

FORFAR GOLF CLUB

FORFAR

ANGUS

DD8 2RL

ERECTION OF A SINGLE

EWT 500 WIND TURBINE

Coordinates – E348524 N750248

Hub Height – 50m

Rotor Diameter – 54m

Tip Height – 77m

ACRAIG
ARCHITECTURAL CONSULTANT
6 CLERK STREET
BRECHIN DD9 6AE

CONTENTS

SECTION 1	Wind Turbine Application Details
SECTION 2	Location Plan, Site/Golf Course Plan, Shadow Flicker Plan, Access Route Plan
SECTION 3	Planning Statement
SECTION 4	ZTV, Viewpoint Plan, Photomontages, List of Surrounding Turbines & Angus Council Figure 3.4
SECTION 5	EWT High Yeild 500kW Direct Drive Wind Turbine
SECTION 6	Power Curve DW 54/500 Specifications
SECTION 7	Sound Power Warranty Levels DW 52/54 500kW
SECTION 8	Theoretical Noise Study
SECTION 9	Environmental Impact Assessment
SECTION 10	Transport, Storage & Crane Guidelines
SECTION 11	EWT 500 Drawing

SECTION 1

FORFAR GOLF CLUB**Coordinates & Turbine Information****COORDINATES:**

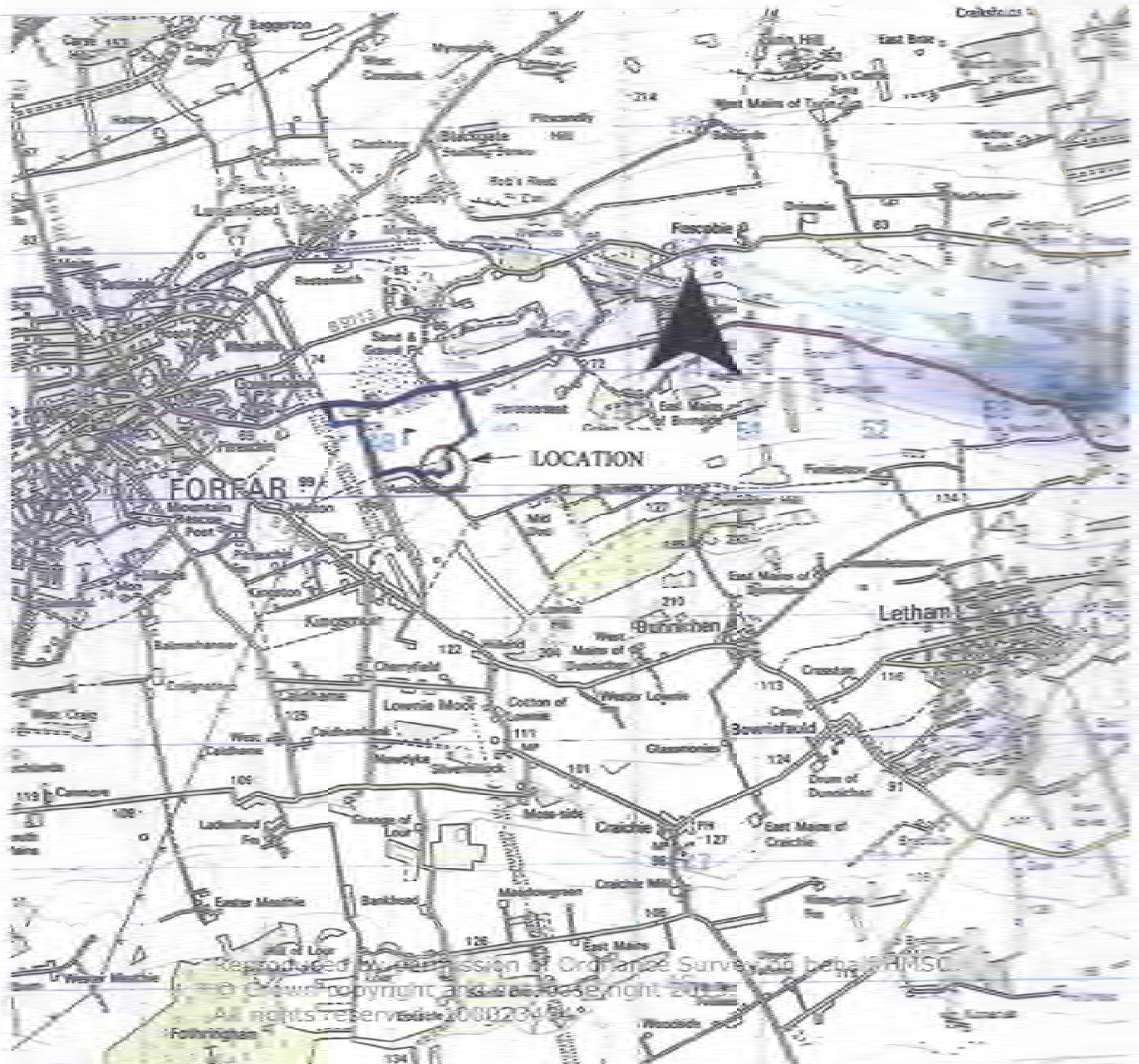
OS X (Eastings) 348524
OS Y (Northings) 750248
Nearest Post Code DD8 2RL
Lat (WGS84) N56:38:28 (56.641209)
Long (WGS84) W2:50:27 (-2.840908)
LR NO485502
mX -316248
mY 7651417

TURBINE:

EWT 500kW
50m hub
54m rotor
77m height to tip

SECTION 2

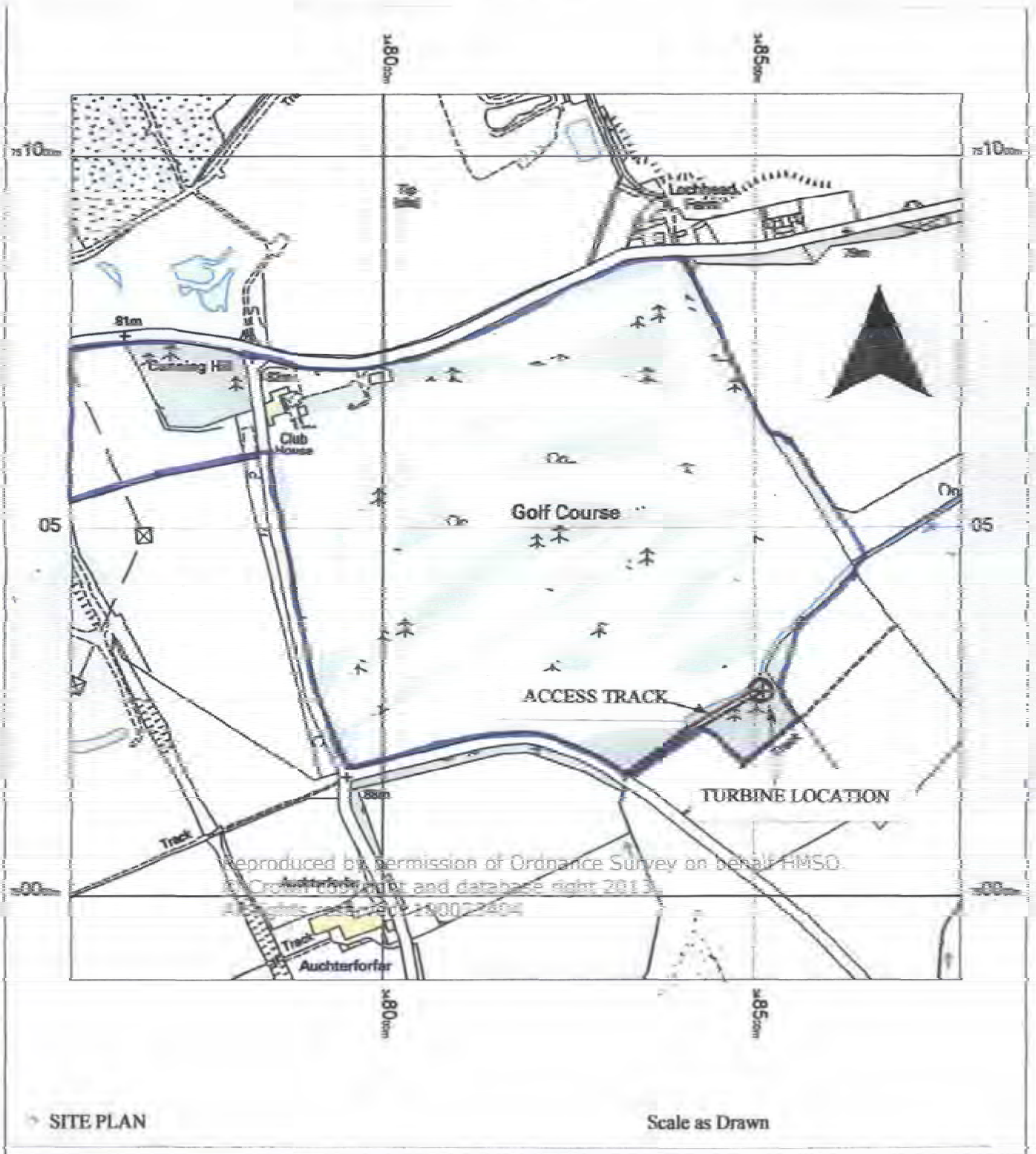
PROPOSED ERECTION OF WIND TURBINE
at
FORFAR GOLF CLUB
FORFAR
ANGUS
DD8 2RL



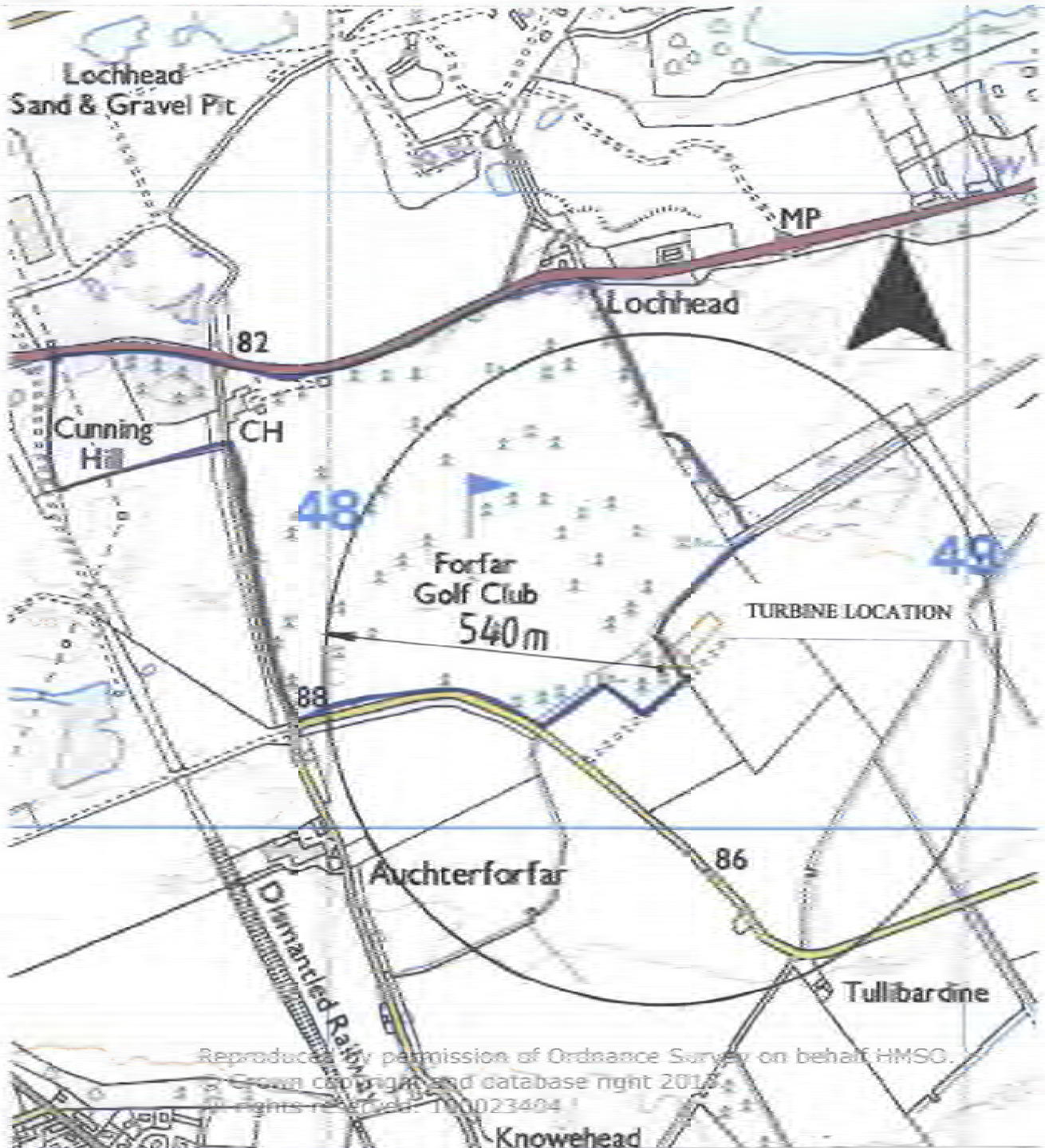
LOCATION PLAN

Scale 1:50000

PROPOSED ERECTION OF WIND TURBINE
at
FORFAR GOLF CLUB
FORFAR
ANGUS
DD8 2RL



PROPOSED ERECTION OF WIND TURBINE
at
FORFAR GOLF CLUB
FORFAR
ANGUS
DD8 2RL



Reproduced by permission of Ordnance Survey on behalf HMSG.
Crown copyright and database right 2013.
Rights reserved. 100023424

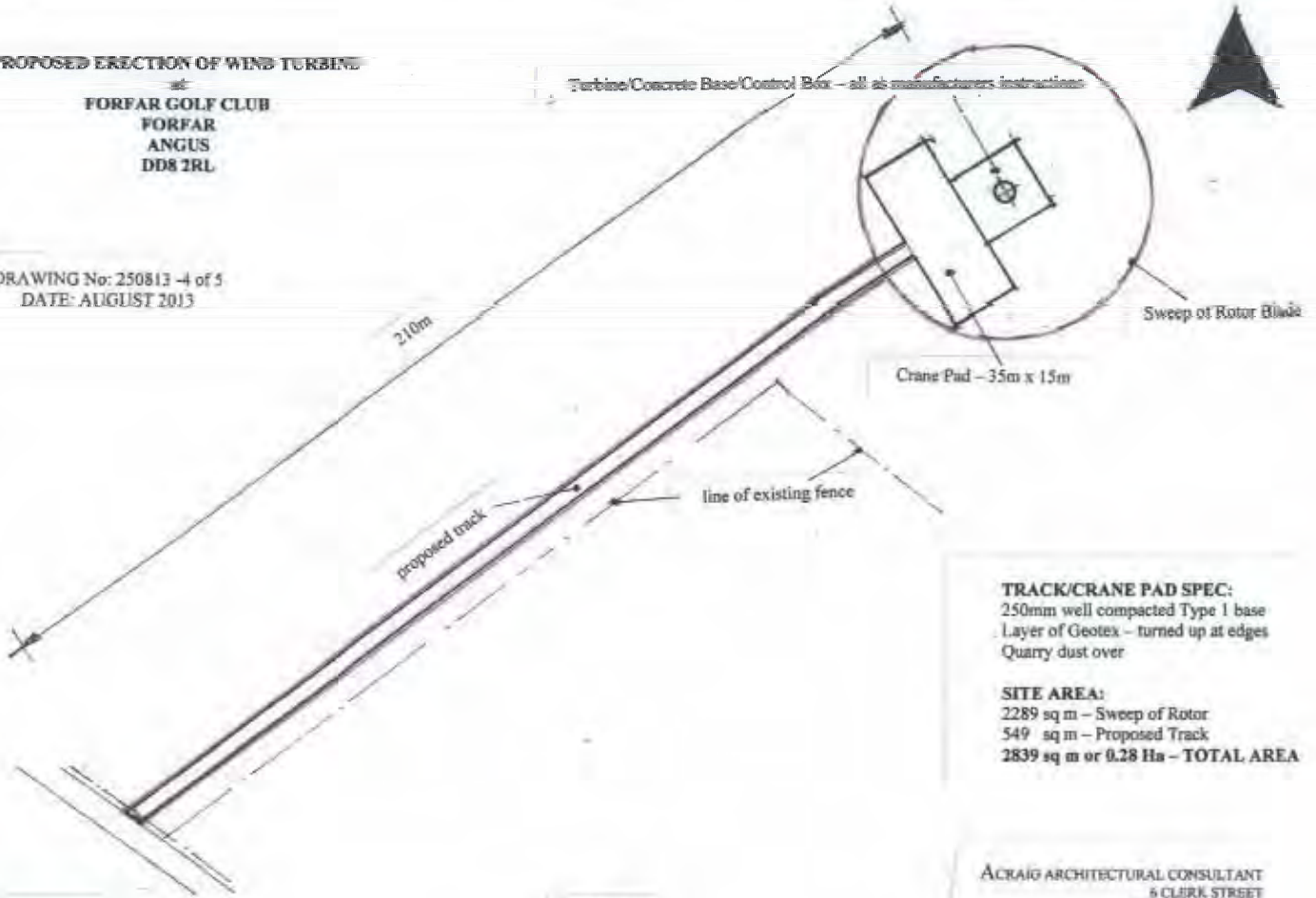
PLAN SHOWING EXTENT OF SHADOW FLICKER

Scale 1:1000

PROPOSED ERECTION OF WIND TURBINE
at
FORFAR GOLF CLUB
FORFAR
ANGUS
DD8 2RL

DRAWING No: 250813 -4 of 5
DATE: AUGUST 2013

Turbine/Concrete Base/Control Box - all as manufacturers instructions



Crane Pad - 35m x 15m

Sweep of Rotor Blade

line of existing fence

proposed track

210m

TRACK/CRANE PAD SPEC:

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

SITE AREA:

2289 sq m - Sweep of Rotor
549 sq m - Proposed Track
2839 sq m or 0.28 Ha - TOTAL AREA

SITE LAYOUT PLAN

Scale 1:1000

ACRAIG ARCHITECTURAL CONSULTANT
6 CLERK STREET
BRECHIN DD9 6AE

SECTION 3

PLANNING STATEMENT

FULL PLANNING APPLICATION TO INSTALL

A SINGLE EWT500 WIND TURBINE

ON

LAND

AT

FORFAR GOLF COURSE

FORFAR

DD8 2RL

Planning Statement
Single EWT500 – Forfar Golf Club

Contents

Introduction

1 The Need

- 1.1 Sustainability
- 1.2 Energy Options

2 The Development

- 2.1 The Proposed Development.
- 2.2 The Site Context.
- 2.3 The Wind Turbine.
- 2.4 The Grid Connection.
- 2.5 Site Access and Tracks.

3 Scheme Design

- 3.1 Site Selection.
- 3.2 Site Design.

4 Operation & Construction

5 Potential Environmental Impacts

- 5.1 Ecology.
- 5.2 Landscape Designation.
- 5.3 Landscape and Visual Impact.
- 5.4 Heritage Sites.
- 5.5 Noise.
- 5.6 Shadow Flicker.
- 5.7 Water Environment and Flood Risk.
- 5.8 Public Rights of Way.

6 Planning Policy Considerations

- 6.0 Policy ER 35.
- 6.1 Climate Change.
- 6.2 Renewable Energy.
- 6.3 Sustainable Energy.
- 6.4 The National Planning Framework 2.
- 6.5 Scottish Planning Policy.
- 6.6 Driver Distraction.

7 Conclusion

PLANNING STATEMENT

Single EWT500 Turbine – Forfar Golf Club

INTRODUCTION

This supporting statement has been prepared to accompany an application for planning permission to develop 1 EWT500 Wind Turbine on land at Forfar Golf Club, Forfar.

The applicant is Harmony Energy Ltd.

The applicants are looking to provide an opportunity to generate renewable energy on land which is currently part of the golf course surrounding land. The generation of renewable energy from this area of land can provide a limited but valuable contribution to the outputs of renewable energy and help meet the needs locally and nationally.

The generation of renewable energy will also improve the viability and sustainability of the Golf Course and benefit both its members and the community.

This proposal will provide a valuable contribution towards the national target of 100% of Scotland's gross annual electricity consumption to be generated by renewable sources by the year 2020. The outputs of renewable energy will help both nationally and locally.

The applicant proposes to set-aside a proportion of the income generated by the turbine each year to establish a '**Community Fund**' to support local projects and good causes. It is anticipated that the 'Harmony Energy Community Fund' will accumulate £2,000 plus RPI each year over the lifetime of the turbine and that the money will be awarded on an annual basis to worthwhile projects that have both an educational and environmental theme.

The proposed turbine has a capacity of 500kW which can achieve a predicted generation of approximately 1900MWh per annum.

Planning Statement
Single EWT500 Turbine – Forfar Golf Club.

1.1 Sustainability

The application is a sustainable proposal which focuses on the conservation of energy and our natural resources through the use of a renewable source. The proposal is to help reduce CO² emissions and increase the proportion of green energy available while also allowing the farmer an income from rental of the land. The implementation of the turbine will play a small but significant part in contributing to the Government's renewable energy targets with the associated impact upon CO² and global warming. The location of this proposal has been carefully selected to both maximise the available wind resource and have as little intrusion on the surrounding environment as possible.

1.2 Energy Options

Whilst considering the types of renewable energy available, the applicant favoured wind energy for the proposed location due to the following factors:

- The proposal would use a very minimal amount of land, the proposed site being only 0.28 hectares. The generation of the same amount of solar energy would require in excess of 30 acres of valuable land.
- The production of wind energy can function over a 24 hour period.

2 THE DEVELOPMENT

2.1 The Proposed Development

The proposed site is on 0.28 hectares of land. The proposed development involves the installation and operation of 1 mid-size wind turbine.

The proposed turbine will have a hub height of 50 metres and a rotor diameter of 54 metres giving a maximum overall height to tip of 77 metres. The turbine has a 'cut in' wind speed of 2.5m/s and a 'cut out' wind speed of 25 m/s (56mph) giving a rated wind speed of 10m/s. At an average wind speed of 6.5m/s the proposed turbine could generate 1900MWh per annum. On this basis the CO² reduction of the proposed wind turbine is estimated to be approximately 993.7 tonnes annually (1900MWh/h x 1000 x 0.523 = 993700 kg CO²). Based on an operational lifespan of 25 years it can be estimated that the wind turbine could offset approximately 24843.5 tonnes of CO² over the proposed lifetime of the development. The proposal also involves the development of an area of hard standing adjacent to the turbine to support the crane during turbine assembly.

2.2 Site Context

The proposed development is located at grid reference Eastings 348524 and Northings 750248. The surrounding landscape is predominantly agricultural to the south and leisure and recreation to the north. There are no footpaths crossing the site and no residential properties within 540 metres.

2.3 The Wind Turbine

The turbine is of a typical design consisting of a tubular tower with three blades attached to a nacelle which houses the generator and operating equipment. The turbine has a hub height of 50 metres and a rotor diameter of 54 metres giving an overall height of 77 metres. The foundations will be constructed from reinforced concrete.

A temporary crane pad will be constructed adjacent to the turbine location for the installation.

2.4 Grid Connection

The Distribution Network Operator (DNO) responsible for the electrical infrastructure in the area of the site has confirmed that there is potential for a grid connection. The turbine will therefore be connected to the grid.

2.5 Site Access and Traffic Management

The site is accessed from an unclassified road running between the A932 and the B9128 and thereafter along a proposed access track as shown on Drawing No.250813 – 4/5. It is envisaged that the crane and delivery vehicles will be able to access the site without any need for re-enforcement of the track.

Manufacturer's Transport, Storage and Crane guidelines have been enclosed with this application.

3 SCHEME DESIGN

3.1 Site Selection

The applicant has been aware for some time that due to the excellent wind resource at the site and favourable topography, Forfar Golf Club has the potential to accommodate small scale wind power generation. The location for the site lies within Zone 10, 'Broad Valley Lowland' as categorised by the Tayside Landscape Character Assessment and as such can be considered to have scope for turbines around 80m in height. The site will be fully compatible with the surrounding land use and will have no detrimental impact on the golf course. The site was selected specifically to have no impact on any residential properties within 540m.

3.2 Site Design

Turbine layout is based on the mapping of technical and environmental constraints specific to the site and its surrounding area.

Mapping separation distances from residential properties, the footprint of under and over ground infrastructure, ecological interest and other restraints allows a developable area within the site to be identified. The result of this mapping is that an unconstrained area large enough to accommodate one mid sized turbine was identified.

4 OPERATION & CONSTRUCTION

It is envisaged that the construction phase of the proposal will last approximately one month and that the Operational Phase of the proposal will last twenty five years.

The installation of the turbine should take approximately four weeks. All excavations, protection, cable laying etc will be carried out in accordance with all relevant health and safety requirements.

Access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent change to the environment or landscape.

5 POTENTIAL ENVIRONMENTAL IMPACTS

This section considers the potential environmental impacts arising from the proposed development.

5.1 Ecology

An ecological report has been prepared and is enclosed. It concludes that there are no habitats of significant nature conservation value in close proximity to the proposed site.

5.2 Natural Heritage Designations

The proposed site lies within Zone 1, classified by SNH as being the lowest natural heritage sensitivity and with least sensitivity to wind farms.

SNH have been consulted regarding protected sites and sites of special interest within 20km of the proposed turbine site. Having checked with their sitelink facility as advised it would appear that Turin Hill, Rescobie & Balgavies Lochs & Restenneth are the nearest sites of special scientific interest. We are now awaiting SNH's response as to whether they consider the proposed turbine to have any impact upon them.

5.3 Landscape and Visual Impact

A ZTV (Zone of Theoretical Visibility) see enclosed, was carried out showing a radius of 25km from the central point of the turbine. This identified areas of countryside where the rotor tips are theoretically visible. The ZTV identified areas which could be impacted upon by the proposed development and enabled a more detailed study of this impact to be carried out by the production of a photomontage. A survey of the site has been carried out at vantage points in accordance with Angus Council for the preparation of photomontages.

Locations are pinpointed using Garmin eTrex H personal navigator.

Photographs taken using Canon EOS 60D with 35mm lens – multiplication factor of 1.6.

First photograph at each point taken approximately 180° from the proposed turbine position.

The photomontages enclosed are discussed individually below.

Viewpoint 1 – Taken from Burnside Farm showing the turbine clearly in the centre of the photograph and no other turbines are visible in the area.

Viewpoint 2 – Taken from west of mid Dod showing the turbine clearly in the centre of the photograph and no other turbines are visible in the area.

Viewpoint 3 – Taken from the road junction to the south east of Kingsmuir showing the hub and tip of the turbine to be well below the ridge line of the background hills.

Viewpoint 4 – Taken from entrance to Pitreuchie Farmhouse showing the turbine to left of centre of the photograph and another turbine in the distance further to the left. The proposed turbine is shown to be clearly below the ridge of the surrounding hills.

Viewpoint 5 – Taken from the ForesterSeat Caravan Park with the proposed turbine in the foreground concealed by trees.

Viewpoint 6 – Taken from track leading to Turin Hill. The turbine is only evident within the wire frame and clearly below the ridge line of surrounding hills.

Viewpoint 7 – Taken from road leading to Carseburn. The turbine is shown in the centre of the photograph below the ridge line of surrounding hills.

Viewpoint 8 – Taken from Suttieside, the turbine is only evident in the wire frame and the photograph clearly shows existing electricity pylons to be more prominent in the foreground.

5.4 Heritage Sites (Archaeology, listed buildings and conservation areas)

Historic Scotland have been consulted regarding the possible impact of the proposed turbine on the Caterthun Forts, the Hill Fort at Turin and the Standing Stones at Aberlemno and a letter has been enclosed detailing their response.

In accordance with their comments regarding Restenneth Priory, it has been confirmed with Ms Clements of Historic Scotland that the turbine can not be seen from Restenneth Priory due to heavy screening by trees and that it will have no impact on the scheduled monument.

5.5 Noise

The site has been selected and located to allow sufficient distance between the turbine and any existing noise sensitive development so that noise will not be a nuisance or a material consideration in deciding the planning application.

Environmental & Consumer Protection have been consulted regarding potential noise issues with the proposed turbine and a Theoretical Noise Impact Assessment has also been enclosed with this application in accordance with advice given by Mr A. Milne from Environmental and Consumer Protection.

Sound Power Warranty Levels have been enclosed within this application. The calculations are from standardised wind speed at ten metre height according to E1C61400-11.

5.6 Shadow Flicker & Residential Amenity

There are no properties within ten rotor diameters of the proposed turbine (540m) the distance above which the effect of shadow flicker would not affect a property.

5.7 Water Environment & Flood Risk

Due to its location in a low flood risk area and the relatively small footprint of the development, the proposed development will have no unacceptable adverse impact on hydrology and flood risk at the site.

The Site is not within the source catchment area of any private water supply and therefore will have no impact on Water Environment.

5.8 Public Rights of Way

There are no public rights of way which would be affected by this proposal.

6 PLANNING POLICY CONSIDERATIONS

6.0 Policy ER 35: Wind Energy Development:

Criterion (d)

NERL Safeguarding have demonstrated that the area around Forfar is completely clear from radar cover and that NATS are not likely to object from any turbine up to 200m.

Civil Aircraft Authority have been contacted and we are still awaiting a response.

Criterion (e)

The Windfarms Team have cleared the proposal with respect to radio link infrastructure.

Ofcom have cleared the proposal with respect to any impact on broadcast communication and signals.

Criterion (g)

Decommissioning - Measures will be taken to ensure that dismantling of equipment and restoration of the site are carried out in accordance with health and safety requirements and to protect the safety of the public. Method Statement to be agreed with Angus Council Planning Department.

6.1 Climate Change

Changes in climate have seen a rise of approximately 0.74°C on average across the world from 1906 to 2005. In 2007, The Intergovernmental Panel on Climate Change determined that most of the observed increases in global temperatures were due to an observed increase in greenhouse gas concentration. Humans influence global climate by releasing 'greenhouse' gases such as methane and CO² into the atmosphere, the gases absorb energy that is radiating from the Earth's surface warming the atmosphere and increasing the temperature globally.

The impact of this climate change can see communities struggling to cope with the effects of extreme droughts and excessive rainfall causing untold disruption to both man made and natural habitats.

6.2 Renewable Energy

The climate change (Scotland) Bill sets a target of an 80% reduction in emissions by 2050 and an interim target for 2020. Key elements of the strategy for achieving a substantial reduction in emissions are greater energy efficiency, making the most of Scotland's renewable energy potential and encouraging power and heat generation from clean, low carbon sources.

6.3 Sustainable Development

The turbine will help ensure the long term viability of the Golf Course providing both financial benefits to the members and secured recreational and leisure benefits to the local community.

Preventing climate change and securing future energy supplies can also provide investment opportunities and jobs within the renewable energy sector. Small scale developments will help support this important industry.

6.4 The National Planning Framework for Scotland 2

The NPF2 is a document which seeks to outline the Scottish Governments view of what sustainable development means in practice for the planning system. The Scottish Governments commitment to sustainable development is reflected in its policies on matters such as climate change and renewable energy with a development strategy which aims to realise the potential of Scotland's renewable energy resources and facilitate the generation of power and heat from clean, low carbon sources.

6.5 Scottish Planning Policy

Scottish Planning Policy recognises that there is potential for small businesses to invest in ownership of renewable energy projects and states that Planning Authorities should support them in developing such initiatives in an environmentally acceptable way.

6.6 Driver Distraction

Due to the location, scale and siting of the turbine, it is not considered that driver distraction will be a material consideration.

7. Conclusion

In line with national, regional and local policy, the generation of renewable energy will help contribute to the target for reducing carbon emissions. The proposed turbine is mid sized in scale and sited on farm land at a reasonable distance from any residential dwellings. The proposed turbine is relatively well screened from many vantage points and the design and scale selected will be kept to a minimum intrusion on the landscape. The application is a sustainable proposal focussed on the conservation of energy through renewable sources.