

Comment on RPS report on noise effects on bird populations, iGas Springs Road site and adjacent SSSI (January 2018)

My name is Mark Watson, and I am currently employed as a Consultant ENT Surgeon at a major NHS Teaching hospital. I obtained the specialist Fellowship in Otolaryngology from the Royal College of Surgeons in England in 1986, and the same year I attended a clinical audiology and deafness course held at the Institute of Sound and Vibration Research at Southampton University. I am an expert witness to the Civil Courts in approximately 150 cases per year, relating to occupational noise exposure and personal injuries.

Measurement of noise is a complex subject. Rather than measuring the actual sound pressure level in physical units, it is usual practice to use the deciBel (dB) scale: this is a system of relative values to a specified baseline value on a logarithmic basis: this means that a doubling of sound intensity in physical terms shows as a 3dB increase, not a doubling in dB value. In addition, the dB scale is weighted according to the frequency of the noise being measured, as the human ear does not respond to different frequencies in a linear fashion, to produce the dBA scale of measurement.

The measurement specified in the **Planning Practice Guidance** (PPG) for mineral planning authorities specifies that noise levels at an adjacent noise-sensitive property should not exceed background noise level (defined as LA90, 1h) by more than 10dBA during working hours. LA90, 1h means the noise level for the highest 90% of values measured over 1 hour and averaged, and a 10dBA increase means a tenfold increase in sound pressure levels. It also stipulates that under no circumstances should the total noise from the site exceed LAeq, 1h of 55dBA. LAeq is a standard measure of noise often used in Health and Safety assessments in noisy workplaces, over a specified period of time. A standard noise meter for this purpose would measure sound level approximately 16 times per second over the measurement period, and average the values to produce LAeq. This can then be used to calculate the 8hour noise exposure of workers, to comply with legislation and assess employers' liability in deafness cases.

In the updated report from RPS dated January 2018 the method of measurement of LAeq and LA90 is specified as being for periods of 5 minutes, not the 1 hour specified in the PPG. Tables 5.1 and 5.2 give values for LAeq and LA90: it will be noted that the LA90 average value is significantly lower than the LAeq value, as LA90 is clearly including a greater proportion of the measured values than LAeq, which is only looking at the noisier part of the measurements. It is the LA90 value which should be used. This gives a value of 32dBA regardless of season. However, this should have been for periods of 1 hour, NOT just 5 minutes. If a 5 minute period includes a noisy event (plane passing overhead, heavy vehicle manoeuvring) then a much greater increase in background noise is suggested, whereas if a time period of 1 hour is used, this event would be averaged out, giving a more accurate estimate of background noise.

In their discussion in section 7, a noise threshold of 42dB is quoted, and they state that this noise level was exceeded by background noise for 33% of the time. This is only true for the LAeq value: the LA90 figure, specified in PPG, does not exceed 37dB. The 5dB difference between these figures equates to an increase in sound pressure level of almost fourfold. How these figures would differ if a measurement period of 1 hour had been used is a matter for conjecture.

Two studies are quoted looking at the effects of noise on bird populations, but these relate mainly to wading birds. These birds are active in the daytime, congregate in large flocks, and their main concern is the danger posed by birds of prey, which are spotted visually. Owls are nocturnal birds, which sleep during the day, and have very sensitive hearing which they use to hunt prey in the dark. The extrapolated data (which is at best an estimate) shown in Fig 4.1 suggests that at 1kHz an owl has hearing which is 10dB (ten times) more sensitive than human hearing and 30dB (1000 times) better than other bird species. If an owl in hunting on the SSSI in background noise of 32dBA (the LA90 average value which is presented in the report), a mouse scuttling through the undergrowth may only produce an added sound of ≤ 3 dB. Even if the added noise from the construction site is only, say, 5dB, the owl would be unable to locate its prey. This assumption is confirmed by recent evidence looking at the effects of noise on owl species. A dose-response relationship between environmental noise level and hunting success has been confirmed (1). For every 1dB(A) increase in background noise, hunting success rate in owls decreases by 8%. A further study looking at traffic noise and including long-eared owls (*Asio otus*) (2) showed that increasing noise from a background level of 32dB to 40dB reduced hunting effectiveness by 17%, and showed traffic noise was likely to affect owl hunting at distances >120m.

If only a proportion of the SSSI is affected by noise, that area becomes unavailable to the birds for hunting. Small changes to availability of food supply during the breeding season can have serious effects on breeding success, and any change in noise levels may of course drive the birds away completely.

I cannot accept that the report demonstrates compliance with condition 21 of the planning consent, as measurements do not appear to have been carried out in line with the PPG, and the impact of even small amounts of additional noise to the owl population, particularly during the breeding season, has not been demonstrated to be safe. I do not understand why the report only contains references to non-owl species, when data specific to owls is available. We need to use background noise parameters which are more likely to be relevant to sensitive birds (LA90, 1h) rather than those designed to prevent deafness in workers (LAeq), and measurement periods need to be much longer.

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References

- 1) Anthropogenic noise impairs owl hunting behaviour. TateMason J, McClure CJW, Barber JR. *Biological Conservation* 2016; 199:29-32.
- 2) Traffic noise reduces foraging efficiency in wild owls. Senzaki M, Yamaura Y, Francis CD, Nakamura F. *Nature.com Scientific reports* (2016) | 6:30602 | DOI: 10.1038/srep30602