

Date: 8th January 2015

Ref: 14081/001/js



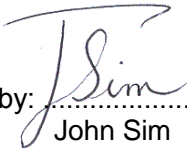
DUNSTABLE MOTOCROSS TRACK

REVIEW OF L F ACOUSTICS

NOISE ASSESSMENT

Re VARIATIONS to PLANNING CONDITIONS

Client: Residents Group

Presented by: .....
John Sim
Associate

Approved by: .....
A V H Holdich
Executive Consultant

© Applied Acoustic Design 2015



This document has been prepared by AAD Ltd for the sole use of our client and in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AAD and the Client. Unless otherwise expressly stated in this document, any information provided by third parties and referred to herein has not been checked or verified by AAD. No third party may rely on this document without the prior and express written agreement of AAD.

THE GREEN BUSINESS CENTRE
THE CAUSEWAY
STAINES
MIDDLESEX
TW18 3AL

TELEPHONE: 01784 464404
FACSIMILE: 01784 465447

CONTENTS

	Preface	2
1.0	Introduction	3
2.0	The Proposed Variations to Conditions	3
3.0	Discussion of the Proposed Variations	4
4.0	Review of the LFA Noise Assessment	5
5.0	Mitigation	8
6.0	Trackside Measurements	9
7.0	Summary	11
8.0	Conclusions	12

Figure 1: Location of Residential Monitoring Positions

Figure 2: Location of Trackside Monitoring Position

Figure 3: Glossary of Acoustic Terms

Preface

This report has been prepared by John Sim who is a member of the Institute of Acoustics and a qualified Environmental Health Officer. John is an Associate with Applied Acoustic Design Limited (AAD) where he has been employed since June 2003. In addition to his qualifications as an Environmental Health Officer he holds the Institute of Acoustics Diploma and the Scottish Institute of Environmental Health Certificate in Noise and Vibration Control.

John has 26 years experience of providing acoustic consultancy services in private practice with a further 8 years as a specialist pollution control officer in local government. He has given acoustic evidence in both Magistrates Courts and the High Court and has provided expert witness evidence to a number of Public Inquiries. John is a registered expert witness under the Sweet & Maxwell checked Expert Witness scheme.

The report is approved by Tony Holdich who is a member of the Institute of Acoustics and a Fellow Member of the Chartered Management Institute. Tony has been a director of Acoustic Practices for 28 years, was a founder of AAD of which he was a director from 1990 to 2013. In 2013 became an Executive Consultant and Quality Control Manager at AAD leading AADs BS EN ISO 9001:2008 Quality Management qualification and Lloyds Register audits.

1.0 Information

- 1.1 A planning application has been received by Central Bedfordshire Council (the Council), reference CB/14/03678/VOC, for the variation of Conditions 3, 4 and 5 of the extant planning consent reference SB/TP/95/0176. The variation to the conditions relate to an increase in the maximum number of motorcycles allowed on the track at any one time and changes to the operating days and hours of the track.
- 1.2 L F Acoustic Ltd (LFA) were employed by the Council to assess the noise implications of the proposed variation of conditions with respect of the likely effect on residential amenity. A group of local residents have instructed Applied Acoustic Design (AAD) to review the report and provide a critique where necessary.

2.0 The Proposed Variations to Conditions

- 2.1 The three conditions for which variations are sought are as set out below;

Condition 3:

This permission shall only extend the use of the site for the purpose of motor cycle training and practice between 1st April and 30th September in any calendar year.

Condition 4:

The site shall be used for the purpose hereby permitted only between the hours of 10.00am to 12.30pm and 2.30pm to 5.00pm Mondays to Saturdays and between the hours of 10.00am to 2.00pm on Sundays or Public Holidays.

Condition 5:

No more than 7 motor cycles shall use the track at any one time.

- 2.2 The proposed variations to these conditions are set out below;

Condition 3:

Change operation from the summer months to the winter months i.e. only operate from 1st October in one calendar year to 30th April in the following calendar year.

Condition 4:

Reduce the days of operation from seven days a week to nominally three days a week i.e. only operate on Fridays, Saturdays, Sundays and Bank Holidays. (Note: by the inclusion of Bank Holidays, a number of which fall on a Monday will give rise to weeks with four days of operation i.e. Monday, Friday, Saturday and Sunday). The variation to this condition includes a change to operating hours as shown below;

Friday and Saturday	10.00am to 1.00pm and 1.30pm to 3.30pm
Sunday	10.00am to 1.00pm and 1.30pm to 3.30pm
Bank Holidays	10.00am to 2.00pm

Condition 5:

Increase the number of bikes on the track at any one time to 18.

3.0 Discussion of the Proposed Variations

- 3.1 On the face of it the proposed variations to the conditions will provide a reduction in the number of days and operating hours of the track and thereby reduce noise disturbance and impact on local residents.
- 3.2 A calculation of the likely activity at the track, taking 2015/16 as an example;
- The current conditions allows 183 days of track use over which up to 7 motorcycles could use the track for 915 hours; a total of 6405 track motorcycle hours.
- The proposed conditions would allow 92 days of track use (including the bank holidays New Years and April bank holiday) over which up to 18 motorcycles could use the track for 426 hours; a total of 7668 track motorcycle hours.
- 3.3 As can be seen, there is a significant increase in the number of track motorcycle hours comparing the controls provided by the conditions attached to the extant consent and the proposed variations to those conditions. The proposed variations to the conditions cannot therefore be regarded as a planning gain in terms of reduced activity levels.
- 3.4 The Council planning report contains information submitted by the applicant following the site noise measurements undertaken by LFA used as the basis of the noise impact assessment. This information includes the statements "*If we run throughout the winter we will be fighting the weather for the most of it*" and "*It is also a massive job for us to keep the track in a rideable condition and we have to continually pump out the small ponds around the track to allow for drainage and also riders will not ride if it is raining on the day as it is impossible for them to see where they are going*".
- 3.5 These statements imply that it is probable that if the variations to the conditions were granted that the track would not be used to the full extent of the revised permitted hours. There would consequently be fewer actual track motorcycle hours than the variations to the conditions would permit.
- 3.6 It is assumed that these statements are made to further re-inforce the position that the proposed variation to the conditions would result in a less intensive use of the track than at present and consequently there would be a reduced impact on residential amenity.
- 3.7 However, the planning report also contains the statement from the applicant that "*At present with the planning conditions we have in place, we don't have any of these problems and can, as we did this year, open **every day that we wanted to** with ease*". (my emphasis).
- 3.8 From this statement it is taken that the track currently does not open every day permitted by the extant planning consent. It would be expected that, based on the operators experience, that the track would only operate on those days which gave rise to sufficient usage to make it viable to open. It would also be typical that these days would be at the weekend as these are the days when most people are not working.
- 3.9 In any event there is no evidence provided by the applicant to show the actual usage of the track compared with the permitted usage and therefore no basis upon which to determine if there is likely to be any significant reduction in the days of operation. The

only information that is clear is an increase in the number of motorcycles allowed on the track and the number of operational months increased from six to seven.

- 3.10 It may be that the proposed number of operational days are no fewer in number than is currently undertaken at the site and consequently the result could be the same number of actual operational days but with an increase by one hour a day Fridays, Saturdays and Sundays with noise from almost twice the number of motorcycles.
- 3.11 From the information provided it is unclear what reduction in site activity, if any, is likely to result from the proposed variations to Conditions 3, 4 and 5 of the extant planning consent.

4.0 Review of the LFA Noise Assessment

- 4.1 The occasion during which the noise measurements were made took place on 29th November 2014 which is outside the permitted operational dates of the track. It is understood that the bike riders present during the occasion were a group of bike riders invited by the applicant for the purpose.
- 4.2 Given the artificial nature of the occasion, with a group of invited bike riders, it must be assumed that the occasion would be a best case with respect of control of the noise from the operation of the track. A more rigorous approach would have been if the applicant, rather than the Council, had employed the acoustic consultant and that the noise measurements had been made during the normal operation of the track on multiple occasions.
- 4.3 This review of the noise assessment is made on the basis that the noise measurements at the site are a best case for the applicant and that there is a high probability that the level of noise from the normal operation of the track, with an ad hoc group of bike riders, will be greater than has been determined during the LFA noise survey.
- 4.4 Noise Survey and Results
- 4.4.1 It is understood that four sound level meters were used during the survey, two located at positions 10m from the track, one in a garden adjacent to Mead House and the final meter in a garden area adjacent to Rye Farm. The measurement positions are given in two Figures attached to the LFA assessment, copies of which are appended to this review. Figure 1 shows the measurement positions at Mead House and Rye Farm and Figure two shows the measurement positions adjacent to the track.
- 4.4.2 The meters were set up to record noise levels over 1 second time periods with audio capture being undertaken contemporaneously with the measurements. The rationale for the measurement set up being the identification of individual occasions.
- 4.4.3 Appendices A to C of the LFA noise assessment show the measured noise levels aggregated into 1 minute time periods. Appendix A shows the aggregated noise levels for the track side positions, Appendix B shows the aggregated noise levels for Mead House (the text identifying the location at the top of the charts wrongly identify the data as being for Rye Farm) and Appendix C shows the aggregated noise levels for Rye Farm.

- 4.4.4 Given the stated intent that 1 second time periods had been chosen so as to allow for the identification of individual occasions it is not understood why the data has subsequently been provided in the form of 1 minute aggregated noise levels.
- 4.4.5 The aggregation of the 1 second noise levels to 1 minute noise levels will smooth out and mask the noise from individual occasions and prevent proper third party assessment of the conclusions reached with respect to the levels of noise from individual occasions.
- 4.4.6 It is noted that the measurement data at the track positions show fairly constant activity from around 10:30 to around 13:00 with a number of very short breaks, a break from around 13:00 to around 13:37 and then constant activity up to around 14:00 with one short break. However, it is also noted that the LFA assessment is based on only 12 five minute time periods during all of the site activity rather than assess the noise levels during the entirety of the activity.
- 4.4.7 It is understood that specific time periods may have been chosen to determine the effect of the number of motor cycles on the track at any given time might have on the measured noise levels. However, there should be no reason why the assessment should not also have considered the levels of noise during the entirety of the track activity so as to provide a comprehensive view of the track noise rather than a snapshot view.
- 4.4.8 It is considered that the best use has not been made of the data obtained from the noise measurement exercise and as a consequence the LFA noise assessment may not reveal the entirety of the noise impact on residents.
- 4.5 Noise Criterion
 - 4.5.1 Consideration of a noise criterion against which noise from the track may be assessed is based on the guidance and advice contained in the National Planning Policy Framework (NPPF). The NPPF advises that local planning authorities should aim to “Avoid noise from giving rise to significant adverse impacts on health and quality of life from new development”.
 - 4.5.2 Reference is then made to the Noise Policy Statement for England (NPSE) and in particular to the relevant effect levels identified in this and the NPPF. These effect levels being as given below;

No Observed Adverse Effect (NOEL)	noticeable not intrusive
Lowest Observed Adverse Effect Level (LAOEL)	noticeable and intrusive
Significant Observed Adverse Effect Level (SOAEL)	noticeable and disruptive
Unacceptable Adverse Effect	noticeable and very disruptive
 - 4.5.3 Reference is also made to the “Code of Practice on Noise from Organised Off-Road Motor Cycle Sport”, British Standard BS8233:2014 and the 1999 World Health Organisation Guidelines.
 - 4.5.4 It is noted that in particular the guideline noise level values from BS8233 and the WHO document are given but that the assessment, although stating that “*The results of the noise measurements taken at Mead House and Rye Farm on 29th November 2014 indicate acceptable noise levels associated with the operation of the motocross track*”, the assessment at no point makes comment as to what an “acceptable noise level” would be.

- 4.5.5 Reference has been made in the LFA assessment to BS8233 and WHO guidelines with 55 dB $L_{Aeq, t}$ being identified in BS8233 as being the “upper guideline value” for gardens and being identified in the WHO guidance as being the noise control level required “To protect the majority of people from being seriously annoyed during the daytime.....”.
- 4.5.6 The LFA noise assessment, although referencing these objective noise criteria, does not then comment on or recommend a testable, measureable objective noise criterion at residential properties against which the proposed development can be assessed.
- 4.5.7 It is not understood why there has been no consideration with respect of relating the 55 dB $L_{Aeq, t}$ in gardens as a maximum guideline noise level to prevent serious annoyance to the SOAEL definition of noise being noticeable and disruptive.
- 4.5.8 There must be reasonable correlation between noise causing serious annoyance and noise causing a material change in behaviour and/or attitude and consequently an objective noise criterion related to the 55 dB $L_{Aeq, t}$ noise criterion should have been recommended.
- 4.5.9 Such a noise criterion would give certainty to the applicant as to what needs to be achieved and gives transparency to residents as to the basis of an assessment that noise from the proposed development is acceptable and will not give rise to serious detriment to their amenity.
- 4.6 Measured Noise Levels
- 4.6.1 The trackside noise measurements given in table 4.1 relate the measured noise levels at two positions 10 metres from the track with differing number of motor cycles running on the track. The LFA assessment then comments, based on these measured noise levels, “the results indicate that there was little variation in the noise level at the property (Mead House) with either 7 or up to 18 bikes using the track. It is noted that the lowest noise level measured was obtained during the period when the maximum number of bikes were on the track, with the highest levels obtained from either 7 or 15 bikes on track”.
- 4.6.2 Table 4.2 in the LFA assessment gives the measured ambient noise levels at Mead House (i.e. the noise levels with no track activity) and table 4.3 gives the measured noise levels at Mead House with bikes on the track. There is no table given which shows the calculated noise levels at Mead House due to the bikes alone i.e. disaggregating the bike noise from the measured noise levels which includes the ambient noise.
- 4.6.3 In the simplest of possible calculations the average ambient noise level is 51.3 dB $L_{Aeq, 5 \text{ min}}$ (average of all of the measured ambient noise levels) and with noise from the bikes the average noise level is 54.3 dB $L_{Aeq, 5 \text{ min}}$. By calculation, on the basis of this simple calculation, the noise level due to the bikes at Mead House is around 51 dB $L_{Aeq, 5 \text{ min}}$ i.e. the bikes on their own at Mead House are as noisy as the sum total of all other noise sources in the area.
- 4.6.4 Even this simplistic analysis of the limited data contradicts the LFA assessment in the last paragraph on page 9 where it is stated “.....the level of noise generated was below that associated with other surrounding noise sources”. Indeed, as shown below, there are periods where the noise from the bikes was around 4 dB higher than the other surrounding noise sources.

- 4.6.5 A more complicated process of calculation can be undertaken by assessing each of the 12 five minute periods individually against the average ambient noise level, the minimum ambient noise level and against the maximum measured ambient noise level as shown below;

Number of bikes	Ave	Min	Max
16	48.9	51.4	
15	55.9	56.5	54.5
7	55.5	56.2	54.0
8		44.2	
7	33.5	47.9	
6	51.0	52.7	43.6
7	55.4	56.1	53.8
7	51.0	52.7	43.6
9	52.4	53.7	48.4
8	51.5	53.0	45.5
7		45.9	
18		41.9	

- 4.6.6 The first column refers to the number of bikes on the track, the second to fourth columns being the calculated noise levels due to the bikes alone corrected for the average, minimum and maximum ambient noise levels as indicated by the titles. The blank cells indicate periods where the measured noise levels with the bikes were lower than the ambient noise levels as indicated by the column titles i.e. average, minimum and maximum.
- 4.6.7 The rows marked in red are periods where the measured noise levels with the bikes were clearly higher than any of the measured ambient noise levels. The average noise level for the bikes alone in these three time periods is 55.4 dB $L_{Aeq, 5 \text{ min}}$.
- 4.6.8 It is clear therefore from analysis of the limited data provided that, even in the best case with an invited group of bikers, that noise from the bikes at the Mead House position can be in excess of the WHO guideline value of 55 dB $L_{Aeq, t}$ required to prevent serious annoyance.
- 4.6.9 It is also clear from the analysis of the limited data provided that, in direct contradiction with a statement in the LFA assessment, noise from the bikes was on average at least as high as other surrounding noise sources and at worst case around 4 dB higher.
- 4.6.10 It is noted that two of the time periods when the noise from the bikes were in excess of 55 dB $L_{Aeq, 5 \text{ min}}$ were with the currently permitted number of bikes on the track.

5.0 Mitigation

- 5.1 The LFA assessment suggests mitigation in the form of perimeter bunds to a minimum height of 2 metres above the track i.e. where there are jumps in the track the bund would be at least 2 metres above the height of the top of the jump.

- 5.2 A bund designed to reduce noise levels is at its most effective when either the source or receiver is close to it. The further away the source and receiver from the bund the less effective it becomes. A 2 metre high bund may therefore be effective for noise sources close to it but would be less effective with respect of bikes on the opposite side of the track.
- 5.3 Taking Mead House as an example, the closest part of the track is around 460 metres from the property and the farthest part of the track around 630 metres. The calculated distance reduction in noise from 460 metres to 630 metres is around 2.7 dB. If, due to increased bike distance from the bund, the reduction in acoustic performance of the bund is more than 2.7 dB then noise from bikes on the far side of the track would give rise to higher noise levels than bikes on the nearest part of the track.
- 5.4 On this basis there could be a requirement for bunding within the track area as well as around the perimeter. To determine the effectiveness of any bunding there should be a comprehensive assessment of actual bund designs based on achieving a set noise level at residential properties.
- 5.5 Such an assessment is not part of the LFA noise assessment report and, it is understood, no scheme of mitigation has been put forward by the applicant. Before any decision can be made on the likely effectiveness or otherwise of a mitigation scheme full details must be provided.
- 5.6 It is considered that any decision to grant consent for the proposed development on the basis of noise mitigation providing an acceptable level of noise at residential properties an actual mitigation scheme must be submitted for consideration.
- 5.7 To grant planning consent on the basis of the information currently provided would be premature.

6.0 Trackside Measurements

- 6.1 It is understood that the trackside measurement data has been referenced at a meeting between Glenn Wigley and David Hale on behalf of the residents with Marion Mustoe, Martin Crosby and Elaine Sutton of Stanbridge Parish Council and Alan Stone an environmental health/acoustic expert.
- 6.2 Reference was made at this meeting to the trackside measurement data in particular with respect of measured noise levels of around 79 dB $L_{Aeq, 5 \text{ min}}$ with 7 bikes and around 80 dB $L_{Aeq, 5 \text{ min}}$ with 15 bikes. The inference being that 15 bikes are no noisier than 7 bikes.
- 6.3 The trackside measurement data in this respect must be treated with caution. The $L_{Aeq, t}$ is an average measured value over the given period of time, in this case 5 minutes, and, as the averaging is logarithmic, is biased towards the higher noise levels experienced during the time period. The result of logarithmic averaging is that noise levels which are 10 dB or more below the highest noise levels contribute little or nothing to the overall period $L_{Aeq, t}$ value.
- 6.4 The trackside measurements were made at positions 10 metres from the track and based on distance reduction, for any given noise source, at around 32 metres distance the noise level would be 10 dB lower than at 10 metres. The consequence of distance

- noise reduction is that the noise from bikes more than around 32 metres from the measurement positions would contribute nothing to the measured period $L_{Aeq, t}$ value.
- 6.5 With bikes spread around the track only the noise from bikes within the 32 metre distance will be contributing to the measured noise level and therefore it is not unexpected that there is little variation in the trackside measurements for 7 bikes and 15 bikes. The fact is that no matter how many bikes were on the track, given that the bikes are spread around the track and not racing as a group, a similar number would be within the 32 metre distance whether there was a total of 7 or 15 running on the track.
- 6.6 It should be noted that this effect does not occur at the houses. As discussed above, the difference in noise levels between the closest part of the track and Mead House and the farthest part of the track is around 2.7 dB and consequently the noise from all of the track will contribute to the $L_{Aeq, t}$ at the houses.
- 6.7 It is further understood that there was some discussion at this meeting with respect of a noise control criterion for the track operations and that Alan Stone suggested 83 dB $L_{Aeq, 5 \text{ minute}}$. The measurements to be made on top of a bund; this is assumed to be measurement position 2.
- 6.8 It is also understood that the rationale behind this suggested limit is the measured noise level of 80 dB $L_{Aeq, 5 \text{ min}}$ with 15 bikes on the track with an increase to allow for more aggressive riding.
- 6.9 It is interesting to note that there was a suggestion that the 15 bikes may not have been driven as aggressively as normal during the measurement exercise undertaken on 29th November 2014.
- 6.10 It is also interesting that the suggestion is that rather than control the noise to that measured and hence limit aggressive riding the suggestion is that the noise from bikes be allowed to be 3 dB higher to allow aggressive riding. It is understood that the noise control limit was also suggested on the basis of minimising the effect on the operation of the track rather than any consideration for the protection of residential amenity.
- 6.10 As noted in 4.6.7 above even with less aggressive riding there were three time periods when the bike noise was over the 55 dB $L_{Aeq, t}$ guideline value given in the WHO guidance as being required to prevent serious annoyance.
- 6.11 If anything, consideration should be given to setting a noise control limit lower than the 79 dB $L_{Aeq, 5 \text{ min}}$ measured with 7 bikes rather than any increase in noise level.
- 6.12 As discussed above a trackside noise monitoring position would only control noise over a very small part of the track and is not appropriate should proper control of the noise from the track be exercised. The position of the noise monitor should be inside the track as far as possible equidistant from all parts of the track with measurement data being recorded, archived and available for inspection by the Council should complaint be made.
- 6.13 The appropriate noise control limit for such a system would be based on achieving a noise control level at the houses of no more than 46 dB $L_{Aeq, 5 \text{ min}}$. This level being 5 dB below the average ambient noise level in the area.
- 6.14 Two noise control levels would be set at the monitoring position an $L_{Aeq, 5 \text{ min}}$ and an overall $L_{Aeq, 1 \text{ sec}}$ limit to control particularly noisy bikes. Such a system of monitoring is

already in use at Croft Circuit see details at <http://www.aad.co.uk/misc/croft-motor-racing-circuit.pdf>.

7.0 Summary

- 7.1 Based on the information provided it is unclear what reduction in site activity might result from the proposed variations to the conditions.
- 7.2 Noise data has been obtained at four positions in the form of 1 second data which has then been aggregated to 1 minute and 5 minute data. It is considered that as a consequence the best use has not been made of the measurement data and as a result the entirety of the noise impact on residents may not have been determined and assessed.
- 7.3 Noise criteria have been discussed in the LFA noise assessment and although it is concluded that "*The results of the noise measurements taken at Mead House and Rye Farm on 29th November 2014 indicate acceptable noise levels associated with the operation of the motocross track*" there is no objective noise criterion given against which such a statement can be judged.
- 7.4 It is also stated in the LFA noise assessment that "*.....the level of noise generated was below that associated with other surrounding noise sources*" whereas even a simplistic analysis shows that noise levels from the track are as high as the noise level from all other sources in the area put together. Further, more detailed analysis shows that noise levels from the bikes are up to 4 dB higher than the typical ambient noise level in the area. The LFA statement is in error.
- 7.5 A more detailed analysis showed that there were three out of the twelve measurement time periods where noise from the bikes alone was in excess of the 55 dB $L_{Aeq, t}$ noise control guideline limit given by WHO as protecting "*the majority of people from being seriously annoyed during the daytime*".
- 7.6 The mitigation suggested by LFA is simplistic in its approach and takes no account of noise from bikes when on the far side of the track and at distance from the suggested perimeter bunds. To assess whether a mitigation scheme is likely to reduce noise levels, such that there should be no serious detriment to residential amenity, would require significant detail and which should be provided by the applicant as part of the application. Such a scheme can then be assessed as part of the planning process before consideration is given to the grant or otherwise of planning consent.
- 7.7 It is understood discussions have taken place with the Central Bedfordshire Council where the matter of a noise control criterion was introduced. It is further understood that the suggestion was for a noise control criterion of 83 dB $L_{Aeq, 5 \text{ min}}$, a noise control criterion 3 dB higher than the measured noise level with 15 bikes on the track. The reason given for a higher than measured noise criterion is understood to be that during the noise measurement exercise the bikes may not have been ridden as aggressively as they normally would be.
- 7.8 This approach seems somewhat weighted towards the track operator rather than considering the amenity of local residents. Rather than setting a noise control limit at the track to ensure little interference with the operation of the track with little concern

for residential amenity it is suggested that a noise control limit be set at the houses and then calculated back to a noise control limit at the track.

- 7.9 A noise control limit of 46 dB $L_{Aeq, 5 \text{ min}}$ at the houses, this being a noise level 5 dB below the typical ambient noise level in the area.

8.0 Conclusions

- 8.1 It is concluded that the LFA noise assessment is lacking in proper analysis of the measurement data and consequently contains conclusions which even a cursory analysis of the limited data given are shown to be wrong.
- 8.2 It is concluded that the consideration of mitigation measures is superficial and a more detailed scheme is required with a proper technical assessment of the likely levels of sound reduction that may be achieved.
- 8.3 It is concluded that the only consideration in setting a measureable noise control limit appears to be weighted towards the track operator with no apparent consideration for residential amenity.
- 8.4 It is further concluded that the approach to assessing the likely noise impact from the track is to start from a noise criterion at the houses and calculated back to the track noise sources thereby arriving at the necessary noise reduction required of any submitted scheme of noise mitigation.

Figure 1: Location of Residential Monitoring Positions



Figure 2: Location of Trackside Monitoring Positions

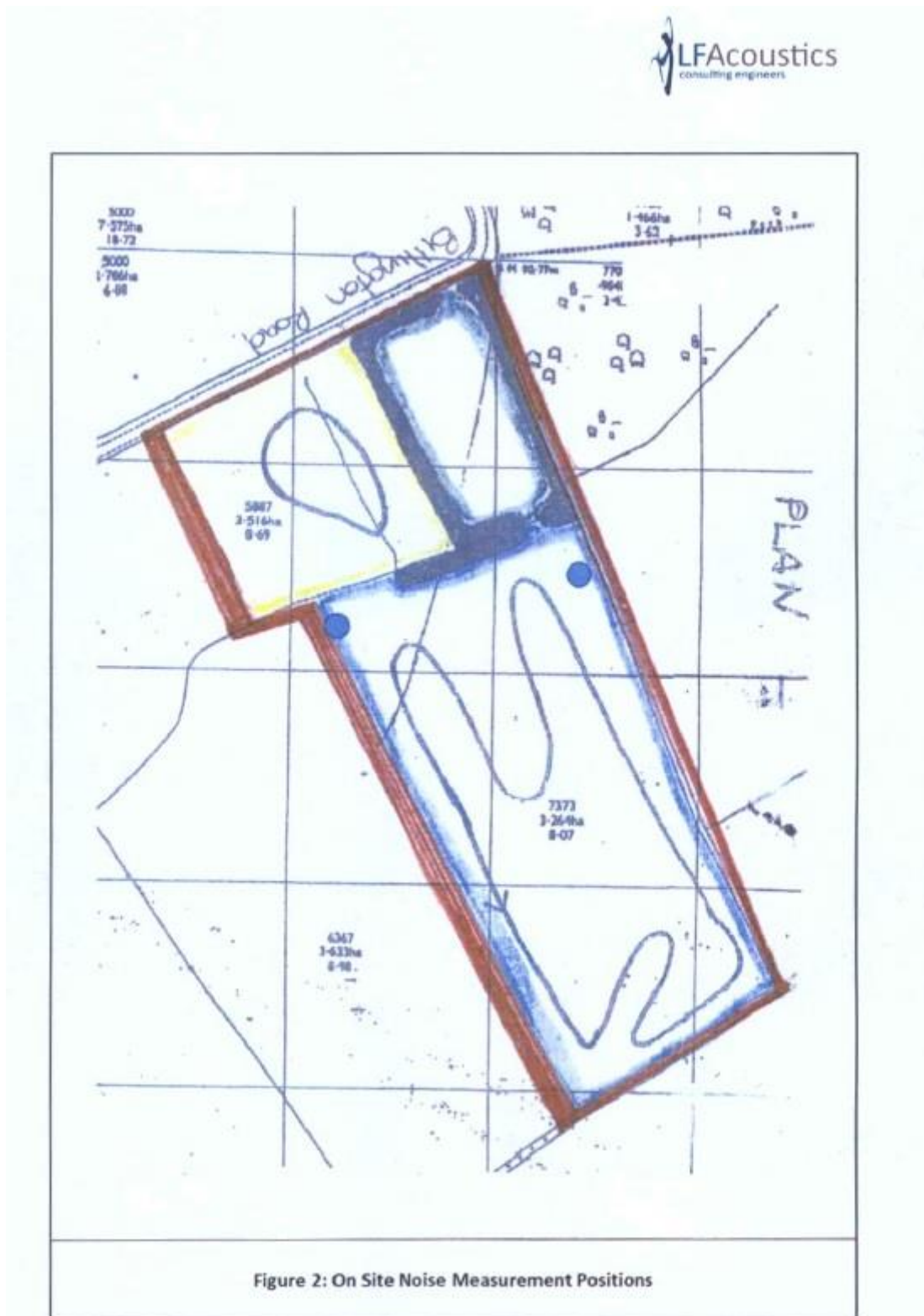


Figure 3: Glossary of Terms.

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is $2 \times 10^{-5} \text{ N/m}^2$. The sound pressure level existing when microphone measured pressure is $2 \times 10^{-5} \text{ N/m}^2$ is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:1997.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:1997.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:1997.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1m from the façade of the nearest affected sensitive property