



Independent Noise Working Group

Wind Turbine Amplitude Modulation & Planning Control Study

Work Package 4 - Den Brook

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Objective:

To document the legal, planning and technical aspects surrounding the Den Brook AM planning conditions.

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Abbreviations

BGN	Background Noise
CoA	Court of Appeal
DBJRG	Den Brook Judicial Review Group
DBVAG	Den Brook Valley Action Group
EAM	Excess Amplitude Modulation
EIA	Environmental Impact Assessment
ETSU-R-97	The Assessment & Rating of Noise from Wind Farms
HMP	Hayes McKenzie Partnership
IoA	Institute of Acoustics
ISVR	Institute of Sound and Vibration
LPA	Local Planning Authority
MH	Mike Hulme
NIA	Noise Impact Assessment
PINS	Planning Inspectorate
REF	Renewable Energy Foundation
RES	Renewable Energy Systems
ReUK	RenewableUK
SoS	Secretary of State
WDBC	West Devon Borough Council
WT	Wind Turbine

1. Executive Summary

1.1 Developments during the first five years of the proposed Den Brook wind farm, located near North Tawton, West Devon, are well documented on aspects related to Excess Amplitude Modulation (EAM) by the four-hour, BBC2 documentary series ‘Wind Farm Wars’. Whilst briefly capturing the project from its beginnings, WP4 more specifically examines the development of EAM related matters since the documentary filming ended and planning permission was granted for a second time in December 2009, but this time, with unprecedented EAM noise controls and conditions appended.

1.2 A Den Brook Judicial Review Group (DBJRG) was established in March 2007 with the principal aim of ensuring acoustic impacts from the proposed wind turbines were properly conditioned and thus controlled in order to adequately preserve people’s well-being and human rights within the Den Brook neighbourhood. More specifically, DBJRG represents the interests of local residents whose amenity, sleep patterns and properties are considered to be at risk of adverse noise effects from the proposed Den Brook wind farm.

1.3 DBJRG has initiated a number of legal actions during the past eight years. Amongst the outcomes, noise data analyses firstly undertaken in-house by RES and later the developer’s commissioned acoustic consultants, Hoare Lea Acoustics, were found to be flawed to such an extent that the initial 2007 planning permission for the Den Brook wind farm was quashed by ruling of the Court of Appeal (CoA).

1.4 Planning conditions 20 and 21 were then imposed for the control of EAM wind turbine noise with the grant of planning permission in December 2009 by a senior Planning Inspector. The stand-alone EAM conditions were later ratified by a further Court of Appeal judgment such that *inter alia* in the ruling of Lord Justice Elias the following terms were specifically specified:

“...there is an obligation on the developers to comply with the AM levels specified in condition 20 and that obligation will run for the duration of the planning permission.”

1.5 Following the latter 2011 CoA judgment, Den Brook developer RES submitted a section 73 application to the Local Planning Authority (LPA) clearly intended for obtaining a substantive weakening of the imposed EAM noise conditions. RES’s proposals became the subject of reports carried out by the Institute of Sound and Vibration (ISVR) on behalf of the LPA and Dr Malcolm Swinbanks et al on behalf of DBJRG.

1.6 Dr Swinbanks’ in-depth examination of RES’s proposals exposed procedures that included undisclosed in-house software code which perversely reduced by up to 50% the measured levels of EAM that were to be assessed for compliance purposes.

1.7 RES subsequently withdrew the section 73 application and in the alternative devised a ‘Written Scheme’ in conjunction with recommendations from ISVR based on requirements of condition 21 of the planning permission.

1.8 A detailed and highly complex Written Scheme was formulated for specific measurement of wind turbine AM noise that was later discharged by the LPA, 21 May 2014. However, internal procedures implemented by the LPA dictated that no third party consultation was entered into by LPA officers for arriving at their decision to approve and discharge the Written Scheme.

1.9 Following discharge, DBJRG's professional acoustic consultants tested the condition 21 Written Scheme by systematic application of real-world wind turbine noise data to the approved methodology.

1.10 In particular, testing of the Written Scheme's stage 4, which incorporates complex mathematical procedures professed to filter out apparently invalid complaints before compliance testing is fully carried out. This revealed substantive discrepancies that clearly undermine the 2011 CoA ruling - i.e. that the EAM limits specified by condition 20 must apply for the life of the planning permission.

1.11 Moreover, it is represented (see WP6.1) that under the Doctrine of Precedent condition 20 is to remain intact unless overturned by an equal or higher authority than the CoA. Clearly, neither RES nor the LPA constitute such a higher authority.

1.12 DBJRG's ensuing efforts for resolving the flawed methodology fell to requiring further intervention through the courts. Detailed, expert evidence clearly identifying and illustrating the problematic aspects was submitted such that the LPA, its consultants ISVR, and RES were all made fully aware of flaws identified within the approved Written Scheme.

1.13 Notwithstanding the submitted evidence, neither RES nor the LPA's consultants ISVR addressed the most transparent flaw identified within stage 4 of the Written Scheme, i.e. stage 4(c).

1.14 Stage 4(c) requires:

If this assessment [i.e. stage 4, clauses (a) and (b)] indicates that GTE-AM is present, then the LAeq, 125msec data required by Condition 20 shall be band pass filtered, from 0.9fc to 1.1fc, and the application of the Condition 20 methodology repeated. This is essential to ensure that the variation causing apparent non-compliance with Condition 20 derives solely from that occurring at the blade passing frequency, fc.

1.15 Band pass filtering in the manner prescribed by stage 4(c) of the Written Scheme eliminates crucial elements of harmonic EAM noise from the raw data employed for compliance testing against the EAM parameters specified by condition 20. Thus, the amount of EAM noise presented for assessment would be significantly and materially understated for all compliance testing in the event of a noise complaint.

1.16 The court however, not having specific expertise in acoustics, held that where there was no agreement between experts, determinations in respect of the submitted technical expert evidence was a matter for the LPA.

1.17 DBJRG then approached RES's senior technical manager Dr Jeremy Bass for his considered view of whether the stage 4(c) requirement to filter raw data alters in any way the level of EAM controls established by condition 20 (Dr Bass is understood to have authored the procedures specified, including stage 4(c) of the Written Scheme). Dr Bass however deferred to the LPA for a determination of the matter.

1.18 Similarly, the LPA's consultants ISVR also evaded addressing the specific question.

1.19 The LPA has since been approached, 11 June 2015, by Mel Stride MP seeking the LPA's understanding and position regarding the consequences of stage 4(c) on condition 20. Up to the time of writing, i.e. 31 July 2015, a response has not been forthcoming from WDBC.

1.20 Moreover, longstanding concerns remain that RES, in consort with commissioned acoustics advisers Hoare Lea Acoustics and the Hayes McKenzie Partnership, misinformed and indeed misled not only the surrounding communities but decision makers within the LPA and later the Planning Inspectorate that EAM was not an issue requiring attention or indeed assessment.

1.21 The now clearly malfeasant position was maintained throughout the extensive Den Brook planning process despite widespread and growing empirical evidence to the contrary.

1.22 Furthermore, it is a matter of public record that during a meeting, 7th November 2013, held to discuss the condition 21 Written Scheme, Dr Bass conceded that the industry wind turbine line (as adopted by RES for many years) that EAM is rare and an EAM condition is not necessary to protect amenity was no longer tenable: *"...that idea has been completely exploded by the weight of evidence presented by Mike Stigwood [professional acoustics adviser to DBJRG] in particular."* Dr Bass went on to say that he suspected in the future, developers at public inquiries will no longer try the argument that EAM is rare and shouldn't have a condition. He added that *"it seems to me the entirely rational position."*

1.23 Absent remaining issues with more complex aspects of stages 4(a) and 4(b) of the Written Scheme, stage 4(c) is arguably both materially imperative and unlawful. It requires potentially important aspects and significant portions of any EAM noise to be excluded from all condition 20 compliance assessments.

1.24 Such requirements appended to the condition 20 EAM controls imposed for the granting of planning permission materially and ominously prejudice neighbours of the proposed Den Brook wind farm, hold grave implications in relation to Article 8 of the Human Rights convention, and fly directly in the face of the extant 2011 CoA ruling.

1.25 Notice was therefore served on RES, 26 May 2015, which formally advised and warned the developer that DBJRG is to carry out professional 24/7 noise monitoring (see WP9) of the Den Brook wind farm. DBJRG has also advised that it will be looking to install infrasound and low frequency noise monitoring.

1.26 The monitoring aims to ensure full, accurate and proper assessment of noise impacts.

2. Introduction

2.1 Work package 4 aims to sketch out the background to the extensive Den Brook timeline where it relates to amplitude modulation with potential noise impact immissions from the wind turbines. The timeline, currently in excess of 10 years, has been assembled in tabular format together with brief observations which can be further explored and expanded by accessing the references where indicated.

2.2 The first five or so years in the development of the Den Brook wind farm is widely agreed to have been broadly and impartially documented in aspects related to EAM by the BBC2 commissioned, four-hour documentary series 'Wind Farm Wars'. This paper, whilst briefly capturing the project from its beginnings, more specifically examines the progression of EAM related matters since the televised documentary recording ended in early 2010.

2.3 At that stage, planning permission had been granted for a second time but with unprecedented EAM noise conditions imposed to provide what the Planning Inspector deemed to be both necessary and precautionary protection for those living and working in the Den Brook neighbourhood.

2.4 However, the specific EAM conditions imposed appeared to be unclear in terms of requiring mitigation should EAM be found to occur. EAM was to be measured but no guidance was provided for whether or how to mitigate the intrusive acoustic phenomenon.

2.5 Moreover, a belated 18 months later and following widespread calls from local planning authorities and others for similar EAM conditions to be imposed on wind farm developments, RES's Dr Bass declared that in his view the Den Brook EAM conditions were unenforceable due to his claimed inability to efficiently distinguish between so-called false-positive AM, i.e. birds chirping, and AM noise from wind turbines.

2.6 RES then embarked on what appears to have been an undertaking to substantively modify the unparalleled Den Brook EAM conditions. The strategy adopted by the developer can perhaps best be captured with the hindsight of past events by the proverbial yet perceptive excerpt from Sir Walter Scott's Marmion: *Oh, what a tangled web we weave when first we practise to deceive!*

3. Den Brook Timeline

Date	Event	Comments
2004 Sept	Background noise (BGN) survey undertaken by developer RES	<ul style="list-style-type: none"> • RES undertook BGN survey on MH’s property. Project manager agreed to provide MH with all BGN survey raw data. • RES then refused to provide raw data following survey. • Raw data eventually provided 3½ years later following severe criticism of the developer in High Court judgement.
2005 Nov	RES submits planning application to WDBC for nine wind turbines in the Den Brook valley between Bow, Spreyton and North Tawton.	<ul style="list-style-type: none"> • Noise Impact Assessment carried out in-house by RES’s Dr Jeremy Bass. • NIA accepted without question by LPA. • Original opposition group DBVAG was advised by Bob Davis – he suggested minor NIA amends but made no mention of wind shear or potential EAM issues. • MH independently submitted representation to LPA outlining personal experience of EAM at Bradworthy wind farm, Frits Van den Berg’s findings in relation to EAM and wind shear and requested noise conditions to adequately control EAM.
2006 Jan	WDBC refuses planning permission.	<ul style="list-style-type: none"> • Noise issues not mentioned in reasons for refusal.
2006 May	RES file Planning Appeal	<ul style="list-style-type: none"> • Dr Andrew Bullmore (Hoare Lea Acoustics) commissioned by RES to review NIA. • Revised wind shear methodology submitted indicating increased noise levels at receptor properties but stated to remain within ETSU-R-97 derived noise limits. • MH challenged aspects of RES’s NIA methodologies and refusal to provide raw BGN assessment raw data.
2007 Feb	Planning Inspector grants planning permission.	<ul style="list-style-type: none"> • Inspector disregarded RES’s refusal to provide raw noise data despite formal complaint issued by MH. • Standard ETSU-R-97 derived noise conditions imposed.
2007 March	DBJRG formed. MH lodges Judicial Appeal.	<ul style="list-style-type: none"> • Grounds of challenge included that noise conditions imposed were not fit for purpose and unenforceable.
2008 March	Judicial Appeal refused by High Court.	<ul style="list-style-type: none"> • Court ruled that noise conditions adequate when interpreted ‘with benevolence’. • Judgment acutely critical of RES for not providing noise data¹. • RES provided raw noise data shortly after judgment.

2008 April	DBJRG (MH) appeals judgment to Court of Appeal	<ul style="list-style-type: none"> • Dr Bass and Dr Bullmore’s assessments of noise data for RES found to contain substantive errors. • RES and SoS conceded to judgment on noise issues².
2008 Aug	Court of Appeal requires redetermination of Planning Appeal	<ul style="list-style-type: none"> • PINS proposed using same Inspector. RES agreed but DBJRG submitted a pre action protocol letter to PINS. PINS conceded and agreed to a fresh Inspector and re-examination of all EIA aspects. • RES commissioned Dr Andrew McKenzie (HMP) to carry out a further, third NIA. Revised NIA undertaken in accordance with newly introduced, IoA published wind shear methodology³. • DBJRG commissioned Mike Stigwood of MAS Environmental, Dr Lee Moroney of the REF and barrister Reuben Taylor to construct, draft and present scientifically based case for imposition of EAM noise conditions. • RES relied on largely discredited Salford report and refused to address EAM as being a potential problem⁴.
2009 Dec	Inspector grants conditional planning permission with unprecedented EAM noise conditions.	<ul style="list-style-type: none"> • Conditions 20 and 21 only state EAM is to be assessed but no mitigation provided for should EAM occur. • Inspector made unequivocal statement about EAM in his decision notice⁵: “...subject to some important conditions [i.e. EAM conditions 20 & 21], <i>I have concluded that the effect of the scheme is likely to fall within the limits which were designed, in part, for the protection of wind farm neighbours.</i>” (emphasis added) • RES’s press release⁶, <i>inter alia</i>, stated: “...Our team presented a solid case demonstrating that the project has been designed sensitively and will be an asset to the local community... ..The main reason the project went to a second public inquiry was because of concerns about the noise impact of the turbines. We have always been

¹ <http://www.richardbuxton.co.uk/transcripts/r-oao-hulme-v-ss-communities-and-local-government-0>

² <http://www.richardbuxton.co.uk/sites/default/files/transcripts/Hulme%20-%20Rix%20LJ%204.8.08.pdf>

³ Prediction and assessment of wind turbine noise (Bulletin Method)_Institute of Acoustics: Acoustics Bulletin_Mar-09:

<https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202000%20to%202010/Acoustics%20bulletin%20article%20March%202009.pdf>

⁴ Email from RES outlining refusal to address EAM_18June 2009

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202000%20to%202010/RES%20email_%20refusal%20to%20address%20EAM_18June%202009.pdf

⁵ Appeal Ref: APP/Q1153/A/06/2017162 – para 186:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202000%20to%202010/10_DL_Den%20Brook_RES%20Appeal_11Dec2009.pdf

⁶ http://www.den-brook.co.uk/media/16981/res-welcomes-approval-of-den-brook-wind-farm_111209final.pdf

		<i>confident that the wind farm was designed to safeguard local residents against noise nuisance and this has now been endorsed by the Planning Inspector’s decision...”</i>
2010	Appeal lodged by MH against the Decision	<ul style="list-style-type: none"> • Grounds included that the EAM conditions re-drafted and imposed by Inspector Pykett failed to specify a requirement for mitigation of EAM and therefore not fit for purpose.
2011 May	CoA upholds RES’s permission and definitively clarifies and ratifies EAM noise conditions	<ul style="list-style-type: none"> • MH’s legal team requested CoA <u>not</u> to quash planning permission but rather to ensure the EAM conditions provide adequate protection for in the event of EAM. Had the permission been quashed DBJRG would have been placed in an intolerable financial position of having to fund a third Public Inquiry. • CoA judgment⁷ found against MH whilst accommodating request to clarify identified shortfalls within the Inspector’s EAM conditions. MH ordered to pay costs. • RES claimed judgment as being a victory supporting their wind farm design and NIA. Subsequently however, RES made three attempts calculated to materially change and/or water-down the EAM conditions and control parameters specifically required by condition 20 of their planning permission.
2011 Oct	RES announces results of its testing of the EAM conditions during ReUK annual conference and later publishes erroneous results in IoA Acoustics Bulletin.	<ul style="list-style-type: none"> • Despite the 2011 CoA ruling RES belatedly claimed that: a) the EAM conditions breach requirements of circular 11/95, b) the Inspector “<i>got it wrong</i>”⁸ and c) EAM conditions “unworkable” due to high levels of false-positive results. • Dr Bass chose to ignore constructive criticisms with regards to errors with his ‘false-positives’ claim provided in good faith by MAS Environmental before RES went public with its claim during the ReUK annual conference.

⁷ <http://www.richardbuxton.co.uk/transcripts/hulme-v-secretary-state-communities-and-local-government-ors>

⁸ Accusation made by Dr Bass during Den Brook Community Liaison Group public meeting, 9th August 2012.

<p>2013 April</p>	<p>RES submits s.73 application to WDBC aimed to change EAM noise conditions 20 & 21.</p>	<ul style="list-style-type: none"> • ISVR, i.e. Bob Davis and Dr Malcolm Smith, commissioned by WDBC to advise in relation to RES's s.73 application. • ISVR criticised condition 20 with (unsubstantiated) claims of it being untested and unworkable. • ISVR recommended developing a scheme, as required by condition 21, to overcome claimed shortfalls⁹. • DBJRG submitted detailed analysis by Dr Malcolm Swinbanks demonstrating that RES's proposed replacement EAM condition's methodology understated EAM by up to 50%¹⁰ • RES's response to Dr Swinbanks' report¹¹ included the following comments: <i>".....It is important to understand that the RES Condition 20 methodology was never meant to be a rigorous solution to a complex psycho-acoustic analytic problem but, rather, a pragmatic one which captures the essence of the problem.....Dr Swinbanks is correct that, in this particular example, a number of higher harmonics of the fundamental frequency are visible, indicative of a sharp-edged waveform, e.g. a sawtooth. These were not included in the RES Condition 20 methodology for the sake of simplicity and because there is little knowledge in the acoustics community about what the waveform of OAM is likely to be. However, such harmonics could be included by energy addition with the energy in the fundamental. RES will investigate and consider its practicality.....when applying the existing methodology alone to 'random noise' a false positive result is highly likely. If we accept this, then the key point is that the existing Condition 20 methodology alone cannot be used to reliably distinguish between periods of data which 'do' or 'do not' contain 'greater than expected AM....."</i>
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⁹ July 2013 – Davis - Discussion of Den Brook wind farm conditions 20 and 21 – ISVR Consulting – RA Davis, MG Smith:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202013/ISVR%20report_RES%20S.73%20app.%20to%20WDBC_July2013.pdf

¹⁰ May 2013 – Swinbanks – Assessment of RES revised condition 20 for evaluating excessive amplitude modulation – MAS Research Ltd – MA Swinbanks:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202013/Dr.M.Swinbanks_Report%20re%20RES%20proposed%20condition%2020_12June2013.pdf

¹¹ July 2013 – Bass – RES email response to Dr Swinbanks report – RES – J Bass, Daniel Leahy:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202013/RES%20response%20to%20Dr%20Swinbanks%20report_2July2013.pdf

2013 Aug	RES withdraws s.73 application	<ul style="list-style-type: none"> RES proposed meetings to develop a scheme as required by condition 21 in collaboration with WDBC and ISVR¹² DBJRG (MH) belatedly invited by LPA to observe.
2013 Oct	1 st meeting to devise Written Scheme	<ul style="list-style-type: none"> WDBC informed meeting that a penalty scheme related to ETSU derived noise limits would <u>not</u> be acceptable to the LPA for control of EAM. Dr Bullmore of Hoare Lea Acoustics also attended.
2013 Nov	2 nd meeting to devise Written Scheme	<ul style="list-style-type: none"> Dr Bass (RES) advised meeting that RES along with its commissioned noise consultants Hoare Lea Acoustics and Hayes McKenzie Partnership had misled the LPA, PINS and the local communities about EAM probabilities throughout the planning process. Moreover, that the wind industry now accepted EAM as a problem in need of control¹³.
2014 Feb	3 rd meeting to devise Written Scheme	<ul style="list-style-type: none"> Final draft of Written Scheme completed but untested against real-world AM data by ISVR. MH advised meeting that the proposed methodology excluded harmonic EAM wind turbine noise from the proposed assessment procedure. RES requested to participate in DBJRG-proposed 24/7 EAM noise monitoring and provide SCADA data. RES declined to assist on the basis that such cooperation was not a requirement of its planning permission.
2014 Feb	RES submits Written Scheme for discharge of condition 21	<ul style="list-style-type: none"> Testing of Written Scheme remained to be undertaken by ISVR. MH and DBJRG excluded from any further sight of or consultation in respect of the Written Scheme and testing of such that remained to be carried out.

¹² 3 Aug 2013 – Ruffle – RES letter: Den Brook wind farm conditions 20 and 21 – RES – Rachel Ruffle:
https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202013/RES%20proposals%20for%20developing%20scheme%20with%20WDBC_14Aug2013.pdf

¹³ Nov 13_Hoare_Rebuttal to the noise proof of evidence of Dr Matthew Cand_Dr Lee Hoare (paras 8 - 8.3):
https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202013/comments/eEAM_LeeHoareRebuttalCand_Nov2013.pdf

2014 May	WDBC discharge Written Scheme ¹⁴ on sole advice of ISVR and the LPA's Environmental Health Officer.	<ul style="list-style-type: none"> • LPA invoked its preferred procedure for discharge of conditions, i.e. no consultation with third parties. • Representations nevertheless submitted by DBJRG to the LPA outlining that exclusion of harmonic EAM noise was a serious oversight given it is a crucial component of EAM particularly in relation to annoyance, sleep deprivation and possible health impacts.
2014 July	MH issues Judicial Review of WDBC's approval and discharge of Written Scheme	<ul style="list-style-type: none"> • Expert evidence submitted by MAS Environmental^{15 16} both scientifically and graphically demonstrated flaws within Written Scheme including specifically the requirement of stage 4(c) to filter out harmonic noise from all data to be used to test compliance in line with parameters established by condition 20. • RES and ISVR submitted rebuttal evidence from Dr Bass and Bob Davis which claimed to address the flaws identified by MAS Environmental. However, neither Bass nor Davis addressed the stage 4(c) requirement to exclude important aspects of EAM noise^{17 18}.
2014 Nov	High Court upholds WDBC's discharge of Written Scheme.	<ul style="list-style-type: none"> • Court unable to make a clear judgment in respect of the merits or otherwise of Written Scheme. The court does not have the necessary expertise and further, the matter remained in dispute between experts' submissions. • The LPA however was found not to have acted illegally when a) relying on ISVR's recommendations alone and b) following established procedures for its determination of the Written Scheme.

¹⁴ Decision letter & approved condition 21 Written Scheme:

<https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202014/Discharge%20of%20DB%20condition%2021%20-%2022May2014.pdf>

¹⁵ Witness statement (first) of Mike Stigwood, 29 July 2014:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202014/Mike%20Stigwood_Wtns%20Stmnt%201_31July2014.pdf

¹⁶ Witness statement (second) of Mike Stigwood, 29 Sept 2014:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202014/Mike%20Stigwood_Wtns%20Stmnt%202_29Sept2014.pdf

¹⁷ Witness statement of Bob Davis (ISVR), 8 Sept 2014:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202014/Bob%20Davis_Wtns%20Stmnt_WDBC_8Sept2014.pdf

¹⁸ Witness statement of Dr Bass (RES), 10 Sept 2014:

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202014/Jeremy%20Bass_Wtns%20Stmnt_RES_10Sept2014.pdf

2014 Nov	MH seeks leave to appeal High Court judgment.	<ul style="list-style-type: none"> • Permission to appeal refused by CoA firstly on the papers and later following an oral hearing in March 2015. • The principal ground for appeal, i.e. the considered flawed requirement of stage 4(c) to exclude all-important harmonic EAM noise from all compliance assessments, was judged by the court to be a matter for the LPA. • Moreover, it was judged not to be in the wider public interest and further, that the courts would be unable to add anything more to the matter in question.
2015 May	DBJRG formally serves pre-action protocol Notice of Intent on Den Brook developer, RES.	<ul style="list-style-type: none"> • <i>“DBJRG regrets that the need has arisen to publicly issue the Den Brook wind farm developer, RES, with a pre-action protocol Notice of Intent to establish both audible and sub-audible infra-sound noise monitoring”</i>¹⁹ • Monitoring to be professionally established similar to the model currently in action at the Cotton Farm wind farm²⁰ in Huntingdonshire. Live, 24/7 audio recordings and interactive charts to be made available and accessible to all through a dedicated website. • Background, reasoning and Notice served on RES²¹
2015 June	Mel Stride MP (Central Devon) submits written request to WDBC seeking the LPA’s understanding in respect of stage 4(c) of discharged condition 21 Written Scheme.	<ul style="list-style-type: none"> • No response from WDBC as of 31 July 2015

¹⁹ <http://www.denbrookvalley.co.uk/> - see ‘Update – 26th May 2015’

²⁰ See WP9 - ‘The Cotton Farm monitor experience’

²¹ Notice of intent –

https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202015/Notice%20of%20Intent%20to%20carry%20out%20noise%20monitoring_redacted_26May2015.pdf

4. EAM Conditions Imposed with Den Brook Planning Permission

4.1 Conditions 20 and 21 (Appeal Ref: APP/Q1153/A/06/2017162, 11th December 2009)²² were imposed following examination of noise evidence for four days by a senior Planning Inspector. The conditions were both clarified and ratified by the UK's second highest legal authority, i.e. the Court of Appeal (CoA), [Neutral Citation Number: [2011] EWCA Civ 638] 26th May 2011²³. Obligations levied on the developer were as follows:

20. At the request of the local planning authority following the receipt of a complaint the wind farm operator shall, at its expense, employ a consultant approved by the local planning authority, to assess whether noise immissions at the complainant's dwelling are characterised by greater than expected amplitude modulation. Amplitude modulation is the modulation of the level of broadband noise emitted by a turbine at blade passing frequency. These will be deemed greater than expected if the following characteristics apply:

a) A change in the measured LAeq, 125 milliseconds turbine noise level of more than 3 dB (represented as a rise and fall in sound energy levels each of more than 3 dB) occurring within a 2 second period.

b) The change identified in (a) above shall not occur less than 5 times in any one minute period provided the LAeq, 1 minute turbine sound energy level for that minute is not below 28 dB.

c) The changes identified in (a) and (b) above shall not occur for fewer than 6 minutes in any hour.

Noise immissions at the complainant's dwelling shall be measured not further than 35m from the relevant building and not closer than within 3.5m of any reflective building or surface, or within 1.2m of the ground.

21. No wind turbine shall generate electricity to the grid until the local planning authority, as advised by a consultant approved by the local planning authority at the expense of the operator, has approved in writing a scheme submitted by the wind farm operator providing for the measurement of greater than expected amplitude modulation immissions generated by the wind turbines. The objective of the scheme (which shall be implemented as approved) shall be to evaluate compliance with condition 20 in a range of wind speeds and directions and it shall terminate when compliance with condition 20 has been demonstrated to the satisfaction of and agreed in writing by the local planning authority.

²² Appeal decision notice - **APP/Q1153/A/06/2017162** Land to the south east of north Tawton and south west Bow: https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202000%20to%20010/10_DL_Den%20Brook_RES%20Appeal_11Dec2009.pdf

²³ Hulme v Secretary of State for Communities and Local Government and RES Developments [2011] EWCA Civ 638: https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202011/9_CoA%20Judgment_Hulme-v-SoS_26May2011.pdf

5. Den Brook EAM Noise Impacts & Controls - a decade of deception

5.1 Renewable Energy Systems (RES) is an experienced, multi-national wind developer, the renewables arm of the Sir Robert McAlpine building and civil engineering conglomerate. The layout and proximity to neighbouring households of the Den Brook wind farm was planned at a time when many developers of wind generation technology, including RES, erroneously claimed EAM to be an extremely rare and relatively insignificant phenomenon.

5.2 Issues for correct assessment including closely related meteorological aspects such as atmospheric wind shear had already been clearly identified by, amongst others, Professor Frits van den Berg well before the Den Brook wind farm planning application was finalised and submitted to WDBC for consideration.

5.3 The LPA's sole concern in relation to the Den Brook noise impact assessment (NIA) was that higher night-time noise limits had been proposed than for day time. Clearly the LPA was not familiar with ETSU-R-97 at the time.

5.4 Three distinct NIAs carried out over a period of 5 years by prominent acousticians who act principally on behalf of the wind industry, i.e. Dr Jeremy Bass, Dr Andrew Bullmore and Dr Andrew McKenzie, all elected to entirely discount EAM with what can now clearly be seen to have been incorrect and misleading advice in terms of an accurate, scientific and reliable analysis for predicted noise impacts from the proposed Den Brook wind turbines.

5.5 It follows that the design, layout and siting of the nine, 120m wind turbines (WT) failed to either consider or indeed incorporate appropriate measures such as adequate separation distances from nearby receptors (family homes) in order to mitigate potential problems in the event of EAM noise impacts.

5.6 Moreover, documentation submitted in relation to the 2009 Den Brook planning Inquiry, after which permission was granted, clearly indicates RES's then position as being unequivocally one of unqualified refusal to assess, plan or engage with precautionary controls and conditions in respect of EAM noise impacts²⁴.

5.7 In this, RES and its commissioned acoustic consultants relied solely and erroneously on the Salford Report²⁵ for their unswerving position despite confirmation from the Secretary of State for the Department for Business, Enterprise and Regulatory Reform (BERR) that a potential for EAM impacts should be considered²⁶: *"Nowhere in the 2007 Statement does the Government suggest that AM is not an issue in the UK, nor does it suggest that AM will not and cannot be an issue in the case of future applications for wind farms close to residences in low background noise areas."*

²⁴ Notification from RES outlining refusal to address EAM_18June 2009
https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202000%20to%202010/RES%20email_%20refusal%20to%20address%20EAM_18June%202009.pdf

²⁵ July-07_ Research into aerodynamic modulation of wind turbine noise: Final report_Moorhouse:
<https://dl.dropboxusercontent.com/u/89777841/INWG%20AM%20Study/INWG%20Ref%20Documents/Ref%20docs%202000%20to%202010/Salford%20report%202007.pdf>

²⁶ See REF statement 'judicial review' paras 9-13: <http://www.ref.org.uk/Files/jc.lm.salford.data.comment.07.02.09.c.pdf>

5.8 Planning conditions 20 and 21 were however later imposed for the control of EAM wind turbine noise with the subsequent grant of planning permission by a senior Planning Inspector in December 2009. The stand-alone, EAM planning conditions were later ratified by a Court of Appeal judgment such that it was specified, *inter alia*, in the ruling of Lord Justice Elias:

“...there is an obligation on the developers to comply with the AM levels specified in condition 20 and that obligation will run for the duration of the planning permission.”

5.9 Following the CoA judgment, the Den Brook developer issued a section 73 application to the Local Planning Authority (LPA) aimed for obtaining substantive material changes to the EAM control levels.

5.10 The s.73 proposals became the subject of reports carried out by the Institute of Sound and Vibration (ISVR) on behalf of the LPA and Dr Malcolm Swinbanks on behalf of DBJRG.

5.11 Dr Swinbanks' in-depth examination of RES's proposals revealed procedures including undisclosed in-house software code which perversely reduced by up to 50% the measured levels of EAM that were to be assessed for compliance purposes.

5.12 RES subsequently withdrew the section 73 application and as an alternative devised a 'Written Scheme' in line with recommendations and cooperation from ISVR based on the requirements of condition 21 of the planning permission.

5.13 A detailed and highly complex Written Scheme was formulated for specific measurement of wind turbine AM noise and later discharged by the LPA, 21 May 2014. Internal procedures specifically applied by WDBC meant that no third party consultation was entered into by LPA officers for arriving at their decision to approve the Written Scheme.

5.14 Following discharge, DBJRG's professional acoustic advisers tested the condition 21 Written Scheme by systematic application of real-world wind turbine noise data to the approved methodology.

5.15 In particular, the Written Scheme's stage 4 incorporates complex mathematical procedures claimed by RES to filter out apparently invalid complaints before compliance testing proper.

5.16 Testing of the Written Scheme by MAS Environmental on behalf of DBJRG exposed substantive discrepancies that undermine the 2011 ruling of the CoA - i.e. that the EAM limits specified by condition 20 must apply for the life of the planning permission.

5.17 Moreover, it is represented that, under the Doctrine of Precedent²⁷, condition 20 must remain intact unless overturned by an equal or higher authority than the CoA. Clearly, neither RES nor the LPA constitute such higher authority.

5.18 DBJRG's ensuing efforts to resolve the matter fell to requiring further legal actions through the courts.

5.19 Extensive detailed expert evidence was submitted that clearly illustrated and specifically identified problematic aspects of the approved Written Scheme.

5.20 Notwithstanding the submitted evidence, neither RES nor the LPA's consultants, ISVR, addressed the most transparent and clearly outlined flaw identified within stage 4 of the Written Scheme, i.e. stage 4(c).

5.21 Stage 4(c) requires:

If this assessment [stage 4, clauses (a) and (b)] indicates that GTE-AM is present, then the LAeq, 125msec data required by Condition 20 shall be band pass filtered, from 0.9fc to 1.1fc, and the application of the Condition 20 methodology repeated. This is essential to ensure that the variation causing apparent non-compliance with Condition 20 derives solely from that occurring at the blade passing frequency, fc.

5.22 Band pass filtering in the manner prescribed by stage 4(c) of the Written Scheme eliminates crucial harmonic EAM noise from the raw data used for compliance testing as specified within condition 20. Thus, the amount of EAM noise presented for assessment would be significantly understated for all compliance testing in the event of noise complaints.

5.23 Not having specific expertise with acoustics to enable evaluation of the technical evidence and issues placed before them, the courts held that determination with respect to the submitted expert evidence was a matter for the LPA.

5.24 DBJRG later approached RES's senior technical manager Dr Jeremy Bass for his considered view of the effects of stage 4(c) on condition 20 (Dr Bass is understood to have authored the procedures specified, including stage 4(c) of the Written Scheme). Dr Bass, perhaps not surprisingly however, deferred to the LPA for determination of the matter.

5.25 Similarly, the LPA's consultants, ISVR's Bob Davis and Dr Malcolm Smith also evaded addressing the specific question of just how the stage 4(c) requirement impacts on condition 20.

5.26 The LPA itself was approached, 11 June 2015, by Mel Stride MP seeking clarity and the council's position with regards to the effects stage 4(c) has in relation to condition 20. As yet, i.e. 31 July 2015, a response has not been forthcoming from WDBC.

²⁷ see WP6.1 - Legal Issues: the Control of Excessive Amplitude Modulation from Wind Turbines.

5.27 Moreover, longstanding concerns also remain that RES, in consort with its commissioned acoustics experts Hoare Lea and the Hayes McKenzie Partnership, advised not only the surrounding communities but decision makers within the LPA and later the Planning Inspectorate that EAM wind turbine noise was not an issue requiring attention or indeed assessment.

5.28 This now clearly malfeasant position was maintained throughout the extensive planning process despite widespread and growing empirical evidence to the contrary.

5.29 It is on public record that during a meeting held to discuss the condition 21 Written Scheme, 7th November 2013, Dr Bass conceded that the industry wind turbine line (as adopted by RES for many years) that EAM is rare and an EAM condition is not necessary to protect amenity was no longer tenable: “...*that idea has been completely exploded by the weight of evidence presented by Mike Stigwood [professional acoustics adviser to DBJRG] in particular.*” Dr Bass went on to say that he suspected in the future, developers at public inquiries will no longer try the argument that EAM is rare and shouldn't have a condition. He added that it “*seems to me the entirely rational position.*”

5.30 Absenting remaining issues with more complex aspects of stages 4(a) and 4(b) of the LPA-approved Written Scheme, stage 4(c) is arguably both materially prejudicial and unlawful.

5.31 In short, stage 4(c) requires potentially important aspects and significant portions of wind turbine generated EAM noise to be excluded from all condition 20 compliance assessments. Such requirements appended to the condition 20 EAM controls that were imposed for the granting of planning permission materially and ominously prejudice neighbours of the proposed Den Brook wind farm, hold grave implications in relation to Article 8 of the Human Rights convention, and fly directly in the face of the extant 2011 CoA ruling.

5.32 DBJRG served notice on the Den Brook developer, 26 May 2015, formally advising and forewarning RES that 24/7 professional noise monitoring of the proposed Den Brook wind farm is to be carried out in a similar way to that currently in operation at the Cotton Farm wind farm²⁸. Moreover, given recent reports concerning infrasound emitted by industrial scale wind turbines and its clear potential for creating adverse effects to neighbours, DBJRG will also be looking to install infrasound and low frequency noise monitoring.

5.33 It is anticipated that independent noise monitoring will highlight flaws identified within the Written Scheme thereby providing clear and unequivocal evidence for any compliance testing required in line with the EAM parameters established within condition 20 of the Den Brook planning permission. Moreover, the monitoring aims to ensure full, accurate and proper assessment of the wind farm's noise impacts.

²⁸ See WP9 - 'The Cotton Farm monitor experience'