Report VA5837.250519.NIA1.1

Land at Burleigh Lane, Crawley Down

Noise Impact Assessment

19 May 2025

Merrow Wood

VENTA ACOUSTICS

01962 461016
0203 8650332
mail@ventaacoustics.com

registered company no. 10139494

Contents

Attachments

1. Introduction

It is proposed to develop vacant land off Burleigh Lane, Crawley Down with a new housing development.

Venta Acoustics has been commissioned by Merrow Wood to undertake measurement and assessment of the current environmental noise impact on the site to address the requirements of the local planning authority.

An environmental noise survey has been undertaken to determine the noise levels incident on the site. These levels are then used to undertake an assessment of the likely impact in accordance with the National Planning Policy Framework with reference to relevant standards, guidance and the planning requirements of Mid Sussex District Council.

2. National Policy and Guidance

2.1 The National Planning Policy Framework (2024)

The revised *National Planning Policy Framework* (NPPF), published in December 2024, sets out the Government's planning polices for England, superseding all previous planning policy statements and guidance.

In respect of noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.

Hence, Paragraph 198 states that *planning policies and decisions should also ensure new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*
b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*

In regards to the term adverse impact, reference is made to the Noise Policy for England:

2.2 Noise Policy Statement for England (2010)

The Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This vision is supported by the following aims:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

The terms "significant adverse" and "adverse" are related to the following concepts:

- No Observed Effect Level (NOEL) - the level below which no effect on health and quality of life can be detected.
- Lowest Observed Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The guidance acknowledges that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations, but will be different for different noise sources, receptors and times.

In order to enable assessment of impacts in line with these requirements, reference should be made to other currently available guidance.

2.3 WHO Guidelines for Community Noise (1999)

The guidance in this document details suitable noise levels for various activities within residential and commercial buildings.

The relevant sections of this document are shown in Table 2.1.

Criterion	Environment	Design range $L_{Aeq,T}$ dB
Maintain speech intelligibility and avoid moderate annoyance, daytime and evening	Living Room	35 dB
Prevent sleep disturbance, night time	Bedrooms	30 dB

Table 2.1 – Excerpt from WHO **[dB ref. 20µPa]**

This guidance also states:

> *For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times a night (Vallet & Vernet 1991).*

For outdoor living areas, it is stated that:

> *To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB LAeq. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.*

For sleep disturbance, i.e. in bedrooms at night, the NOEL can, therefore, be taken as anything below 30dB(A), whilst the onset of the LOAEL occurs at 30dB(A) and above. The SOAEL cannot be inferred from this information.

During daytime periods, for avoidance of annoyance, the NOEL relates to anything up to 50dB(A) (typically applied to external areas, such as gardens), whilst the onset of the LOAEL occurs at 50dB(A) and above.

2.4 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to desirable internal ambient noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 2.2.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room	40 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$

Table 2.2 – Excerpt from BS8233:2014 - Indoor ambient noise levels for dwellings [dB ref. 20µPa]

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

For external areas the standard states the following:

> *For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.*
>
> *However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

3. Site Description

As illustrated on attached site plan VA5837/SP1, the site proposed for development lies between Burleigh Lane to the south (an unadopted road) and residential roads to the north. The proposed development is at least two kilometres from the nearest main road and over seven kilometres southeast of Gatwick International Airport, outside of the main flight path and the 51dB contour.

The area is rural in character, with the site and surroundings offering a habitat to local wildlife, with birdsong being particularly prevalent.

The dominant noise source expected to affect the site is birdsong/wildlife, with a contribution from air traffic and distant road noise.

4. Environmental Noise Survey

4.1 Survey Procedure & Equipment

In order to establish the existing noise levels at the site, a noise survey was carried out between Friday 7th and Tuesday 11th March 2025 at the location shown in site plan VA5837/SP1.

This location was chosen to be representative of prevailing transportation noise levels in the area, namely distant aircraft and road noise..

Continuous 5-minute samples of the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were undertaken at the measurement location.

The weather during the survey was calm, with dry conditions during both the day and night-time. The measured noise data is therefore considered representative of typical conditions at site.

Measurements were made generally in accordance with ISO 1996 2:2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-11586-E0	1509201-2	19/7/24
Larson Davis calibrator	CAL200	13069	1511238-1	14/2/25

Table 4.1 – Equipment used for the tests

The calibration of the sound level meter was verified before and after use with no significant calibration drift observed.

4.2 Results

The measured sound levels are shown as a time-history plot on the attached charts VA5837/TH1-5.

The site is in a rural location with minimal human activity in the area. As such, the primary noise currently affecting the site is birdsong and animal activity. During site attendance, the noise climate was subjectively noted by the attendant consultant to be pleasant and largely tranquil.

The birdsong dawn chorus, confirmed through audio recordings taken during the survey, is noted to significantly affect noise levels between approximately 5:30am – 7am (noted in blue on the attached time histories). This has therefore been excluded from analysis of night-time average and maximum noise levels, as it is not representative of typical transportation noise.

Beyond birdsong and animal noise, air traffic from Gatwick airport is audible although not predominant. It is noted that the site lies well outside of the current $L_{Aeq,16hour}$ 51 dB noise contour published by the airport in 2023. Gatwick airport departures and arrivals information shows that flights do not typically start until around 06:45 each day, indicating that flights do not substantially contribute to night-time noise levels in the early morning.

Road traffic is very distantly audible. Local vehicle pass bys on adjacent roads serving neighbouring housing are occasional enough and of low enough noise level that they do not meaningfully affect overall daytime and night-time noise levels.

Given the above, noise levels do not substantially vary across the site.

The average noise levels for the Daytime and Night-time periods, as measured at the automated monitoring position were:

Monitoring Period	$L_{Aeq,T}$
07:00 – 23:00 hours	50 dB
23:00 – 07:00 hours	28 dB

Table 4.2 – Average ambient noise levels at measurement locations [dB ref. 20µPa]

The typical night-time L_{Amax} events (not exceeding 10-15 times per night), generated by transportation noise, were recorded to be in the order of 47 dB $L_{Amax,fast.}$ Maxima never normally exceeded (as discussed in the AVO Guide 2020) are at a level of 62 dB $L_{Amax,fast.}$

5. Noise Impact Assessment

5.1 Internal Noise Assessment

BS8233:2014 suggests that a loss of around 15 dB can be expected to external noise ingress via a partially open window.

As such, internal transportation noise levels inside dwellings are not expected to exceed $L_{Aeq,16hour}$ 35 dB during the daytime and $L_{Aeq,8hhour}$ 13 dB[1] during the night-time via partially open windows, which meet the internal noise guidelines detailed in Table 2.1 and Table 2.2.

Typical internal maxima due to transportation noise would be approximately $L_{Amax,fast}$ 32 dB, which is a level widely compliant with the guideline level detailed in WHO (1999).

As windows do not need to be closed to ensure suitable internal noise levels, glazing and ventilative façade elements do not require any acoustic specification.

The predicted internal noise levels are well below the limits detailed in Approved Document O and are commensurate with a 'negligible risk', as defined in the Level 1 site risk section of the AVO Guide (2020). This indicates that windows could remain partially open on hotter summer days and nights to provide additional cooling without a likelihood of negative health effects.

As such the noise levels within the proposed dwelling would be considered to lie between the NOEL the LOAEL levels.

5.2 Areas of External Amenity

External transportation noise levels in all garden areas will lie at or below the lower $L_{Aeq,16hour}$ 50 dB limit detailed in BS823:2014 and WHO (1999).

A substantial amount of the sound affecting residents enjoying garden amenity would result from birdsong and or typical rural noise, which would generally be considered pleasant by most people.

The outdoor noise levels across the site can therefore be considered to be commensurate with the LOAEL, being at or below the level that is expected to cause moderate annoyance.

No mitigation measures are deemed necessary in relation to external noise levels.

6. Conclusion

To address Mid Sussex District Council planning requirements, a baseline noise survey has been undertaken by Venta Acoustics to establish the prevailing noise climate at vacant land at Burleigh Lane, Crawley Down.

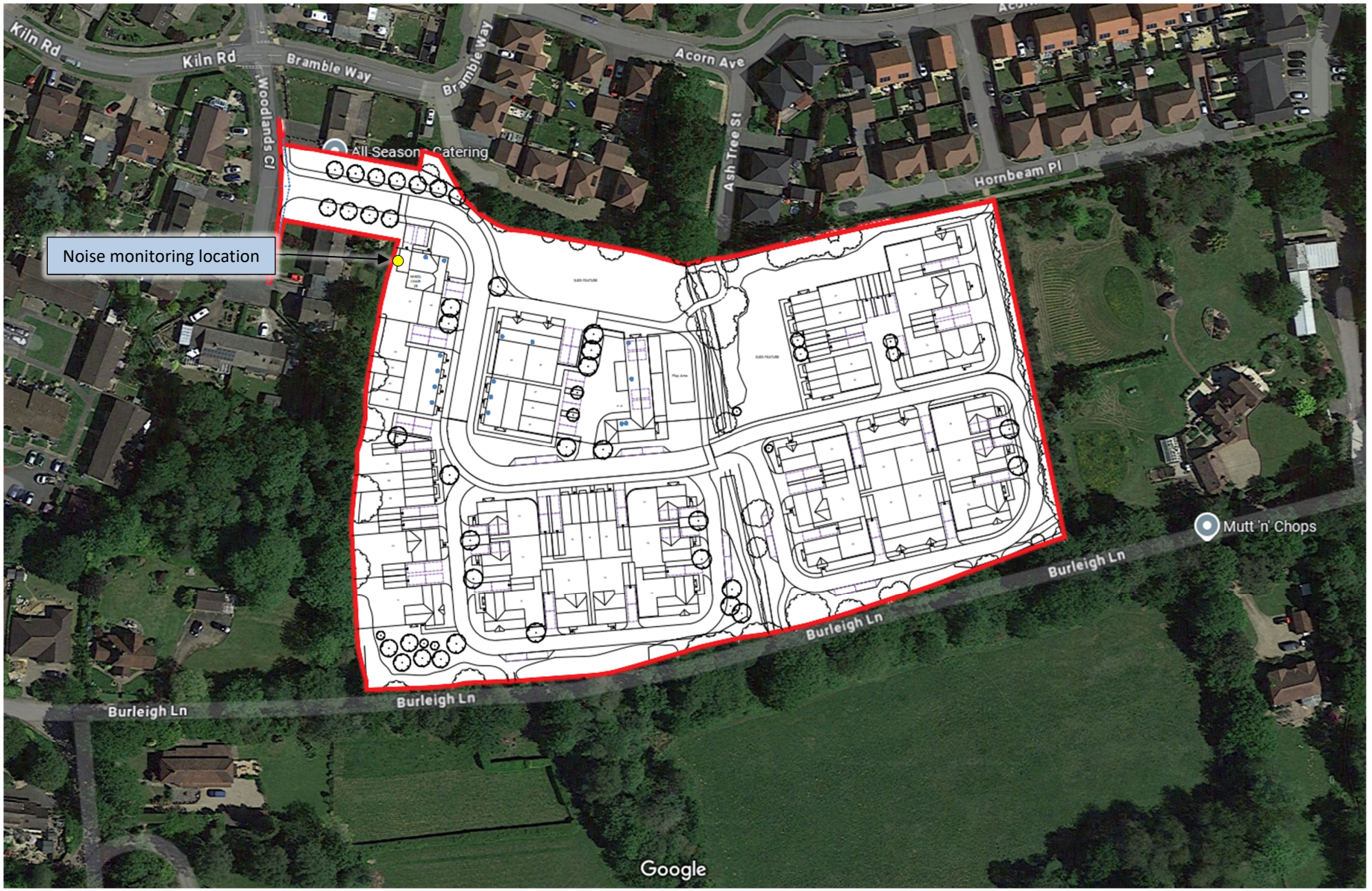
The measured levels have been assessed against the National Planning Policy Framework and currently available standards and guidance documents including World Health Organisation *Guidelines for Community Noise* (1999) and BS8233:2014 *Guidance on sound Insulation and noise*.

[1] Expected to be below the noise floor in most houses due to noise from services and electrical goods.

Appropriate external and internal noise criteria have been considered to minimise adverse impacts on health and quality of life as a result of the new development.

The proposed scheme is considered acceptable for the proposed residential use and achieves suitable internal noise levels with windows partially open. As such, no acoustic specification of glazing or ventilation elements is required. Suitable noise levels will also be achieved in gardens without mitigation.

Ben Alexander MIOA



VA5837/SP1 Site Plan showing measurement locations

Land at Burleigh Lane, Crawley Down

Environmental Noise Time History: 1

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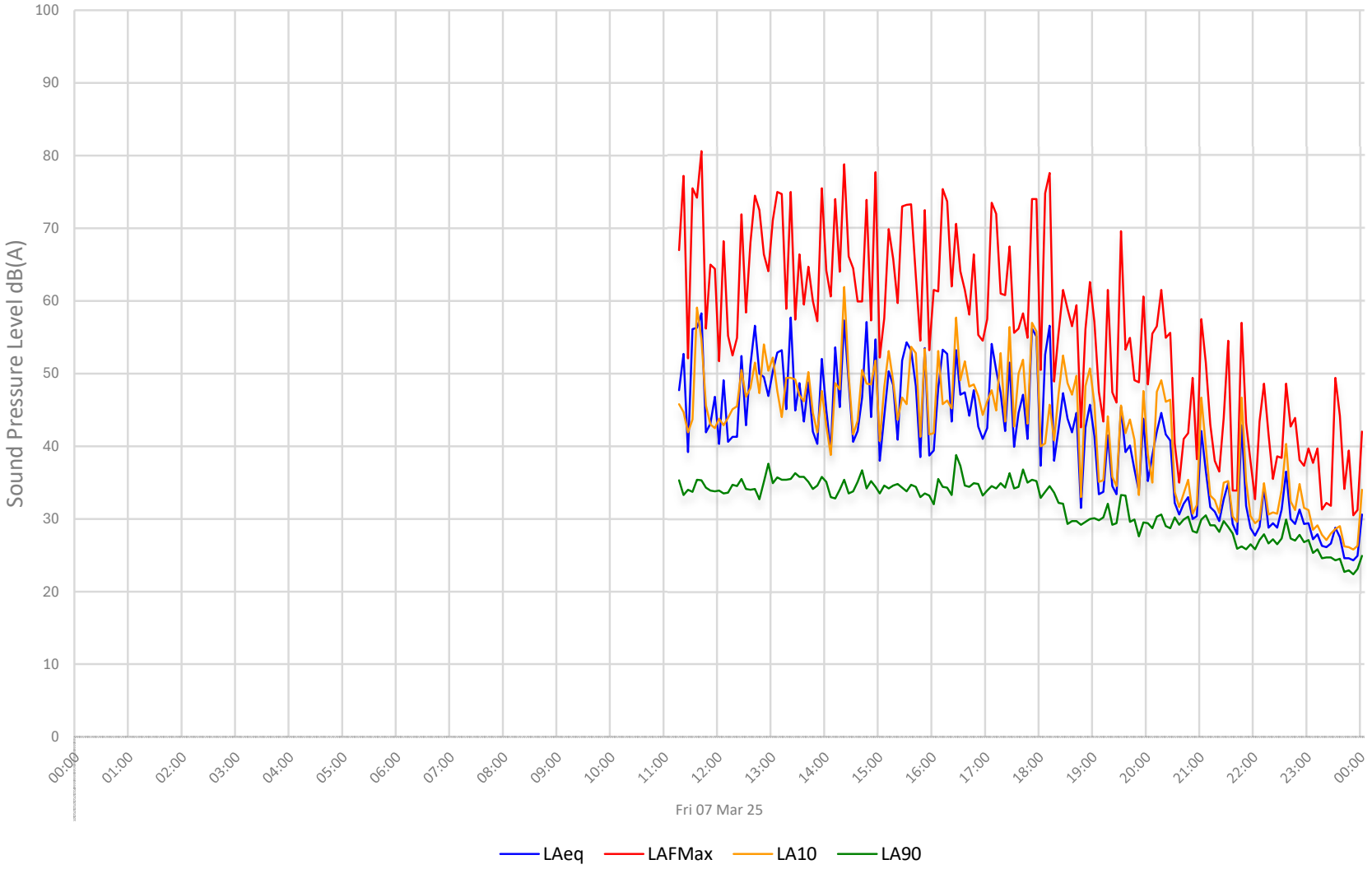
Figure VA5837/TH1



Land at Burleigh Lane, Crawley Down

Environmental Noise Time History: 2

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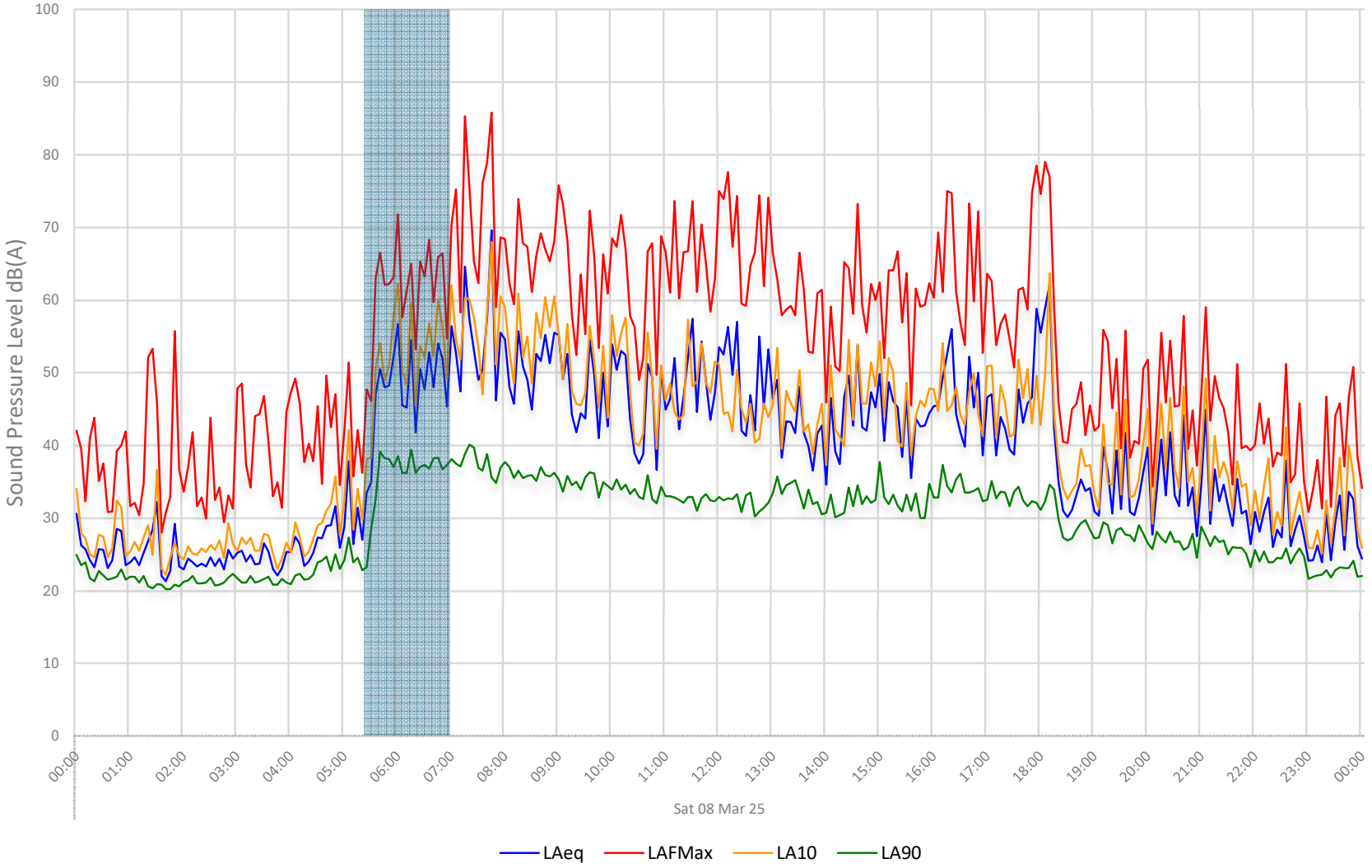
Figure VA5837/TH2



Land at Burleigh Lane, Crawley Down

Environmental Noise Time History: 3

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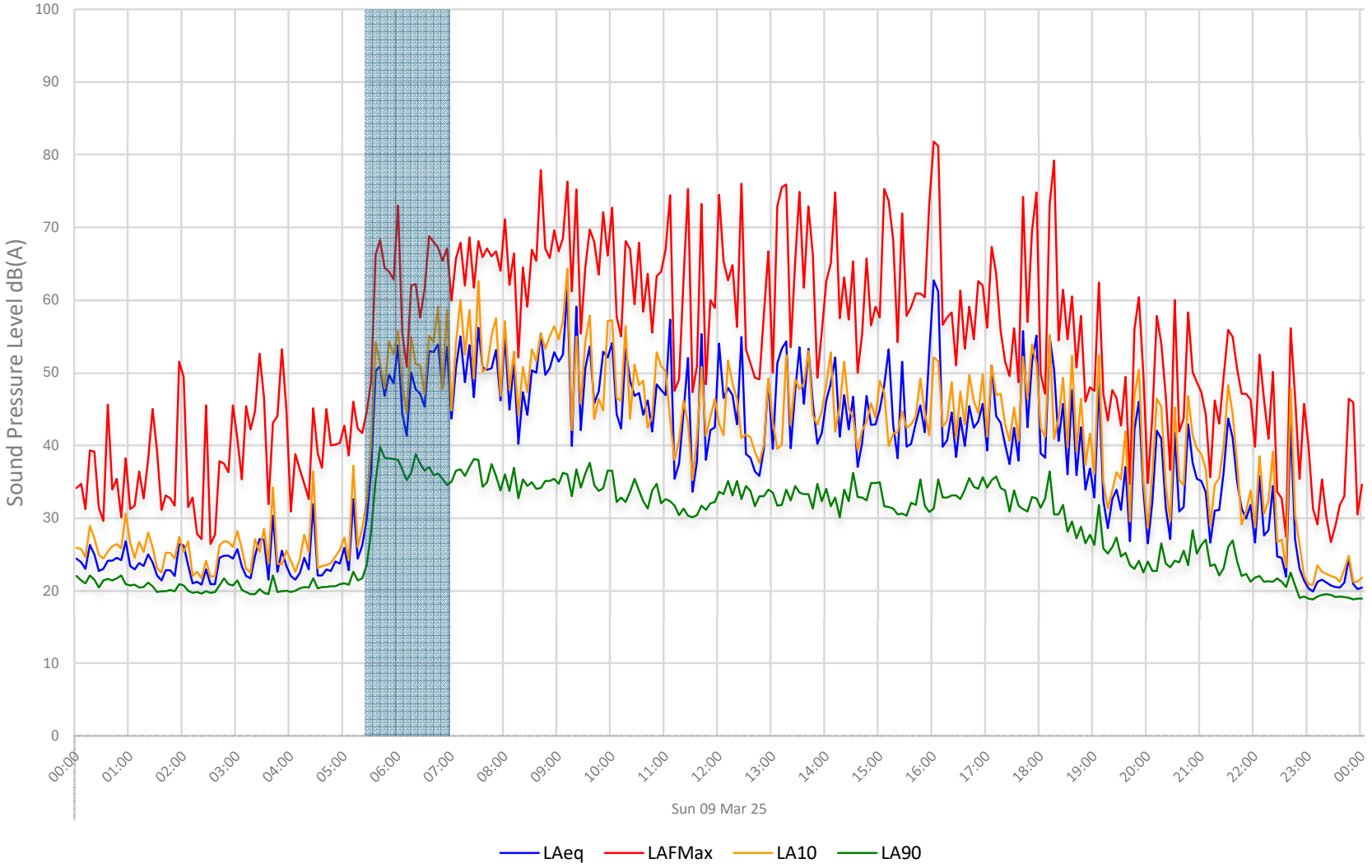
Figure VA5837/TH3



Land at Burleigh Lane, Crawley Down

Environmental Noise Time History: 4

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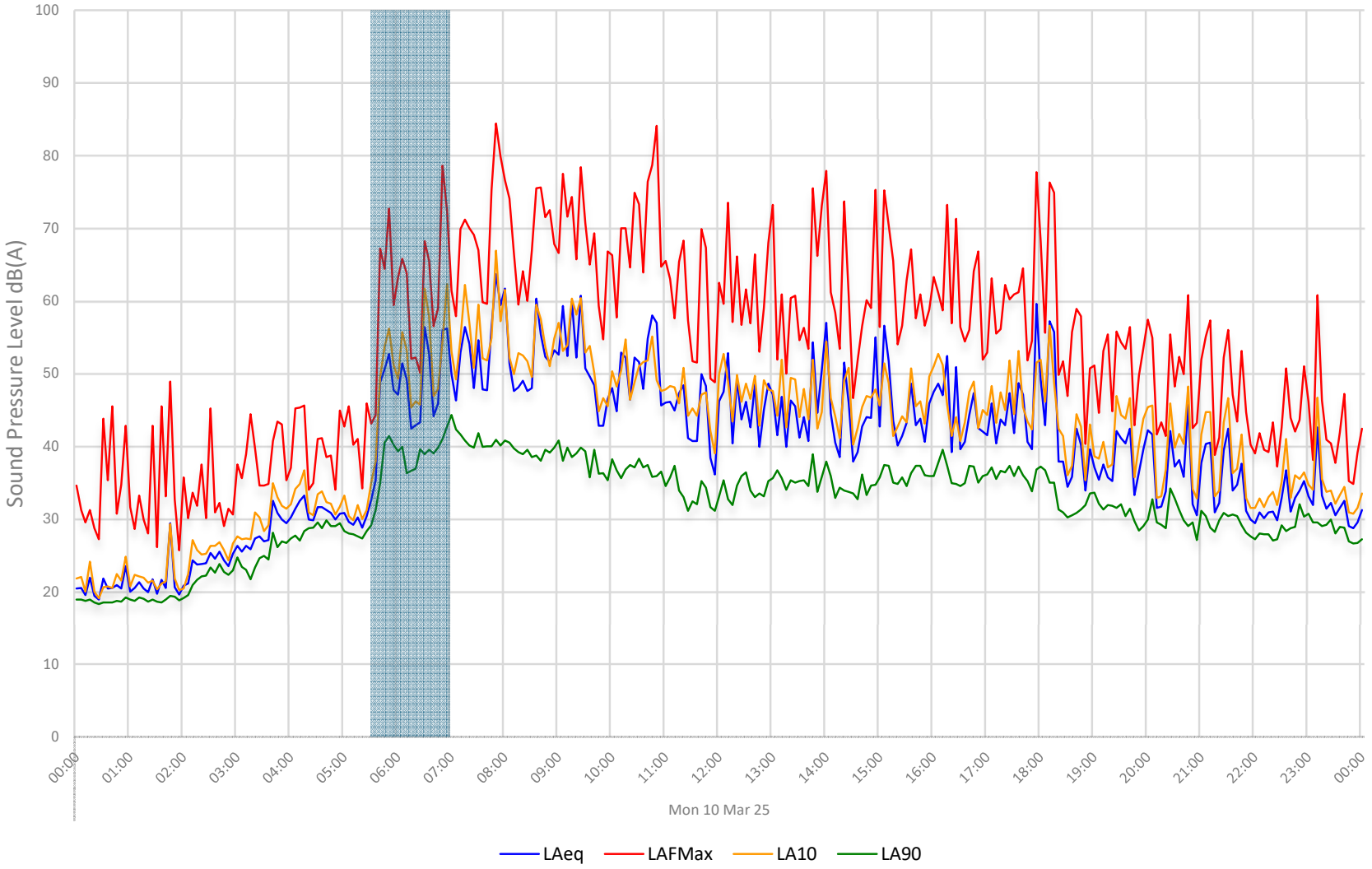
Figure VA5837/TH4



Land at Burleigh Lane, Crawley Down

Environmental Noise Time History: 5

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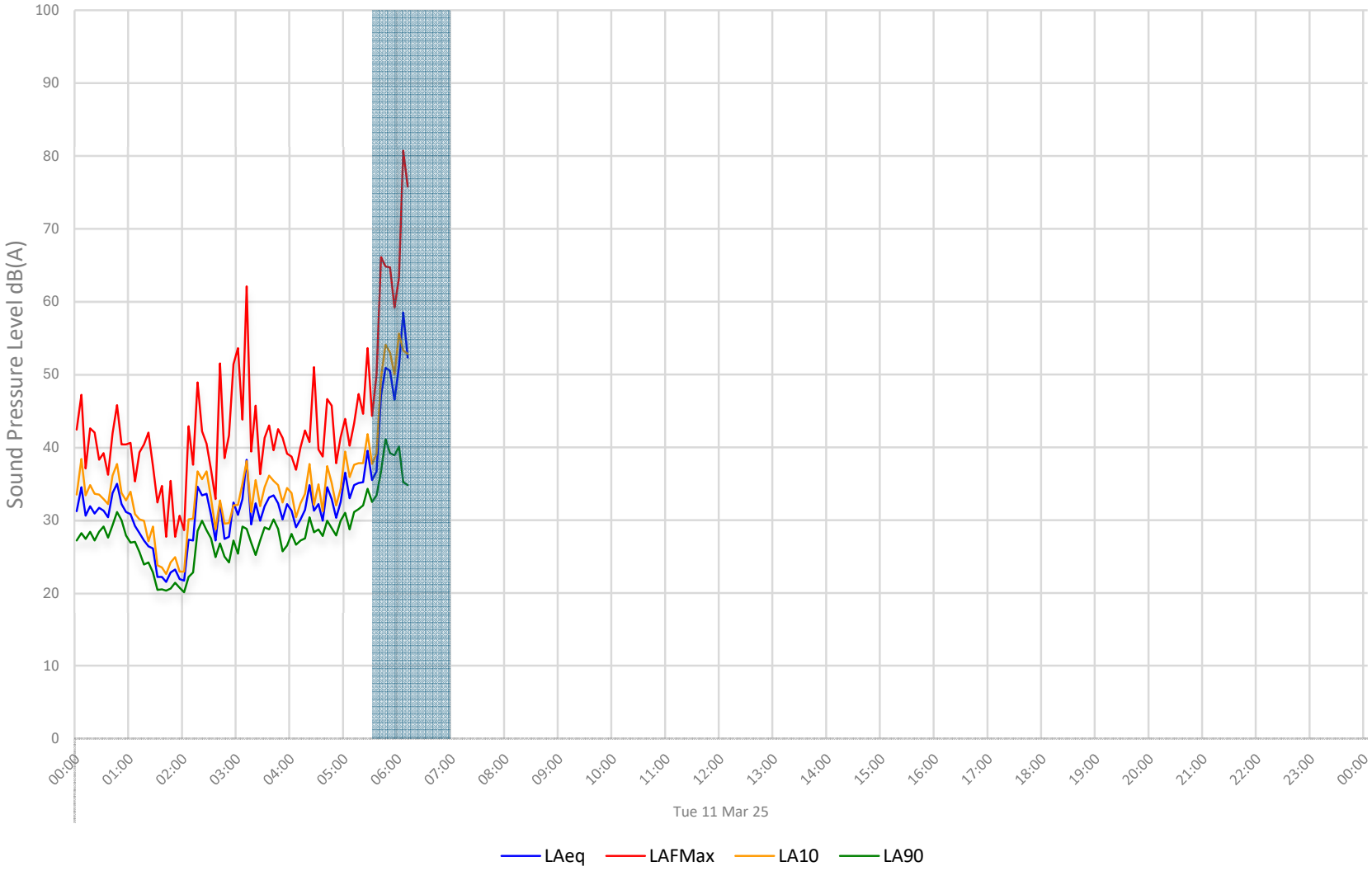
Figure VA5837/TH5



APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.1 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.2 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial