



RP TYSON CONSTRUCTION LTD

20-26 DORRIS STREET, LEVENSHULME, MANCHESTER

NOISE ASSESSMENT FOR PLANNING PURPOSES

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AEC REPORT: P4029/R1/NRS

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1.0 INTRODUCTION

- 1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by RP Tyson Construction Ltd to undertake a noise assessment in relation to the proposed construction of four semi-detached houses at 20-26 Dorris Street, Levenshulme, Manchester.
- 1.2 This report details the on-site baseline noise levels approximated by AEC, presents the assessment criteria, and discusses the implications on building design to achieve acceptable noise levels in internal areas to meet the Local Authority requirements.
- 1.3 AEC has discussed with Rebecca Twigg, of Manchester City Council (MCC), the unrepresentative nature of current noise levels during the present Coronavirus pandemic and agreed on using noise levels available from the DEFRA noise maps and AEC's experience in order to undertake the assessment.
- 1.4 Acoustic terminology is discussed in brief in Appendix A.

2.0 BACKGROUND AND SITE DESCRIPTION

- 2.1 The Site is bound by residential properties to the west and north, a plant nursery to the east and a commercial unit, Jamil's Auto Ltd (vehicle repair shop) to the south, as indicated on Figure 1.
- 2.2 To the north of Site are Dorris Street and Tonbridge Road, both of which are cul-de-sac's accessed only by the residents.
- 2.3 Further west of the residential apartments, is the Broom Lane and further south of Jamil's Auto Ltd is the A6, a busy road in and out of Manchester, which is about 65m from the Site boundary.
- 2.4 It is understood that Jamil's Auto Ltd is only open during the daytime.
- 2.5 The proposed development consists of four, two-storey, semi-detached houses, as indicated on Figure 2.
- 2.6 It is also understood that the Site will be enclosed by a 2.1m high barrier made of 1.8m of close boarded timber fence (acoustically solid) and a 0.3m timber trellis (acoustically transparent) on top, as indicated in Figure 2.

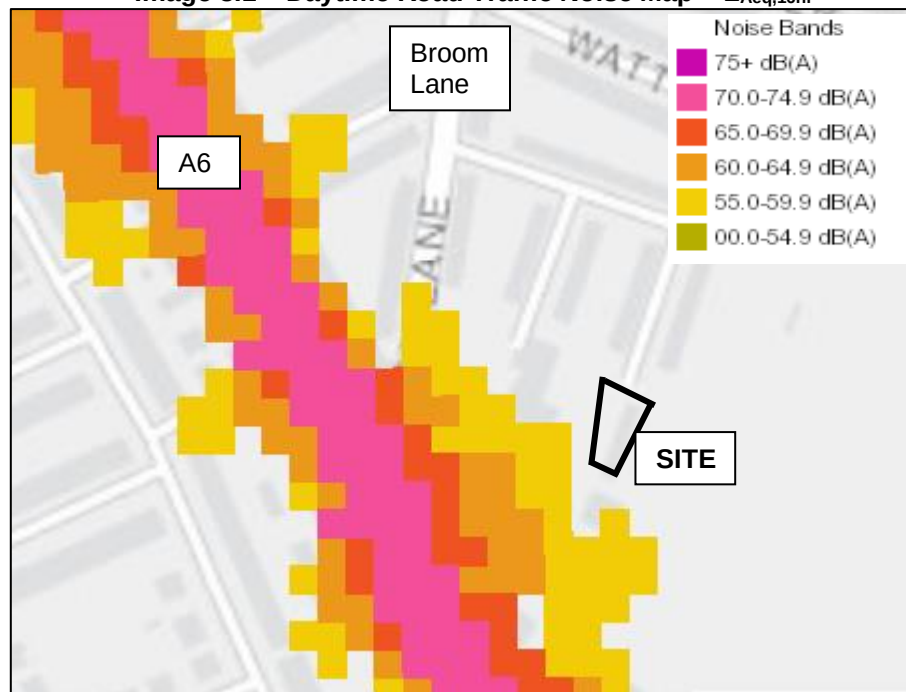
3.0 BASELINE NOISE CLIMATE

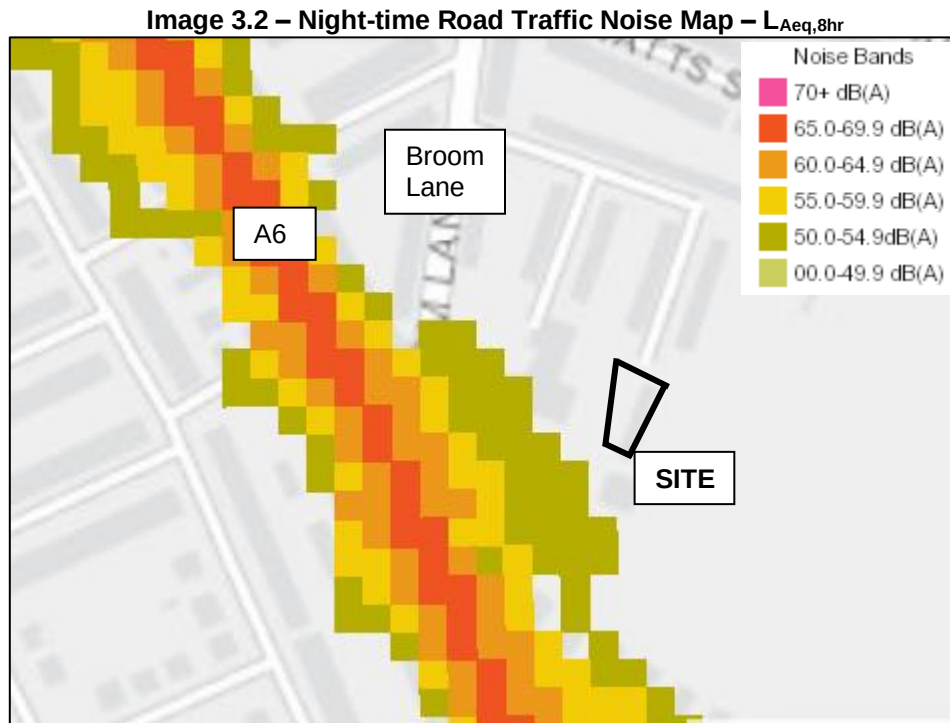
- 3.1 As mentioned above, due to the Coronavirus pandemic a baseline noise survey could not be undertaken for this assessment. Therefore, the strategy is to provide an overview of the noise levels affecting the site based on: a desktop review of different noise sources affecting the site; review of the DEFRA strategic noise maps online, and AEC's professional experience of measuring baseline noise levels at similar sites.

Road Traffic Noise

- 3.2 As discussed above, online aerial maps show that the Site is located in a relative busy urban area with nearby busy roads such as the A6 and Broom Lane, which connect Manchester to the north and Stockport to the south, and the A57 to the north and the A6 to the south, respectively.
- 3.3 It is highly likely that the baseline noise climate on the Site is dominated by road traffic noise from the A6 and, to a lesser extent by Broom Lane.
- 3.4 The strategic noise maps (major roads) made available by DEFRA (<https://www.gov.uk/government/publications/strategic-noise-mapping-2019>) are updated every 5 years. The maps were developed as part of implementing the Environmental Noise Directive, 2002/49/EC (END), and they provide an indication of estimated noise levels from major roads across England.
- 3.5 Indicative excerpts of the online daytime and night-time noise maps are provided in Image 3.1 and 3.2 below, respectively, with the approximate Site area shown.

Image 3.1 – Daytime Road Traffic Noise Map – $L_{Aeq,16hr}$





- 3.6 As seen from the noise maps, above, daytime and night-time noise level due to road traffic vary from 70-75dBL_{Aeq,16h} and 65-70dBL_{Aeq,8h}, respectively at the roadside. At the southern Site boundary, predicted noise levels reduce to around 55dBL_{Aeq,16h} and 50dBL_{Aeq,8h}, in the daytime and night-time, respectively. These levels only include traffic noise from the A6.
- 3.7 AEC has been assessing urban noise levels in cities and towns, particularly in the northwest, for over 20 years. Hundreds of daytime and night-time noise surveys have been carried out over the years in relation to understanding the noisiest periods of the daytime and night-time that could impact on proposed residential developments. From experience, the above-mentioned noise levels on the Site are considered reasonable.

Noise from Commercial Units

- 3.8 As mentioned above, there is a commercial unit, Jamil's Auto Ltd (vehicle repair shop) which is about 5m to the south of the Site boundary.
- 3.9 AEC has undertaken numerous noise assessments of MOT garages and the noise exposure of mechanics. There are several noisy activities that occur intermittently, such as: use of pneumatic tools to remove wheel nuts; use of grinders; hammering, engine revving etc. However, these activities are typically very short in duration and there are longer periods of relative quiet.
- 3.10 Based on AEC's experience and an assumption that all noisy works take place inside the garage, a noise level of 66dBL_{Aeq,1hr} at 5m from the open garage door is suggested for a typically 'noisy' 1-hour period e.g. several cars being worked on.

4.0 BASIS OF ASSESSMENT

National Planning Policy Framework

- 4.1 The latest Planning Policies are included in the National Planning Policy Framework (NPPF) published by the Department for Communities and Local Government and dated March 2012 and revised in July 2019.
- 4.2 This planning policies which relate specifically to noise are presented in paragraphs 170, 180 and 182 which are reproduced below:

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise.

180. Planning policies and decisions should also ensure that 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.

182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Noise Policy Statement for England

- 4.3 The terms ‘significant adverse’ and ‘adverse’, in the NPPF above, are references to the Noise Policy Statement for England (NPSE), published by DEFRA, published in March 2010. One of the main aims of this policy is also to avoid significant adverse effects on health and quality of life.
- 4.4 Further to the above, the Governments ‘Planning Practice Guidance’ published on 6 March 2014 and updated on 22 July 2019 states:

‘Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset.’

- 4.5 In addition, the guidance indicates that, whilst noise can override other planning concerns, it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect as to whether or not noise is likely to pose a concern.

Local Authority Requirements

- 4.6 AEC understands that MCC requires that internal noise levels in new residential properties should comply with guidance presented in BS8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ (BS8233) and the World Health Organisation (WHO) document ‘Guidelines for Community Noise’, 1999.
- 4.7 Based on the guidance presented in BS8233 and WHO, the proposed noise levels to be achieved in habitable rooms due to transportation noise sources are presented in Table 4.1, below.

Table 4.1 – Internal Noise Level Limits within Habitable Rooms

Activity	Location	Noise Limit, dB		
		Daytime 0700 – 2300h	Night-Time 2300 – 0700h	
		L _{Aeq,16h}	L _{Aeq,8h}	L _{Amax}
Resting	Living Room	35	-	-
Dining	Dining Room/Area	40	-	-
Sleeping (daytime resting)	Bedroom	35	30	45

- 4.8 With regard to the maximum noise level limit of 45dB_{L_{Amax}} during the night-time period, WHO guidelines state that, for a good night’s sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB_{L_{Amax}} more than 10 to 15 times.

- 4.9 Based on this AEC would propose to design the façade in order that 45dB L_{Amax} is not typically exceeded during the night-time period 2300h to 0700h and any non-typical events such as a one-off emergency siren or noisy motorbike pass-by will be excluded from the assessment.
- 4.10 BS8233 notes that where noise has a specific character, such as being intermittent in nature, containing a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has a strong low-frequency content, lower noise limits may be appropriate.
- 4.11 In locations where the noise has a specific character AEC propose that the design aim should be to achieve internal noise levels at least 5dB below those presented in Table 4.1.
- 4.12 In addition to the above, the WHO document also assumes that attenuation of external to internal noise levels provided by a window partially open for ventilation is up to 15dB.
- 4.13 Therefore, for whole dwelling (background) ventilation to be provided via a partially open window, the external noise levels presented in Table 4.2 should not be exceeded for sources such as road traffic.

Table 4.2 – Allowable External Noise Levels for Background Ventilation via a Partially Opened Window

Activity	Location	Noise Limit, dB		
		Daytime 0700 – 2300h	Night-time 2300 – 0700h	
		$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{Amax}
Resting	Living Room	50	-	-
Dining	Dining Room/Area	55	-	-
Sleeping (daytime resting)	Bedroom	50	45	60

Ventilation

- 4.14 The ventilation specifications presented in this report are based on achieving the requirements of Approved Document F 'Ventilation' (2010) of the Building Regulations only.
- 4.15 ADF requires that continuous whole dwelling ventilation is provided to limit the accumulation of moisture and other pollutants originating within a building. This is typically achieved either via a partially opened window, or by a whole building ventilation system through the provision of trickle ventilators or mechanical ventilators. ADF states that '*The ventilation provisions will not necessarily meet cooling needs*'.

Control of Overheating

- 4.16 AEC understands that there are no Local Authority requirements in relation to acceptable internal noise level limits where windows are open to control overheating and that an overheating assessment has not been undertaken on the scheme. Therefore, AEC have considered the potential impact on internal noise levels due to windows being open to control overheating.
- 4.17 Guidance on desirable internal noise levels with windows open to control overheating is presented in the Association of Noise Consultants (ANC) document – ‘*Acoustic ventilation and Overheating (AVO)*’, which is a residential design guide issued in January 2020.
- 4.18 Based on the guidance in AVO, where transportation is the main source of noise, a partially open window will provide an outside-to-inside level difference of 13dB and is representative of typical domestic rooms with simple façade openings of around 2% of the floor area.
- 4.19 AVO states that where internal ambient noise levels are greater than 50dBL_{Aeq, 16h} during the daytime, 42dBL_{Aeq, 8h} during the night-time and when the typical maximum noise level exceeds 65dBL_{Amax}, a level 2 assessment is required to control overheating.
- 4.20 Taking into account the above, the external free-field noise levels at which windows would typically need to be closed and the control of overheating is provided by alternative means is presented in Table 4.3, below.

Table 4.3 – External Free-Field Noise Levels to Control Overheating Through Openable Windows

Activity	Location	Noise Limit, dB		
		Daytime 0700 – 2300h	Night-Time 2300 – 0700h	
		L _{Aeq,16h}	L _{Aeq,8h}	L _{Amax}
Resting	Living Room	63	-	-
Dining	Dining Room/Area	63	-	-
Sleeping (daytime resting)	Bedroom	63	55	78

External Noise Level Limits

- 4.21 For traditional external areas that are used as an amenity space, such as gardens and patios, BS8223 states that it is desirable that ambient noise levels should be not exceed 50dBL_{Aeq, 16 hour} during the daytime, with an upper limit of 55dBL_{Aeq, 16 hour}.
- 4.22 WHO guidance also provides a limit of 55dBL_{Aeq, 16 hour} to stop the majority of people from being “*seriously annoyed most of the time*”.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

- 5.1 As mentioned above, it is highly likely that the main sources of noise affecting the Site would be road traffic noise the A6 and noise from the commercial unit to the south. These are discussed separately, below.

Road Traffic Noise

- 5.2 Based on the discussion in Section 3 above and the partial attenuation from the proposed the Site perimeter fence, daytime and night-time road traffic noise levels from the A6 affecting the southern elevations of the proposed dwellings are likely to be in the range of 50-55dB_{L_{Aeq,16h}} and 45-50dB_{L_{Aeq,8h}}, respectively. Allowing for contributions from other nearby roads (Broom Lane, Cringle Road & Tonbridge Road), the upper value of these noise levels have been used in the assessment below.
- 5.3 In terms of maximum night-time noise levels from the A6 affecting the southern elevation of the Site, a noise level of 68dB_{L_{Amax,F}} has been used. This was the highest night-time noise level previously measured by AEC a similar distance back from a similar road which was measured from a loud car pass by.
- 5.4 The northern elevations of the proposed dwellings are likely to be exposed to slightly lower noise levels than the southern elevation. However, allowing for intermittent road traffic from Dorris Street, Tonbridge Road and Broom Lane, noise levels of around 50-55dB_{L_{Aeq,16h}} and 45-50dB_{L_{Aeq,8h}} for daytime and night-time have also been used in the assessment below.

Noise from Commercial Unit

- 5.5 In addition to the road traffic noise, the southern elevations are also potentially affected by noise from the commercial unit.
- 5.6 Based on the discussion in Section 3, the noise level of 66dB_{L_{Aeq,1h}} from the commercial unit in the typical 1 hour 'noisy' period at 5m from an open garage door, barrier attenuation and the distance attenuation to the southern elevation of dwellings, the free-field noise levels could be around 40-45dB_{L_{Aeq,1h}}. This is considered a worst-case estimate. Although this activity noise may be audible at times in the day, the hourly ambient noise is low and would be below the constant ambient road traffic noise, providing a level of masking. Hence, with the mitigation provided by the solid (1.8m) perimeter fence, activity noise from inside the garage is not likely to be particularly intrusive or annoying.
- 5.7 The perimeter close boarded 1.8m high fence on the southern boundary, should be at least 10kg/m², with no gaps at the base or posts.

Internal Noise Level Assessment

- 5.8 Based on the noise levels mentioned above, the determined free-field daytime and night-time noise levels external to each elevation are shown in Table 5.1 below, and on Figure 2.

Table 5.1 – Free-field Noise Levels External to Each Facade

Façade (Colour)	Noise Limit, dB		
	Daytime 0700 – 2300h	Night-Time 2300 – 0700h	
	$L_{Aeq, T}$	$L_{Aeq,}$	$L_{Amax,}$
	55	50	68

Glazing and Whole Dwelling Ventilation

- 5.9 A comparison of the determined noise levels presented in Table 5.1, and the noise levels presented in Table 4.2, all habitable rooms in the development would need their windows to be kept closed and alternate means of whole dwelling (background) ventilation would need to be provided.
- 5.10 The sound insulation performance of the glazing and ventilators, to meet the requirements stated in Table 4.1, have been calculated based on the spectrum data measured previously by AEC on similar roads and the room sizes and glazing areas presented on the architectural drawings, and these are presented in Table 5.2, below.

Table 5.2 – Outline Requirements to Achieve Internal Noise Levels in Habitable Rooms

Façade (Colour)	Sound Insulation Performance	
	Glazing	Ventilator
	$29dBR_w / 25dBR_w + C_{tr}$	$29dBD_{n,e,w}$

- 5.11 Example of a glazing build-up that may achieve the above required sound insulation performance is presented in Table 5.3 below.

Table 5.3 – Example Glazing Constructions

Sound Insulation Performance	Example Construction
$29dBR_w / 25dBR_w + C_{tr}$	4-6mm Glass / 12-20mm TC / 4-6mm Glass

TC = Thermal Cavity

- 5.12 Prior to any glazing being installed, octave band sound insulation performance data of the glazing build-ups and ventilators selected should be verified by AEC or other suitably qualified persons.
- 5.13 All ventilation requirements have been based on the use of a single ventilator per room. If more than one unit is required, such as may be required to satisfy Building Control requirements, the performance of each unit might need to be increased.

Purge Ventilation

- 5.14 Windows can be openable for purge ventilation provided that they are effectively acoustically sealed when closed, and it is important that any frames and seals do not downgrade the sound insulation performance of the glazing.

Control of Overheating

- 5.15 Based on the noise levels presented in Table 5.1 and comparing them with the noise levels presented in Table 4.3, windows can be opened to control overheating on both the southern and northern elevation, if needed.

Other Façade Elements

- 5.16 The roof and walls of the building would need to achieve a minimum sound insulation performance of at least 45dB_{R'w} and 50dB_{R'w}, respectively. This is not particularly onerous and would be achieved by traditional constructions.

Noise Level in External Areas

- 5.17 Based on the noise levels from the A6, noise from the commercial unit and the barrier and distance attenuation, the noise level in the external garden areas would be less than or equal to 55dB_{LAeq,16h} as presented in Figure 2.

Confirmation of External Noise Levels

- 5.18 As mentioned above, even though based on the desktop review, DEFRA noise maps and AEC's professional experience, the noise levels predicted around the site are considered realistic, AEC will undertake a noise survey at the Site and confirm the external noise levels that are used in the assessment, once the Coronavirus pandemic situation is relaxed and normality (typical traffic conditions) is restored.

6.0 SUMMARY AND CONCLUSIONS

- 6.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by RP Tyson Construction Ltd to undertake a noise assessment in relation to the proposed construction of four new dwellings at 20-26 Dorris Street, Levenshulme, Manchester. This noise assessment is required to accompany the associated planning application for the development.
- 6.2 The main source of noise affecting the Site is road traffic, predominantly on the A6. There is also likely to be some noise from other nearby roads and from the commercial unit to the south.
- 6.3 The noise levels from road traffic and commercial unit are based on the desktop review, DEFRA noise maps and AEC's professional experience which are discussed in Section 3.

- 6.4 Section 4 presents the design aim to achieve the desirable internal noise level limits as required by the local authority and which are similar to ones presented in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' and the World Health Organisation (WHO) document '*Guidelines for Community Noise*' (1999). These noise limits are based on also achieving the background ventilation requirements as set out in Approved Document F '*Ventilation*' (2010) of the Building Regulations only.
- 6.5 The noise levels presented in Section 3 have been assessed in Section 5 and the determined daytime and night-time noise levels external to each elevation is presented in Table 5.1 and on Figure 2. These are cautious estimates which factor in some of the assessment uncertainty of not having undertaken baseline noise surveys.
- 6.6 Based on the estimated noise levels affecting the proposed development site, the sound insulation requirements of the building envelope and ventilation have been determined and are presented in Table 5.2. To ensure appropriate internal noise levels are achieved, all habitable rooms of the development would need their windows to be closed and alternate means of whole dwelling ventilation would be required i.e. trickle vents.
- 6.7 In terms of control of overheating, based on the noise levels mentioned in Section 5, windows can be opened on all elevations of the development if it was deemed necessary by others, and internal noise levels should be acceptable for these limited periods.
- 6.8 Provided the mitigation measures detailed in Section 5 are implemented, and subject to verification measurements of external noise levels, noise should not be considered a determining factor in relation to any planning permission being sought.

FIGURE 1 – Site Location Plan



FIGURE 2 – Proposed Layout With External Noise Levels



APPENDIX A – Acoustic Terminology in Brief

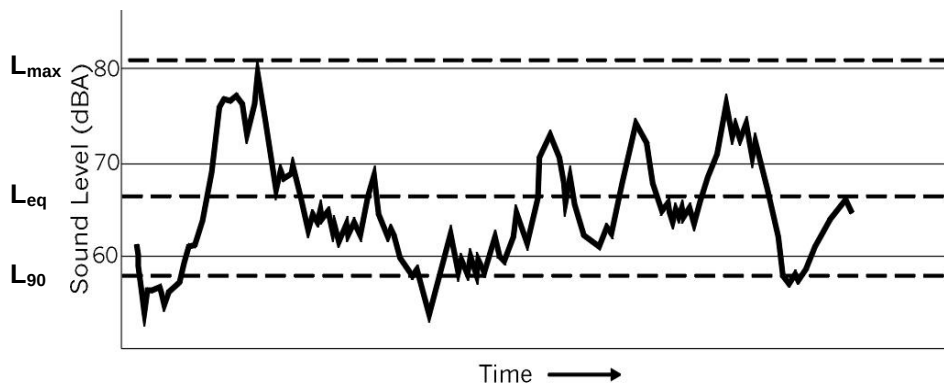
Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most sound is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The *dBA* weighting emphasises or reduces the importance of certain frequencies within the audible range.

Sound Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as fifteen minutes or one hour, the statistically determined results being used to quantify various aspects of the sound.

The figure below shows an example of sound level varying with time. Because of this time variation the same period of sound can be described by several different levels. The most common of these are described below. It should be noted that in many instances in the main body of text, the unit will be preceded by a *dB* descriptor in the report e.g. $L_{Aeq,T}$ could be written $dB L_{Aeq,T}$



Example of Sound Level Varying With Time

- $L_{Aeq,T}$** The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, *T*. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the "ambient" noise level.
- L_{Amax}** The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.

Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	This refers to the sound level measured outside, at 1m from a hard reflecting surface, typically 3dB greater than the free-field level.

Other Acoustics Units

R_w	Sound reduction index - single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
R'_w	Apparent sound reduction index - Single number rating used to describe the sound reduction index of an on-site construction over a range of frequencies, typically 100-3150Hz.
R_w + C_{tr}	Single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element (normally windows) over a range of frequencies, typically 100-3150Hz, adjusted to adjusted by a spectrum adaptation to provide the reduction of traffic noise.
C_{tr}	A road traffic spectrum adaptation term which is referenced to demonstrate the to the low frequency sound insulation performance of building elements.
D_{n,e,w}	Element normalised normalised level difference. Single number rating used to describe the sound insulation performance of small elements