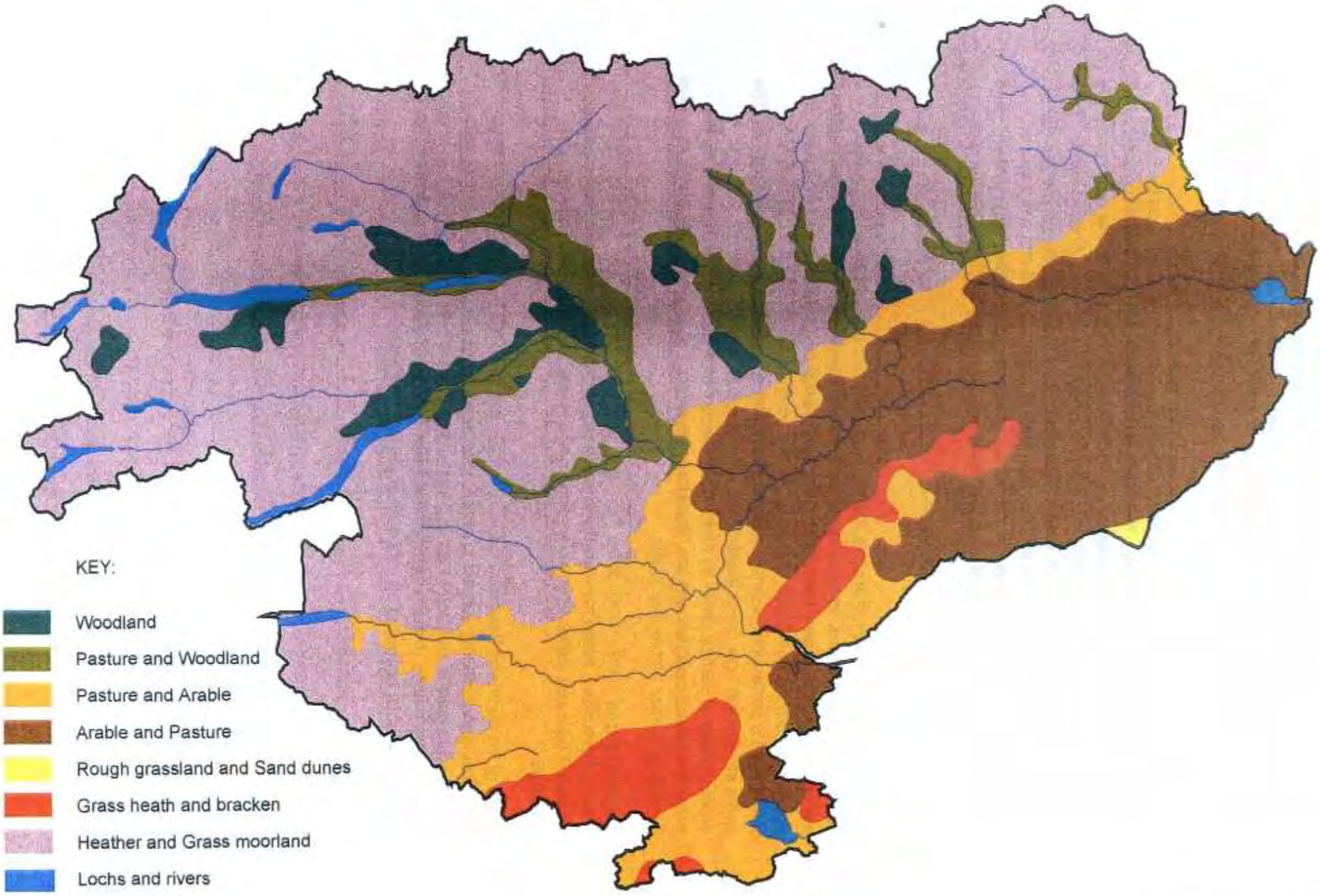
2.27. The hydrology of the lowlands is interesting as it largely ignores the underlying structures. Whilst these structures generally run south-west to north-east, the drainage of the area is predominantly from the west or north-west. The Rivers Tay, Earn and Almond all exhibit this pattern to a greater 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.

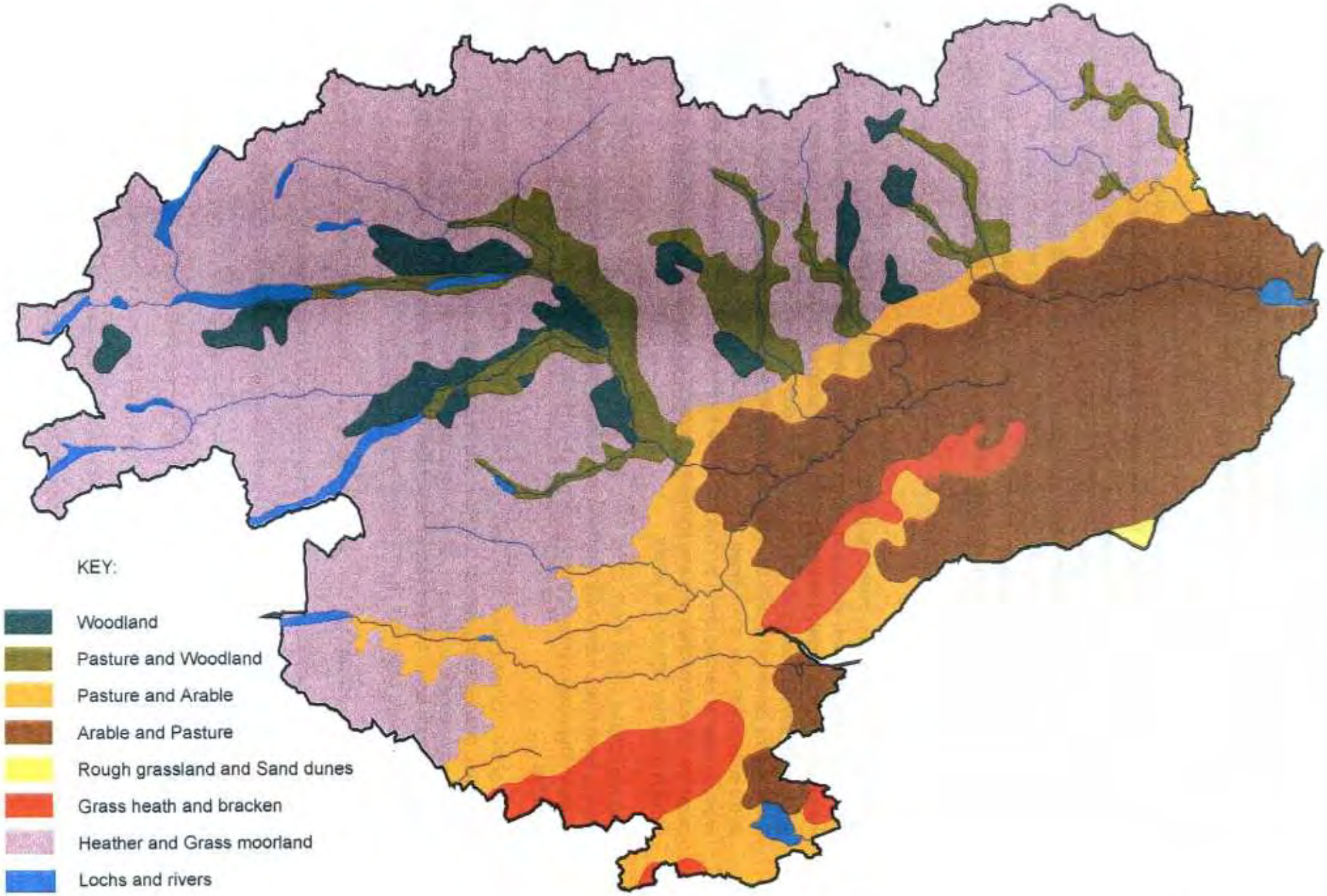
2.40. West of here, the tract of land from Breadalbane to Aberfeldy is dominated by Ben Lawers, Glen Lyon and Loch Tay. This area is considered important as a transitional area between the more heavily glaciated Western Highlands, outwith the region, and the less deeply eroded Eastern Highlands, including 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

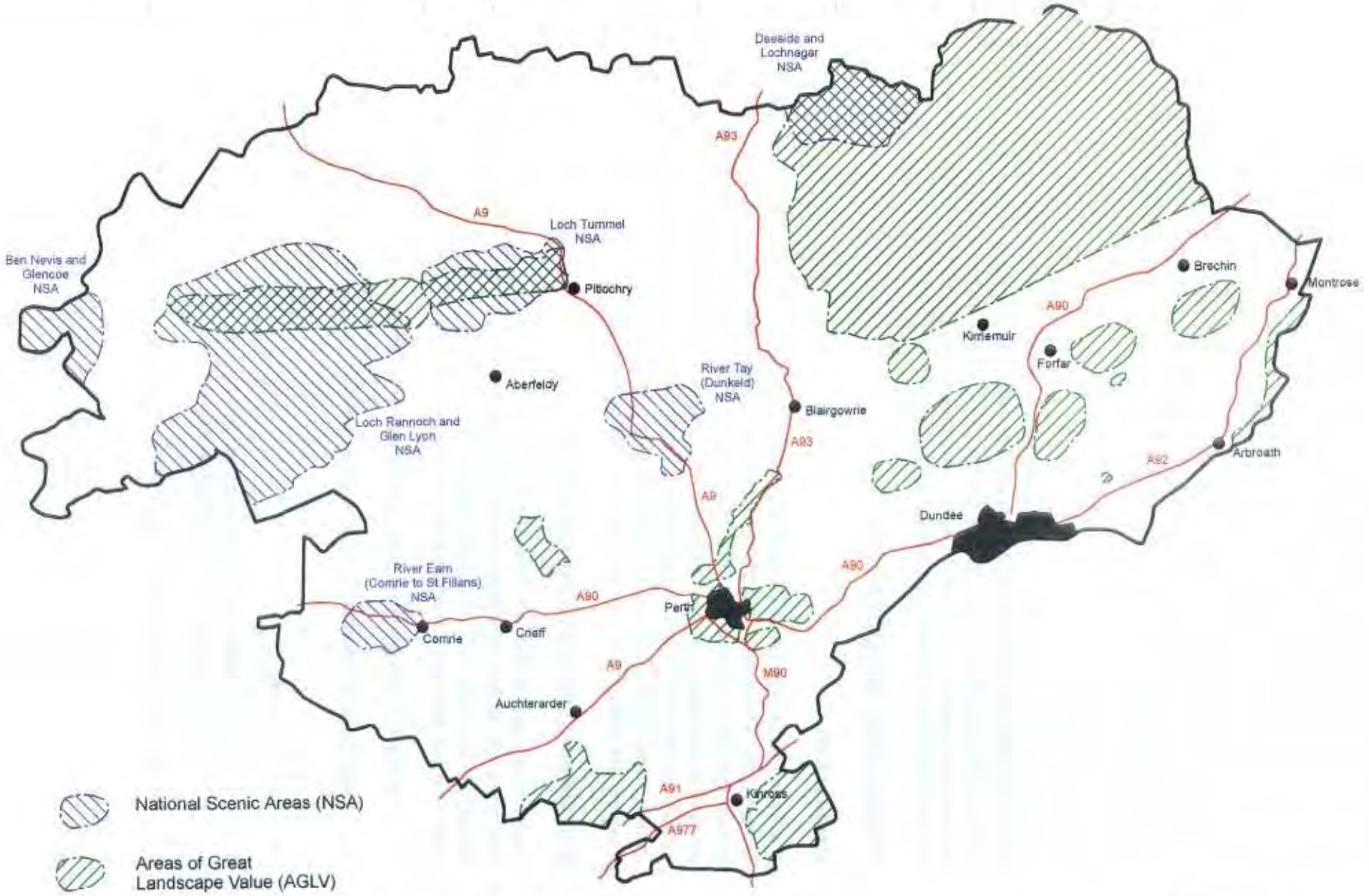
and have a significant local impact. From distant and lower ground, these upland and montane communities create mosaics of muted greens, ochres, browns and oranges, brought to life by the seasonal blooms of alpine flowers, swathes of pink heather, and the autumn russets of ericaceous shrubs, bracken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

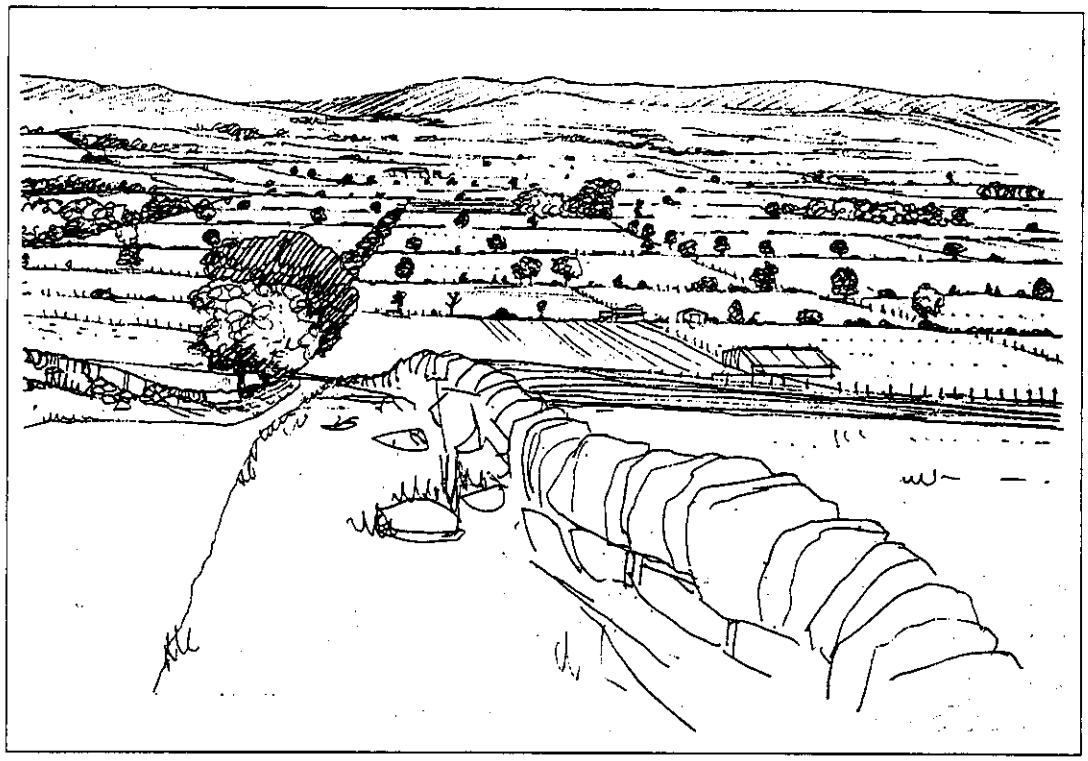
- Hedgerow boundaries are also important in this agricultural landscape, often creating a sense of enclosure and emphasising the contrast between lowlands and uplands. However, loss of hedgerow and replacement by post-and-wire fences has had a significant adverse effect on some of these landscapes. Further 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

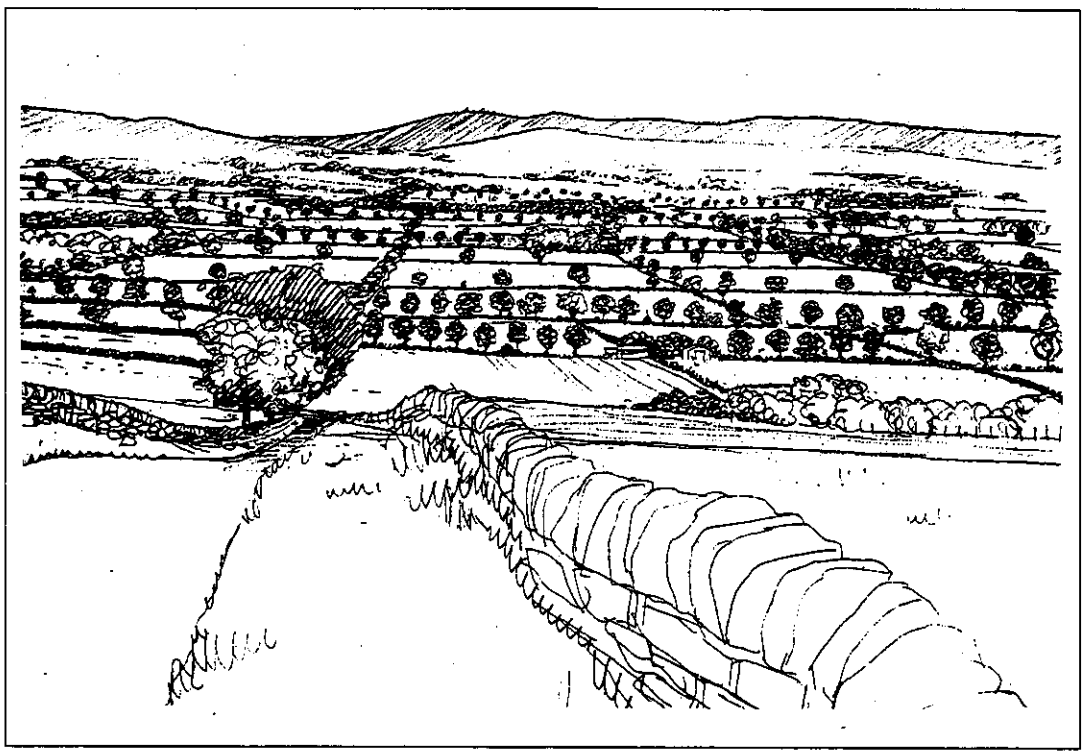
- Agriculture's central role in both shaping and maintaining the landscape means that retaining a healthy and viable farming community is essential. Large parts of the agriculture of the region, particularly in Highland areas, are dependent on subsidy. It is important that the various forms of funding 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.



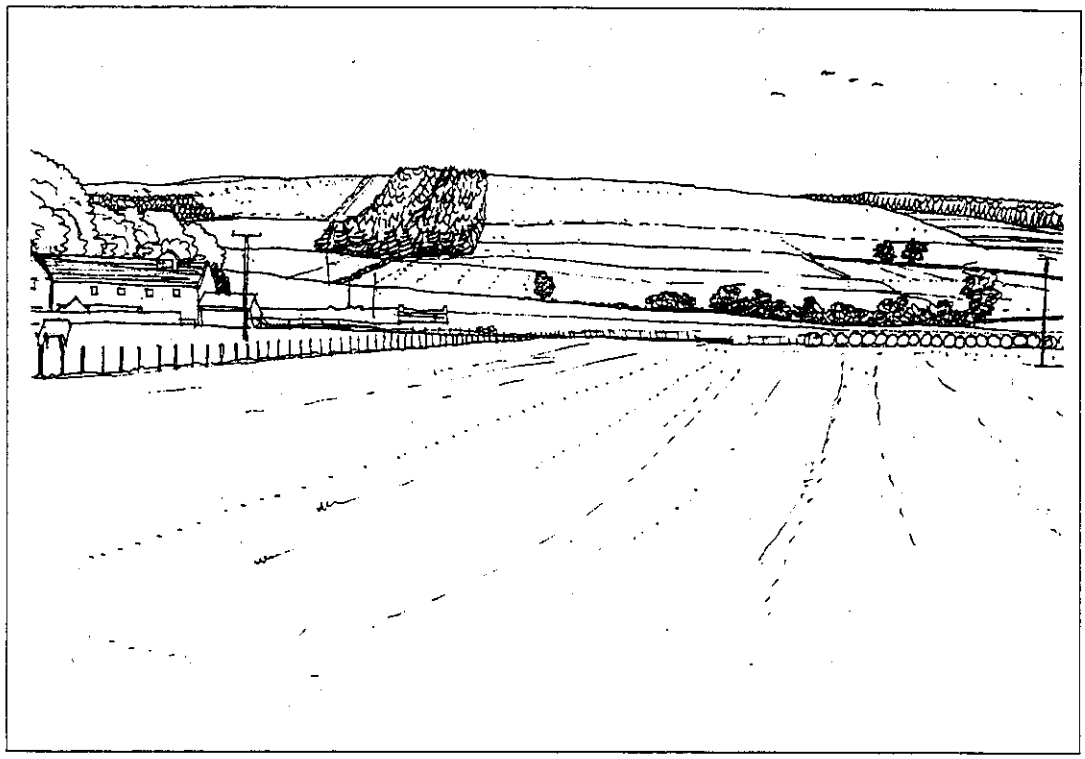
Broad Valley Lowlands

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



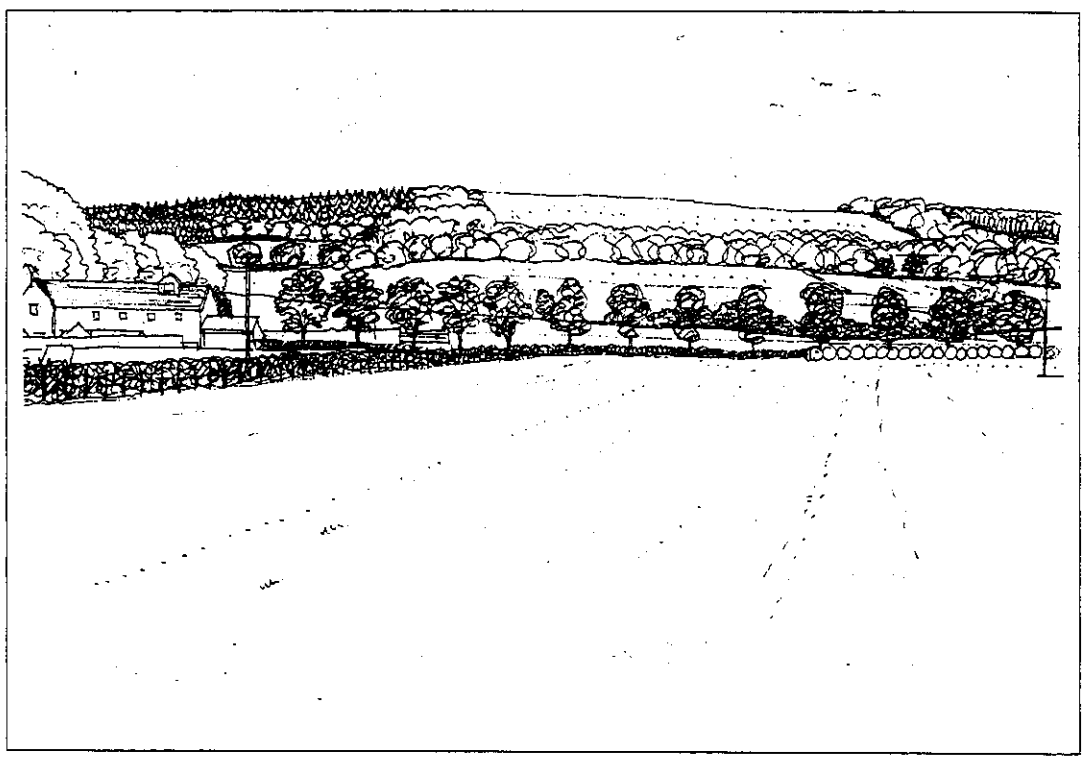
Management Option

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.

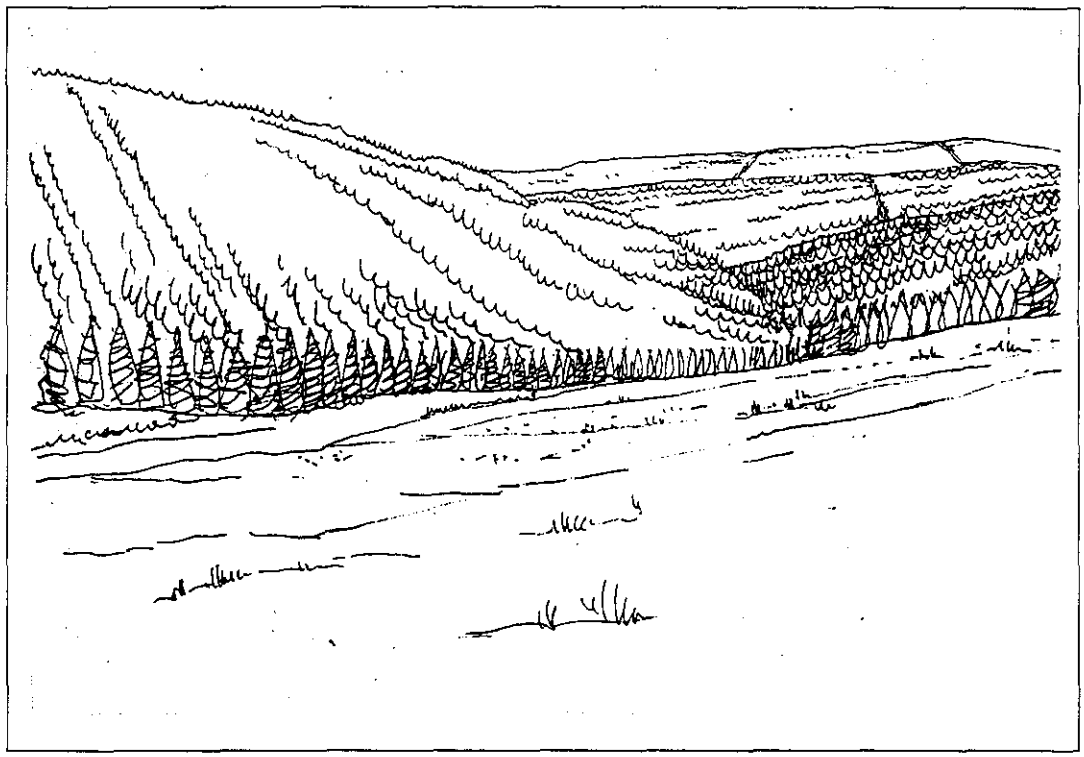
Policy Woodlands

- 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

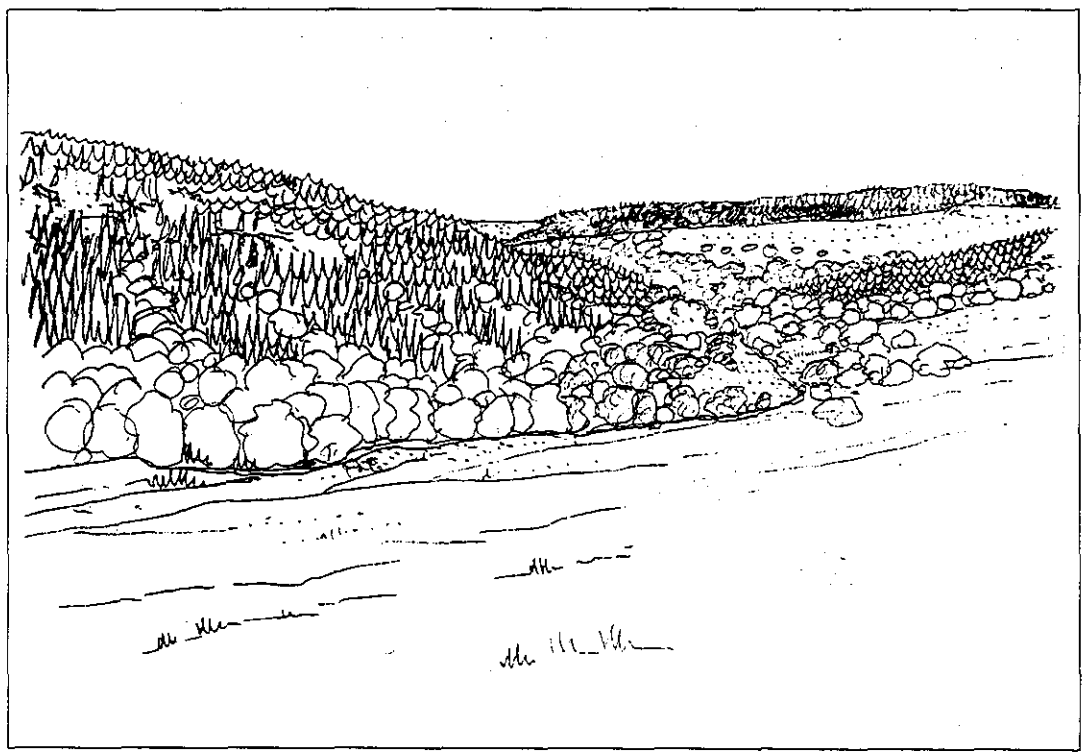
- The protection of these woodlands should be regarded as very important. Semi-natural and ancient woodlands make important contributions to the landscape of Tayside - particularly its glens. Continued support for their protection and management through the Tayside Native Woodlands and other initiatives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



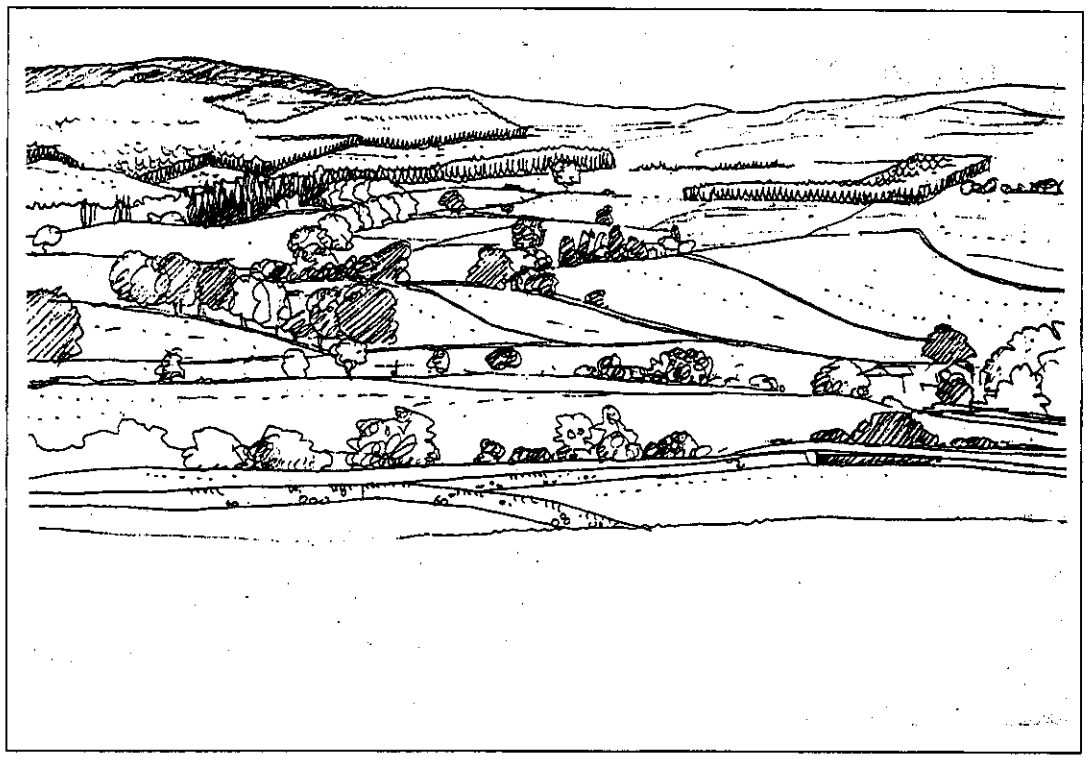
Igneous Hills

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



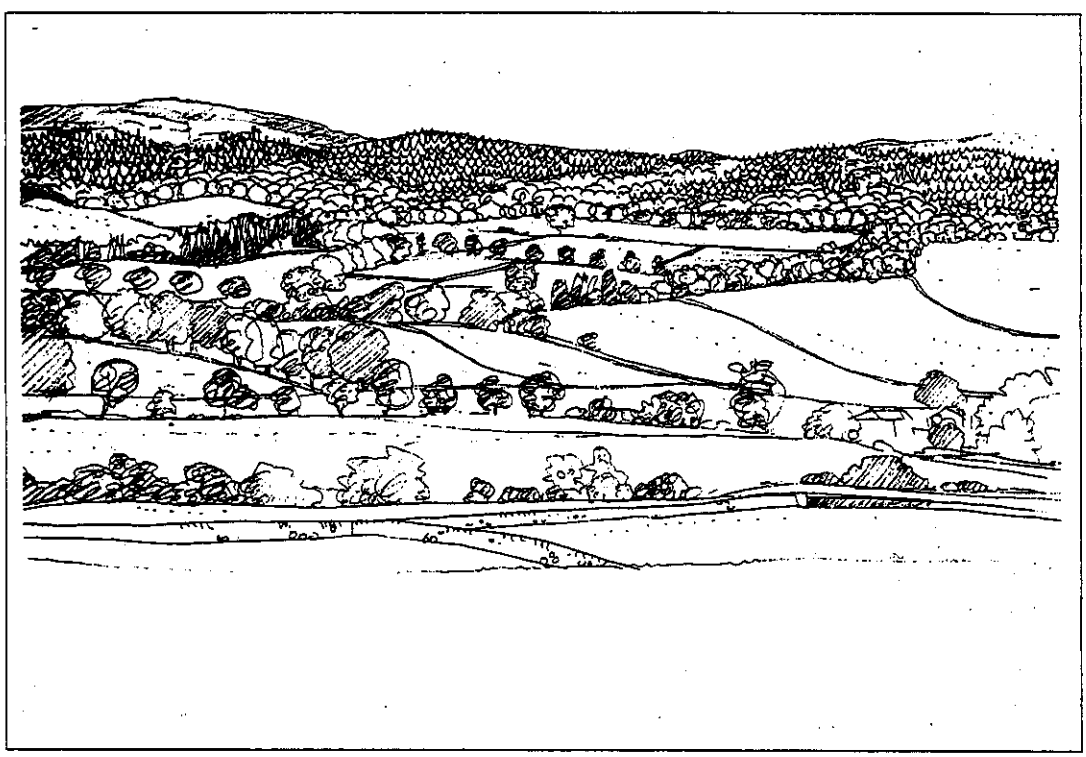
Management Option

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.



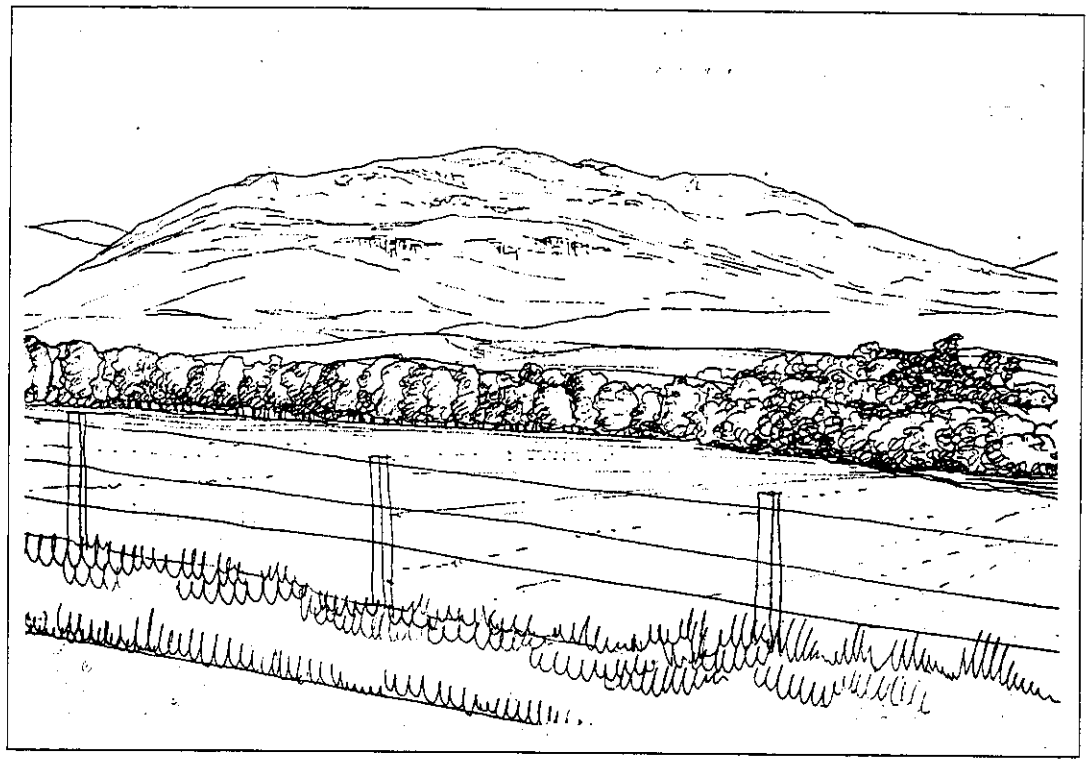
Lower Highland Glens

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



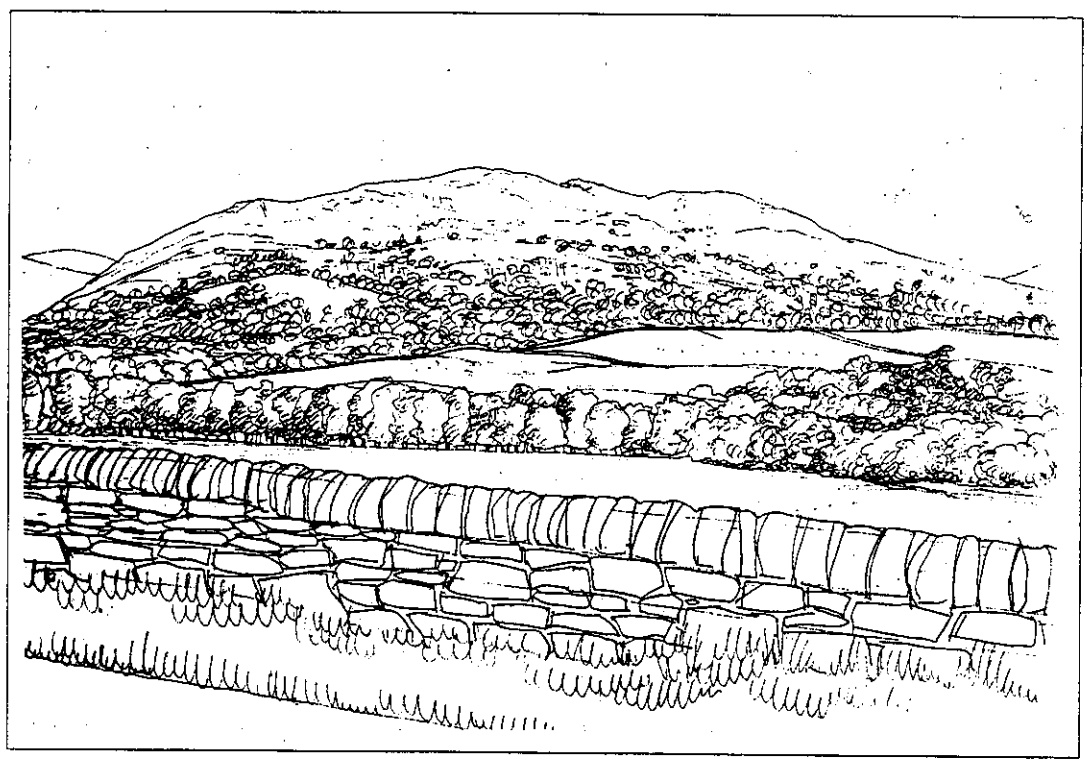
Management Option

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:

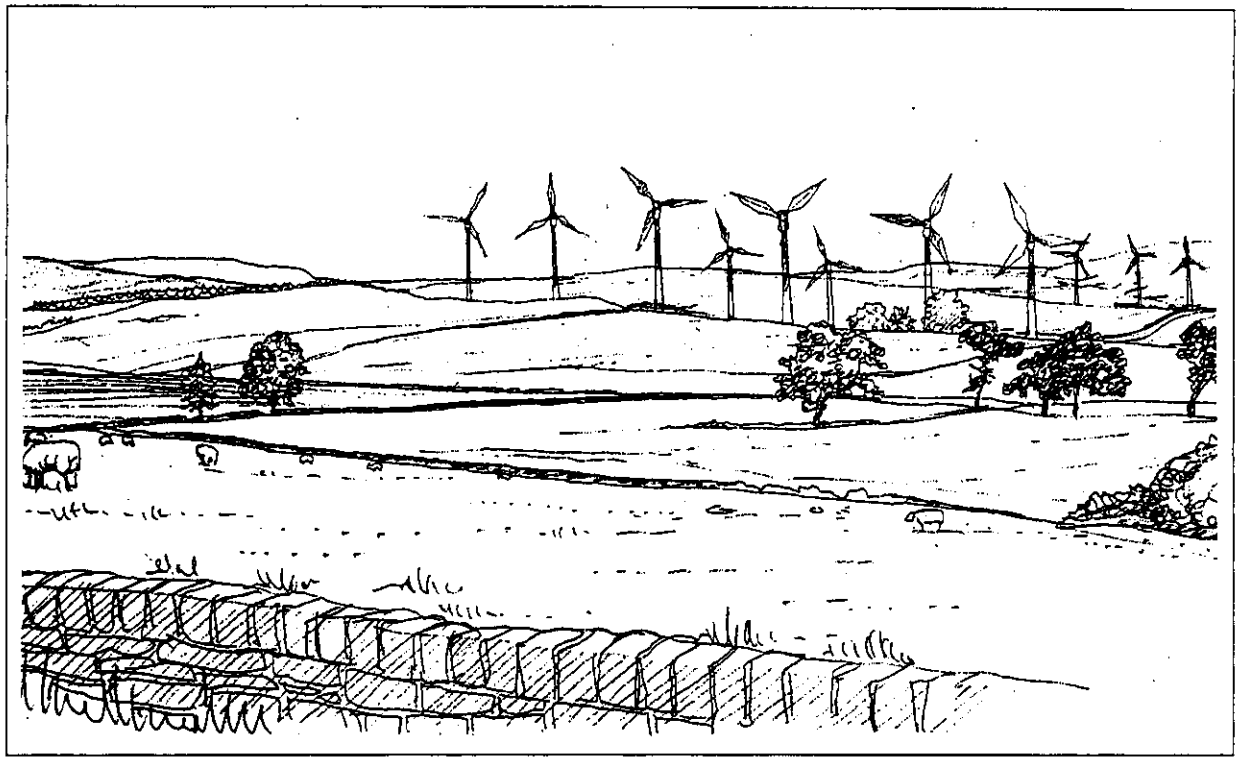
- visual intrusion and effect on landscape character;
- effect on nature conservation;
- noise;
- secondary effects resulting from links to the National Grid or the provision of road access.

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.

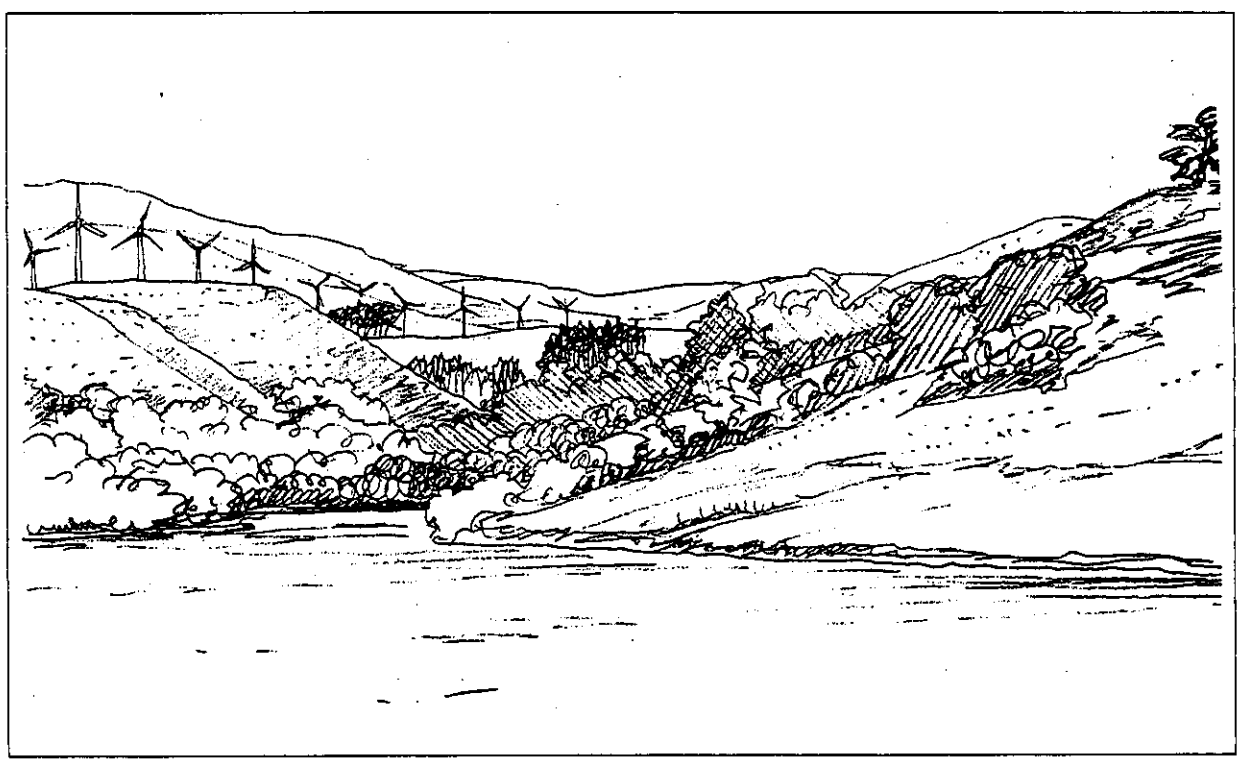
4.60. The landscape impact of wind farms will, in turn, reflect a variety of factors. Most significant, perhaps, is the size of individual turbines (30-35m high with a rotor diameter of 30-35m), their vertical, modern and industrial appearance and the movement that they introduce into the landscape. 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.

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.

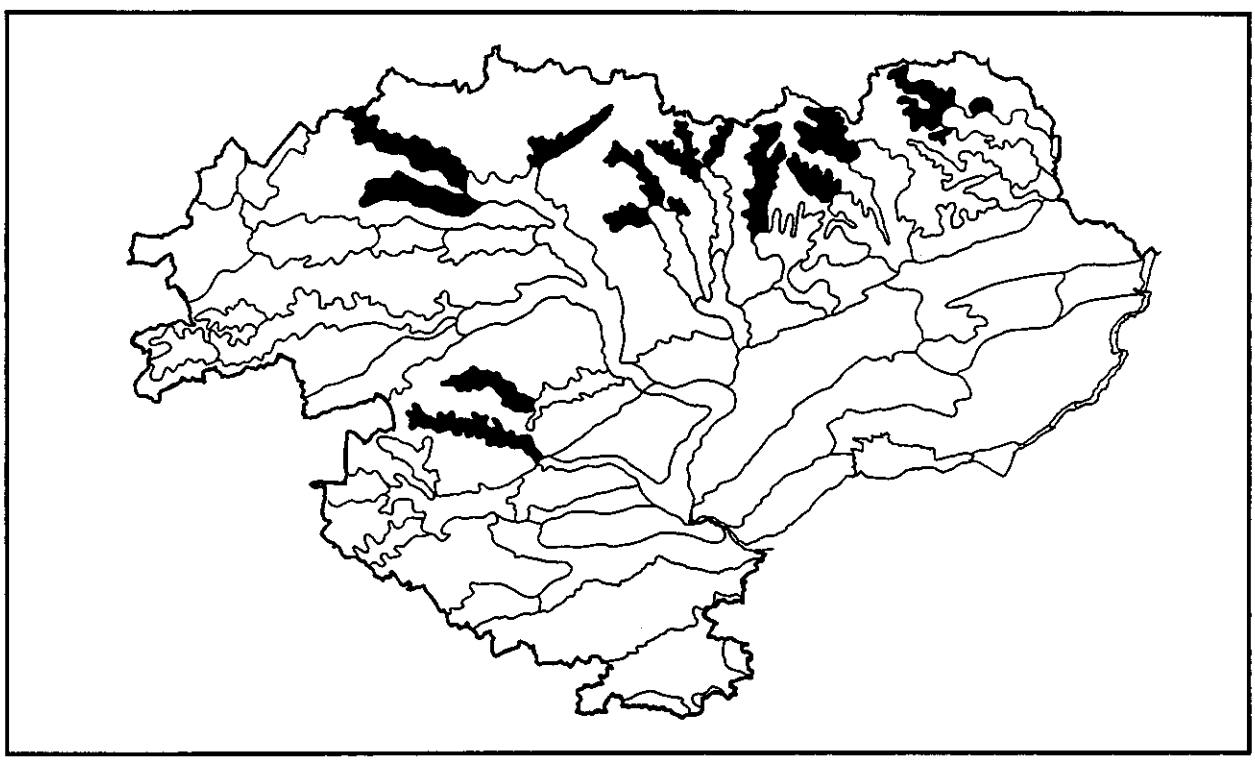
LANDSCAPE TYPE DESCRIPTIONS

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.

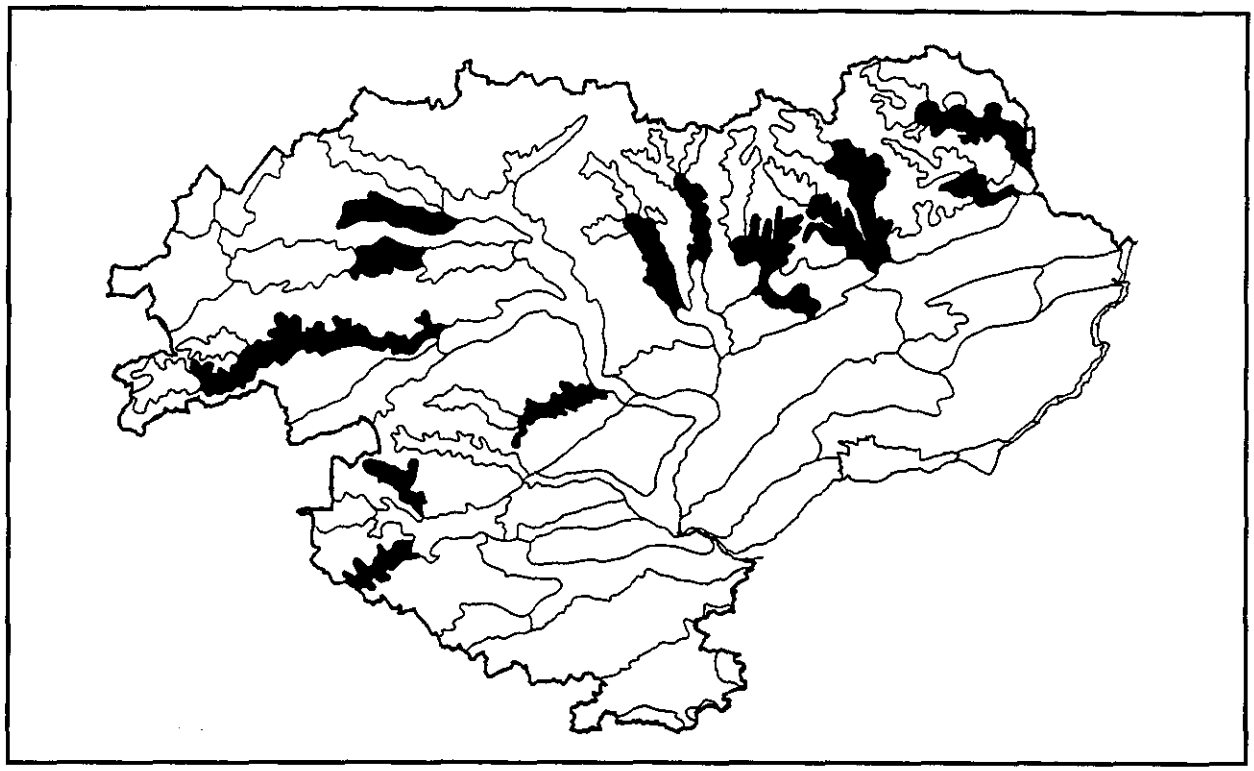
LANDSCAPE GUIDELINES

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.