

From: [REDACTED]
To: [Glyn Rhonwy Pumped Storage Scheme](#)
Subject: Submission for 21st July deadline: ID 10031978
Date: 20 June 2016 21:35:39

Good evening Steffan,

Herewith as promised a somewhat rushed submission for tomorrow's deadline:

In response to my earlier submissions published on the website, the applicant has replied as follows:

'Extensive psychoacoustic research during the last century showed that a doubling of perceived loudness occurs with an increase of around 10 dB and that the smallest perceptible change is around 3 dB. This conclusion forms one of the points for noise assessment and is referenced in many guidance documents.....'

..... a change of 3 dB(A) is the minimum perceptible under normal conditions'

Please note the expression 'normal conditions'. Further to this, the applicant states:

'The published guidance and planning framework for acoustics require that professional judgement be applied to interpretation of the acoustic context of a given scenario in a given area. This judgement is based on the accumulated experience of the acoustics profession shared through technical papers and published guidance and individual experience of similar projects.....'

.....Members of the AECOM Acoustics team are members of various committees and working groups.'

Now, to date I have not gone so far as to blow my own trumpet, but during my career I have been instrumental in publishing technical specifications for equipment and having my advice sought by manufacturers on operational parameters for the design of new equipment and providing modifications to existing apparatus. This is down to the fact that I have a wealth of experience in 'real world' acoustic environments, advising on adjustments to techniques in dealing with problems encountered therein, and a thorough grounding in the handling, placement and operation of sound/acoustic instrumentation, measurement, metering, monitoring, recording, replaying, etc.

To be pedantic, before I pay heed to 'acoustics experts' I would want to see the results of their hearing tests for both ears. For instance, prolonged exposure to sounds of a certain intensity and/or frequency can cause 'dips' in a person's hearing, and many professionals suffer from discrepancies of this sort after years of exposure. So, it is vital that they are aware of their shortcomings, and make the necessary allowances in their judgement.

I would then wish to know about experience involving sound gathering techniques as outlined in the previous paragraph, together with working knowledge of equipment in use, where it has been sourced, its operational specifications, how to confirm that it is functioning correctly, and how to deal with problems arising from malfunctions that can occur during its installation and subsequent operation.

Since I too have sat on councils and committees, and delivered workshops and demonstrations at international exhibitions in venues such as Olympia, Wembley, Earl's Court, etc. and lectured to staff, students and academics at Universities and colleges, I think it highly likely that in 'the past century' I too have made some small contribution to psychoacoustic research and understanding.

In my previous submissions, I pointed out that the sound monitoring installation that was installed on the Green Lane in Waunfawr up to Cefn Du, was incorrectly sited, poorly rigged, and unsuitable to record and monitor the data which we, the residents, were led to believe was its purpose. I therefore have no confidence in the 'experts' employed by the applicant to undertake measurements of this nature.

To go back to the preliminary paragraphs, 'normal' human perception of loudness equates a doubling of loudness with an actual increase of approximately 10dB SPL, under 'normal conditions'. This is one of the many half-truths encountered in the applicant's assertions. In the Great Outdoors, one of the major factors in sound propagation and perception is the prevailing weather conditions. Sound/acoustic measurements produced without synchronous weather data in these circumstances are meaningless. Other factors affecting the perception of loudness are the frequency and duration of a sound, whether it is from a stationary or moving source, and the loudness/intensity/frequency of any preceding sound, and whether the observer/recorder is in itself/themselves stationary.

Some of the measurements quoted by the applicant from acoustic surveys in the area have figures quoted as 'L sub eq'. This means that the sound has been averaged over a period (often of 5 minutes) and I have already pointed out previously that for both construction and vehicular traffic noise of the type envisaged, averaged results are meaningless.

But from the point of view of satisfying regulatory bodies, figures such as these are relied upon far too often, as they potentially satisfy the acoustic environment encountered in urban areas, with a relatively high level of background noise, and construction work that rarely incorporates blasting. The figures are A-weighted, but this only emulates 'average' human hearing at low to medium sound levels. For noise levels which may be expected from the proposed construction/traffic movements, C-weighting would be more appropriate.

From a note on one of the academic websites linked to psychoacoustic research comes the following quote: '*Along with the dBA metric has come an associated shortfall in precision in accurately representing the capacity of a given sound to produce hearing loss and the capacity to create annoyance.....noise control design demands the octave-band or even third-octave band spectral data metric.*'

The summary I have given here is simplistic at best, and the 'average' human

ear's response to differing frequencies of equal level is more accurately represented by a curve (the 40 phon response curve, representing equal loudness contours for pure tones, ISO 226, 2003). It is usually based on a human's hearing in their early to mid twenties, and from that age, hearing can deteriorate, but not necessarily equally over the whole frequency spectrum. However, all this really is esoteric for the considerations within the DCO, nevertheless I mention it to raise awareness of the inherent complexities associated with the study and application of psychoacoustics, and my knowledge of the matter.

FYI, psychoacoustics not only covers a human's ability to detect sounds, as well as changes in their intensity and duration, but also includes factors such as their personal 'sound memory', helping to identify components within the sound, discriminating between them, especially variations in their level, and whether the sound is being transmitted from its natural source, or replayed via a loudspeaker (with associated deterioration associated with compression recording techniques) or headphones. A human's perceptions can also be influenced by their emotional and psychological state, whether hungry or thirsty, and temperature differences, e.g. whether they feel hot or cold, plus the shape of their ears, and their position relative to the source of the sound (phase difference, doppler effects), head movement, and to other bodily aspects, especially visual cues, but also for example, to natural body rhythms such as heartbeat and breathing, and even unpleasant effects such as low frequency disturbance causing nausea etc.

I could go on, but once psychoacoustics are brought into the equation, it points up all the inadequacies and inaccuracies in the applicant's previously published figures. To date, I have always replied to their responses using the same terminology and measurements, but there are a plethora of further terms and alternative ways to measure all the various aspects of human hearing (an analogy would be mixing the differing scales of Fahrenheit, Celsius and Kelvin when referring to heat/temperature).

In conclusion, I found an interesting quote in one of the industry publications I still receive, which may well apply to those querying the information contained in my contributions: *'If you have a qualification, does that make you competent to work in our industry? No, not really. It'll give you some underpinning knowledge, but it won't teach you everything you need to know.'* All the information detailed above is readily obtained via the internet, but real world application and variations thereof can only be gathered by practical experience in the field. I apologise that this present submission is fragmentary and somewhat disjointed, but circumstances have conspired to force its completion in more of a hurry than I would have liked in order to arrive with you before the 21st June deadline. As I mentioned in my previous email, I have nothing but admiration for Mike Vitkovitch, who has produced an incredibly detailed body of work which is both explanatory in nature, but also contains more economically viable, practical and workable alternatives to the previous plans put forward by the applicant. Had these measures been adopted in the first place, there may well have been a more constructive consideration given to the project by local residents.

Tony Grant
Waunfawr

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