

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

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

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

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

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

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

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

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



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

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

### Policy 3: Managing TAYplan's Assets

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

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

Perth Core Area



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

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

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

Employment Land

Greenbelts

Natural and Historic Assets\*

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

Transport

Finite Resources

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

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

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

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

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

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

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

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

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

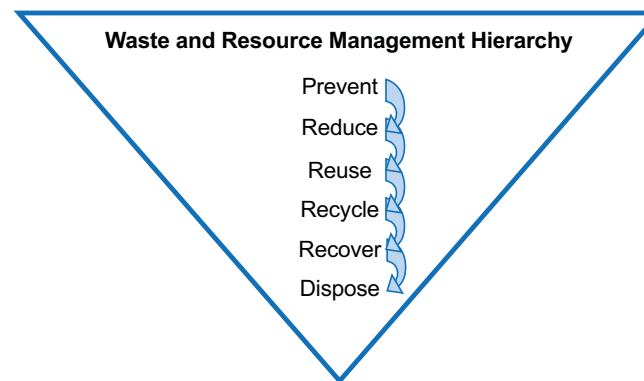
It recognises the different scales – property (eg micro-renewables or individual waste facilities), community (eg district heating and power or local waste facilities) and regional/national (eg national level schemes and waste facilities for wide areas) at which this infrastructure can be provided and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

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

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

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

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



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

## Policy 6: Energy and Waste/Resource Management Infrastructure

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

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

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

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

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

## WhyteKA

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**From:** ALLEN, Sarah J [Sarah.ALLEN@nats.co.uk] on behalf of NATS Safeguarding [NATSSafeguarding@nats.co.uk]  
**Sent:** 19 September 2014 09:54  
**To:** PLNProcessing  
**Subject:** Your Ref: 14/00781/FULL (Our Ref: SG9999)

The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal.

However, please be aware that this response applies specifically to the above consultation and only reflects the position of NATS (that is responsible for the management of en route air traffic) based on the information supplied at the time of this application. This letter does not provide any indication of the position of any other party, whether they be an airport, airspace user or otherwise. It remains your responsibility to ensure that all the appropriate consultees are properly consulted.

If any changes are proposed to the information supplied to NATS in regard to this application which become the basis of a revised, amended or further application for approval, then as a statutory consultee NERL requires that it be further consulted on any such changes prior to any planning permission or any consent being granted.

Yours faithfully,

Sarah Allen  
Technical Administrator  
On behalf of NERL Safeguarding Office

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**Defence  
Infrastructure  
Organisation**

Miss Rachel Evans  
Assistant Safeguarding Officer  
Ministry of Defence  
Safeguarding – Wind Energy  
Kingston Road  
Sutton Coldfield  
West Midlands B75 7RL  
United Kingdom

Your Reference: 14/00781/FULL

Telephone [MOD]: +44 (0)121 311 2195

Our Reference: DIO/SUT/43/10/1/18639

Facsimile [MOD]: +44 (0)121 311 2218

E-mail: DIOODC-IPSSG3a@mod.uk

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

23 September 2014

Dear Mr Wright

**Please quote in any correspondence: 18639**

**Site Name: Field 600m North West of Balhall Lodge**

**Proposal: Erection of 1 Wind Turbine**

**Planning Application Number: 14/00781/FULL**

**Site Address: Menmuir, Brechin**

Thank you for consulting the Ministry of Defence (MOD) on the above Planning Application in your communication dated 17 September 2014.

I am writing to tell you that the MOD has no objection to the proposal.

The application is for 1 turbine at 49 metres to blade tip. This has been assessed using the grid references below as submitted in the planning application or in the developers' or your pro-forma.

Turbine	100km Square letter	Easting	Northing
1	NO	50832	64324

The principal safeguarding concern of the MOD with respect to the development of wind turbines relates to their potential to create a physical obstruction to air traffic movements and cause interference to Air Traffic Control and Air Defence radar installations.

Defence Infrastructure Organisation 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.

If planning permission is granted we would like to be advised of the following;

- 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.

If the application is altered in any way we must be consulted again as even the slightest change could unacceptably affect us.

I hope this adequately explains our position on the matter. If you require further information or would like to discuss this matter further please do not hesitate to contact me.

Further information about the effects of wind turbines on MOD interests can be obtained from the following websites:

**MOD:** <https://www.gov.uk/mod-safeguarding>

Yours sincerely

A black rectangular redaction box covering the signature of Miss Rachel Evans.

Miss Rachel Evans  
Assistant Safeguarding Officer – Wind Energy  
Defence Infrastructure Organisation

**SAFEGUARDING SOLUTIONS TO DEFENCE NEEDS**

**LeslieIA**

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**From:** Kirsteen MacDonald [kmacdonald@hial.co.uk]  
**Sent:** 19 September 2014 14:30  
**To:** PLNProcessing  
**Cc:** Anne Phillips  
**Subject:** 14/00781- Wind Turbine, 49m, Brechin

**NO OBJECTION - HIAL**

**Your Ref:** 14/00781/FULL

Dear Sir/Madam

**PROPOSAL:** Erection of Wind Turbine of 37m to hub height and 49m to blade tip and ancillary development – Re-Application  
**LOCATION:** Field 600m North West of Balhall Lodge, Menmui, Brechin

With reference to the above proposed development, it is confirmed that our calculations show that, at the given position and height, this development would not infringe the safeguarding surfaces for **Dundee Airport**.

Therefore, Highlands and Islands Airports Limited would have no objections to the proposal.

Kind regards

Kirsteen

**Safeguarding Team**  
**on behalf of Dundee Airport Limited**  
**c/o Highlands and Islands Airports Limited**  
Head Office, Inverness Airport, Inverness IV2 7JB  
☎ 01667 464244 (DIRECT DIAL)  
✉ [safeguarding@hial.co.uk](mailto:safeguarding@hial.co.uk) 🌐 [www.hial.co.uk](http://www.hial.co.uk)

22/09/2014



**From:**AkroydL  
**Sent:**15 Oct 2014 10:57:40 +0100  
**To:**WrightJ  
**Cc:**ThomsonSD  
**Subject:**14/00781/FULL - Erection of Wind Turbine, Field 600m North West of Balhall Lodge, Menmuir

James,

14/00781/FULL

Erection of Wind Turbine

Field 600m North West of Balhall Lodge, Menmuir

I refer to the above application and can advise that I have seen the submitted information and visited the site. This department previously raised concerns regarding this application due to the cumulative impact this additional turbine would have on nearby residential properties. However, I have looked at the revised application and noise impact assessment and have the following comments to make:

- The proposed turbine has been relocated further away from the residential properties at Balhall Lodge
- The cumulative noise prediction calculations have been based on the consented levels for the existing turbine (Planning Ref 10/01133/FULL) and manufacturers revised noise data for the northern Power Systems NPS 100-24 turbine
- Cumulative noise prediction calculations have been undertaken in accordance with IOA - A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (May 2013) and the noise from the proposed wind turbine will be 10 dB (A) below the consent level for the approved wind turbine and cumulatively will not exceed the fixed limit of 39 dB(A) L90 at Balhall Lodge.

Based on the above I would advise that this department would not object to this development subject to the following conditions:

1. The rating level of noise immissions from the wind turbine (including the application of any tonal penalty) when determined in accordance with the attached Guidance Notes (to this condition),

shall not exceed at any property lawfully existing at the date of this planning permission:

- (a) the  $L_{A90}$  dB (A) 10min levels, shown in table A, where there is more than one property at a location the noise limits apply to all properties at that location or;
  - (b)  $L_{A90}$  28dB (A) 10min at wind speeds up to 10 m/s at 10m height at any other location.
2. Prior to the commencement of development the make and model of the turbine selected for use in the development shall be submitted for the written approval of the Planning Authority.
  3. In the event that any turbine other than the candidate turbine is to be installed, a detailed noise assessment, including where necessary a cumulative assessment taking into account any existing wind turbine developments approved prior to the date of this permission, demonstrating that the noise limits specified by this permission shall not be exceeded shall be submitted for the written approval of the Planning Authority.
  4. In the event that any wind turbine is required to operate in a reduced power mode in order to comply with the noise limits specified by this permission a scheme for the mitigation of noise shall be submitted for the written approval of the Planning Authority.
  5. The wind farm operator shall continuously log power production, wind speed and wind direction, all in accordance with Guidance Note 1(d). This data shall be retained for a period of not less than 24 months. The wind farm operator shall provide this information in the format set out in Guidance Note 1(e) to the Local Planning Authority on its request, within 14 days of receipt in writing of such a request.
  6. No electricity shall be exported until the wind farm operator has submitted to the Local Planning Authority for written approval a list of proposed independent consultants who may undertake noise compliance measurements in accordance with this permission. Amendments to the list of approved consultants shall be made only with the prior written approval of the Local Planning Authority.

7. Within 21 days from receipt of a written request from the Local Planning Authority following a complaint to it from an occupant of a dwelling alleging noise disturbance at that dwelling, the wind farm operator shall, at its expense, employ a consultant approved by the Local Planning Authority to assess the level of noise immissions from the wind farm at the complainant's property in accordance with the procedures described in the attached Guidance Notes. The written request from the Local Planning Authority shall set out at least the date, time and location that the complaint relates to and any identified atmospheric conditions, including wind direction, and include a statement as to whether, in the opinion of the Local Planning Authority, the noise giving rise to the complaint contains or is likely to contain a tonal component.
  
8. The assessment of the rating level of noise immissions shall be undertaken in accordance with an assessment protocol that shall previously have been submitted to and approved in writing by the Local Planning Authority. The protocol shall include the proposed measurement location identified in accordance with the Guidance Notes where measurements for compliance checking purposes shall be undertaken, whether noise giving rise to the complaint contains or is likely to contain a tonal component, and also the range of meteorological and operational conditions (which shall include the range of wind speeds, wind directions, power generation and times of day) to determine the assessment of rating level of noise immissions. The proposed range of conditions shall be those which prevailed during times when the complainant alleges there was disturbance due to noise, having regard to the written request by the Local Planning Authority to investigate a complaint, and such others as the independent consultant considers likely to result in a breach of the noise limits.
  
9. Where a dwelling to which a complaint is related is not listed in the tables attached to these conditions, the wind farm operator shall submit to the Local Planning Authority for written approval proposed noise limits to be adopted at the complainant's dwelling for compliance checking purposes. The proposed noise limits are to be those limits selected from the Tables specified for a listed location which the independent consultant considers as being likely to experience the most similar background noise environment to that experienced at the complainant's dwelling. The rating level of noise immissions resulting from the combined effects of the wind turbines when determined in accordance with the attached Guidance Notes shall not exceed the noise limits approved in writing by the Local Planning Authority for the complainant's dwelling.

10. The wind farm operator shall provide to the Local Planning Authority the independent consultant's assessment of the rating level of noise immissions undertaken in accordance with the Guidance Notes within 2 months of the date of the written request of the Local Planning Authority for compliance measurements to be undertaken, unless the time limit is extended in writing by the Local Planning Authority. The assessment shall include all data collected for the purposes of undertaking the compliance measurements, such data to be provided in the format set out in Guidance Note 1(e) of the Guidance Notes. The instrumentation used to undertake the measurements shall be calibrated in accordance with Guidance Note 1(a) and certificates of calibration shall be submitted to the Local Planning Authority with the independent consultant's assessment of the rating level of noise immissions.
11. Where a further assessment of the rating level of noise immissions from the wind farm is required pursuant to Guidance Note 4(c), the wind farm operator shall submit a copy of the further assessment within 21 days of submission of the independent consultant's assessment pursuant to condition 8 above unless the time limit has been extended in writing by the Local Planning Authority.
12. Prior to the commencement of development a shadow flicker assessment shall be submitted for the written approval of the Planning Authority. The aforementioned assessment shall consider any sensitive receptors a minimum of 1km from any proposed turbine. Where under worst case conditions any property is predicted to be affected by shadow flicker for more than 30 minutes per day or more than 30 days per year then a scheme of mitigation shall be submitted for the written approval of the Planning Authority. Once approved the operation of the wind farm shall take place in accordance with the said scheme unless the Planning Authority gives written consent to any variation. For the avoidance of doubt sensitive receptors includes all residential properties, hospitals, schools and office buildings.
13. That in the event of a pollution incident or interruption to supply, caused by the wind farm development, affecting or likely to affect any private water supply, the wind farm operator shall provide an immediate temporary supply to those affected until permanent mitigation can be effected to the satisfaction of the Planning Authority. Any replacement supply shall be of a quality to meet the private water supplies (Scotland) Regulations 1992 or any other appropriate Regulation in force at the time. In any case a

permanent replacement supply or mitigation measures shall be provided no later than one month after the supply is first affected.

14. Noise associated with construction operations including the movement of materials, plant and equipment shall not exceed the noise limits shown in table C below for the times shown. At all other times noise associated with construction operations shall be inaudible at any sensitive receptor. For the avoidance of doubt sensitive receptors includes all residential properties, hospitals, schools and office buildings.

Table A: Operational wind turbine noise at all times

Location	LA90 (10 min) Noise limit at a standardised wind speed of up to 10m/s at 10m height
Balhall Lodge	28 dBA

Table C: Construction Noise limits

Day	Time	Average Period (t)	Noise limit
Monday-Friday	0700-0800	1 hour	55 dBA Leq
Monday-Friday	0800-1800	10 hour	65 dBA Leq
Monday-Friday	1800-1900	1 hour	55 dBA Leq
Saturday	0700-0800	1 hour	55 dBA Leq
Saturday	0800-1800	10 hour	65 dBA Leq
Saturday	1800-1900	1 hour	55 dBA Leq
Sunday	0800-1800	10 hour	55 dBA Leq

## Guidance Notes for Noise Conditions

These notes are to be read with and form part of the noise condition. They further explain the condition and specify the methods to be employed in the assessment of complaints about noise immissions from the wind farm. The rating level at each integer wind speed is the arithmetic sum of the wind farm noise level as determined from the best-fit curve described in Guidance Note 2 of these Guidance Notes and any tonal penalty applied in accordance with Guidance Note 3. Reference to ETSU-R-97 refers to the publication entitled "The Assessment and Rating of Noise from Wind Farms" (1997) published by the Energy Technology Support Unit (ETSU) for the Department of Trade and Industry (DTI).

### Guidance Note 1

(a) Values of the LA90,10 minute noise statistic should be measured at the complainant's property, using a sound level meter of EN 60651/BS EN 60804 Type 1, or BS EN 61672 Class 1 quality (or the equivalent UK adopted standard in force at the time of the measurements) set to measure using the fast time weighted response as specified in BS EN 60651/BS EN 60804 or BS EN 61672-1 (or the equivalent UK adopted standard in force at the time of the measurements). This should be calibrated in accordance with the procedure specified in BS 4142: 1997 (or the equivalent UK adopted standard in force at the time of the measurements). Measurements shall be undertaken in such a manner to enable a tonal penalty to be applied in accordance with Guidance Note 3.

(b) The microphone should be mounted at 1.2 – 1.5 metres above ground level, fitted with a two-layer windshield or suitable equivalent approved in writing by the Local Planning Authority, and placed outside the complainant's dwelling. Measurements should be made in "free field" conditions. To achieve this, the microphone should be placed at least 3.5 metres away from the building facade or any reflecting surface except the ground at the approved measurement location. In the event that the consent of the complainant for access to his or her property to undertake compliance measurements is withheld, the wind farm operator shall submit for the written approval of the Local Planning Authority details of the proposed alternative representative measurement location prior to the commencement of measurements and the measurements shall be undertaken at the approved alternative representative measurement location.

(c) The LA90,10 minute measurements should be synchronised with measurements of the 10-minute arithmetic mean wind and operational data logged in accordance with Guidance Note 1(d), including the power generation data from the turbine control systems of the wind farm.

(d) To enable compliance with the conditions to be evaluated, the wind farm operator shall continuously log arithmetic mean wind speed in metres per second and wind direction in degrees from north at hub height for each turbine and arithmetic mean power generated by each turbine, all in successive 10-minute periods. Unless an alternative procedure is previously agreed in writing with the Planning Authority, this hub height wind speed, averaged across all operating wind turbines, shall be used as the basis for the analysis. All 10 minute arithmetic average mean wind speed data measured at hub height shall be 'standardised' to a reference height of 10 metres as described in ETSU-R-97 at page 120 using a reference roughness length of 0.05 metres. It is this standardised 10 metre height wind speed data, which is correlated with the noise measurements determined as valid in accordance with Guidance Note 2, such correlation to be undertaken in the manner described in Guidance Note 2. All 10-minute periods shall commence on the hour and in 10- minute increments thereafter.

(e) Data provided to the Local Planning Authority in accordance with the noise condition shall be provided in comma separated values in electronic format.

(f) A data logging rain gauge shall be installed in the course of the assessment of the levels of noise immissions. The gauge shall record over successive 10-minute periods synchronised with the periods of data recorded in accordance with Note 1(d).

#### Guidance Note 2

(a) The noise measurements shall be made so as to provide not less than 20 valid data points as defined in Guidance Note 2 (b)

(b) Valid data points are those measured in the conditions specified in the agreed written assessment protocol, but excluding any periods of rainfall measured in the vicinity of the sound level meter. Rainfall shall be assessed by use of a rain gauge that shall log the occurrence of rainfall in each 10 minute period concurrent with the measurement periods set out in Guidance Note 1.

In specifying such conditions the Local Planning Authority shall have regard to those conditions which prevailed during times when the complainant alleges there was disturbance due to noise or which are considered likely to result in a breach of the limits.

(c) For those data points considered valid in accordance with Guidance Note 2(b), values of the LA90,10 minute noise measurements and corresponding values of the 10- minute wind speed, as derived from the standardised ten metre height wind speed averaged across all operating wind turbines using the procedure specified in Guidance Note 1(d), shall be plotted on an XY chart with noise level on the Y-axis and the standardised mean wind speed on the X-axis. A least squares, "best fit" curve of an order deemed appropriate by the independent consultant (but which may not be higher than a fourth order) should be fitted to the data points and define the wind farm noise level at each integer speed.

### Guidance Note 3

(a) Where, in accordance with the approved assessment protocol, noise immissions at the location or locations where compliance measurements are being undertaken contain or are likely to contain a tonal component, a tonal penalty is to be calculated and applied using the following rating procedure.

(b) For each 10 minute interval for which LA90,10 minute data have been determined as valid in accordance with Guidance Note 2 a tonal assessment shall be performed on noise immissions during 2 minutes of each 10 minute period. The 2 minute periods should be spaced at 10 minute intervals provided that uninterrupted uncorrupted data are available ("the standard procedure"). Where uncorrupted data are not available, the first available uninterrupted clean 2 minute period out of the affected overall 10 minute period shall be selected. Any such deviations from the standard procedure, as described in Section 2.1 on pages 104-109 of ETSU-R-97, shall be reported.

(c) For each of the 2 minute samples the tone level above or below audibility shall be calculated by comparison with the audibility criterion given in Section 2.1 on pages 104-109 of ETSU-R-97.

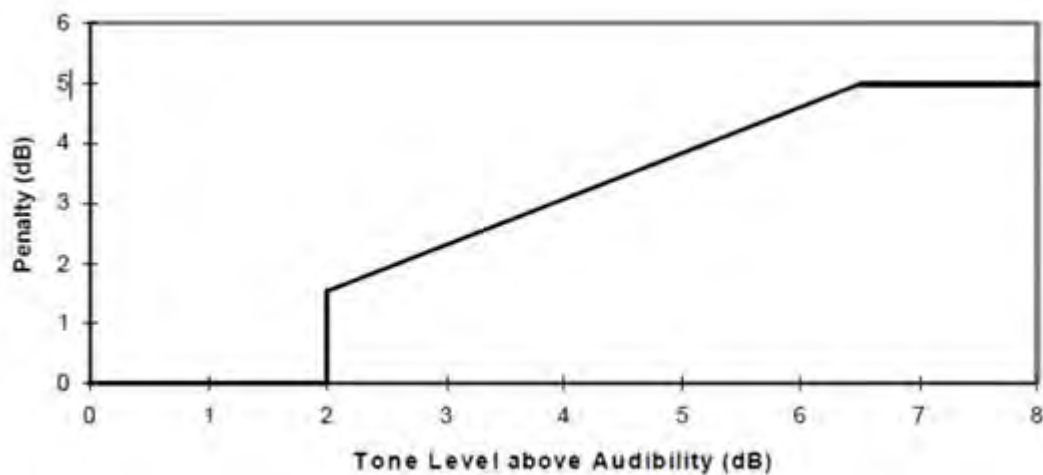
(d) The tone level above audibility shall be plotted against wind speed for each of the 2 minute samples. Samples for which the tones were below the



audibility criterion or no tone was identified, a value of zero audibility shall be used.

(e) A least squares "best fit" linear regression line shall then be performed to establish the average tone level above audibility for each integer wind speed derived from the value of the "best fit" line at each integer wind speed. If there is no apparent trend with wind speed then a simple arithmetic mean shall be used. This process shall be repeated for each integer wind speed for which there is an assessment of overall levels in Guidance Note 2.

(f) The tonal penalty is derived from the margin above audibility of the tone according to the figure below.



#### Guidance Note 4

(a) If a tonal penalty is to be applied in accordance with Guidance Note 3 the rating level of the turbine noise at each wind speed is the arithmetic sum of the measured noise level as determined from the best fit curve described in Guidance Note 2 and the penalty for tonal noise as derived in accordance with Guidance Note 3 at each integer wind speed within the range specified by the agreed written assessment protocol.

(b) If no tonal penalty is to be applied then the rating level of the turbine noise at each wind speed is equal to the measured noise level as determined from the best fit curve described in Guidance Note 2.

(c) In the event that the rating level is above the limit(s) set out in the Tables attached to the noise conditions or the noise limits for a complainant's dwelling, the independent consultant shall undertake a further assessment of the rating level to correct for background noise so that the rating level relates to wind turbine noise immission only.

(d) The wind farm operator shall ensure that all the wind turbines in the development are turned off for such period as the independent consultant requires to undertake the further assessment. The further assessment shall be undertaken in accordance with the following steps:

(e). Repeating the steps in Guidance Note 2, with the wind farm switched off, and determining the background noise (L3) at each integer wind speed within the range requested by the Local Planning Authority in its written request and the approved protocol.

(f) The wind farm noise (L1) at this speed shall then be calculated as follows where L2 is the measured level with turbines running but without the addition of any tonal penalty:

$$L_1 = 10 \log \left[ 10^{L_2/10} - 10^{L_3/10} \right]$$

(g) The rating level shall be re-calculated by adding arithmetically the tonal penalty (if any is applied in accordance with Note 3) to the derived wind farm noise L1 at that integer wind speed.

(h) If the rating level after adjustment for background noise contribution and adjustment for tonal penalty (if required in accordance with note 3 above) at any integer wind speed lies at or below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Planning Authority for a complainant's dwelling then no further action is necessary. If

the rating level at any integer wind speed exceeds the values set out in the Tables attached to the conditions or the noise limits approved by the Local Planning Authority for a complainant's dwelling then the development fails to comply with the conditions.

If you have any queries please let me know

Regards

Louise **Akroyd** | **Environmental** Health Officer | Angus Council | **Communities**  
| **Regulatory** Protective & Prevention **Services** | **County** Buildings, Market Street,  
Forfar, DD8 3WE, Tel: (01307) 473382

## WhyteKA

---

**From:** Lennon, Jenny [Jenny.Lennon@rspb.org.uk]  
**Sent:** 19 September 2014 12:52  
**To:** PLNProcessing  
**Subject:** Balhall Lodge, Menmuir, Brechin 14/00781/FULL  
Thankyou for consulting RSPB Scotland on this application.

We have no comments to make at this stage.

Regards

**Jenny Lennon**

**Conservation Officer**  
RSPB Scotland

RSPB Scotland is part of the RSPB which speaks out for birds and wildlife, tackling the problems that threaten our environment. Nature is amazing - help us keep it that way.

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## WhyteKA

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**From:** Windfarms [windfarms@atkinsglobal.com]  
**Sent:** 19 September 2014 10:21  
**To:** PLNProcessing  
**Cc:** windfarms-radiotelemetry@scottishwater.co.uk  
**Subject:** WF 28724 - 14/00781/FULL - Field 600M North West Of Balhall Lodge Menmuir Brechin - NO 50861 64306

Dear Sirs,

I am responding to an email of 17-Sep-2014, regarding the above named proposed development.

The above application has now been examined in relation to UHF Radio Scanning Telemetry communications used by our Client in that region and we are happy to inform you that we have **NO OBJECTION** to your proposal.

Please note that this is not in relation to any Microwave Links operated by Scottish Water

*Atkins Limited is responsible for providing Wind Farm/Turbine support services to TAUWI.*

*Atkins Limited is responsible for providing Wind Farm/Turbine support services to the Telecommunications Association of the UK Water Industry. Web: [www.tauwi.co.uk](http://www.tauwi.co.uk)*

### **Windfarm Support**

#### **ATKINS**

The official engineering design services provider  
for the London 2012 Olympic and Paralympic Games

Web: [www.atkinsglobal.com/communications](http://www.atkinsglobal.com/communications)

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Consider the environment. Please don't print this e-mail unless you really need to.

**LeslieA**

---

**From:** Windfarms Team [windfarms@jrc.co.uk]  
**Sent:** 03 October 2014 17:41  
**To:** PLNProcessing  
**Subject:** Planning Ref: 14/00781/FULL -- Balhall Lodge Menmuir Brechin

Dear Sir/Madam,

Planning Ref: 14/00781/FULL

Name/Location: Balhall Lodge Menmuir Brechin

Turbine at NGR/IGR: 350861 764306

Hub Height: 37m Rotor Radius: 12m

(defaults used if not specified on application)

Cleared with respect to radio link infrastructure operated by:-

Local Electricity Utility and Scotia Gas Networks

JRC analyses proposals for wind farms etc. on behalf of the UK Fuel & Power Industry and the Water Industry in north-west England. This is to assess their potential to interfere with radio systems operated by utility companies in support of their regulatory operational requirements.

In the case of this proposed wind energy development, JRC does not foresee any potential problems based on known interference scenarios and the data you have provided. However, if any details of the wind farm change, particularly the disposition or scale of any turbine(s), it will be necessary to re-evaluate the proposal.

In making this judgement, JRC has used its best endeavours with the available data, although we recognise that there may be effects which are as yet unknown or inadequately predicted. JRC cannot therefore be held liable if subsequently problems arise that we have not predicted.

It should be noted that this clearance pertains only to the date of its issue. As the use of the spectrum is dynamic, the use of the band is changing on an ongoing basis and consequently, developers are advised to seek re-coordination prior to considering any design changes.

Regards

Keith Brogden

Wind Farm Team

The Joint Radio Company Limited  
Dean Bradley House,  
52 Horseferry Road,  
LONDON SW1P 2AF  
United Kingdom

DDI: +44 20 7706 5197

TEL: +44 20 7706 5199

Skype: keithb\_jrc

<windfarms@jrc.co.uk>

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JRC Ltd. is a Joint Venture between the Energy Networks Association (on behalf of the UK Energy Industries) and National Grid.

Registered in England & Wales: 2990041

<<http://www.jrc.co.uk/about>>

**LeslielA**

---

**From:** Claire Herbert [Claire.Herbert@aberdeenshire.gov.uk]  
**Sent:** 24 September 2014 13:44  
**To:** PLNProcessing  
**Cc:** WrightJ  
**Subject:** Planning consultation 14/00781/FULL - archaeology response

**Plan App No:** 14/00781/FULL

**Planning Officer:** James Wright

**Proposal:** Erection Of Wind Turbine Of 37M To Hub Height And 49M To Blade Tip And Ancillary Development - Re-Application

**Address:** Field 600M North West Of Balhall Lodge Menmuir Brechin

**Post Code:**

**Grid Reference:** NO 5086 6430

Thank you for consulting us on the above application.

The proposed turbine occupies a prominent position in the landscape, in close proximity to a number of archaeology sites dating to the prehistoric period (including NO56SW0018: an area of prehistoric cairns & a barrow; NO56SW0017: the remains of a prehistoric field system & cairns, also a Scheduled Monument; and NO56SW0001: a cup marked stone, also a Scheduled Monument). Looking at the wider landscape, the Caterthun hillforts lie a relatively short distance to the North East of the proposed turbine site, and note concerns, as detailed by Historic Scotland, over the potential visual impact of the proposed turbine on both the archaeological sites to the West and the Caterthuns to the East.

In the first instance I would ask that an improved visual impact assessment/photo montage is undertaken for the Caterthuns, in order to allow a better assessment of the potential impact of the proposal on them. I would also ask that consideration is given to reducing the height of the proposed turbine, which would serve to reduce its potential visual impact.

The supporting documentation for the application does not address the potential impact of the proposed turbine on the undesignated archaeology within, and in proximity to, the development area. While there are no previously recorded archaeological features within the proposed development site itself, a number of prehistoric archaeological features have been recorded within 500m of the site.

Taking this into consideration, I would ask that an archaeological walkover survey is undertaken at an early stage (as outlined in the requirement below) to assess whether there are any previously unrecorded archaeological features within the proposed development area. I would suggest that this survey is undertaken pre-determination - the results of the survey may raise the need to micro-site the turbine in order to minimise any potential impact on archaeological features.

**“Walk-over Survey Condition (PAN 2/2011, SPP, SHEP)**

Prior to any works commencing, the developer shall secure the implementation of an archaeological survey of the extant structures, to be carried out by an archaeological organization acceptable to the planning authority. The scope of the archaeological survey will be set by the Aberdeenshire Council Archaeology Service on behalf of the planning authority. The name of the archaeological organization retained by the developer shall be given to the planning authority and to the Aberdeenshire Archaeology Service in writing not less than 14 days before the survey commences. Copies of the resulting survey shall be deposited in the National Monuments Record for Scotland and in the local Sites and Monuments Record upon completion.

**Reason: to record features of the historic environment of the area.”**



Should the application be minded for approval, I would also ask that an archaeological watching brief (as outlined below) be carried out over all groundbreaking works, including foundations, access tracks and cabling trenches, due to the potential for buried archaeological remains to survive in this area.

**“Watching-brief Condition (PAN 2/2011, SPP, SHEP)**

The developer shall secure the implementation of an archaeological watching brief, to be carried out by an archaeological organisation acceptable to the Aberdeenshire Council Archaeology Service on behalf of the planning authority, during any groundbreaking and development work. The retained archaeological organisation shall be afforded access at all reasonable times and allowed to record and recover items of interest and finds. Terms of Reference for the watching brief will be supplied by the Aberdeenshire Council Archaeology Service.

The name of the archaeological organization retained by the developer shall be given to the planning authority and to the Aberdeenshire Council Archaeology Service in writing not less than 14 days before development commences.

**Reason: to record items of archaeological interest.”**

Please note, Historic Scotland should also be consulted for their views on this application given the potential impact on Scheduled Monuments in the area.

Should you have any comments or queries regarding the above then please do not hesitate to contact me.

Kind regards,  
Claire

Claire Herbert MA(Hons) MA AIFA

Archaeologist  
Archaeology Service  
Infrastructure Services  
Aberdeenshire Council  
Woodhill House  
Westburn Road  
Aberdeen  
AB16 5GB

01224 665185  
07825356913

[claire.herbert@aberdeenshire.gov.uk](mailto:claire.herbert@aberdeenshire.gov.uk)

Archaeology Service for Aberdeenshire, Moray & Angus Councils

<http://www.aberdeenshire.gov.uk/archaeology>

<http://www.aberdeenshire.gov.uk>

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

Longmore House  
Salisbury Place  
Edinburgh  
EH9 1SH

Direct Line: 0131 668 8770  
Switchboard: 0131 668 8600  
[Sandra.Archer@scotland.gsi.gov.uk](mailto:Sandra.Archer@scotland.gsi.gov.uk)

Our ref: AMH/4459/10  
Our Case ID: 201403784  
Your ref: 14/00781/FULL

30 September 2014

Dear Sirs

**Town And Country Planning (Development Management Procedure) (Scotland) Regulations 2013  
Erection Of Wind Turbine Of 37M To Hub Height And 49M To Blade Tip And Ancillary Development - Re-Application - Field 600m North West Of Balhall Lodge, Menmuir, Brechin**

Thank you for your consultation dated 17 September which we received on the same date.

We have considered your consultation and comment as follows:

Historic Scotland does not object to this proposed development.

**The development proposal**

The proposals are for the erection of a wind turbine with a maximum height of 49m to blade tip, and associated infrastructure.

Historic Scotland has been consulted by the applicant's agent during the development of this scheme. We note the applicants have considered the impact of the development on cultural heritage in section 5.4 of the Supporting Turbine Statement. We are, however, concerned that this assessment does not consider adequately the impact of the development on the settings of nearby heritage assets. We note that the application does include supporting information to help assess that setting impact, specifically photomontage views of the development from the summits of The White Caterthun and from Aberlemno.

**Historic Environment Policy Background**

Government policy affirms the *in situ* preservation of the site and setting of scheduled monuments. Angus Council has planning policies which reflect these national policies. In addition, we note that Angus Council has also commissioned the following



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planning study to assist in cases such as this: *Strategic Landscape Capacity Assessment for Wind Energy in Angus (March 2014)*

We would expect development proposals to reflect these policies and mitigate the potential impact of the development through the design process.

### **Historic Environment Assets affected**

We have carried out our own assessment of the potential impact of this development on cultural heritage interests in the area and identified two nationally designated assets likely to be affected -

***Balhall, fields and cupmarked stone 800m W of Balhall Lodge*** comprises a series of field systems defined by banks and small cairns. At least three phases of land use can be identified with at least two of these likely to be prehistoric in date. Within the field system, there is a cupmarked stone; an earthfast boulder with a flat top incised with over 30 small bowl shaped “cups”. Cup marked rocks date from a long period of prehistory spanning almost two millennia from soon after the arrival of farming in the Neolithic (around 3500BC) to the middle of the Bronze Age (around 1500BC). Their exact function is uncertain, and is likely to have varied over time, but they are often found on boulders or bedrock outcrops on hillsides with extensive views, in locations that appear likely to have marked the transition between domesticated cultivated land and wilder uplands.

***The Caterthuns hillforts*** is comprised of a complex pair of monuments located on adjacent hill summits rising to between 260m and 300m OD from where they command extensive views across the fertile farmland of Strathmore. The Brown Caterthun is a multi-period fort, remodelled throughout the 1<sup>st</sup> 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 a summit area measuring some 140m by 60m. The forts are amongst the most impressive and best preserved in Scotland and represent an important archaeological resource.

The remains at Balhall and The Caterthuns are designated as scheduled monuments under the Ancient Monuments and Archaeological Areas Act 1979. The Caterthuns are also maintained as a Property in the Care of the Scottish Ministers, with open public access.

### **Impact of the development on the setting of *Balhall, fields and cupmarked stone 800m W of Balhall Lodge***

The setting of *Balhall, fields and cupmarked stone 800m W of Balhall Lodge* is characterised by its location on a shoulder of Tullo Hill, just off the summit of the foothill ridge which marks the transition between the low-lying fertile land towards the coast and the hills which rise to form the Grampians to the NW. For the field system element of the monument, this location offers an advantageous south easterly aspect on an area of comparatively gently sloping land, while for the cupmarked stone, it affords extensive visibility over the lower lying land towards the coast.





The current environment of the monument is grazing land interspersed with woodland. To the northwest, the grazing becomes rougher while to the southeast, the grazing gives way to crop cultivation on the lower hill slopes and wider plain. As at The Caterthuns, the landscape is identifiably man-made but rural featuring a small and limited presence of larger structural elements such as agricultural structures and small to medium height wind turbines.

We have considered the impact of the proposed development on the setting of this scheduled monument and reached the following conclusions: –

- The turbine would be visible in views to and from the monument.
- The monument is not a dominant feature in the landscape, and therefore would not be significantly compromised by the potential dominance of the turbine over its immediate area.
- The turbine would not interrupt any perceived relationships between this site and other contemporary monuments in the vicinity.

### **Impact of the development on the setting of *The Caterthuns hillforts***

To understand and appreciate *The Caterthuns hillforts* as a monument it is necessary to understand its relation to topography and landscape. Historic Scotland has long recognised the desirability of preventing development close to such sites or which might adversely affect their wider setting since the purpose of these sites can only be properly understood by appreciating their location within their wider landscape setting. This wider landscape setting should contribute to the interpretation and appreciation of a field monument, and also to the understanding of the mind-set which led the builders of such sites to decide on these particular locations. Development proposals should recognise the significance, character and value of these monuments; and should seek to conserve the archaeological interest of the site based on a thorough understanding of the historic environment and due consideration to the principles of national planning policy.

The setting of *The Caterthuns* is characterised by the paired dominant hilltop location of the forts, their close proximity and their liminal position between the bulk of the Grampians rising to the north and west and the low-lying fertile farmland of Strathmore reaching down towards the sea to the south and east. *The Caterthuns* occupy a specifically selected location within their landscape; not the highest and most dominant, but one which emphasises the change in terrain from hill land to lowland, allows extensive views both to and from the site and allows for the construction of a paired set of monuments. The characteristic double-summit form of *The Caterthuns* can be seen over a considerable distance and the forts were clearly located and constructed to be a prominent and easily identifiable feature.

The current environment of the monument is one of managed moorland, within a wider landscape of mixed moorland, grazing land and conifer plantations to the north and west, and mixed grazing, arable and woodland to the south and east. The landscape is identifiably man-made but rural with a small and limited presence of larger structural





elements in the form of electricity pylons, agricultural silos and small to medium height wind turbines.

We have considered the impact of the proposed development on the setting of this scheduled monument and reached the following conclusions: –

- The turbine would appear in long range views from the monument.
- The development would be visible in views towards *The Caterthuns* from the surrounding area but would not disrupt the relationship between the forts or challenge them for dominance from any obvious key viewpoints.
- The wind turbine development would not disrupt any perceived or possible relationships between *The Caterthuns* and other monuments.

### Historic Scotland's comments

We do not object to this development proposal.

The turbine would have an impact on the setting of the scheduled monuments known as *The Caterthuns*, *hillforts* and *Balhall*, *fields* and *cupmarked stone 800m W of Balhall Lodge*. However, due to its proposed location, the turbine would not challenge these monuments for dominance within their settings, would not interrupt any obvious key views of the monuments from the surrounding area, and would not disrupt any perceived relationships between monuments and other sites or landscape features in the vicinity. The turbine would be visually obvious from both monuments but would not fundamentally disrupt the relationship between the monuments and their settings.

As a result, while we acknowledge an impact on the setting of the monuments, we consider that impact to be limited and localised. Consequently, we do not consider the proposed development would adversely affect the way in which these monuments are understood, appreciated and experienced to such an extent that issues of national significance would be affected. However, given the proximity of the turbine to a number of nationally important historic sites, we would wish to be reconsulted on any amendments to the proposed scheme, such as an increase in size or number of turbines, or a change in location.

Notwithstanding our comments above, we confirm that your Council should proceed to determine the application without further reference to us.

If you require any further information, please contact me.

Yours faithfully

**DEIRDRE CAMERON**

Senior Heritage Management Officer, East



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# Memorandum

Communities, Roads, County Buildings, Forfar Telephone 01307 461460

**TO:** HEAD OF PLANNING & TRANSPORT

**FROM:** HEAD OF ROADS

**YOUR REF:**

**OUR REF:** GH/AGG/JB TD1.3

**DATE:** 5 NOVEMBER 2014

**SUBJECT:** **PLANNING APPLICATION REF. NO. 14/00781/FULL – PROPOSED ERECTION OF A WIND TURBINE AT MAINS OF BALHALL, MENMUIR, BRECHIN FOR HARMONY ENERGY LTD**

---

I refer to the above planning application which was subject to a previous application 13/00632/FULL

The site is located on land to the north-west of Mains of Balhall, Menmuir approximately 1km north-west of the classified, Cortachy – Menmuir – Brechin Road.

The proposal involves the erection of a single Northwind 100 wind turbine, 49m to blade tip. Access to the site is via the existing access leading to Balhall Lodge. An additional 100 metres length of new track will be created from the end of the existing track to the site.

No details are provided with respect to the environmental impacts of traffic associated with the proposed development, although it is stated that the construction phase is predicted to last for approximately 1 month.

I have considered the application in terms of the traffic likely to be generated by it, and its impact on the public road network. As a result, I do not object to the application but would recommend that any consent granted shall be subject to the following conditions:

- 1 That, prior to the commencement of development, a Construction Traffic Management and Routing Plan shall be submitted for the written approval of the Planning Authority. The details of the plan should consider arrangements for the following:



- (i) agreement with the Roads Authority on the routing for abnormal loads;
- (ii) the type and volume of vehicles to be utilised in the delivery of construction materials;
- (iii) assessment of the suitability of the proposed routes, including bridge capacities, to accommodate the type and volume of traffic to be generated by the development. The assessment shall include details of swept path analyses and include DVD video route surveys;
- (iv) mitigating measures on public roads, including, carriageway widening, junction alterations, associated drainage works, protection to public utilities, temporary or permanent traffic management signing, and temporary relocation or removal of other items of street furniture;
- (v) the restriction of delivery traffic to agreed routes;
- (vi) the timing of construction traffic to minimise impacts on local communities, particularly at school start and finish times, during refuse collection, at weekends and during community events;
- (vii) a code of conduct for HGV drivers to allow for queuing traffic to pass;
- (viii) liaison with the roads authority regarding winter maintenance;
- (ix) contingency procedures, including names and telephone numbers of persons responsible, for dealing with vehicle breakdowns;
- (x) a dust and dirt management strategy, including sheeting and wheel cleaning prior to departure from the site;
- (xi) the location, design, erection and maintenance of warning/information signs for the duration of the works, at site accesses and crossovers on private haul roads or tracks used by construction traffic and pedestrians, cyclists or equestrians;
- (xii) contingencies for unobstructed access for emergency services;
- (xiii) co-ordination with other major commercial users of the public roads on the agreed routes in the vicinity of the site;
- (xiv) traffic management, in the vicinity of temporary construction compounds;
- (xv) the provision of data from traffic counters, installed at locations and at intervals to be agreed with the Roads Authority, at the applicant's expense;
- (xvi) arrangements for the monitoring, reviewing and reporting on the implementation of the approved plan; and





(xvii) procedures for dealing with non-compliance with the approved plan.

The Construction Traffic Management and Routing Plan shall be implemented in accordance with the approved details.

*Reason: to ensure the free flow of traffic, in the interests of road safety and for the convenience of road users.*

- 2 That, prior to the commencement of development, details for the formation of the new length of access track between the existing access track and the site shall be submitted for the written approval of the Planning Authority. The details shall, as a minimum, include the following:
- (i) a drawing showing the width of the track and/or provision of inter-visible passing places. The passing places shall extend to the junction of the existing track with public road;
  - (ii) a construction specification in accordance with the council's planning advice note; PAN 17 – Miscellaneous Planning Policies;
  - (iii) the provision of surface water drainage; and
- (iv) an agreement with the land owner or other persons with rights of access over the track.

I trust the above comments are of assistance but should you have any further queries, please contact Adrian Gwynne on extension 3393.

*p.p.*



## Comments for Planning Application 14/00781/FULL

### Application Summary

Application Number: 14/00781/FULL

Address: Field 600M North West Of Balhall Lodge Menmuir Brechin

Proposal: Erection Of Wind Turbine Of 37M To Hub Height And 49M To Blade Tip And Ancillary Development - Re-Application

Case Officer: James Wright

### Customer Details

Name: Inveresk Community Council Planning Officer Patrick Ford

Address: West Cottage, Tigerton Menmuir Brechin

### Comment Details

Commenter Type: Community Council

Stance: Customer objects to the Planning Application

Comment Reasons:

Comment: INVERESK COMMUNITY COUNCIL

Planning Application 14/00781/FULL

Erection of Wind Turbine, Field 600m North West of Balhall Lodge, Menmuir, Brechin

The Inveresk Community Council (ICC) objects to the application for the following reasons:

1. The development would have a significantly adverse visual impact on its setting within a sensitive Landscape Character Type.
2. The cumulative visual impact of the development would be unacceptable when taken in conjunction with other turbines in the area, either existing or consented.
3. The development would adversely affect public appreciation and enjoyment of the Catherthuns and other local cultural heritage sites.
4. The adverse impact of the development would be disproportionate in relation to the anticipated climate change benefits.

#### 1. Visual impact

Our starting point is that the ICC supports in principle the guidelines in the Strategic Landscape Capacity Assessment for Wind Energy in Angus, Final Report (November 2013) (SLCA Angus) as approved by Angus Council. The site of the proposed turbine lies in LCA Tay 5: Highland Foothills, (iii) Menmuir Foothills and close to LCA Tay 3: Highland Summits and Plateaux. SLCA Angus (p 30) highlights the visual sensitivity of LCA Tay 3, as forming the foreground for views south from the National Park, the setting for the Angus Glens and an ever present backdrop to the north for much of the rest of Angus, emphasising the separation of lowland and highland landscapes north

and south of the Highland Boundary Fault. Visually, LCA Tay 5 (iii) forms part of the ever present backdrop referred to.

In relation to the Tay 5 LCAs generally, SLCA Angus (p 35) contains the following guidance: There is capacity for occasional small/medium and medium turbines within the LCAs. Locate turbines in the enclosed farmland or on lower slopes of the hills, avoiding skylines and reducing intervisibility between turbine groups. The height of turbines should relate to the scale of the landscape, with particular regard to the vertical scale of the hills. In relation to LCA Tay 5 (iii) in particular, SLCA Angus (p 35) recommends as follows: The Menmuir Foothills are only suitable for turbines below 50m due to their limited scale. Do not site turbines on or close to the main ridgeline overlooking Strathmore, where they may break the horizon.

We understand the effect of the 50m maximum to be, not that turbines of just under 50m would be permissible anywhere within LCA Tay 5 (iii), but that, while turbines of up to 50m may be permissible in some places, in many other places only turbines of much lower height, if any, would be appropriate, once other limiting factors have been taken into account. In the present case, while the turbine proposed is just under 50m (at 49m), its proposed location, high up within LCA Tay 5 (iii), makes it significantly too tall for its site. The proposed site is a full 10m higher than the site of the existing turbine at Balhall Lodge, which is in turn inappropriately tall for its site (at 47.1m). Using the existing turbine as a benchmark, we make the following more detailed comments on item 5.3 of the applicants Section 3 Planning Statement, taken in conjunction with the Section 4 ZTV Report. From these it is clear that the proposed development does not fall within the guidelines laid out in SLCA Angus.

### 5.3 Landscape and Visual Impact

The photomontages in the ZTV Report do not in our view provide an adequate impression of the visual impact of the existing and proposed turbines at Balhall. Unless it has already been done, we suggest that the impact be checked by a site visit to the selected (and other) viewpoints by a representative of Angus Council.

Viewpoint 1 Aberlemno Hill. The existing turbine is clearly visible in fine weather, and while well below the skyline, impacts none the less on the sense of wildness and remoteness of the Highland Summits and Plateaux beyond. A second and more prominent turbine would exacerbate the effect.

Viewpoint 2 White Caterthun. The statement that neither [turbine] can be seen on the photograph due to plantation is manifestly inaccurate. Both can be seen clearly in the photograph, with only the very base of each screened by trees. It is also quite clear from this photomontage that the proposed turbine would be significantly more prominent than the existing turbine because of its greater height and higher site elevation. What we take to be the consented turbines at Afflochie are also clearly visible in the photomontage (when magnified to 100%).

Viewpoint 3 Tigerton / Menmuir. Again, we question the accuracy of the applicants commentary here. The reason the existing turbine is minimally visible on the photograph is because it appears against a near-white background. In reality, the bulk of the turbine is very clearly visible above the skyline from this and many other points around Tigerton and Kirkton of Menmuir. It is evident from the photomontage (once the near-white background is discounted) that this would be equally true of the proposed turbine.

Viewpoint 6 Coe and Cowford. A site visit to this viewpoint has caused us to question the description very unobtrusive. The existing turbine breaks the sensitive ridge skyline to the north, and it is obvious from the photomontage that the proposed turbine would do the same. The obtrusiveness of the turbines is clearer still from viewpoints to the west of Coe towards Milton of Balhall.

The Planning Statement is silent on the visibility of the existing turbine, and therefore of the proposed turbine, from many other viewpoints including various points along the A90. The general obtrusiveness of the existing turbine is underlined by the fact that in clear weather it can be seen against the backdrop of the Menmuir Hills from the Visitor Centre at Montrose Basin.

As noted, therefore, the proposed development would be inconsistent with the guidance in SLCA Angus quoted above. It would impact unacceptably on the visually sensitive landscape made up of the Menmuir Foothills in combination with the Angus Highland Summits and Plateaux. The fact that the existing turbine at Balhall is itself in breach of the guidelines is not in our view a good reason for permitting further significant breaches.

## 2. Cumulative visual impact

The Section 3 Planning Statement does not address the issue of cumulative impact, despite the appearance of a number of existing and consented turbines in the photomontages. Of particular concern are those already erected or consented along the southern face of the Highland Foothills or in visually adjacent locations in Strathmore. We suggest that in considering the application account should be taken of (at least) the following (all above 45m) in addition to the existing turbine at Balhall: 2 at Memus; 1 at Baldoukie; 2 at Afflochie; 2 at Glentrusta; 1 at Dunswood; 2 at Balrownie; 1 at Huntlyhill; 1 at Hill of Stracathro.

## 3. Impact on Catherthuns and other cultural heritage sites

We acknowledge that Historic Scotland, while noting that that the development would have an impact on the Catherthuns in particular, though limited and localised, have chosen not to object to it. Our own view is that Historic Scotland may have underestimated the cumulative impact of recent actual and consented developments in the surrounding area. The view from the Caterthuns, as a view once enjoyed by their Pictish creators, is increasingly under threat as an accumulation of turbines (see above) makes it ever more difficult to picture how the landscape would have looked

to our predecessors. A second and more prominent turbine at Balhall would intensify the difficulty.

#### 4. Adverse impacts disproportionate to benefits

The Section 3 Planning Statement refers to the climate change benefits of the proposed development. In our view the benefits would be heavily outweighed by the adverse visual and cumulative impact noted above, and by its adverse impact on visitor enjoyment of the Caterthuns and other local heritage sites.

We hope these comments are helpful.

Patrick Ford

Planning Officer, Inveresk Community Council

16 October 2014

## Comments for Planning Application 14/00781/FULL

### Application Summary

Application Number: 14/00781/FULL

Address: Field 600M North West Of Balhall Lodge Menmuir Brechin

Proposal: Erection Of Wind Turbine Of 37M To Hub Height And 49M To Blade Tip And Ancillary Development - Re-Application

Case Officer: James Wright

### Customer Details

Name: Mr Ashton Radcliffe

Address: Blairno Glen Lethnot Brechin

### Comment Details

Commenter Type: Member of Public

Stance: Customer objects to the Planning Application

Comment Reasons:

Comment: I object to the proposed development for the following reasons:

1. the scale of the turbine is inappropriate to the landscape character and visual sensitivity of the site as identified by the Strategic Landscape Capacity Assessment for Wind Energy in Angus, Final Report (November 2013). These hills present visually as transitional between the Vale of Strathmore and the area of Highland Summits and Plateaux to the North, and while comparatively low-lying, are significant as providing a visual threshold to the Cairngorms National Park and associated wild land.

"The height of turbines should relate to the scale of the landscape, with particular regard to the vertical scale of the hills."

The visual sensitivity of the site lies in the fact that the Menmuir Foothills are for many tourists their first visual contact of any proximity with the wild spaces associated with the Grampians and Cairngorms. For Angus residents, they are a major contributor to the quality of life.

2. There would be adverse cumulative visual impact given existing and approved turbines in the area - the one already at Balhall, the 2 at Memus and the planned ones at Afflochie and Glen Trusta - this would form a cluster.

3. There would be adverse impact on the cultural heritage of the area, particularly the Pictish White and Brown Catherthun hill forts, the views towards the Angus Glens from Aberlemno Standing Stones and Finavon Hill Fort.

4. There would be adverse impact on residential amenity in the Menmuir area and the area towards Glen Ogil and Memus as well as to Glen Lethnot and towards Careston and Brechin. We, the residents of the Angus Glens and the Menmuir area do not want our area to resemble certain parts of Aberdeenshire and Perthshire which have become ruined with wind turbines.

**WhyteKA**

---

**From:** PLANNING  
**Sent:** 17 October 2014 09:13  
**To:** PLNProcessing  
**Subject:** FW: Your ref:14/00781FULL

Objection

Sandra Cameron, Clerical Officer, Communities, Planning & Place, Angus Council, County Buildings, Market Street, Forfar DD8 3LG; Tel: 01307 473342; E-mail: camerons@angus.gov.uk -----

Original Message-----

From: Walker [mailto:walker1959@btinternet.com]

Sent: 16 October 2014 20:08

To: PLANNING

Subject: Your ref:14/00781FULL

Bryan Walker  
The Old Smiddy  
Tigerton  
Menmuir  
Brechin  
Angus  
DD9 7RL

Communities Directorate  
Planning Service  
Angus Council  
County Buildings  
Forfar  
Angus  
DD8 3WB

Dear Sirs

Your ref: 14/00781/FULL

Erection of wind turbine and ancillary development, Field 600m North West of Balhall Lodge, Menmuir , Brechin.

I am writing to object to the above proposal on the following grounds :

Visual Impact

The Menmuir Foothills are a key transitional landscape lying between Strathmore and the hills to the North. The site is highly visible from the A90 transport route and the Forfar-Aberlemno-Brechin road.

It has been stated " that the height of a turbine should relate to the scale of the landscape and the vertical scale of the hills ".

The erection of a second turbine would compound the impact of the existing turbine at Balhall . This is plainly visible as far as Montrose and from Cultural Heritage sites at the Caterthuns,



# AC16

Finavon Hill Fort and the Aberlemno Stones. When Cultural Sites are visited, people do not want to see an industrialised landscape .

A second turbine on this site would compound the damage already done by the original turbine.

I sincerely hope due notice will be taken of these concerns.

Bryan Walker

Sent from my iPad

RECEIVED  
12 DEC 2014  
14KW

Broadlands,  
Loanhead,  
Forfar,  
Angus,  
DD8 1XF

11/12/14

Head of Planning and Transport,  
County Buildings,  
Market Street,  
Forfar,  
DD8 3LG

Ref: 14/00781/FULL Ballhall Lodge Re-Application.

Dear Sir,

Reading the Agent's letter regarding this re-application and the re-siting of the proposed turbines as shown on the accompanying 'Alternative Wind Turbine Locations' plan, I became aware of one or two anomalies.

Alternative location 'B' is shown as being very close to the tree line and the accompanying letter describes it as being 'directly in front of the tree belt'. Although no precise co-ordinates are offered, from the scale shown this would appear to be 10m or less from the trees and described as being at '227m based on OS contour lines'.

I have to assume that the agent is using a different OS map or that there has been a recent unrecorded but significant occurrence of local subsidence in this location. My OS 1:25,000 map (2007) shows the 240m contour passing through location 'B' and this is confirmed by Google Earth altitude readings. The 227m contour lies approximately 77m south-east of the tree line, which would put the turbine half-way down the field.

A further consideration is that, located on the 240m line, with a height to tip of 48m, the proposed turbine would be even taller, by approximately 8m, than the existing turbine and the tip would be at 298m, not 276m, just 2m lower than Tullo Hill.

I am a little puzzled by the reference to the height of Tullo Hill since no part of the hill is visible from the road just to the west of Balhall as can be seen from the attached photograph. The turbine completely dominates this part of the country.

All this for just 100kW nominal output, which at the average capacity factor would yield just 25kW, enough for eight kettles?



D.R.Powell

## Comments for Planning Application 14/00781/FULL

### Application Summary

Application Number: 14/00781/FULL

Address: Field 600M North West Of Balhall Lodge Menmuir Brechin

Proposal: Erection Of Wind Turbine Of 37M To Hub Height And 49M To Blade Tip And Ancillary Development - Re-Application

Case Officer: James Wright

### Customer Details

Name: Mr Patrick Ford

Address: West Cottage, Tigerton Menmuir Brechin

### Comment Details

Commenter Type: Member of Public

Stance: Customer objects to the Planning Application

Comment Reasons:

Comment: Summary

We object to the proposed development for the following reasons:

The scale of the turbine is inappropriate to the landscape character and visual sensitivity of the site;

There would be adverse cumulative visual impact given existing and approved turbines in the area;

There would be adverse impact on the Pictish cultural heritage of the area;

There would be adverse impact on residential amenity in the Menmuir area.

#### Landscape character and visual impact

#### Landscape character and visual sensitivity

We object to the proposed development because the scale of the turbine is inappropriate to the landscape character and visual sensitivity of the site. The proposed location lies in the Menmuir Foothills, part of the Highland Foothills area identified by the Strategic Landscape Capacity Assessment for Wind Energy in Angus, Final Report (November 2013). These hills present visually as transitional between the Vale of Strathmore and the area of Highland Summits and Plateaux to the North, and while comparatively low-lying, are significant as providing a visual threshold to the Cairngorms National Park and associated wild land.

The visual sensitivity of the site lies in the fact that the Menmuir Foothills, in common with the

other Angus Highland Foothills, are visually accessible to very large numbers of people, including those travelling on the A90. These foothills, and the summits and plateaux beyond them, are for many tourists their first visual contact of any proximity with the wild spaces associated with the Grampians and Cairngorms. For Angus residents, they are a major contributor to the quality of life.

## Impact

We note that while the Strategic Landscape Capacity Assessment envisages a maximum height for turbines in the Highland Foothills of 50m, it counsels that, within that maximum, the height of turbines should relate to the scale of the landscape, with particular regard to the vertical scale of the hills. Regrettably, the existing turbine at Balhall shows that a turbine close to 50m in this location does in fact adversely affect perception of the scale of these foothills. In clear weather the turbine stands out as an obtrusive man-made structure against the background of the hills, and is visible from such key locations as Angus Hill (Aberlemno), the visitor centre at Montrose Basin, and various points along the A90. The effect is to concentrate the eye on the obtrusive object rather than the otherwise unspoilt line of hills. With hindsight, a more appropriate height limit for turbines in such locations would be a maximum of 25m. By comparison, the single turbines at Bareyards, Menmuir and Forthill Farm, Glen Lethnot blend in much more successfully with the foothills background.

## Cumulative impact

So far as cumulative impact is concerned, the most obvious adverse effect would be to compound the impact of the existing turbine at Balhall. This impact should be considered in the context of the already erected or approved turbine developments in the surrounding area, in particular those approved for Afflochie, Glentrusta, Dunswood and Balrownie.

## Cultural heritage

We are concerned that the visual impact of a second turbine at Balhall would further undermine the quality of the visitor experience at neighbouring Pictish sites, most directly the White and Brown Caterthuns, but also Finavon Hill Fort and the Aberlemno Stones. A key part of the visitor experience of such monuments is the sense of sharing the same clear view of the neighbouring foothills and wild spaces as the Picts themselves.

## Residential amenity

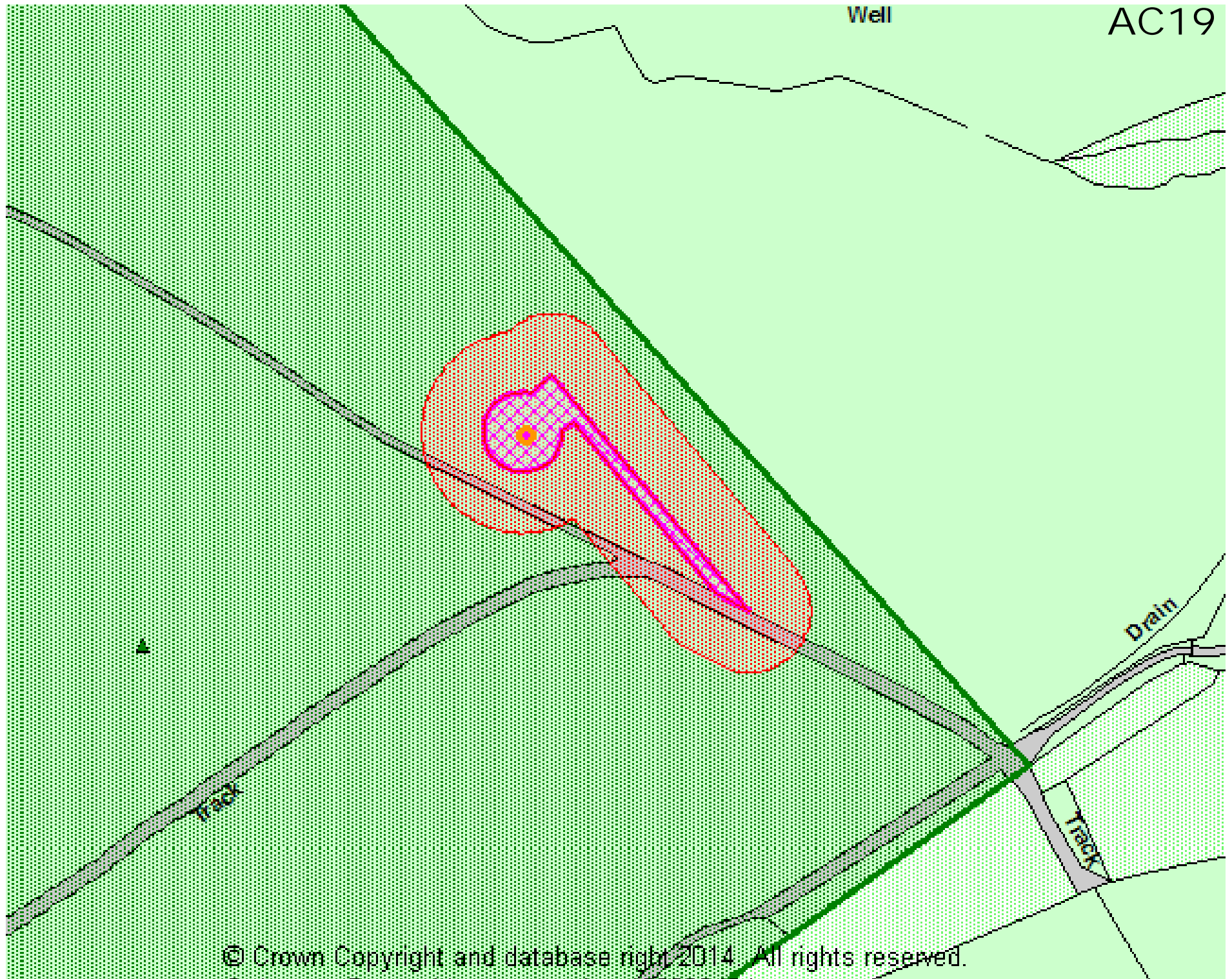
As householders at Tigerton, Menmuir, we are also concerned by the loss of visual amenity to our own house which would result from the erection of a second turbine at Balhall. We have a clear view of the existing turbine from the garden and immediate surroundings of the house, from where it presents starkly above the skyline as an incongruous man-made structure in an otherwise rural setting. From our experience of the existing turbine, we are also concerned by the prospect of additional and more complex visual disturbance by reflected light. While these considerations apply to our own house, they apply equally to many others in the Menmuir area.

Yours faithfully

Patrick Ford  
Melanie Ford

Well

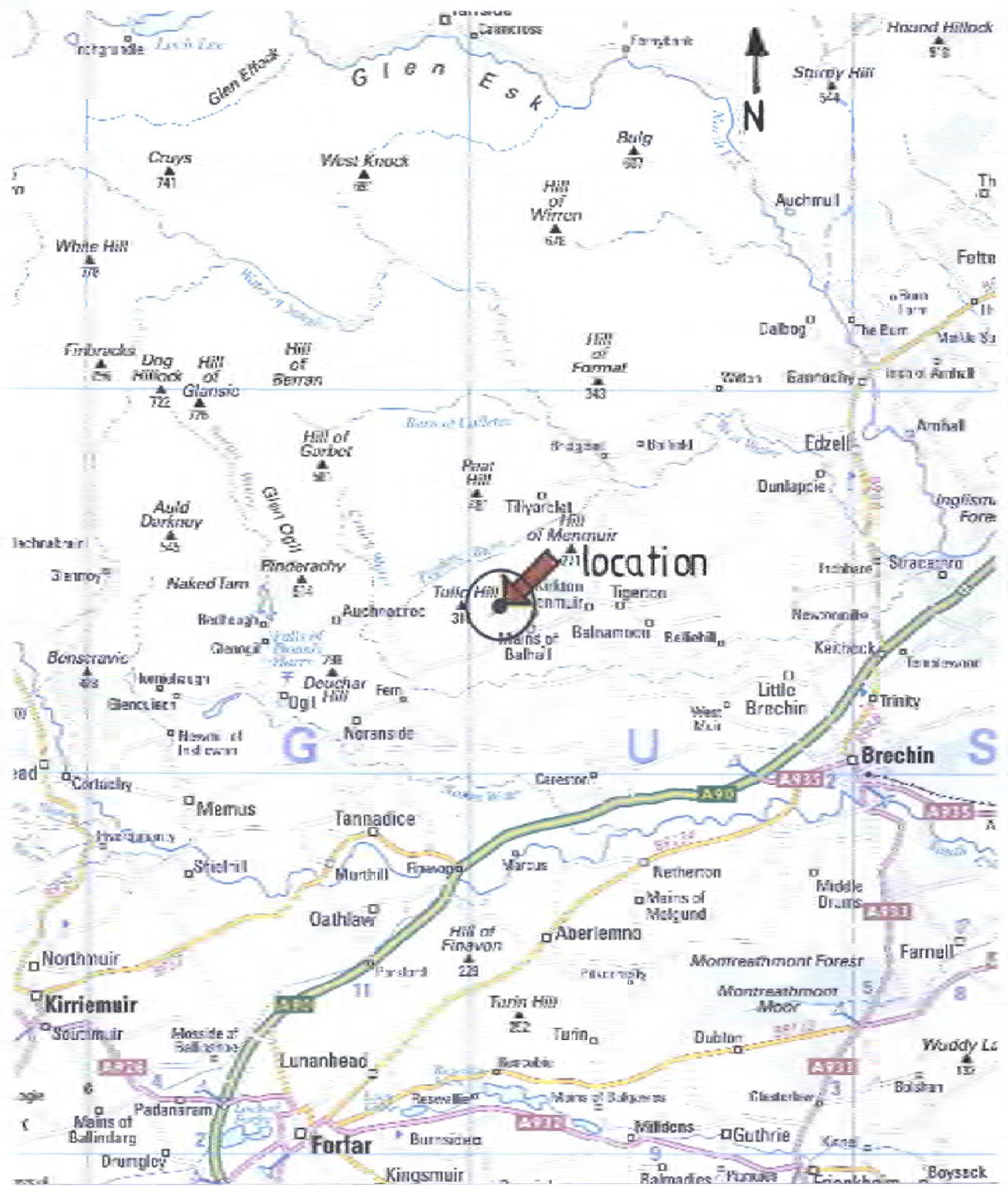
AC19



PROPOSED ERECTION OF A SINGLE WIND TURBINE

AC20

at  
MAINS OF BALHALL  
MENMUIR  
BY BRECHIN



LOCATION PLAN

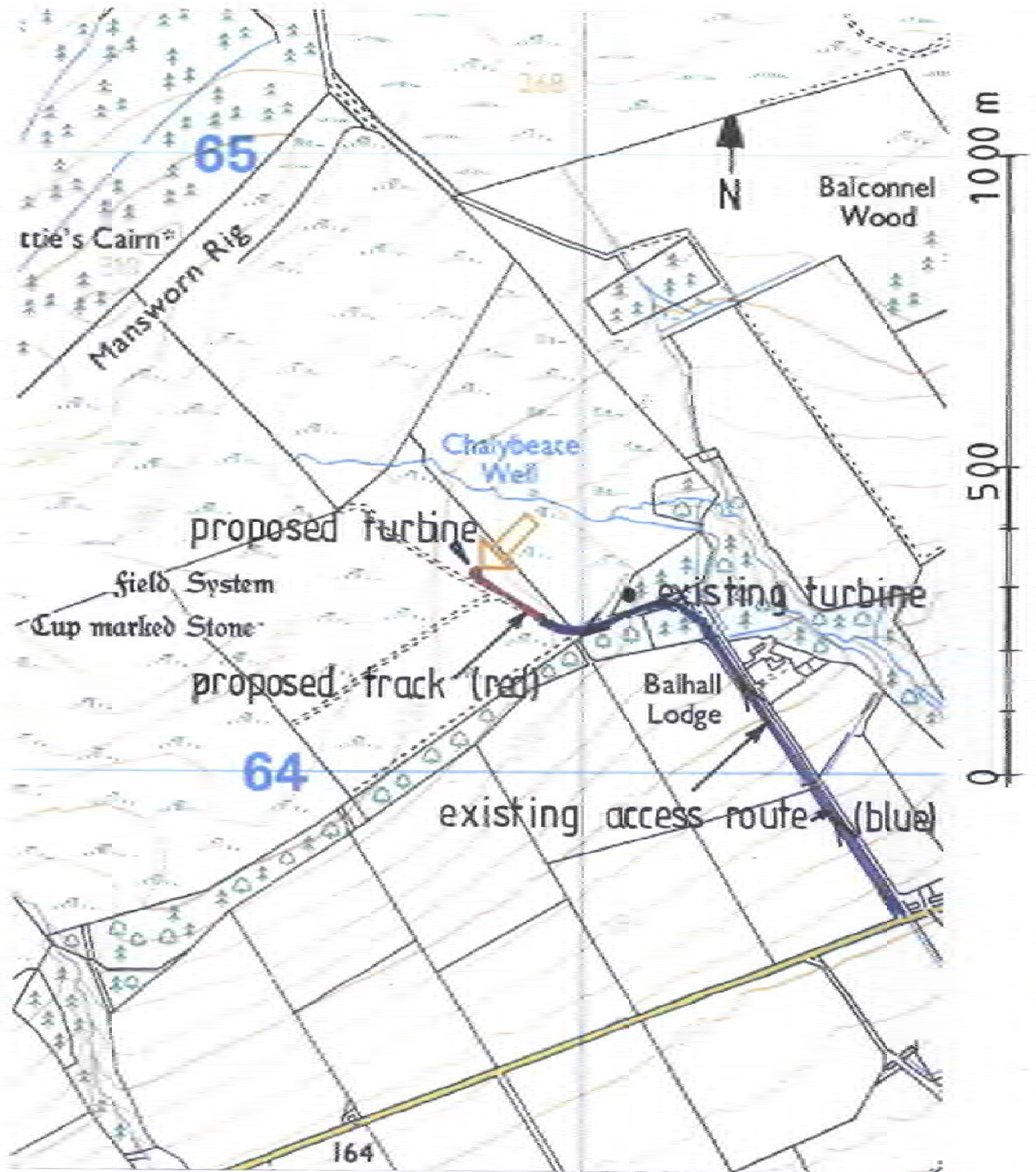
Not to Scale

DRAWING No: 080313REV – 1 of 4  
DATE: AUGUST 2014

ACRIG  
ARCHITECTURAL CONSULTANT  
6 CLERK STREET  
BRECHIN DD9 6AE

PROPOSED ERECTION OF A SINGLE WIND TURBINE  
at  
MAINS OF BALHALL  
MENMUIR  
BY BRECHIN

AC20



ACCESS PLAN

Scale: 1-10000

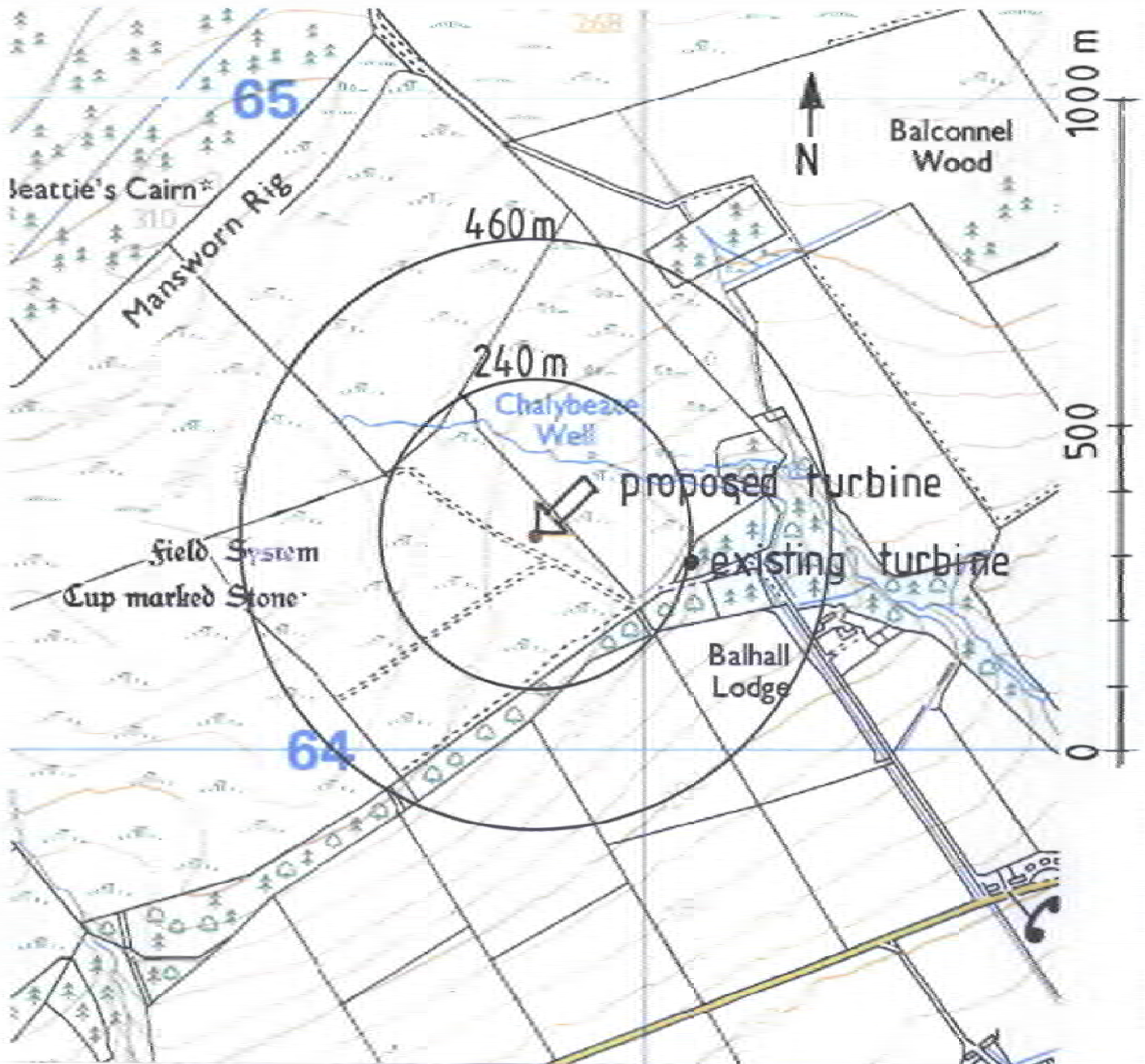
DRAWING No: 080313REV - 2 of 4  
DATE: AUGUST 2014

ACRAIG  
ARCHITECTURAL CONSULTANT  
6 CLERK STREET  
BRECHIN DD9 6AE



PROPOSED ERECTION OF A SINGLE WIND TURBINE  
at  
MAINS OF BALHALL  
MENMUIR  
BY BRECHIN

AC20



Extent of Shadow Flicker – 240 m

Distance to nearest property – 460 m

SHADOW FLICKER PLAN

Scale: 1-10000

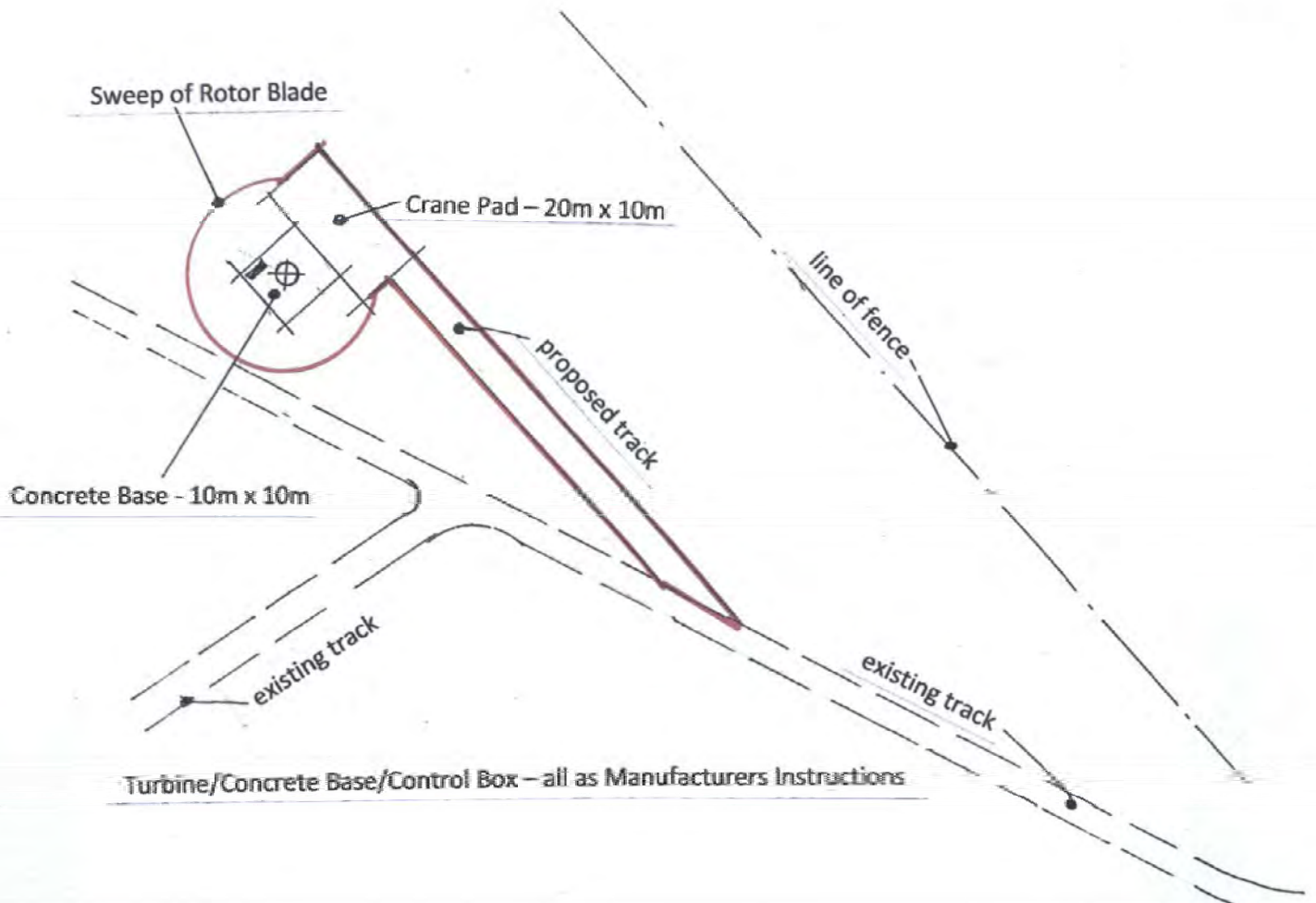
DRAWING No: 080313REV – 3 of 4

DATE: AUGUST 2014

ACRAIG  
ARCHITECTURAL CONSULTANT  
6 CLERK STREET  
BRECHIN DD9 6AE

PROPOSED ERECTION OF A SINGLE WIND TURBINE  
at  
MAINS OF BALHALL  
MENMUIR  
BY BRECHIN

AC20



**TRACK/CRANE SPEC:**

Layer of Geotex - turned up at edges  
250mm well compacted Type 1 base  
Quarry dust

**SITE AREA:**

453 sq m - Sweep of Rotor  
210 sq m - Proposed Track  
60 sq m - Crane Pad Projection  
0.08 Ha - TOTAL AREA

**SITE LAYOUT PLAN**

**Scale: 1-1000**

**DRAWING No: 080313REV - 4 of 4**

**DATE: AUGUST 2014**

**ACRAIG  
ARCHITECTURAL CONSULTANT  
6 CLERK STREET  
BRECHIN DD9 6AE**

[77]  
 $\phi$  23.6  
 ROTOR DIAMETER

[159]  
 48.5  
 BLADE TIP HEIGHT  
 (FROM FOUNDATION)

[4.00]  
 $\phi$  1.22  
 TOWER TOP

[121]  
 36.8  
 HUB TO FOUNDATION

[117]  
 35.7  
 TOWER HEIGHT

[6.56]  
 $\phi$  2.00  
 TOWER BASE

STRUCTURAL DESIGN IS PERFORMED ACCORDING TO IEC 61400-1, EDITION 3, "WIND TURBINES - DESIGN REQUIREMENTS". EXTREME WIND CONDITIONS ARE DEFINED BY IEC WTGS CLASS IIIA.

TOWER TOP LOAD CALCULATION ACCORDING TO IEC 61400-1 IS SIMILAR TO THAT DESCRIBED BY SECTION 6.5 (ANALYTICAL PROCEDURE) OF ASCE 7-05. STRUCTURAL DESIGN INFORMATION USED BY NORTHERN POWER IS ACCORDING TO IEC 61400-1 AND IS PRESENTED BELOW IN A FORM CONSISTENT WITH ASCE 7-05.

CHARACTERISTIC (UNFACTORED) LOADS AT TOWER TOP .....SEE NOTE 1

- F<sub>xy</sub> (Shear): 58.3 kN (13.1 kip)
- F<sub>z</sub> (Weight): -78.5 kN (-17.6 kip)
- M<sub>xy</sub> (Overturning Moment): 45.8 kN-m (33.8 kip-ft)
- M<sub>z</sub> (Torsional Moment): 14.1 kN-m (10.4 kip-ft)

CHARACTERISTIC (UNFACTORED) LOADS AT TOWER BASE .....SEE NOTE 2

- F<sub>xy</sub> (Shear): 112.0 kN (25.2 kip)
- F<sub>z</sub> (Weight): -200.3 kN (-45.0 kip)
- M<sub>xy</sub> (Overturning Moment): 9100.7 kN-m (2287.0 kip-ft)
- M<sub>z</sub> (Torsional Moment): 14.1 kN-m (10.4 kip-ft)
- M<sub>z</sub> Maximum (Torsional Moment): 46.9 kN-m (34.6 kip-ft)

BASIC WIND SPEED, V = 45.5 m/s (102 mph) .....SEE NOTE 3  
 AIR DENSITY,  $\rho = 1.225 \text{ kg/m}^3$  (0.0765 lbm/ft<sup>3</sup>) .....SEE NOTE 4  
 IMPORTANCE FACTOR, I = 1.0  
 EXPOSURE CATEGORY = C  
 WIND DIRECTIONALITY FACTOR, K<sub>d</sub> = 1.0 .....SEE NOTE 5  
 TOWER HEIGHT, h = 35.7 m (117 ft)  
 TOPOGRAPHIC FACTOR, K<sub>z1</sub> = 1.0 .....SEE NOTE 6  
 GUST EFFECT FACTOR, G = 1.0 .....SEE NOTE 7  
 TOWER FORCE COEFFICIENT, C<sub>f</sub> = 0.6

FOUNDATION STIFFNESS REQUIREMENTS .....SEE NOTE 10

- LATERAL FOUNDATION STIFFNESS, K<sub>xy</sub> = 5 X 10<sup>17</sup> N/m MINIMUM
- ROTATIONAL FOUNDATION STIFFNESS, K<sub>R,xy</sub> = 3.25 X 10<sup>19</sup> N-m/rad MINIMUM

- NOTES
- TOWER TOP LOADS PROVIDED INCLUDE EFFECTS OF THE WIND ON THE BLADES AND NACELLE. NORTHERN POWER USED A LOAD FACTOR OF 1.35 (NOT INCLUDED ABOVE) FOR ALL AERODYNAMIC LOADS ON THE STRUCTURE ACCORDING TO IEC 61400-1.
  - TOWER BASE LOADS PROVIDED INCLUDE EFFECTS OF THE WIND ON THE BLADES, NACELLE, AND TOWER. NORTHERN POWER USED A LOAD FACTOR OF 1.35 (NOT INCLUDED ABOVE) FOR ALL AERODYNAMIC LOADS ON THE STRUCTURE ACCORDING TO IEC 61400-1. "M<sub>z</sub>" AND "M<sub>z</sub> MAXIMUM" ARE DERIVED FROM DIFFERENT LOAD CASES. NOTE THAT "M<sub>z</sub> MAXIMUM" DOES NOT OCCUR DURING THE 50-YEAR EXTREME GUST LOAD CASE, BUT MAY BE CONSERVATIVELY ASSUMED IN LOAD COMBINATION FOR PURPOSES OF FOUNDATION DESIGN.
  - BASIC WIND SPEED IS AT h=10m (33 ft). THIS VALUE IS DERIVED FROM THE EXTREME WIND SPEED AT HUB HEIGHT ACCORDING TO IEC 61400-1, V<sub>e50</sub> = 52.5 m/s (117 mph), USING A POWER LAW EXPONENT CONSISTENT WITH EXPOSURE C.
  - STANDARD AIR DENSITY IS NOT EXPLICITLY IDENTIFIED IN SECTION 6.5 OF ASCE 7-05. IT IS IMPLICIT IN THE VELOCITY PRESSURE CALCULATION, EQUATION 6-15.
  - A DIRECTIONALITY FACTOR IS NOT USED BY NORTHERN POWER.
  - EFFECTS OF LOCAL TOPOGRAPHY ON THE WIND ARE NOT ACCOUNTED FOR IN THIS CALCULATION. THEY MUST BE CONSIDERED DURING PROJECT PLANNING AND SITE REVIEW.
  - THE TOWER LOADS ARE PREDICTED USING A COMPLETE AERO-ELASTIC SIMULATION WHICH ACCOUNTS FOR DYNAMIC INTERACTIONS OF THE STRUCTURE AND THE APPLIED LOADS. AN ADDITIONAL GUST EFFECT FACTOR (E.G. ACCORDING TO SECTION 6.5.8 OF ASCE 7-05) IS THEREFORE NOT USED BY NORTHERN POWER.
  - SEISMIC ACTIONS ARE NOT ACCOUNTED FOR IN THIS CALCULATION, THOUGH TYPICALLY NON-GOVERNING, THEY MUST BE CONSIDERED DURING PROJECT PLANNING AND SITE REVIEW.
  - THE VALUES STATED IN METRIC (SI) UNITS SHALL BE REGARDED AS THE STANDARD. THE INCH-POUND (IP) UNITS SHOWN IN PARENTHESES SHALL BE FOR REFERENCE ONLY.
  - NORTHERN POWER IS CONTINUALLY DEVELOPING PRODUCT UPGRADES, MODIFICATIONS, AND IMPROVEMENTS, AND AS A RESULT RESERVES THE RIGHT TO CHANGE OR ALTER THESE SPECIFICATIONS AT ANY TIME. REFER TO DOCUMENT A05450 "NPS 100-24 GENERAL SPECIFICATION" AND DOCUMENT A00298 "NPS 100 APPLICATION REQUIREMENTS" FOR FURTHER INFORMATION.

TOWER SECTION 3  
 WALL THICKNESS=8mm  
 STEEL GRADE :  
 GB Q235B (CHINA)  
 F<sub>y</sub> = 235 MPa MINIMUM  
 F<sub>u</sub> = 370-500 MPa

TOWER SECTION 2  
 WALL THICKNESS=8mm  
 STEEL GRADE :  
 GB Q235B (CHINA)  
 F<sub>y</sub> = 235 MPa MINIMUM  
 F<sub>u</sub> = 370-500 MPa

TOWER SECTION 1  
 WALL THICKNESS=10 mm  
 STEEL GRADE :  
 GB Q345D (CHINA)  
 F<sub>y</sub> = 345 MPa MINIMUM  
 F<sub>u</sub> = 470-630 MPa

**NPS100-24-37**  
**STRUCTURAL LOADS AND GEOMETRY**  
 ROTOR DIAMETER: 24m  
 HUB HEIGHT: 37m  
 SCALE 1:100  
 WHEN PRINTED ON ISO A2  
 ALL DIMENSIONS IN METRES AND (FEET)

REV	DESCRIPTION	DATE	ENG	CHK	APR
C	RELEASE FOR CUSTOMER USE, ADDED NPS100-24-30, UPDATED LOADS NOTES AND FORMATTING	7/25/2012	NMS	CBC	DPC
B	RELEASE FOR BID/QUOTE	4/9/2012	NMS	CBC	DPC
A	RELEASE FOR BID/QUOTE	12MAR12	CBC	NMS	CAM

DRAWING NUMBER: 1013417 REVISION: C SHEET: 1 OF 3



**Northern POWER SYSTEMS**  
 29 Pitman Road  
 Barre, VT 05641 USA  
 www.northernpower.com

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