



REPORT AS9100.160913.R2.0

RUNWAYS FARM,

UPPER BOURNE END LANE, BOVINGDON



MOTORSPORT NOISE CONTROL



Prepared: 29 September 2016



Bovingdon Action Group



**CONTENTS**

<b>1.0</b>	<b>EXECUTIVE SUMMARY</b>	<b>2</b>
<b>2.0</b>	<b>INTRODUCTION</b>	<b>3</b>
<b>3.0</b>	<b>PLANNING CONSENT</b>	<b>3</b>
<b>4.0</b>	<b>SITE INSPECTION VISIT</b>	<b>4</b>
<b>5.0</b>	<b>ASSESSMENT</b>	<b>5</b>
<b>5.1</b>	<i>Noise Monitoring</i>	<b>6</b>
<b>5.2</b>	<i>Static Noise Testing</i>	<b>8</b>
<b>5.3</b>	<i>Drifting Tyre Squeal</i>	<b>9</b>
<b>6.0</b>	<b>RECOMMENDATIONS</b>	<b>10</b>

## 1.0 EXECUTIVE SUMMARY

Noise disturbance to surrounding residents has prompted an independent review of noise emissions from motorsport activities at Runways Farm, Bovingdon Airfield. The site is approaching the end of a two year trial planning consent, issued following an appeal to the Planning Inspectorate.

In his report, the Planning Inspector set out his expectations for this trial period to establish and refine noise control and monitoring procedures, due to his scepticism over the predicted acceptability of noise emissions submitted by the site operator (see paragraphs 21, 27, 28, 40 and 41 of the Inspector's report). In paragraph 42 of his decision the Inspector made his expectations clear *"...a trial run be allowed for a two year period, in which time the operations can be modified to prevent noise nuisance to neighbouring occupiers..."*.

This review has confirmed the Inspector's view that the initial noise impact assessment did not fully reflect the disturbance caused by the activity. Engine revving and tyre squeal from drifting activities is more disturbing than was anticipated by a somewhat simplistic assessment which did not consider the highly directional characteristics of performance exhaust systems nor the prevailing or typical meteorological conditions on site, along with the inherent variability of these conditions.

Noise disturbance from the site is not adequately monitored or controlled. The system installed to monitor noise levels can be undermined relatively easily, either deliberately or sub-consciously by driver behaviour, and does not provide the transparency and clarity neighbouring residents could reasonably be expected to demand.

In terms of practical noise impact control, the static engine noise test regime appears to be incorrectly implemented, both in terms of the test method and the acceptance threshold established, and the track wetting commitment to minimise tyre noise during drifting activities appears to be poorly observed.

In summary, for a number of clearly set out reasons, it would not be appropriate for Dacorum Borough Council to consider allowing the activity to continue under the current noise monitoring and control regime, significant improvements to which are required.

## 2.0 INTRODUCTION

The site of the airfield which previously housed RAF Bovingdon, just south of Hemel Hempstead, is now used for a range of activities, including use as a film set, a large open market, and a motorsport track facility featuring performance car experience driving and ‘drifting’<sup>[1]</sup>. Other, less vigorous, automotive uses include corporate and advanced driver training.

The planning history for these noisier motorsport activities has been contentious, with complaints and objections from nearby residents leading to an appeal and public inquiry in September 2014. The decision issued by the Planning Inspector included noise restriction and monitoring conditions, to be reviewed following a two-year trial period, which is due to lapse on 14 January 2017.

Clarke Saunders Acoustics (CSA) is a firm of specialist acoustical consultants which provides expert consultancy advice to many UK motorsport circuit and off-road venue operators, including Silverstone, Brands Hatch, Oulton Park and the Bugatti Owners Club. CSA has also been involved in the planning stages of new and modified motorsport facilities, such as the Circuit of Wales, Snetterton and smaller corporate and club facilities, and provided assistance to Local Planning Authorities and neighbours of such venues.

CSA has been appointed by local residents, concerned that a noise nuisance continues to exist despite the control in place. This report reviews the current situation providing an independent assessment of the noise impact of motorsport activities, and the extent to which they are, or are not, adequately controlled and monitored in the context of the planning history, and in particular the conditions on the trial period consent. The intention is to provide the local planning authority, Dacorum Borough Council, with as much assistance and information as possible which might assist in their review of the trial period, and their consideration of any application to extend or renew the consent.

## 3.0 PLANNING CONSENT

The conditions annexed to the Planning Inspector’s report required the operators to observe the following during the two year trial consent period:

- Compile an operational log diary, including noise monitoring records, within one month of the consent, to be made available at any time with 10 working days’ notice from the local authority

---

<sup>1</sup> Drifting is a driving technique where the driver intentionally oversteers, causing loss of traction in the rear wheels or all tyres, while maintaining control for the entirety of a corner. A car is drifting when the rear slip angle is greater than the front slip angle, to such an extent that often the front wheels are pointing in the opposite direction to the turn (e.g. car is turning left, wheels are pointed right or vice versa, also known as opposite lock or counter-steering).

As a motoring discipline, professional drifting competitions are held worldwide and are judged according to the speed, angle, showmanship and line taken through a corner or set of corners. [https://en.wikipedia.org/wiki/Drifting\\_\(motorsport\)](https://en.wikipedia.org/wiki/Drifting_(motorsport))

- Submit a Management Plan (including noise management) within two months of the consent for local authority approval

The stipulations for the Management Plan are very specific, setting out elements considered by the Inspector to be key in controlling the use, primarily in relation to neighbour disturbance. Condition 5 is reproduced in full below.

- 5) Within two months of the date of this decision a Management Plan, including noise management, shall have been submitted to and approved in writing by the local planning authority. The Noise Management Plan shall provide details including, but not limited to:-
- Details of noise limits and operating restrictions.
  - Details of how these limits and restrictions will be monitored and policed.
  - Details of the noise monitoring equipment to be installed.
  - Details of the vehicles noise emissions test and the frequency in which these are to be carried out; how the results are recorded and made available for viewing whilst those vehicles are on the site, and the method for recording any modifications to the vehicles undertaken since the noise emission test.
  - Measures to be put in place to ensure no sounding of alarms, horns or sirens in connection with the uses hereby permitted.
  - The means of conveying the recorded information to the local planning authority.
  - Provision for access to the site by the authority's representative without advanced notice.
  - Details of external lighting.
  - Details of the times when drifting may take place, including precautions to prevent squealing tyres, such as watering the track.
  - Scheme of work to restore the land at the end of two years.

The most recent publicly accessible Management Plan for Runways Farm (Controlled Document No.1 version 6, dated 8 June 2015) can be found via Dacorum's online planning records.

## 4.0 SITE INSPECTION VISIT

A site visit was conducted on the morning of Tuesday 23rd August 2016. For the duration of the site inspection, activity on the tracks was very modest and the cars running were operating at reduced speeds. In discussion with local residents it was clear that these levels of activity were not the subject of their complaints.

The residents also suggested that the operators of the track, being sensitive to neighbour concerns, tended to moderate their activities when it was apparent that they were being observed. It was clear that they had noticed the arrival of three visitors to site.

The visit provided an opportunity to observe the circuits in use, albeit at low noise levels, and to consider the location of the noise monitoring instruments installed as detailed in the operators' management plan.

## 5.0 ASSESSMENT

This assessment has been based on the findings of a site visit, discussions with neighbouring residents and the following documents relevant to the planning consent:

- Summary Proof of Evidence, Gary King, Sharps Redmore 04/08/2014
- Proof of Evidence, Gary King, Sharps Redmore 21/07/2014
- Management Plan for Runways Farm #1 v6 08/06/2015
- Management Plan for Runways Farm – Appendix 1: Circuit Watering Details
- Management Plan for Runways Farm – Appendix 2: Operating Logs
- Management Plan for Runways Farm – Appendix 3: Noise Monitoring System Details
- Planning Inspector's Appeal Decision ref APP/A1910/C/14/2213612

Initially it is important to establish the specific characteristics of the site, its context in relation to nearby noise sensitive receptors (neighbouring residents) and the uses to which the operators put the facility.

Motorsport facilities are unlike many other environmental noise sources commonly encountered by local authority planning and environmental health officers, and indeed acoustics experts. The combination of a number of continuously changing variable conditions related to activity noise output, overlain by the dramatic variability introduced by sound propagation over long ranges in different weather conditions makes assessment and control of noise emissions a non-trivial exercise.

The influence of weather conditions cannot be overstated in considering day to day and even hour to hour variability in the level of disturbance caused. Although the prevailing wind is from the west, it changes frequently at this hilltop location, encouraging noise propagation towards Bovingdon, Whelpley Hill and the homes on the Hempstead Road in turn. Downwind propagation typically increases noise levels by 5dB, whereas the reduction for an equivalent upwind vector is 15dB. This total 'swing' of 20dB difference between upwind and downwind conditions can be equated to a four-fold change in the subjective level of disturbance and does not appear to have been taken into consideration in developing the sound management plan.

The planning appeal documentation, notably the Sharps Redmore technical evidence, provides useful insight into the consenting process, and the level of noise impact anticipated by the Planning Inspector. The Redmore report concluded that the impact of proposed motorsport use was, in the main, acceptable, and that only the most vigorous 'hot lap' drifting might cause an impact which required mitigation, proposed in the form of a track wetting commitment to reduce tyre squeal.

CSA's brief for this assessment does not include re-examining the basis on which the Inspector allowed the Appeal, but it is relevant to note that in relation to current neighbour concerns there are a number of aspects which are likely to have resulted in an underestimate of the likely noise impact. The noise assessment criteria used were more appropriate to anonymous transportation noise sources than the specific and distracting noise generated by motorsport, whether from tyre squeal during drifting or the exhaust notes of high performance supercars.

The SoundPLAN noise propagation modelling did not include any consideration of the highly directional characteristics of performance exhaust systems nor the prevailing or typical meteorological conditions. This must be considered to be a significant omission for such a strongly weather affected source of noise disturbance.

Neighbour expectations were not, therefore, effectively managed by the planning process, the impression having been given that the track noise would not be troublesome, and the elements which could be an issue had been addressed.

In reality, however, depending on the complex combination of many variables, the situation is much more dynamic. At times the circuit activity will be inaudible to most if not all neighbours, but much of the time it will be annoying to some while barely discernible to others, and sometimes troublesome in all directions over a wider area. This level of variability is not captured effectively in the homogenised averaged noise map approach using standard software like SoundPLAN.

It is unsurprising, therefore, that concerns have been raised by neighbouring residents over levels of disturbance they were lead to believe would not be caused.

## 5.1 Noise Monitoring

CSA has considerable experience of establishing trackside drive-by noise monitoring systems at motorsport venues, having worked with the leading circuit operators and equipment suppliers in establishing optimum system and installation details. The most important factor is the location of the monitor, in terms of both position on the circuit and lateral set-back distance from the track. The location needs to capture pass-by noise when the vehicle is under full acceleration at relatively high revs to capture the loudest and most consistent noise emissions. It needs to be close enough to identify noise emissions from a single vehicle, but not so close that the lateral location of the vehicle on the circuit makes an appreciable difference to the repeatability of noise readings due to taking different lines through and between corners.

These confounding factors are largely addressed on competitive circuits by making informed judgments about race driver behaviour. It is generally possible to establish locations at which no competitive driver will be prepared to moderate their acceleration efforts, or be able to position the car further on the track from the microphone without compromising their race position or laptime.

As observed during the site inspection, however, it is apparent that the drifting instruction and experience drive activities are entirely different. With laps being untimed, and uncompetitive, with the emphasis on fun and handling skills, there are no consistent track behaviour patterns. In addition, whether deliberately or sub-consciously, it is almost inevitable that drivers (or instructors) who are aware of the monitoring microphone location will moderate their behaviour in its vicinity. As a result, any single microphone location for each track will inevitably underestimate the noise emissions from vehicles engaged in these types of activity.

The noise monitoring system, using Cirrus Environmental CR247 equipment and a cloud based reporting system “Noise-Hub2” is configured to enable Dacorum Borough Council to view the monitoring data live, and provides level triggered alerts by text message and email. The system is described in some detail in Appendix 3 to the Management Plan ‘Noise Monitoring System Details’ including the thresholds at which alerts are triggered. Automatic electronic internal calibration<sup>[2]</sup> occurs daily, but no details of an external physical calibration regime are described. Previous experience of relying exclusively on internal equipment calibration raises this as a concern. The calibration regime for this equipment should include use of an external physical calibration source, albeit on a less frequent basis.

While the noise monitoring system has the potential to deliver suitably accurate and reliable monitoring data, the implementation and scale isn’t sufficiently deployed to effectively monitor the activity it is required to ‘police’. The reporting mechanism via DBC introduces unnecessary delay and undermines the main benefit of cloud based systems, which is their immediacy and transparency. Experience has shown that web-based systems of this type can be of greater direct benefit to neighbouring communities if direct open access is provided, enabling residents to access the information directly. This has been found to reduce the number of complaints received, when potential complainants are able to access the system and better understand levels of activity and variability occurring on site.

The thresholds against which alert triggers are set have not been justified in any of the information reviewed, hence the validity of their derivation cannot be ascertained. The trial period has presented ample opportunity to further study the noise generation and propagation characteristics of the site, with a view to verify or adjust these thresholds. The assumption that the values first selected as triggers can be retained without justification should be challenged.

---

<sup>2</sup> This enables the equipment to ‘self-test’ against an internally generated signal. An external physical calibrator requires a separate external field calibration device which fits over the measurement microphone and generates sound at a fixed reference level to ensure that it is being detected correctly by the measurement system.



## 5.2 Static Noise Testing

At section 6 (k) of the Management Plan, operating restrictions are described including vehicle exhaust noise emissions control by means of the ‘standard’ static noise test, and reference is made to MSA passport approval. The test regime described, however, is subtly different from the MSA<sup>[3]</sup> static sound test, which requires noise levels to be measured at 0.5m rather than the 1m shown in the Management Plan, or with an option to test at 2m against a more stringent limit.

This doubling of measurement distance can be expected to make up to a 6dB difference to the resultant noise reading, making the 110dB(A) limit in the Management Plan the equivalent of 116dB(A) at 0.5m if tested to the correct MSA methodology. With reference to the table below from the MSA regulations it is clear that this constitutes a very high comparative level of output in comparison with high performance competitive racing formulae.

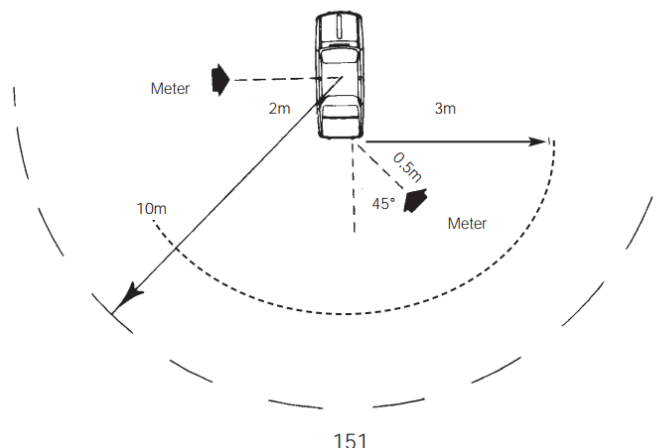
In comparison, most track day operators apply a static test limit in the region of 105dB(A) at 0.5m for normal track days, with a reduced limit of, say 102dB(A) for ‘quiet days’.

**Appendix 1: Charts and Diagrams**

**Chart 5.18: Maximum Noise Limits**

The following table gives alternative distance readings. (Noise measured in dB(A))

	0.5m	2.0m	
Section 'A'	105	93	CAR RACE (SALOON AND SPORTS CARS) MAXIMUM AT ¾ MAXIMUM RPM
Section 'B'	108	96	CAR RACE (SINGLE SEATER AND SPORTS RACING CARS) MAXIMUM AT ¾ MAXIMUM RPM
Section 'C'	100	88	STAGE RALLY, AUTOTEST, TRIALS, MAXIMUM AT 4,500 RPM
Section 'D'	98	86	ROAD RALLY MAXIMUM AT ¾ MAXIMUM RPM
Section 'E'	100	88	CCV MAXIMUM AT ¾ MAXIMUM RPM
Section 'F'	108	96	AUTOCROSS AND RALLYCROSS MAXIMUM AT ¾ MAXIMUM RPM
Section 'G'			HILLCLIMB AND SPRINT MAXIMUM AT ¾ MAXIMUM RPM -
	110	98	RACING AND SPORTS LIBRE CARS AND CARS COMPLYING WITH S.12 AND S.13
	108	96	ALL OTHER CATEGORIES



It is also noted that most of the vehicle categories which would appear relevant to the types of vehicles used on the circuits are tested under the MSA regulations at  $\frac{3}{4}$  rather than  $\frac{2}{3}$  revs as

<sup>3</sup> Motor Sports Association – UK Governing Body for four-wheel motor sport. Common Regulations for Competitors: Vehicles <https://www.msauk.org/assets/144152commonregulationsforcompetitorsvehiclesj.pdf>

shown in the management plan. This would also tend to underestimate the noise output tested by several decibels.

### 5.3 Drifting Tyre Squeal

Noise generated by tyre squeal during the deliberate power slides involved in drifting makes it one of the more disturbing and intrusive aspects of motorsport from an occasional noticeable characteristic into the dominant aspect of the 'soundscape'. A number of venues are precluded from holding organised drifting events for this reason.

This facility, however, features drifting as one of the central aspects of the business and as a result has had to take measures to reduce the resultant additional noise impact. Identified in the evidence submitted to the planning appeal and also by the Inspector as the most troublesome aspect of the operation, tyre noise from drifting is required to be controlled by wetting of the track.

Although overall noise levels are not reduced dramatically by track wetting, the character of the sound is improved significantly and this measure is undoubtedly beneficial in terms of neighbour impact.

No track wetting was observable during the site visit, and it is understood from the neighbouring residents interviewed that this aspect of the Management Plan is not rigorously observed.

Section 6 (j) of the management plan, however, states that *When "drifting" is taking place, the surface of the circuit must be maintained in a wet condition, using water hoses as often as necessary*. The efficacy of this process and the rigour with which it is implemented, therefore, appears to be in question, and should be proven. If insufficient resources are in place to keep all of the drifting track wet at all times, infrastructure improvements may be required in terms of water supply.

## 6.0 RECOMMENDATIONS

On the basis of the assessment presented above, it is recommended that Dacorum Borough Council require the track operator to implement the following changes before it considers any continuation of the current activities.

1. Multiple simultaneous noise monitoring locations (at least 3 per track) to reduce the under-reading effect of driver moderation
2. Addition of quarterly external field calibration checks to the equipment calibration regime
3. Direct access to online noise monitoring data to all interested parties, providing immediate feedback and information to potential complainants
4. Provide a detailed technical justification of the validity of the trigger threshold levels based on experience gained during the trial period, including off-site survey measurements.
5. Standardise exhaust noise test procedure:
  - a. Revert to approved MSA measurement distance of 0.5m and follow MSA method
  - b. Revert to  $\frac{3}{4}$  maximum engine revs test (or provide technical justification of alternative)
  - c. Reduce static test limit in line with MSA limits normally applied for track day events, rather than competitive racing, to 105dB(A).
6. Track wetting process to be proven with sufficient water supply to keep the track wet at all times during drifting activities.

These recommendations directly address key aspects of condition #5 of the planning consent as directed by the Planning Inspector.

*E H Clarke*

E H Clarke

CLARKE SAUNDERS ASSOCIATES