From:	[redacted]
To:	East Anglia ONE North
Subject:	Deadline 9
Date:	13 April 2021 13:22:00
Attachments:	Deadline 9 Submission.pdf

For the attention of EA1N and EA2 Case Team

Dear Sir/Madam,

Please find attached a note in .pdf format regarding my observations on the recent ISH carried out by the Examining Panel for the EA1(N) and EA2 DCO application.

Yours sincerely

Alan Thomas

RR-804 and Registered ID 20024089 & 20024090

Deadline 9 Submission

Sirs,

This note represents a Deadline 9 submission, with detailed comment limited to aspects of Issue Specific Hearings, ISH2, ISH11, ISH12 and ISH 13.

Observations of Examination Process to date

As a resident of Friston I had severe misgivings prior to the start of the hearings regarding the proposed development of three substations on a farmland site to the north of this village. To me, the main issues were, and remain, as follows:

- The loss of a much loved rural landscape with amenity footpaths, and its replacement by many acres of industrial infrastructure, wholly out of keeping with area. This is concern is magnified by the perceived risk of expansion to accommodate further developments.
- The strong likelihood of a permanent and debilitating background 'hum' associated with high power electrical apparatus operating both day and night for the next 30-40 years.
- The increased risk of flooding in Friston as a consequence of run-off after heavy rainfall.
- The adverse effect of increased traffic, particularly HGVs, regarding noise and road safety during the protracted construction phase of EA1N, EA2 and the NG substation.
- The wider impact upon the socio-economic fabric of the local area, which is heavily dependent upon a thriving tourist and holiday trade.

Sadly, the Examination Process thus far has provided me with little reassurance that the Applicant is fully committed to addressing the above concerns.

Conduct of the Examination

Regarding the conduct of the examination, the 'virtual' hearing carried out using 'TEAMS' worked reasonably well, although on quite a number of occasions the digital signal suffered interruptions (dropout) requiring the link to be re-established, by which time the question/answer/ issue being addressed, had moved on. It is thus likely that some misunderstandings occurred, particularly where the transfer of numeric information was important.

For the greater part, I found the delivery of the case for a DCO presented by the Applicant to be unconvincing, laboured and over reliant upon quoting from their manifestly verbose written submission and from National and other standards. However counsel for the Applicant is to be congratulated for his endeavours in trying to defend the indefensible.

It is now of considerable concern to me that the timetable for the Examination is to be extended by a further 3 months, thus preventing some return to normality.

Open Floor Hearings (OFH)

Given the limitations of the Internet based system, these hearings were conducted well, and showed the extent and depth of local dismay regarding the proposed developments. I do not recall a single local person speaking in favour of the proposed development, which is understandable, as during the subsequent ISH, the Applicant was unable to cite even a single instance of permanent employment opportunity to the local population. By contrast, many speakers in the OFH and ISH outlined the potential risks to existing employment within the area, which is dependent on visitors and the holiday destination economy, and the likelihood that a five to seven year construction period will inflict permanent damage. Viewed cynically, no one is likely to visit the area just to witness a substation (or three) under construction.

Issue Specific Hearings (ISH)

Issue Specific Hearing 2 (ISH2) Onshore siting, design and construction

ISH(2) revealed the extent to which the deeply flawed RAG assessment resulted in the selection of the site at Friston as being suitable for the development of 3 substations. This decision was made, despite the relatively close proximity of residential properties, lack of easy access to major road networks, disregard for known flood risk in the village, injury to the landscape and setting of Friston plus the loss of amenity footpaths. As a process, the RAG assessment itself was poorly conducted and presented in that it:

- Convolved Attributes (subjective/non-measurable features) and Parameters (measurable features), which led in part to subjective assessments overriding factual data.
- Did not present any sensitivity analysis to show that results were not unduly skewed by small changes in subjectivity or numeric thresholds.
- Did not apply weighting factors to reflect relative importance of different features: all features were scored equally and straight numerical addition of Attribute and Parameter is in essence mathematical nonsense.
- It did not consider any sites further inland than Friston.

ISH2 failed to elicit a satisfactory explanation of why the National Grid substation appears to be far larger than that needed just to effect connexion of EA1N and EA2 to the Overhead Transmission Lines. The reasons put forward by the Applicant and supported by National Grid as to why the NG substation was not the subject of a separate DCO remain unconvincing and have re-enforced the widely held view that the substation will be used as the connexion point for trans-North Sea interconnectors, programmes to be managed by another part of the National Grid enterprise.

Issue Specific Hearing 11 (ISH2) - Flood Risk and Drainage

The risk of flooding to Friston a consequence of altered drainage patterns of what is known locally as 'Friston Moor' was brought to the attention of the Applicant during early consultation phases, and should have been a major consideration in site selection. The existence of two properties at the northern edge of the development site known as 'Friston Moor Farm' and 'Moor Farm' should have alerted the developer to the likely presence of below-surface water management.

Proposals by the Applicant to include drainage ponds, elevated well above the lower lying properties in Friston and presented as a mitigation measure, has had the perverse effect of increasing villagers concerns about flooding, as by volume, these ponds approach the regime of small naturally filled reservoirs.

Issue Specific Hearing 12 (ISH 12) - Noise

Like most residents in the area, I have deep concerns regarding noise generated during the Operational Phase and the Construction Phase of the development, and found no reassurance from the presentations made during ISH12 by the Applicant.

Substation Operational Noise

First: An observation taken directly from a publication by a leading supplier of acoustic enclosures for HVAC transformers:

> The low frequency nuisance noise from high voltage transformers and shunt reactors can frequently present problems for the energy networks. Where sensitive noise receptors (such as dwellings) are nearby, then nuisance noise management is often conditioned as part of a planning decision from the outset. This requires engineering

controls to reduce the noise levels of the operational site to acceptable levels, and with low-frequency noise being more difficult to control, specialist acoustic enclosures are required. [Source acknowledged]

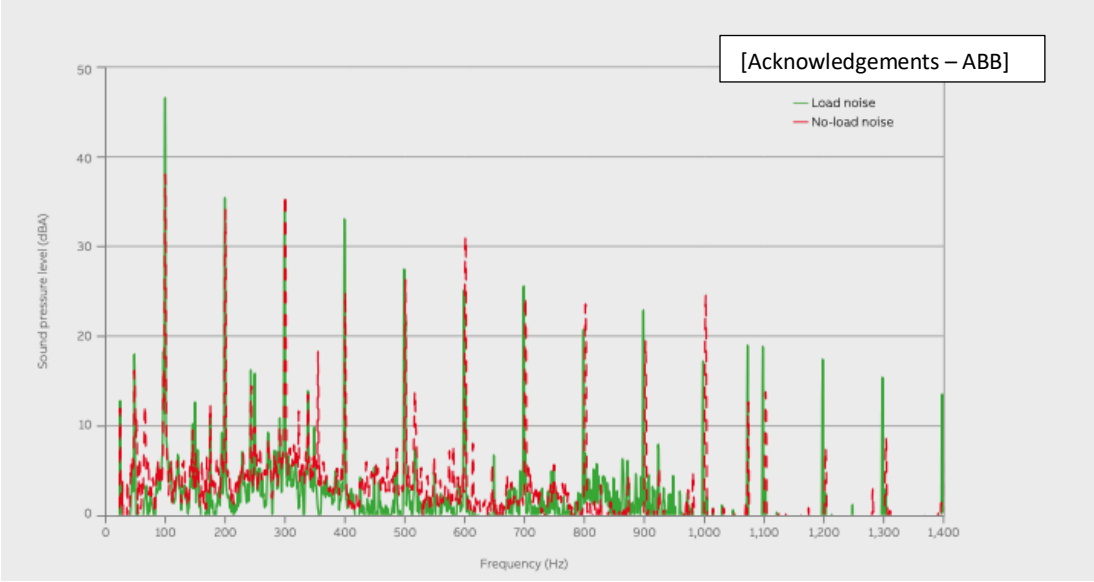
ISH 12 was disappointing on the subject of substation Operational Noise, and it was clear from the start that experts from both ESC and SASES disagreed with noise analysis presented by the Applicant's subject matter expert. For those observers lacking understanding of the nature of sound generated by High Power transformers and the true nature of sound propagation, it must have seemed like a disputation on ***"How many angels can dance on the head of a pin?"*** Given the risk that acceptance of the DCO Application as it currently stands, could well impose a permanent industrial soundscape upon a quiet rural environment, I feel that the Examination Panel would have benefitted enormously from having an Examiner with some in-depth comprehension of the subject matter being discussed. Some experience in the application of Statistical Methods would also appear to have been an advantage.

It was noted that the Applicant became quite agitated when it was opined that the possible existence of "hum" might become a characteristic of the soundscape in Friston. This stance by the Applicant was quite unnecessary, as the subject of transformer (and shunt reactor) hum occupies considerable attention by acknowledged experts in the field of substation design. Quoting from a recent ABB Library Note on the use of Vibroacoustic Analyses for Noise Mitigation in Transformers [see Michal Kozupa & Grzegorz Kmita, ABB Corporate Research, Krakow, Poland]:

> *Industrial noise is classed as pollution. Transformer noise, due to its harmonic nature, is considered a particularly unpleasant noise pollutant and has, therefore, always been the target of specific design effort in ABB products.*
>
> *Hum is an inherent transformer characteristic that originates from physical phenomena in the core and windings. In non-loaded transformers, magnetostriction of the magnetic core is the main source of hum; in transformers under load, it is winding vibrations. In both load modes, the noise has a harmonic nature, but the modes differ in the frequency spectrum and dominant frequency that is presented*

Included in the ABB note referenced above is a complete acoustic spectrum for a large transformer, presented in the manner of a Fourier Transform, and is replicated below:

It should be noted that the sound intensity portrayed is from the transformer tank, which surrounds the windings and does not include any attenuation provided by an acoustic enclosure.



(FFT showing HVAC Sound Pressure Levels as function of frequency)

From the above it can be seen that the noise spectrum of a high power transformer is dominated by multiples of the First Harmonic (100 Hz), showing distinct lines at 100Hz, 200Hz, 300 Hz, etc. The Applicant's portrayal of acoustic signature is in part flawed, because the Applicant has adhered rigidly to the "standard" spectrum set out in BS 4142, ie 63Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz and 8 kHz, which would be appropriate if the noise signature in question originated in a highly de-correlated source like motorway traffic.

During ISH12, the Applicant sought to convince the Examining panel that recent acoustic measurements in the environs of Bramfield and attributed to an EA1 survey, were sufficient to show that concerns regarding the potential operational noise at Friston were unfounded. Adopting a similar *post facto* approach for Friston is most unwise, in that there are many differences between the two sites and once installed and shown to exceed pre-set limits, it will be very difficult to arrange an 'outage' to carry out remedial work. The Applicant must, as a matter of completeness supply the ExA with:

- Source spectra for the dominant emitters to be sited at Friston.
- A full list of the input parameters used by the selected sound propagation model.
- A full spectral analysis of the background noise level in the vicinity of the three designated receptors at Friston and which can act as the "gold" standard against which actual substation noise can be assessed.

Had the Applicant presented a full FFT of the noise signature of the recently installed HVAC transformers at Bramford, then Examiners and the experts appearing on behalf of ESC and SASES would have had a clearer picture of the baseline position before going on to consider the effects of noise absorbing enclosures, attenuation due to the distance to nearest receptors and attenuation due to terrain and atmospheric absorption, etc.

Comparison with other onshore substation developments shows a willingness of other developers to include advanced acoustic attenuation measures to curtail the low frequency (100Hz) emissions from the HVAC transformers, Shunt Reactors and STATCOMs. The Applicant offered little indication of the proposed means of suppressing transformer hum.

Construction Phase Noise

Here the Applicant's interpretation of BS 5228 was at variance with the views expressed by the other experts. Given that construction site noise is very difficult to mitigate, I feel that the Examining Panel should give serious consideration to imposing a strict limit on construction noise at the relevant receptors to ensure that it does not exceed 10 dBA above the prevailing noise background, in line with BS 5228-1 2009 Section E5. This should be coupled to a strict directive regarding core working hours.

<u>Issue Specific Hearing 13 (ISH 13) - Traffic and Transport</u>

I found ISH 13 disappointing and shall not comment further. I refer to my Deadline 8 submission, a note published by PINS on 29/03/2021.

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