



Internal Memo

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Dept: Planning & New Communities

From: Greg Kearney
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Date: 17th February 2012

Subject: **Castle Farm, Hatley Road, Gamlingay, Sandy, SG19 3HH**
Erection / installation of one 53.88m 330kw wind turbine

Our Ref:
Your Ref: S/2564/11

This application is for the erection / installation of one 330kw wind turbine (53.88m to tip: hub height 37.18m and 16.7m rotor blade length), access track and crane hardstanding.

The proposed wind turbine is approximately 1.75km west from the centre of Gamlingay, Hatley St George is 1.8km to the East and Cockayne Hatley is at a similar distance to the South. The closest residential properties are as follows:

- Castle Farm: Approximately 500m NNE of the proposed wind turbine (identified in application as having a financial interest in the project)
- The Paddocks: Approximately 600m NNE of the proposed wind turbine (identified in application as having a financial interest in the project)
- Barberry Cottage: Approximately 800m NE of the proposed wind turbine
- Station House: Approximately 800m NNW of the proposed wind turbine

The main environmental health related material considerations associated with the proposed turbine are:

- Construction and Operational Noise
- Shadow flicker

It is noted that whilst the proposed wind turbine is wholly within SCDC but there are villages to the south such as Cockayne Hatley that are within the neighbouring district boundary of Central Bedfordshire Council (CBC). I understand that some residents of Central Bedfordshire have expressed concern in relation to possible noise and shadow flicker impacts. As the closest properties to the wind turbine are dwellings in SCDC, I have only considered the direct impact at these properties but I can confidently conclude that the impacts would be even less significant and probably imperceptible at these locations due to a greater separation distance. The noise

predictions have been modelled in all directions. In addition, any conditions that have been recommended to protect amenity are in my view robust enough to protect residents outside SCDC, as the main decision making authority.

However it is my view that it would be sensible for respective officers at CBC to consider the specific impacts of the proposals on residents within their district and satisfy themselves that they have been adequately considered and mitigated by condition to meet their requirements as necessary.

Construction and Operational Noise

The following noise impact assessments documents / reports have been submitted:

- A Spectrum Acoustic Consultants Noise Impact Assessment Report titled "*Gamlingay Community Turbine Generator –Environmental Appraisal and appendices*", Report ref: CJA3185/11291 dated December 2011 issued to Gamlingay Community Turbine Ltd.
- "*An Investigation of the Likelihood of Amplitude Modulation of Noise from the Gamlingay Community Turbine*" document by Mike Brettle, CMet dated 2011-11-21.

National Planning Policy

The most appropriate national policy on wind energy and operational noise impact is expressed in Planning Policy Statement (PPS) 22: *Renewable Energy* and its Companion Guide *Planning for Renewable Energy*, both published in 2004. They advise that the 1997 report of the Energy Technology Support Unit titled "*The Assessment and Rating of Noise from Wind Farms*" (ETSU-R-97) for the former Department of Trade and Industry should be used to assess and rate noise⁵.

Assessment Methodology

This service has had detailed pre-application discussions and correspondence with the applicant /agent and their noise consultant Spectrum Noise Consultants regarding potential noise impact associated with the wind turbine operating having regarding the most appropriate noise assessment standards. The following noise impact assessment methodology and environmental noise acceptability criterion in accordance with ETSU-R-97 have been agreed and used:

- the properties and locations that could potentially be affected by noise during the construction and operation of the turbine have been identified by site survey, and from a desk study of OS mapping for the site and surrounding area;
- a qualitative and quantitative appraisal of construction noise has been undertaken;
- the noise emission characteristics, including warranted sound power level data and spectral data for the candidate turbine (the Enercon E33) have been obtained from the manufacturer;
- a site specific noise model has been prepared for the site, extending to the closest identified sensitive receptors, using the Bruel & Kjaer 'Predictor' software, which follows the noise propagation calculation procedures detailed in International Standards Organisation documents ISO 9613-1:1993 *Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere* and ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* ;
- the site specific noise model has been used to undertake a series of noise level predictions for the proposed candidate turbine operating under a variety of different wind speed conditions;

- the suitability of the proposed development for the local noise environment has been considered drawing upon the noise assessment methodology presented with ETSU-R-97 and in particular the ETSU simplified assessment method approach ; and
- measures in the form of maximum permissible noise levels to mitigate adverse noise impacts have been agreed and the resulting residual effects for construction and operation determined.

Construction Noise

Assessment of construction activities demonstrates that calculated noise levels generated at the nearest residences (with no financial interest in the project) during the construction and demolition of the proposed development are below the threshold of significance when assessed using best practice guidance from BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. Any limited impact would be temporary but the following condition should be imposed:

All construction and decommissioning works including collection and deliveries during construction shall be carried out only between the hours of 0730 to 1800 Monday to Friday, 0800 to 1300 Saturdays and at no times on Sundays and recognised Public Holidays. Notwithstanding the hours stated above, the local planning authority may approve in writing deliveries outside these hours on prior application from the developer.

Operational Noise

Both PPS 22 and ETSU-R-97 refer to a 'simplified assessment method', which states that if it can be demonstrated that

'For single turbines or wind farms with very large separation distances between the turbines and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to a LA90,10min of 35 dB(A) up to wind speeds of 10 m/s at 10 m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary.'

It is also noted that the application has specifically identified residential properties at the The Paddocks and Castle Farm, Hadley Road, Gamlingay as having a specific financial interest in this project but no specific supporting information has been provided.

In terms of noise this is important because where a property has a financial involvement in the scheme, ETSU recommends that a relaxation of the derived noise limits be considered, stating that *'It is widely accepted that the level of disturbance or annoyance caused by a noise source is not only dependant upon the level and character of noise but also the receiver's attitude towards the noise source in general. If the residents at the noise-sensitive properties were financially involved in the project then higher noise limits will be appropriate'*. The guidance goes on to state that *it is fixed limits can be increased to 45 dB(A) to increase the permissible margin above background where the occupier of the property has some financial interest in the wind farm.*

I would agree with such an "occupier financial involvement approach" relaxation principle as such individuals are likely to be more tolerant in their attitude and may have a degree of control over the operation of the turbine should problems arise. In this case however the limit should only be increased to 40 dB(A).

However, ETSU provides no definition for a financially involved noise sensitive property and how this should be interpreted when assessing planning applications and whether they should be conditioned in detail to allow higher permitted noise levels. For example whilst the same

individual/s may own the nearest noise sensitive premises and the wind turbine or derive a rent, the property may be independently let and occupiers may not be considered financially interested and it could be argued that they should be afforded the same noise protection as others.

This may be deliberate (to allow flexibility) but in the absence of any detailed explanation, local planning authorities sometimes apply their own interpretation or definition in planning permissions and / or planning agreements. This drives uncertainty as to what type of contractual arrangement in any given case is likely to provide a robust basis for proceeding with the development.

However, it is our view to have a genuine "financial involvement" requires money or assets to be directly invested in the project in anticipation of a specific return or income source.

In this case the simplified assessment approach has been followed and operational wind turbine noise levels have been predicted to all the closest residential premises respectively, assuming a downwind in all directions, using manufacturer's test data for the turbines and suitable computer noise modeling software. The predictions indicate that at all residential premises not having a financial interest in the wind turbine noise levels will be below a LA90,10min of 35 dB(A) up to wind speeds of 10 m/s at 10 m height calculated at the turbine site. For those properties identified as having a financial interest noise levels will be below a LA90, 10min of 40 dB(A).

It should be noted that such a simplified approach is more conservative and stringent than the fixed limits proposed by ETSU-R-97, and afford a higher level of protection. In view of this it is reasonable to assume that the noise impact of the proposed wind turbine will be negligible.

Consideration has been given to the phenomenon of amplitude modulation. Having regard to the site specifics, government research on this matter and the fact that this is single turbine, I agree that its occurrence is extremely unlikely and warrants no further consideration.

The assessment is in accordance with noise assessment best practice / guidance and standards. It has been demonstrated that noise from the proposed turbine can be controlled to within acceptable noise level limits, determined in accordance with ETSU-R-97. It is therefore considered that noise from the turbine once operational would be, minor and not significant. No significant adverse impact is envisaged and an adequate level of protection against noise to protect amenity can be secured by conditions.

The following "wind turbine operational noise" conditions based on predicted noise levels are recommended to protect the amenity of nearby residential premises:

1. The development hereby permitted shall be carried out, operated and maintained in accordance with the submitted details and the Spectrum Acoustic Consultants Noise Impact Assessment Report titled "Gamlingay Community Turbine Generator –Environmental Appraisal" Report ref: CJA3185/11291 dated December 2011.
2. The level of noise emissions from the wind turbine shall not exceed a noise immission limit level of 35 dB LA90, 10-minute at any time in free-field conditions at any noise sensitive residential premises / dwellings, at wind speeds of up to 12m/s as measured or calculated at a height of 10m above ground level averaged over 10-minute periods within the turbine site.

The noise 35 dB LA90, 10-minute immission limit shall be increased to 40dB LA90, 10-minute at The Paddocks and Castle Farm, Hadley Road, Gamlingay which have been specifically identified as dwellings occupied by persons having a financial involvement in the turbine.

Dwellings occupied by persons having a “financial involvement” in the turbine shall be interpreted at those occupiers who have directly invested money or assets in the project in anticipation of a specific return or income source.

3. Within 28 days from the receipt of a written request from the local planning authority following a complaint to it, the wind turbine operator shall, at its own expense, employ an independent consultant approved in writing by the local planning authority to assess the level of noise emissions from the wind turbine at the complainant's property following a procedure to be agreed in writing and in accordance with the methods recommended in Section 2.0 on pages 102-104 of ETSU-R-97. Wind speeds shall be measured on site and referenced to a height of 10m above ground level. Where it is necessary to convert between measured wind speeds and the wind speed at a height of 10m above ground level, this shall be undertaken using a methodology to be submitted to and approved in writing by the local planning authority. Tonal noise (as defined on page 95 of ETSU-R-97) shall be assessed and rated in accordance with the advice contained in Sections 2.0 and 2.1 on pages 103-109 of ETSU-R-97. The developer shall supply wind speed and directional data to and at the request of the local planning authority to enable the proper evaluation of the measurements obtained.
4. Details of the assessment and its results as to whether a breach of the noise limits in Condition has been established shall be reported to the local planning authority as soon as the assessment is completed.
5. Upon notification in writing from the local planning authority of an established breach of the noise limits in Condition, the wind turbine operator shall, within 28 days propose a scheme to the local planning authority to mitigate the breach to prevent its future occurrence, including a timetable for its implementation. Following the written approval of the scheme by the local planning authority it shall be activated forthwith and thereafter retained.
6. No development shall commence until a protocol has been submitted to and approved in writing by the local planning authority for an effective means of addressing any complaints received by the local planning authority arising from noise emissions from the construction or operation of the turbine. The protocol shall be implemented as necessary at the request of the local planning authority.

Shadow Flicker

Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off within buildings and can cause an effect known as 'shadow flicker'. It is a precise phenomenon related to the sun rising in the East trajectory and movement during the day and setting in the West.

With regard to shadow flicker, PPS 22: Planning for Renewable Energy describes the conditions under which flicker may occur and states that the effect diminishes with distance, and that “flicker effects have been proven to occur only within ten rotor diameters of a turbine”. It also confirms that due to the trajectory of the sun, effects only occur within 130 degrees either side of north relative to the turbines.

This guidance was reviewed in a 2011 study which was commissioned by the Department of Energy and Climate Change (DECC) and carried out by infrastructure company Parsons Brinkerhoff. Based on the findings of the research, the government has concluded that existing planning guidance on shadow flicker is fit for purpose and no changes are necessary as the

potential for shadow flicker is very low at distances greater than ten rotor diameter from the turbine.

The Myriad CEG Environmental Appraisal submitted includes some simplistic prediction of shadow flicker and it is concluded that the effect is minimal and no mitigation is required. It is noted that no detailed computer modeling of shadow flicker has been undertaken and the predictions detailed and methodology are not clear.

However based on guidance, for the proposed turbine shadow flicker can only realistically occur at distances of up to approximately 334 metres away (rotor diameter 33.4m x 10).

All the closest buildings to the proposed turbine are at distances greater than 334 metres, with Castle Farm being the closest approximately 500m NNE. Based on this separation distance alone shadow flicker is very unlikely to cause any adverse impact.

If there remains concern about this phenomenon becoming a nuisance and as the potential for shadow flicker is very low at distances greater than ten rotor diameter from the turbine, its effect can be adequately mitigated through the imposition and implementation of an appropriately worded condition requiring assessment and mitigation if justified complaints are received by the LPA when operational. The following wording is suggested:

Following a complaint to and at the request of the local planning authority, a scheme setting out a protocol for the investigation and alleviation of shadow flicker caused by the turbine hereby permitted shall be submitted to and approved in writing by the local planning authority. The scheme shall include details of the photocells and any other measures proposed to remove any such effect. The approved mitigation measures shall be implemented in accordance with a timescale approved in writing by the local planning authority and retained for the duration of the permission.

Conclusion - Recommendation

The potential for noise impact has been assessed in accordance with best practice / guidance and standards. It has been demonstrated that noise from the proposed turbine can be controlled to within acceptable noise level limits, determined in accordance with ETSU-R-97. It is therefore considered that noise from the turbine once operational would be minor and not significant. No significant adverse impact is envisaged and an adequate level of protection against noise to protect amenity can be secured by conditions.

Shadow flicker is unlikely to cause any significant adverse impact.

No objection in principle subject to the imposition of conditions for operational noise and shadow flicker as recommended.

However consideration should be given to the legality and enforceability of the recommended lower noise immission limit level condition part wording relating to "dwellings occupied by persons having a financial involvement in the turbine". As stated in the absence of any detailed explanation in ETSU on this matter, we the LPA may need to apply our own interpretation or definition in planning permissions and / or planning agreements. This drives uncertainty as to what type of contractual arrangement in this case is likely to provide a robust basis for proceeding with the development.

If there are any issues that require further explanation or information then please contact me.

Regards

**GREG KEARNEY
ENVIRONMENTAL HEALTH OFFICER**

