BEL/SA/2: Proof of evidence

PINS Ref: APP/Z2830/A/11/2165035

TOWN AND COUNTRY PLANNING ACT 1990

An appeal by Broadview Energy Developments Limited concerning Land at Spring Farm Ridge to the North of Welsh Lane, between Greatworth and Helmdon

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on behalf of Broadview Energy Developments Limited

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1 Personal experience

1.1 I am Stephen Arnott, Principal Associate Consultant with TNEI Services Limited, a consultancy specialising in the planning and development of renewables, predominantly wind energy, for which I have worked on behalf of developers, Local Authorities and objectors. I am involved with the measurement, prediction and assessment of all types of occupational, community and environmental noise.

1.2 I hold the degree of Bachelor of Science in Environmental Sciences, a Diploma in Acoustics and Noise Control and a Diploma in Environmental Health, together with a Master of Science degree in Applied Acoustics. In the last 32 years I have acquired a broad experience of environmental noise prediction, measurement and assessment from a variety of industrial and commercial sources, initially in the public sector working as an Environmental Health Officer (EHO) and for the last 22 years working within the private sector. I have been a member of the UK Institute of Acoustics since 1987.

1.3 Working with TNEI Services Limited since July 2007, I have been involved with over 60 wind farm assessments, from the fairly common small 3-5 turbine schemes to several 15-20+ turbine schemes, together with numerous smaller wind turbine assessments across the UK. I am involved in each stage of the process, from initial selection of monitoring locations, preparation of the ETSU-R-97 assessments and environmental statement chapters, together with their associated planning applications and where appropriate, their appeals. To date I have provided evidence to 15 public inquiries and am currently preparing evidence for 9 more.

1.4 I have experience of drafting and review of suitable noise conditions related to the control of operational noise, including Other Amplitude Modulation (OAM). I will discuss the merit of such conditions within my proof.

1.5 My involvement with this project began in 2010, when TNEI Services Limited (TNEI) was appointed by Broadview Energy Developments Limited (the Appellant) to undertake the ETSU-R-97 assessment. After refusal of the application, TNEI were retained to assist with preparation of Further Environmental Information (FEI) and to provide assistance at the subsequent Public Inquiry in relation to noise, where I presented evidence. Inspector Fieldhouse granted permission[1] which was then quashed following judicial review[2] on 16/01/2013. TNEI have since had an on-going brief to provide support throughout the redetermination.

[1] Decision Notice APP/Z2830/A/11/2165035 , Spring Farm Ridge, land to the north of Welsh Lane between Greatworth and Helmdon, 12 July 2012

[2] [2013] EWHC 11 (ADMIN) Case No: CO/8849 AND 8922/2012

2 Purpose, Scope and Structure of Evidence

2.1 I have been responsible for approving all aspects of the noise assessment submitted in support of the application. My evidence will therefore describe, as required, the noise assessments, the relevant standards that apply and the outcomes of those assessments.

2.2 I will refer to:

- the ETSU-R-97 assessment prepared by TNEI;
- the construction noise assessment prepared by TNEI;
- the Further Environmental Information submitted in February 2012;
- the recent guidance on the application of ETSU-R-97 issued by the Institute of Acoustics, and how that relates to these assessments;
- the Appeal Decision APP/Z2830/A/11/2165035 insofar as it relates to noise.

2.3 In the absence of any further information submitted by Helmdon, Stuchbury and Greatworth Wind Action Group (HSGWAG), I will briefly consider the original review undertaken by Robert Davis Associates and address the minor points raised.

Changes since the original Public Inquiry

2.4 I will consider the implications of proposed developments in the vicinity of the proposed site, in particular the major HS2 high speed rail link.

2.5 The Council no longer consider noise to be a reason for refusal[3], subject to the agreement of suitably worded noise conditions. I discuss the need for conditions in Section 6 and suggest that the conditions included by Inspector Fieldhouse in her original Appeal decision notice may usefully be used as a starting point, for consideration by all parties.

2.6 I will explain to the Inquiry why I consider that the noise assessment undertaken for the proposed Spring Farm Ridge wind farm reflects current good practice and agree with the Council that noise should not be considered a reason for refusal of planning permission.

[3] Statement of Common Ground, Section 3, dated 19th July 2013

3 Background

3.1 The proposed site is situated equidistant between Greatworth approximately 1km to the south west and Helmdon to the east, with Stuchbury about 500m north and the village of Sulgrave approximately 2km distant.

3.2 The site and immediate surroundings are currently agricultural land bounded by established hedgerows interspersed with trees, with the B4525 as the southern boundary. Having due regard to the topography and current agricultural use, I consider this to be acoustically 'soft' ground, offering absorption but affording no physical screening to the nearest residential receptors. A recently consented[4] off road facility operated by Tanks-a-Lot[5] hosts 100 military vehicles including tanks and specialises in adventure days including car crushing, while an un-metalled track running from the B4525 north through Stuchbury Hall Farm is frequented by 4X4 and motorbike enthusiasts. The soundscape evident on the established footpaths and bridleway across the site is that of working farms, traffic and motorsport, both onsite and from the distant Silverstone racetrack. Appendix 6 of the TNEI noise assessment [6278-04-N-057 ETSU-R-97 Noise Report R1] highlights just some of these noises noted by residents during the background noise survey.

3.3 In addition to consideration of operational noise, construction noise was also assessed and submitted as FEI [6278-04-N-094 Spring Farm Ridge Renewable Energy Project Construction Noise Report R2 23-01-12]. This confirmed there would be audible, temporary increases at the nearest receptors, but these were not significant when assessed using guidance in the relevant British Standard[6].

3.4 The Council originally described noise as injurious to residential amenity, and this formed one of the six grounds for refusal addressed at the original public inquiry. Having reviewed their position the Council no longer raise any objection on noise grounds.

3.5 Inspector Fieldhouse gave careful consideration to the potential noise impacts[7] and concluded that, subject to appropriate controls through conditions, there would be no harm due to noise and the proposed development could be controlled in accordance with government policy. This position was challenged in the subsequent High Court appeal, where it was alleged the Inspector had failed to adequately consider the actual noise impacts of wind turbines in amenity terms and/or to examine and/or focus upon noise impacts beyond the issue of compliance with ETSU-R-97, and had failed to provide adequate reasons for her approach to examining noise impacts and concluding upon them in terms of ETSU-R-97. This argument, which formed Ground 4 of the challenge, was rejected by His Honour Judge Mackie QC, who observed (paragraph 85) that;

> *…In this case the Inspector considered the matter with care and then decided, unsurprisingly perhaps given the national guidance, to apply ETSU and attach a condition. This was a matter of fact for her to decide and she did so lawfully.*

[4] Decision Notice (Application SS/2010/1117/MAF) dated 22 August 2012, South Northamptonshire Council
[5] http://www.tanklimo.com/vehicles
[6] BS5228-1:2009 Code of practice for noise and vibration control on construction and open sites- Part 1: Noise
[7] Decision notice APP/Z2830/A/11/2165035 Spring Farm Ridge, 12 July 2012

3.6 Representations were made by Helmdon, Stuchbury and Greatworth Wind Action Group (HSGWAG), who appointed Robert Davis Associates (RDA) to advise on noise. I understand that HSGWAG have applied for Rule 6 status at this inquiry. In the absence of further information having being submitted at this time, as noted in the HSGWAG Statement of Case dated June 2013 the original RDA report is relied upon and is therefore considered in Section 5.

4 Relevant noise impact assessment guidance

Local guidance

4.1 Supplementary Planning Document (SPD) 'Wind Turbines in the Open Countryside' dated December 2010, prepared by South Northamptonshire Council, deals with amenity in Section 13. This was adopted after submission of the Environmental Statement (ES), just prior to determination of the application by the Development Control Committee. At paragraph 13.5 it refers to an unreferenced 600m distance recommendation that appears nowhere else in the document. There is no material justification for this recommendation provided in the text and no acceptable criteria specified. Recent guidance[8] does not support the use of such arbitrary buffer distances.

4.2 At paragraph 13.7 an outline approach to conditions is provided. The draft conditions proposed by the appellant and included in the Appeal Decision for the original inquiry meet this requirement.

4.3 At paragraph 13.8 a number of guidelines and standards are endorsed without any qualification. Of these, only ETSU-R-97 relates specifically to wind turbines and recommendations within the remaining documents can conflict with this e.g. BS 7445-2 1991 para 5.4.3.3 restricts measurements to 1-5ms^{-1} wind speed, clearly inappropriate to wind farms. Although ISO9613-2 is listed, no guidance is provided in terms of assumptions to be made or limitations in use.

4.4 At paragraph 13.9 the SPD requires that noise monitoring locations are agreed with the local planning authority. Background monitoring locations were discussed and agreed with the Environmental Protection Officer (EPO) in January 2010 and baseline surveys were subsequently carried out at nine locations, during March, April and May 2010. On-going correspondence with the EPO was included as Appendix 2 of that report. I consider that this requirement was met.

4.5 In my opinion the SPD provides little information that is either useful or meaningful on noise matters. Where requirements are clearly expressed in a meaningful way, the ES and FEI have met those requirements.

National guidance

4.6 TNEI report 6278-04-N-057 dated September 2010 was presented as Appendix 6 of the ES supporting the planning application. This described the methodology employed and the relevant guidance adopted, in particular ETSU-R-97 [CD 9.1], which was and is the relevant guidance.

4.7 NPS EN-1[9] identifies [CD 2.7 Section 5.11.4] key issues to be addressed by an ES noise assessment, specifically referring to further guidance on renewables in EN-3.

4.8 NPS EN-3[10] [CD 2.8 paragraph 2.7.55 & 2.7.56] provides explicit support for the use of ETSU-R-97 and notes (Footnote 33) that notwithstanding the date of that report the limits it recommends remain a sound basis for planning decisions. No additional requirements are specified. Neither NPS document refers to any guidance by the World Health Organisation or other international bodies.

[8] Planning Practice Guidance for Renewable and Low carbon Enercy, DCLG, July 2013
[9] Overarching National Policy Satement for Energy (EN-1), DECC July 2011
10 National Policy Statement for Renewable Energy Infrastructure (EN-3), DECC July 2011

Research by Hayes Mckenzie Partnership noted that in England, ETSU-R-97 is universally used[11] for the assessment of wind farm developments. Although Inspectors have noted[12] that ETSU-R-97 provides a framework for assessment and should not be applied inflexibly, in my opinion it should be applied consistently. Since the Hayes Mckenzie report and in the interim period since the TNEI assessment was completed, the Institute of Acoustics has consulted extensively on guidance on the application of ETSU-R-97, which has now been published[13] and endorsed[14] by the Secretary of State and should therefore be given significant weight. I have reviewed the assessment against that new guidance, in particular with respect to data handling for the background survey, the noise prediction methodology adopted and use of appropriate turbine sound power data, including conservative uncertainty factors. The summary outcomes of this review are discussed in Section 4.9 and in detail in SA3/Appendix 1. Application of the current guidance necessitated some minor amendments to the assessment as shown in Appendix 1, however the overall outcomes remain the same. In my opinion the assessment was robust and remains valid.

Good practice guidance

4.9 The Institute of Acoustics Good Practice Guidance on the Application of ETSU-R-97 for the Assessment and rating of Wind Turbine Noise (IOA GPG) was released in May 2013.

4.10 TNEI reviewed the assessment in response to the new guidance and this was discussed by the appellant with Inspector Woolcock at the pre inquiry meeting. Subsequently the outcomes of the review were issued to all parties on 8th August 2013 and confirmed that the earlier assessments meet all the requirements of current good practice. The information is included here for convenience as SA3/Appendix 1.

The implications of HS2

4.11 At the time of the first inquiry, the route for the proposed HS2 remained uncertain, and there was little information available. It was not therefore considered material to that inquiry. The route has now been confirmed, to the extent it is indicated in publicly available documents (CD 14.1), and proximate to the proposed Spring Farm Ridge wind farm at its closest point the route passes very near to Greatworth Hall.

4.12 Examination of the accompanying draft Environmental Statement (CD 14.1) provides a noise contour plot showing L_{Aeq} levels near the hall of 60-65 dBA from 07:00-23:00 relating solely to operation of the trains, given here as Figure SV-01-35 dated 18/04/13 prepared by the HS2. I have not validated these predictions, but have no grounds to suspect they have not been assessed competently. Train noise typically decreases by 3dB per doubling of distance, so from the plot we observe a reduction in levels towards Bungalow Farm down to about 45dBA.

4.13 At both locations existing background ranged from 34.7 dBA @ $3ms^{-1}$ up to 45.3 dBA @ $10ms^{-1}$. At Bungalow Farm the noise from HS2 will therefore

[11] Analysis of how noise impacts are considered in the determination of wind farm planning applications, HM:2293/R1, DECC April 2011

[12] APP/k1128/A/08/2072150 North of Goveton, 7 April 2009

[13] Good Practice Guidance on the Application of ETSU-R-97 for the Assessment and rating of Wind Turbine Noise, Institute of Acoustics, 21 May 2013

[14] Letter Rt Hon Edward Davey MP to Prof B Shield, IOA, 20 May 2013 (Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/201013/130520_Institute_of_Acoustics.pdf)

dominate the soundscape under all wind conditions. At Greatworth Hall the predicted increase represents a significant change, such that train noise will dominate all other noise in that locality, resulting in a dramatic change in overall background noise levels. The L_{Aeq} parameter used in the HS2 ES is widely used in environmental noise assessment; essentially it expresses the average over the measured time period, which in this case is a 16 hour period. Levels experienced when a train is actually passing will be considerably more than this.

4.14 The implication for the proposed wind farm is that for these two receptors the background noise levels will increase very significantly. The current basis of assessment for wind turbine noise based on existing levels would therefore overestimate the impact from turbines in the event the HS2 scheme proceeds. To assess the impact on other receptors would require additional modelling work, which is not necessary for the purpose of this inquiry. The predicted wind turbine noise at these two receptors is acceptable in terms of current Government guidelines. It is my opinion that the subsequent development, or otherwise, of the HS2 proposal is therefore not material to this appeal in respect of noise.

5 Helmdon, Stuchbury and Greatworth Wind Action Group (HSGWAG)

Impact upon amenity

5.1 HSGWAG instructed Robert Davis & Associates Limited (RDA) to consider the noise aspects of the proposal. Their summary report, dated 5 December 2010, formed Appendix G of the HSGWAG objection at the original public inquiry. The issue of amenity was raised in the RDA report, which noted in Section 1.1 that compliance with ETSU-R-97 does not imply that there will be no adverse noise impact. The potential audibility of turbines was highlighted in the TNEI report [paragraph 4.41]. ETSU-R-97 is intended to assess acceptability viewed against the wider environmental benefits of renewable energy generation, not audibility. As noted at paragraph 4.8, EN-3 (paragraph 2.7.58) considers ETSU-R-97 compliant proposals satisfactory in noise terms and there is no reason to consider this does not apply both at application and appeal stages.

5.2 To consider how the proposed turbines can impact upon amenity at Spring Farm Ridge it is helpful to consider the change in levels that are predicted to occur during operation of the turbines. The ETSU-R-97 graphs showing background noise and predicted turbine noise were included as Figures 6.1-6.11 of the TNEI report. These have now been superceded by the updated graphs, as shown in Appendix 1, in light of the IOA GPG.

5.3 The ability to perceive changes in noise levels will vary between individuals. A 10 dB increase in noise level will produce a perception of about a doubling of the loudness. Thus a noise measured at 50dB(A) will sound twice as loud as one at 40dB(A). Generally a sound level change of 3dB is the minimum detectable under controlled conditions. As gardens are not a controlled environment, a change of 3dB is liable to go unnoticed and should not be considered detrimental to amenity, however the degree of audibility depends on the characteristics of the background noise at any given time and how that compares to the character of the turbine noise immissions. Application of the ETSU-R-97 standards, which allow an increase of 5dB above background during quiet daytime periods, is liable to be perceptible, not least because of the distinctive character of turbine noise and can therefore be perceived a resulting in a moderate loss of amenity.

5.4 The perception of impact upon amenity is difficult to express in objective terms. Wind farm opponents usually cite noise concerns as a significant issue, but their views, in particular how significant the noise impact will be on their amenity may be very much influenced by their relationship to the scheme. G.P. van den Berg[15] [CD 9.14] made the point that acceptability was related not to absolute noise levels but the relationship or involvement of an individual with the development.

5.5 A review of Table 6.4 of the TNEI report indicated that during quiet daytime predicted downwind turbine noise using a candidate turbine was always less than 5dB above the average background, below the level identified as a moderate loss of amenity. The updated graphs in Appendix 1 demonstrate this continues to be the case.

Non-conformance with local policies

5.6 Given the primacy of the adopted development plan, it is necessary to determine the compliance or otherwise of the scheme with those policies which seek to protect general amenity of existing occupiers, including noise

[15] Why is wind turbine noise noisier than other noise? G.P. van den Berg, Public Health Service Amsterdam, Euronoise 2009, Edinburgh, Section 3B, page 5

amenity. To this extent, changes to the background noise environment brought about by the turbines, even if ETSU-R-97 derived levels can be met, can be material considerations in the planning balance. At the first inquiry the Inspector considered this aspect and noted;

> *69. ….No harm is found in respect of noise immission levels suggested in the condition and there would be no conflict with the advice in CG PPS22, EN-1, EN-3 and the Framework in this respect. Subject to the proposed condition there would be no conflict with LP policy G3 (D) or emerging CS policy S11 (3) in respect of noise.*

5.7 From my perspective as an Acoustician , not a Planner, the Council had the opportunity to review their position yet chose not to promote a case on noise amenity, implying their continuing satisfaction in respect of those policies as regards potential noise impacts. Mr Bell deals with matters of planning policy, but my view is that firstly the scheme is compliant with ETSU-R-97 applied in accordance with the IOA GPG and secondly, any changes to the background noise environment brought about the turbines should not lead to a breach of the amenity based policies in the adopted development plan. That view was also expressed by Inspector Fieldhouse in her Appeal Decision in July 2012.

Alternative assessment methods

5.8 RDA cited an appeal in Wales (Gorsedd Bran, Nantglyn APP/R6830/A/08/2074921 [CD 6.34 paragraphs. 21-23]) as an example of a planning inspector expressing concern over amenity issues, despite compliance with ETSU-R-97 limits. The consideration of amenity beyond ETSU-R-97 was addressed specifically for Spring Farm Ridge in a High Court challenge (as Ground 4 of the challenge), which claimed the Inspector had failed adequately to consider the actual noise impact of wind turbines in amenity terms and/or to examine and/or focus upon noise impacts beyond the issue of compliance with ETSU-R-97 and that the Inspector failed to provide adequate reasons for her approach to examining noise impacts and concluding upon them in terms of ETSU-R-97. Judge Mackie QC discussed these issues at paragraphs 77- 84 and decided that

> *85. As I see it this Ground was raised and decided at the Inquiry and is not for this Court. The fact that the law recognises that in some cases an Inspector can validly decide to take factors other than ETSU into account does not mean that in other situations an Inspector may not lawfully conclude that ETSU compliance is the right measure. In this case the Inspector considered the matter with care and then decided, unsurprisingly perhaps given the national guidance, to apply ETSU and attach a condition. This was a matter for her to decide and she did so lawfully.*

5.9 Gorsedd Bran was in fact a rare example. I have reviewed numerous wind farm appeal decisions and yet find only two others where an Inspector has considered additional guidance;

- At Auchtermuchty (Appeal Ref: P/PPAl250/675, paragraphs 28-31) Reporter David Gordon carefully considered amenity impacts and dismissed the appeal. The operator proposed curtailing all turbines to 1.4MW during the day- in other words they proposed ramping the noise up at night to utilise the fixed minimum limits. That is not the design philosophy adopted here. The visual impact of turbines in close proximity (180m) to valued common

land was given significant weight, as was the predicted increase in noise such that it would no longer be considered a peaceful place; in contrast land at the proposed site is private and currently used either for large scale agriculture, or war games, car crushing and adventure sports, a completely different scenario to the community land at Auchtermuchty. Any potential impact upon amenity for those using the footpaths across the site must reflect this, together with the limited duration of their exposure crossing the site.

- The second example concerns Weaverthorpe Road (APP/W4705/A/09/2114165, paragraphs 6 & 42-55) where Inspector E Ord dismissed the appeal for a single turbine on both noise and visual grounds, relying upon an assessment based upon BS4142. That appeal relied upon written submissions; there was no opportunity to challenge the evidence by cross examination and the Inspector was not able to seek clarification on technical issues. It was an industrial site, situated above an urban residential area with the closest dwelling just 165m away, a very different situation from the proposal at Spring Farm Ridge.

It remains for the Inspector to give weight, or not, to alternative assessment methodologies. In the absence of any substantive evidence presented by opponents to the scheme, and in light of the High Court decision and subsequent government endorsement for the application of ETSU-R-97 in accordance with the IOA GPG, I can find no reason to justify the adoption an alternative approach here at Spring Farm Ridge.

Fixed minimum limits

5.10 At Section 2 of the RDA report it was stated that the 40dBA fixed minimum limited had been proposed without justification; this is simply incorrect, the TNEI report clearly utilised a 35dBA fixed minimum limit during quiet daytime and this was relied upon at only one receptor, Peters Farm, and then only at $3ms^{-1}$, as all for all other receptors and wind speeds the background + 5dBA was louder than this.

Data analysis & filtering

5.11 At Section 3 RDA question prediction uncertainty without further clarification and indicate Bungalow Farm to be 'at risk' in a narrow range of northerly wind speeds. The predicted turbine immission levels represent the downwind conditions, so for Bungalow Farm that would be in northerly winds. RDA do not acknowledge that in other wind directions the noise levels are liable to be significantly less than those downwind predictions, at times 10dB[16] less. As the northerly winds occur for approximately <5% of the time, as indicated by the wind rose given as SA3/Appendix 2, original suggestions by RDA that this receptor are 'at risk' seem unduly alarmist.

5.12 At Section 4 RDA highlight a split in night time data and suggest this is the dawn chorus. This phenomenon typically occurs from perhaps an hour before sunrise and progresses throughout the night, until the affect is overridden by the progressive increase in noise that is often seen towards morning. It is argued that this is seasonal and therefore misrepresents the background noise levels in the locality and the IOA GPG states (paragraph 3.1.7) that where appropriate, clear dawn chorus effects should be

[16] Good Practice Guidance on the Applicatcation of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise ,p22 paragraph 4.4.2, Institute of Acoustics May 2013

removed from night time data. This topic has been considered at inquiry[17] (para 11.55 p 94), where Inspector Baird felt that any distortions due to birdsong were not significant, particularly in view of the fixed minimum limits and I consider that the same situation is applicable here. I share that view, but in accordance with current good practice the background noise data was reassessed and amended to remove birdsong. The amendments did not result in any significant change, as anticipated. The results are given in SA3/Appendix 1.

5.13 RDA suggested that traffic noise from the M40 and possibly the A43 contributes when the wind is from the south or west. Since that is the dominant wind direction this is very much a part of the background noise for all receptors. Having reviewed the requirements of the IOA GPG (paragraphs 3.1.22-3.1.24) I do not consider filtering appropriate.

5.14 At Section 5 RDA highlight that TNEI did not use a rain gauge and suggest that the data recorded may be unreliable due to this. ETSU-R-97 notes (p85) that measurements should not be used from periods of heavy rainfall, it does not say that a rain gauge must be utilised for that purpose. Whilst that is the usual TNEI approach, at this site during the first five weeks of background survey rain was monitored by the Zephir LIDAR unit. Thereafter a 60m mast was provided by the appellant that had no rain gauge provided, so for the final 2 weeks of survey TNEI obtained data from the Meteorological Office, measured by the Chenies Rainfall Radar with 2km resolution centred upon the Spring Farm Ridge site. All data excluded during periods of rain was indicated on the Figures 5.2-5.23 in blue of the TNEI report. The IOA GPG (Section 2.7) indicates that rain gauges are the preferred method whilst acknowledging use of the alternative methods adopted here. All recorded data during periods of rainfall recorded by any means were excluded from derivation of background noise levels. Having reviewed all available information, I am satisfied this was a robust approach that provided data that can be relied upon.

Additional topics raised by HSGWAG

5.15 HSGWAG noted in paragraph 4 of their Statement of Case dated June 2013 that they will rely upon the evidence detailed in their written objection dated January 2011. This section addresses the issues raised at that time.

5.16 On 9th May 2012 South Northamptonshire District Council made available a number of third party documents, including further documents prepared by HSGWAG. For clarity page numbers shown in parenthesis refer to physical page numbers in the PDF document provided by the council, while paragraph numbers in square parenthesis are those used within each original document. Note that further representations from third parties were subsequently made available by the Planning Inspectorate in 2013, but none of these introduced any new noise topics requiring additional comment.

5.17 The British Horse Society (Pages 10 & 11) [para 5.2.4 & para 6.1 bullet 3] expresses vague, non site specific concerns that noise can un-nerve a horse. No specific information in terms of noise levels or characteristics, or variations in the susceptibility of individual horses is provided against which the proposals can be assessed. The same issue is noted in their conclusions [para 10.2].

[17] APP/H0928/A/09/2093576, Grise Wind Farm, Calthwaite, Penrith, Secretary of State for Communities and Local Government, February 2010.

5.18 Inspector Fieldhouse considered this at the first inquiry and discussed this at paragraph 78 of her Appeal Decision;

> *78. CG PPS22 advises that the 200m separation distance is deemed desirable but it is not a statutory requirement. If the BOAT is used by horses where the separation distance is below that desirable, they would already have been travelling in a 'wind farm landscape' and the wind turbines would not appear suddenly. The Appellant advises, and as found by a previous Inspector (APP/E2001/A/10/2137617 and 2139965), turbines start very slowly and gradually pick up speed. Therefore, to all but the most highly strung horse the wind turbines are unlikely to be a surprise or frightening. The proposed micro-siting condition would prevent any micro-siting of turbines T2 or T3 closer to the BOAT, so the maximum shortfall on the desirable separation would be 17m. The shortfall on the separation distance from the BOAT carries limited weight.*

5.19 Appendix 3 provides a noise contour plot of predicted turbine noise levels across the site, with highest predicted noise levels at wind up to $10ms^{-1}$ i.e. all turbines at maximum power. On the bridleway to Stuchbury Hall Farm the maximum noise, nearest to Turbine 5, would be 42 dBA (L90). In contrast, noise from typical agricultural machinery e.g a Tractor towing a trailer can be 79 dBA[18] LAeq at 10m distance. Noise from a tank operating nearby is liable to be even higher and their movements are unpredictable. Riders passing south on the BOAT from Stuchbury Hall Farm would pass between turbines 2 & 3 and for a brief time could experience noise levels up to 48 dBA. As the bridleway joins the road to the south, noise from traffic at speed is inevitable for any riders on this route. The noise from the turbines is therefore considerably less than from other frequently encountered sources in this locality. No evidence has been presented to demonstrate that the turbine noise levels are liable to cause problems for horses, or their riders.

5.20 Mr Powell (Page 33) [para 3] expresses concern about noise and is critical of the modelling undertaken which he states is based on 'flat ground'. I suspect there may be some misunderstanding of the ISO9613 modelling approach adopted here, even though the modelling methodology was described in the TNEI report. The model calculates the average height between each source and receiver for every turbine; it does not assume flat ground but does assume a steady slope. ISO9613 is the most widely used model for wind turbine noise in the UK and is recommended in the IOA GPG. The implication for slope corrections was considered within the IOA GPG review and found to be unnecessary. I consider ISO 9613 to be the most robust model available for wind turbine noise prediction. No alternative evidence has been presented, by any party, to demonstrate otherwise.

5.21 The Friends of Mary Magdelene Church (Page 38) express concern that turbine noise could be heard within the church. Predicted turbine noise levels in that part of Helmdon are about 29dBA. I measured a brief snapshot of noise outside the church (given here as Appendix 4) which indicated the ambient LAeq was 43dBA. At that time I heard birdsong and distant traffic. Under these circumstances, with predicted noise more than 10dB below

[18] Code of practice for noise and vibration control on construction and open sites – Part 1: Noise BS5228-1:2009, Table C.4 'Sound level data on general site activities' Row entry reference 75, British Standards Institute, London

ambient noise there would be no change in the ambient levels and I would not expect the turbines to be audible within the church.

5.22 Mr Peter Burns, writing on behalf of Helmdon Parish Council (Page 44) voices general concerns on noise and reports observations of a bowl in the village reflecting noise, particularly towards the eastern end of the village. This is purely anecdotal information, unsupported by any evidence relating to the topography or any measurement information. Predicted turbine noise is liable to be between 26-27 dBA at this end of the village. These are very low levels that are not anticipated to cause any noise disturbance at this location. The presence, or otherwise, of a bowl is not significant in my view.

5.23 At (Page 52/53) resident Mr Cross expresses concern about turbine noise and his horses. As I noted in paragraph 5.19 turbine noise is considerably less than noise associated with agricultural machinery or indeed general traffic in the locality and there is no evidence to support any suggestion of particular problems for horse riders.

5.24 Mrs Atkins, resident at Grange Farm (Page 67/68) [para 2.1 & 2.2] raises a broad concern in respect of noise, amenity and sleep disturbance issues, together with concerns about the ETSU-R-97 methodology. Predicted noise at Grange Farm was around 35-36dBA. Examining Figure 12.25 [Grange Farm H3] of the FEI Appendices we see that during the ETSU-R-97 quiet day time periods predicted turbine noise is very close to the existing background noise, which should not result in any loss of amenity for residents using their garden. At night the level is above background, but at night we are concerned with potential sleep disturbance rather than amenity within the garden. External levels of 35 dBA at night will result in perfectly acceptable levels within any bedroom, even if we allow just 10dB attenuation through an opened window. ETSU-R-97 remains the Government endorsed guidance and as such is the appropriate tool to be used here, despite any unspecified reservations Mrs Atkins may have. At the Low Spinney inquiry (APP/F2415/A/09/2109745) I gave evidence on this topic, while evidence for the opposition group was presented by Dr Hanning, a specialist in sleep medicine. Inspector Griffiths commented [paras 44-46] that the evidence put forward on sleep disturbance was not sufficient for him to consider setting aside Government guidance and that ETSU-R-97 was the yardstick to be used for assessment. It is of interest to note that Low Spinney windfarm was subsequently consented, built and is currently operated without any noise complaints from residents, as far as I am aware. Their noise concerns, though genuinely held, proved unfounded.

5.25 (Page 82) Mr Colin Wooton on behalf of Sulgrave Parish Council refers to National Planning Policy Framework areas of tranquillity, suggesting this is just such an area. In my view this site does not fall within the concept of a 'quiet area in open country' and the background noise measurements undertaken by TNEI demonstrated this. His Appendix 2 (Page 105) mentions noise again and at Page 105 mentions 'there would be more or less constant and unnaturally rhythmical loud noise'. Predicted turbine noise around Sulgrave is between 25-28 dBA outside properties. These are very low noise levels and are liable to be inaudible at Sulgrave most of the time. To put these levels in context BS 823319: suggests that reasonable internal conditions for Living Rooms is 30-40 dBA and reasonable listening conditions in a Concert Hall is 25-30 dBA. The available evidence does not therefore support his concern in relation to noise.

[19] BS 8233: 1999 'Sound Insulation and noise reduction for buildings- Code of practice', BS 8233: 1999 Table 5, BSI, London.

5.26 (Page 119) The Appendix to Mr Haynes objection, a resident of Greatworth, states that many villagers are worried about noise in general and the effect on their pets. Appendix 1 shows predicted turbine noise levels for Greatworth are between 28 - 34 dB. Location H7 within the TNEI report shown in Figure 6.7, represents the nearest receptor in Greatworth and shows predicted turbine noise to be at a similar level to the existing daytime background noise levels. At locations further from the proposed wind farm noise levels will reduce to several decibels below the background. On that basis I feel the concerns expressed on behalf of the residents are unfounded.

5.27 Fiona Davies on behalf of HSGWAG reiterates (Page 122/123) Richard Honeys Opinion on noise and amenity issues, referring to the Gorsedd Bran inquiry and court case. As discussed at paragraph 3.7 of this proof, the option of alternative assessment methodologies was considered by the High Court. Since then the recent[20] Planning Practice Guidance for Renewable and Low Carbon Energy has been issued which clearly states;

> *30. The report, 'The assessment and rating of noise from wind farms' (ETSU-R-97) should be used by local planning authorities when assessing and rating noise from wind energy developments. Good practice guidance on noise assessments of wind farms has been prepared by the Institute Of Acoustics. The Department of Energy and Climate Change accept that it represents current industry good practice and endorses it as a supplement to ETSU-R-97. It is available on the Department of Energy and Climate Change's website.*

Paragraph 15 (last bullet point) makes it clear that protecting local amenity is an important consideration and should be given proper weight in planning decisions. By endorsing ETSU-R-97, the Government are clearly satisfied it provides sufficient protection for amenity. It remains open for any decision maker to adopt an alternative assessment methodology, but to do so in light of such clear guidance from Government would require detailed justification.

5.28 The Council have made no noise objection on amenity grounds, being satisfied that the noise assessment prepared by TNEI was satisfactory.

[20] 'Planning Practice Guidance for Renewable and Low Carbon Energy', Department for Communities and Local Government, July 2013

6 Conditions

6.1 The Apellant has drafted a full set of conditions for consideration should the Inspector be minded to grant the appeal. These include detailed noise conditions, which prescribe the appropriate ETSU-R-97 limits and identify how noise complaints would be subsequently investigated and resolved. In accordance with the IOA GPG recommendations (paragraph 7.2) the draft conditions do not include any condition to address amplitude modulation (AM). I would consider any such condition unnecessary, imprecise and unenforceable.

6.2 At the Woolley Hill appeal (APP/H0520/A/11/2158702 23 March 2012), Inspector Rose undertook a comprehensive assessment of the need for and lawfulness of an OAM condition. He concluded that such a condition was not necessary and would fail the tests set out in Circular 11/95. He also rejected suggested draft conditions, including one from the Appellant itself as being unlawful. I agree with the detailed analysis given by Inspector Rose in this decision letter and see no reason to depart from his findings in this case.

6.3 More recently at Common Barn (APP/H0520/A/12/2188648 Land at Church Farm, Rectory Lane, Southoe, Cambridgeshire 11 July 2013) where I gave evidence, Inspector Philip Major adopted a similar position, noting that;

> *59. The question of excess, or other, amplitude modulation (OAM) was raised. This is a phenomenon which is not completely understood and it cannot be predicted accurately. However, there is nothing to suggest that this particular location would be susceptible to the likelihood of OAM occurring here, and this can be given little weight. In any event, should nuisance be reported which apparently results from perceived OAM tones then other legal procedures exist to deal with it. I do not agree with the suggestion that this should be dealt with by condition for 2 reasons. First, it is difficult to design a condition which meets the tests of Circular 11/956 (C11/95). Secondly, given that OAM is rare and unpredictable, it would not be reasonable and necessary to impose such a condition (again failing the tests of C11/95).*

6.4 Any assertion that an OAM condition is both necessary and reasonable, despite the lack of any evidence to support such a proposal, is unfounded and would not in my view accord with current good practice.

7 Conclusions

7.1 The assessment shows that the predicted wind turbine noise immission levels for Spring Farm Ridge Wind Farm, using a candidate turbine, meet the ETSU-R-97 derived noise limits, under all conditions and at all locations, for both quiet daytime and night-time periods.

7.2 I have:

- considered the assessment of operational noise and construction noise prepared by TNEI, reviewed in light of recent guidance on current good practice;
- considered the original report by RDA and their subsequent recommendations to their client HSGWAG,
- reviewed additional comments on noise provided by the EPO to his planning colleagues.

7.3 I consider that the assessment undertaken by TNEI applied the relevant guidance at the time of submission. Reviewing and updating that assessment to reflect the latest industry good practice does not alter the outcome of the assessment. In my view this is sufficient, subject to the imposition of suitable and legally enforceable conditions, to secure the amenity of local residents.

7.4 I have seen no evidence presented that would suggest a higher than remote chance of 'other' AM occurring at this site, or which would support the application of any condition on 'other' AM beyond the provisions included within ETSU-R-97.

7.5 I can find no reason why this appeal should be dismissed on noise grounds.

7.6 The information I have reviewed and included in this, my proof of evidence for appeal APP/Z2830/A/11/2165035, has been prepared in accordance with current good practice and with all due diligence. Any opinions expressed are my true and professional opinions.

Stephen Arnott
2nd September 2013