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Dear John

**AS12069 WROXTON MOTO X TRACK****Noise Impact Assessment Review**

The 'Noise Impact Assessment' submitted with an application to Cherwell District Council for Wroxton Motocross Track, Banbury, has been referred to us at Clarke Saunders Acoustics for technical review.

At CSA we have considerable expertise in the field of motorsport noise assessment and control, it being a specific area of specialist consultancy expertise. Our experience ranges from small kart tracks and motocross venues to the largest and most prestigious circuits in this country and further afield. We have provided consultancy advice to Silverstone, Brands Hatch and Oulton Park among others and evaluated plans for proposed new circuits in other countries.. We have also considered motorsport impacts on behalf of, and from the perspective of, neighbouring residents and provided advice to local planning authorities.

We have found that vitally important factors when describing the impact of motorsport noise on residential amenity are clarity, traceability and (perhaps most importantly) a full and frank treatment of uncertainty and variability.

The noise impact assessment presented in support of this application provides some useful insight as might be expected, with the data presented giving some insight into the noise levels generated by the activity observed. It does not, however, address many of the key requirements for assessment of motorsport events. With many variables, an assessment should at all times be aware of the following fundamentals:

- i) context,
- ii) directivity of engine noise / overly simplified calculation methods,
- iii) meteorological factors.

In summary, the PJA report provides some time limited measurements of noise levels in various pre-determined locations around the site. Importantly, the measurements are associated with practice activity at the track during a single visit to site. It is the type of preliminary exercise that might be useful in establishing some broad context and refining the details of more comprehensive measurements required to provide a meaningful assessment.

As such, the survey measurements themselves may well be perfectly valid, but they are not adequate to inform any kind of assessment suitable for the determination of a planning application.

## 1. Context

One of the most striking omissions is that an environmental noise survey was not undertaken beyond attendance at the practice event to establish otherwise prevailing conditions. Trends in noise variations without the activity present to determine the prevailing background noise levels at noise sensitive receptors would have allowed a fuller discussion on the ambient noise level and the general soundscape of the area. As is often the case in relatively rural settings, even at the lower windspeeds characteristic of benign calm conditions, background noise levels (measured over consecutive periods) show considerable variation.

There is no real attempt within the assessment to describe the context in terms of the soundscape of the local area. The only context given is the reference to the A422 and surrounding roads, with no data or discussions highlighting the existing impact of these noise sources, only *"that background  $L_{A90}$  levels are fairly consistent because of road traffic from the A422."* The character of this noise is not discussed in comparison to that of motocross bikes.

There is little discussion on the specific features, including frequency content of a motocross bikes engine or exhaust notes, nor any possible implications of tonality, intermittency or impulsivity of the sound characteristics, which is central when considering the context of the local environment.

Although NOEL, LOAEL and SOAEL are notoriously difficult to define precisely, it seems clear that the assessment has not clearly identified thresholds at which noise disturbance effects first occur and then become significant. The suggested 50dB level at which activity might be allowed would certainly give rise to an observable adverse effect, the significance of which has not been properly assessed or quantified. This 50dB level is not, and cannot be justified, derived or categorised in an appropriate framework in consideration of context. It appears to reflect the wishes of the applicant rather than any planning balance or consideration of appropriate controls on community impact.

## 2. Practice v Race Day

The validity of the measurements taken during the site visit is undermined by this important difference. Even with the same numbers of the same vehicles on track (although this is demonstrably not the case), the noise emissions profile from a competitive event is noticeably different (i.e. noisier) when racing. Practice activity is characterised by shorter, uncoordinated periods of focussed effort from the riders, interspersed with periods of less frenetic activity.

Necessarily, more power is extracted from the motorbike on a race day than a practice day; the noise output of the motorbikes being directly proportional to how hard they are ridden. There is also a characteristic crescendo at the start of each race which can be the most clearly audible feature off-site.

## 3. Noise Source Characteristics

In addition, beyond the report's cursory distinction between 2 and 4 stroke machines, there is no reference to the classification of bikes, the nature of the race events (competitive leagues, national or even international competition series) or the skill level of the participants during the survey period, or in future events.

Frequency content between 2 stroke and 4 stroke machines differs significantly. In general, 4 stroke bikes do not emit the high pitched 'buzz' which characterises 2 stroke engines, but conversely, the deeper low frequency exhaust notes are more evident, especially at greater distance.

All of the factors which affect sound transmission outdoors are frequency dependant. Air and ground absorption; and the screening effects of the built environment and natural topography are all dependant on the interaction of sound waves and the medium through which they are

transmitted, specific to their wavelength and therefore frequency, or pitch. The characteristics of the sound in question, therefore, dictate the way its effects are propagated further afield.

Despite the computer noise modelling presentation of the results, the report submitted describes a very simplistic set of assumptions which can't be relied on to describe motocross noise propagation with any level of precision or reliability without any consideration of these fundamental factors.

The landform of the area places parts of Hornton, for example, in a location which receives a diffracted wavefront which, especially with a southerly wind vector, focusses low frequency exhaust noise to produce higher levels than some locations closer to the track. When combined with receptor locations at which otherwise prevailing background levels are particularly low, the resultant impact will be particularly noticeable. The submitted report contains none of this level of detail or nuance.

#### 4. Noise Levels at Source

Motorsport noise is primarily dictated by engine noise from single point sources moving around a track, interrupted by occasional backfires for some types of highly tuned machine. The bike exhaust noise tests on site were conducted incorrectly (at 1m rather than 0.5m) displaying a marked lack of familiarity with the long-established motorsport noise test principles, but perhaps more worrying were then adjusted using a 3dB distance loss correction. A 3dB correction would apply to a 'line source' rather than the 'point source' which the bike clearly constitutes.

#### 5. Directivity

No consideration has been given to source directivity in the noise modelling prediction either. With the strong directivity of exhaust noise the orientation of the machines and hence the track circulation orientation become significant factors. This becomes even more significant when taking into account the undulating track features, resulting in increased power output from the engines which at times are significantly higher than the local ground level when airborne over jumps.

#### 6. Meteorological Effects

Finally, but perhaps most significantly the influence of weather conditions on long range sound transmission is the most important variable of all, having much more influence than variation in number or types of vehicle, for example. The effect must be a factor in the discussion of impacts, numbers of days' exposure, which of the receptors are the most critical with respect to prevailing wind conditions and so on. The author states "*these levels wouldn't be particularly affected by different weather conditions, strong winds would not cause an increase in levels at receptors in the direction of the wind, but would actually benefit those in the opposite direction.*"

There is no reference to prevailing or typical conditions, or the conditions under which the worst-case impact occurs (and the statistical rate of recurrence of those conditions). Distance propagation calculations are prone to significant error if they are not tested and corrected under different meteorological conditions. Any attempts at 'crude predictions' provide no meaningful insight. The biggest variable in motorsport noise assessment is the weather, which dramatically affects the propagation of both activity noise and the ambient noise against which it is assessed, and insufficient consideration has been given to this factor.

Historical weather data shows records a northerly wind on the day of the noise survey, with the implication that noise propagation towards Hornton would have been lower than with a more typical prevailing wind, which would have a southerly component. When the wind speed gradient is aligned with the direction of sound propagation it effectively imparts 'top spin' to the propagating wavefront which would effectively undermine the screening influence of the intervening hill between the circuit and the village of Hornton.

## Conclusion

The assessment sets its objective as '*to ensure that the risk of noise impact will be controlled sufficiently*', but there appears to be no effort to control noise. The assessment instead dismisses the possibility of any impact following some highly suspect and in other areas fundamentally flawed calculations and reasoning.

When considered in combination, the unaddressed uncertainty, inappropriate calculation and assessment methods with the source characteristic inadequately characterised, and the lack of consideration given to meteorological effects, it appears inevitable that the assessment cannot be relied on to describe the community impact of the proposals.

Yours sincerely  
for CLARKE SAUNDERS ASSOCIATES  
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