Part of the KP Acoustics Group

New Pumphouse - Manchester City Football Club, Etihad Campus Ashton New Rd, Manchester

Planning Compliance Report
Report 30777.PCR.01

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KP Acoustics Ltd. 2025

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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by W.E. Hewitt & Son Limited to undertake a noise impact assessment of a proposed plant unit installation serving the new pumphouse at Manchester City Football Club, Etihad Campus, Ashton New Rd, Manchester.

An environmental noise survey has been undertaken on site in order to prepare a noise impact assessment in accordance with BS4142:2014 '*Method for rating and assessing industrial and commercial sound*' as part of the planning requirements of Manchester City Council (MCC).

This report presents the methodology and results from the environmental survey, followed by calculations in accordance with BS4142 to provide an indication as to the likelihood of the noise emissions from the proposed plant unit installation having an adverse impact on the closest noise sensitive receiver. Mitigation measures will be outlined as appropriate.

2.0 SITE SURVEYS

2.1 Site Description

As shown in Figure 2.1, the site is bounded by the Manchester City Etihad Campus to the north, Manchester Institute of Health & Performance to the west and Wilson Street to the south.



Figure 2.1 Site location plan (Image Source: Google Maps)

Initial inspection of the site revealed that the background noise profile at the monitoring location was typical of an urban cityscape environment, with the dominant source being road traffic noise from the surrounding roads.

2.2 Environmental Noise Survey Procedure

Continuous automated monitoring was undertaken for the duration of the noise survey between 15:00 on 11/07/2025 and 07:00 on 14/07/2025.

The environmental noise measurement position, proposed plant installation location, and the closest noise sensitive receiver relative to the plant installation are described within Table 2.1 and shown within Figure 2.2.

Icon	Descriptor	Location Description
1	Noise Measurement Position 1	The microphone was installed 1.5 above ground floor level overlooking Wilson Street, as shown in Figure 2.2. The microphone was positioned within free-field conditions at least 3.5 metres from the nearest surface.
	Nearest noise sensitive receptors	50 Colliery Street to the south of the site .
	Proposed plant installation location	Proposed plant installations are outlined in Section 5.1.

Table 2.1 Measurement position and descriptions

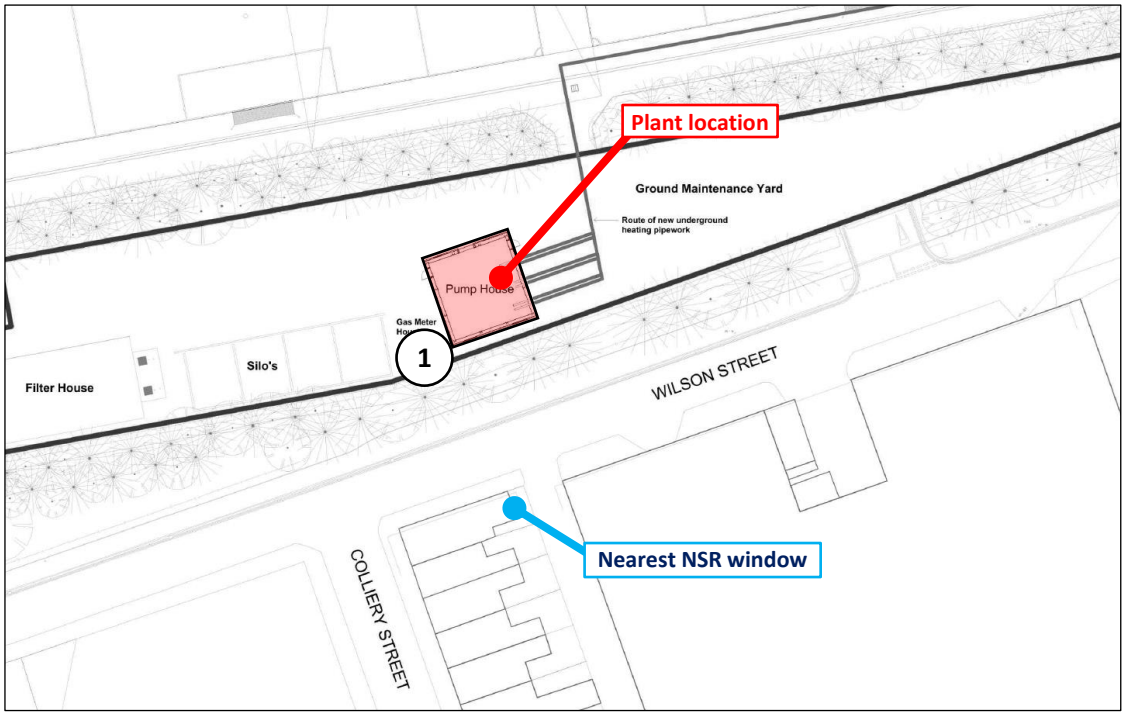


Figure 2.1 Site measurement positions (Image Source: Google Maps)

The choice of the position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver and the proposed plant installation.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.3 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

Measurement instrumentation		Serial no.	Calibration Date	Cert no.
Noise Kit 34	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21069-E0	07/08/2024	TCRT24/1630
	Free-field microphone NTI Acoustics MC230A	A23544		
	Preamp NTI Acoustics MA220	11020		
	NTI Audio External Weatherproof Shroud	-	-	-
Larson Davis CAL200 Class 1 Calibrator – KP North		8932	07/08/2024	UCRT24/2065

Table 2.2 Measurement instrumentation

2.4 Results

The $L_{Aeq,5min}$, $L_{Amax,5min}$ and $L_{A90,5min}$ acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figure 30777.TH1.

Typical background noise levels are shown in Table 3.1 for daytime and night-time. It should be noted that the typical background noise level has been derived based on the guidance of Manchester City Council as set out in 'Planning and Noise, Technical Guidance, October 2022'.

Time Period	Typical Background Noise Level
Daytime (07:00-23:00)	38 dB $L_{A90,1h}$
Night-time (23:00-07:00)	37 dB $L_{A90,15m}$

Table 2.3 Typical background noise levels (free field)

3.0 NOISE ASSESSMENT GUIDANCE

3.1 Local Authority Guidance

The proposed development falls within the jurisdiction of Manchester City Council (MCC). Guidance on the assessment of noise affecting and associated with new developments is provided in Manchester City Council's 'Planning and Noise' Technical Guidance Document (October 2022), the relevant extracts of this guidance are presented below.

Fixed Plant Noise Emissions

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'.

3.2 BS4142: 2014 '*Methods for rating and assessing industrial and commercial sound*'

British Standard BS4142:2014 '*Methods for rating and assessing industrial and commercial sound*' describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

This Standard compares the Rating Level due to the noise source/s under assessment for a one-hour period during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours) with the existing background noise level in terms of an L_{A90} when the noise source is not operating.

It should be noted that the Rating Level is the Specific Sound Level in question ($L_{Aeq,\ Tr}$), including any relevant acoustic feature corrections, as follows:

- **Tonality** – '*For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible'*

- **Impulsivity** – '*A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible'*
- **Intermittency** – '*If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied'*
- **Other sound characteristics** – '*Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied'*

Once the Rating Level has been obtained, the representative background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact, as follows:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context

NOTE: Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

4.0 NOISE IMPACT ASSESSMENT

4.1 Proposed Plant Installations

It is understood that the proposed plant installation is comprised of the following units:

- 12 No. Hamworthy Upton UF700/2 boilers
- 6 No. TPED 100/240 & 100/250 pumps

The proposed installation location for the proposed plant will be within the proposed pumphouse, as shown in Figure 5.1 below.

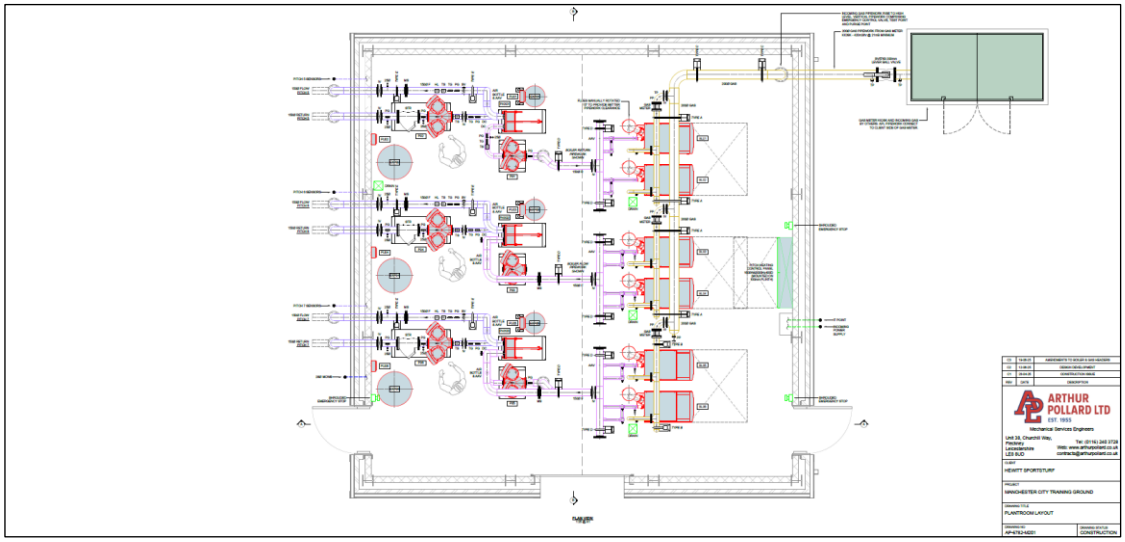


Figure 5.1 Plant installation

The equipment will be ventilated via louvres located in the building, as shown in Figure 5.2 below.

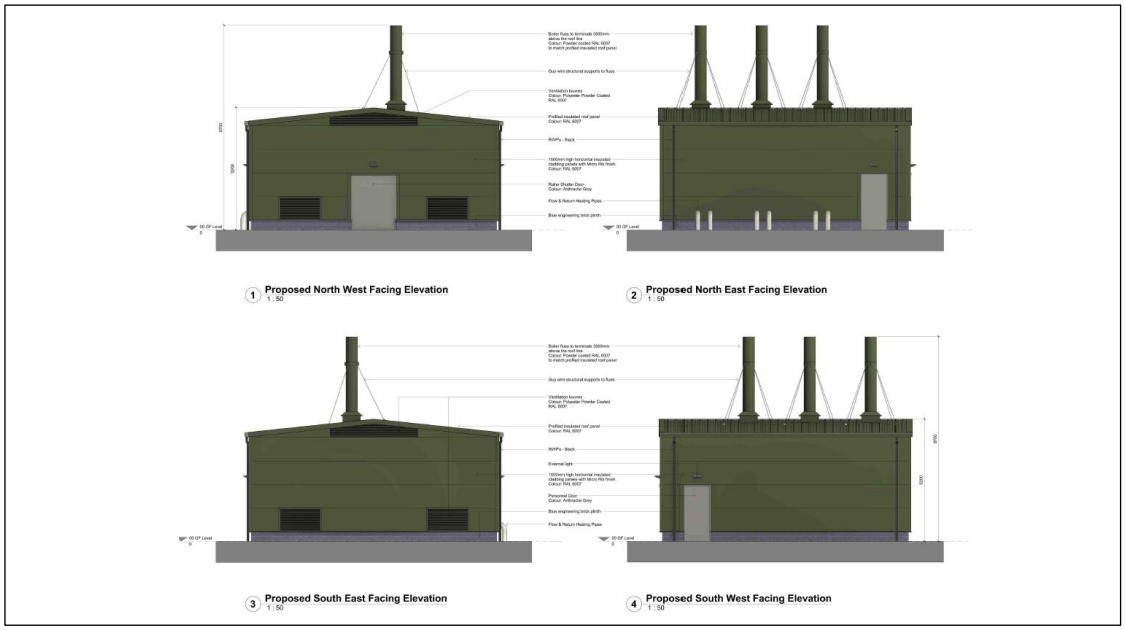


Figure 5.2 Proposed louvres

The specialist supplier for the equipment has provided a predicted sound level of **56.5 dB L_{Aeq} at 3 m** from the louvre openings (externally). It is understood that this figure relates to the sound level contribution from each louvre individually.

It is understood that the plant would emit free from tonality, impulsivity or other attention grabbing acoustic features.

4.2 Noise Sensitive Receiver

The worst-case noise sensitive receiver to the proposed installation location has been identified as being a residential window of 50 Colliery Street, located approximately 21 metres from the proposed plant installation location, as shown in Figure 2.2.

4.3 Plant Noise Limits

The following limits would apply at the nearest receptor in line with Manchester City Council requirements.

Time Period	Typical Background Noise Level
Daytime (07:00-23:00)	33 dB $L_{Ar,1h}$
Night-time (23:00-07:00)	32 dB $L_{Ar,15min}$

Table 5.1 Plant noise emission limits

4.4 Calculations

Taking all acoustic corrections into consideration, the noise level contribution expected at the closest residential window from the proposed plant would be as shown in Table 5.1. Note that there are 3No louvres on the south-west elevation, all of a similar size, facing the receptor.

Description	Receptor – 50 Colliery Street
Sound Pressure Level at 3 m from Louvre	57 dB $L_{Aeq,15min}$
Correction for 3No Louvres	+5 dB
Distance Correction to 21 m	-17 dB
Sound Level at Receptor	**44 dB $L_{Ar,15min}$**
Limit	**32 dB $L_{Ar,15min}$**
Note: *Reported values are rounded to the nearest whole number. Final results have been calculated using unrounded figures, hence minor differences may appear between individual values and their arithmetical sum.*	

Table 5.2 Predicted noise level and criterion at nearest noise sensitive location

As shown above, the limit at the nearby receptor is predicted to be exceeded by up to 12 dB and would therefore not be considered to comply with the requirements of Manchester City Council without further mitigation.

4.5 Recommendations

Based on the data provided by the specialist supplier, an exceedance of around 12 dB is predicted at the nearest receptor.

The overriding requirement for any mitigation shall therefore be to reduce noise levels at the nearest receptor to below the limits set out within Table 5.1.

It is understood that it is not possible to reduce the plant noise levels at source, therefore the practical approaches available are:

a) Introduce absorption within the plantroom to reduce reverberant noise levels.
b) Install acoustic louvres to reduce sound breakout.

Option A alone is unlikely to achieve the required 12 dB reduction, but in combination with Option B it could reduce the louvre specification required.

For guidance, indicative reductions at the receptor are as follows:

Absorption within Plantroom

- 100m^2 Class A Absorption – **5 dB** reduction
- 200m^2 Class A Absorption – **8 dB** reduction

Acoustic Louvres

- 100mm deep acoustic louvre – **6 dB** reduction
- 150mm deep acoustic louvre – **11 dB** reduction
- 300mm deep acoustic louvre – **13 dB** reduction

Any combination of the above measures may be used that achieves the target overall reduction of 12 dB. For example, a combination of 200 m² Class A absorption (approx. 8 dB) and a 100 mm deep acoustic louvre (approx. 6 dB) would achieve an overall reduction of around 14 dB, sufficient to meet the required criterion.

Since the current data is limited to a broadband A-weighted figure, any proposed mitigation measures should be reviewed by KP Acoustics prior to installation to ensure compliance with the limits. Octave-band sound power data will allow a more detailed assessment of performance and specification.

5.0 CONCLUSION

A noise impact assessment has been undertaken for the proposed plant installation at the new pumphouse, Etihad Campus. Surveyed background levels indicate site-specific plant noise limits of 33 dB $L_{Ar,1h}$ (daytime) and 32 dB $L_{Ar,15min}$ (night-time) at the nearest residential receptor, 50 Colliery Street, in line with Manchester City Council guidance.

Predictions based on supplier data indicate that the proposed plant would exceed the applicable limit by approximately 12 dB at the receptor, and therefore would not comply without mitigation.

Mitigation measures will be required to reduce noise emissions by at least 12 dB. Feasible approaches include the introduction of Class A absorption within the plantroom and/or the installation of acoustic louvres to the plant façade. Example combinations, such as 200 m² of absorption with a 100 mm deep acoustic louvre, demonstrate that compliance is achievable.

As the available data is limited to a broadband A-weighted figure, it is recommended that KP Acoustics review detailed mitigation specifications prior to implementation to confirm compliance. Provision of octave-band sound power levels for the plant will allow a more robust assessment of performance.

Manchester City Football Club, Etihad Stadium, Ashton New Rd, Manchester - Posi
Environmental Time History
11/07/2025 to 14/07/2025

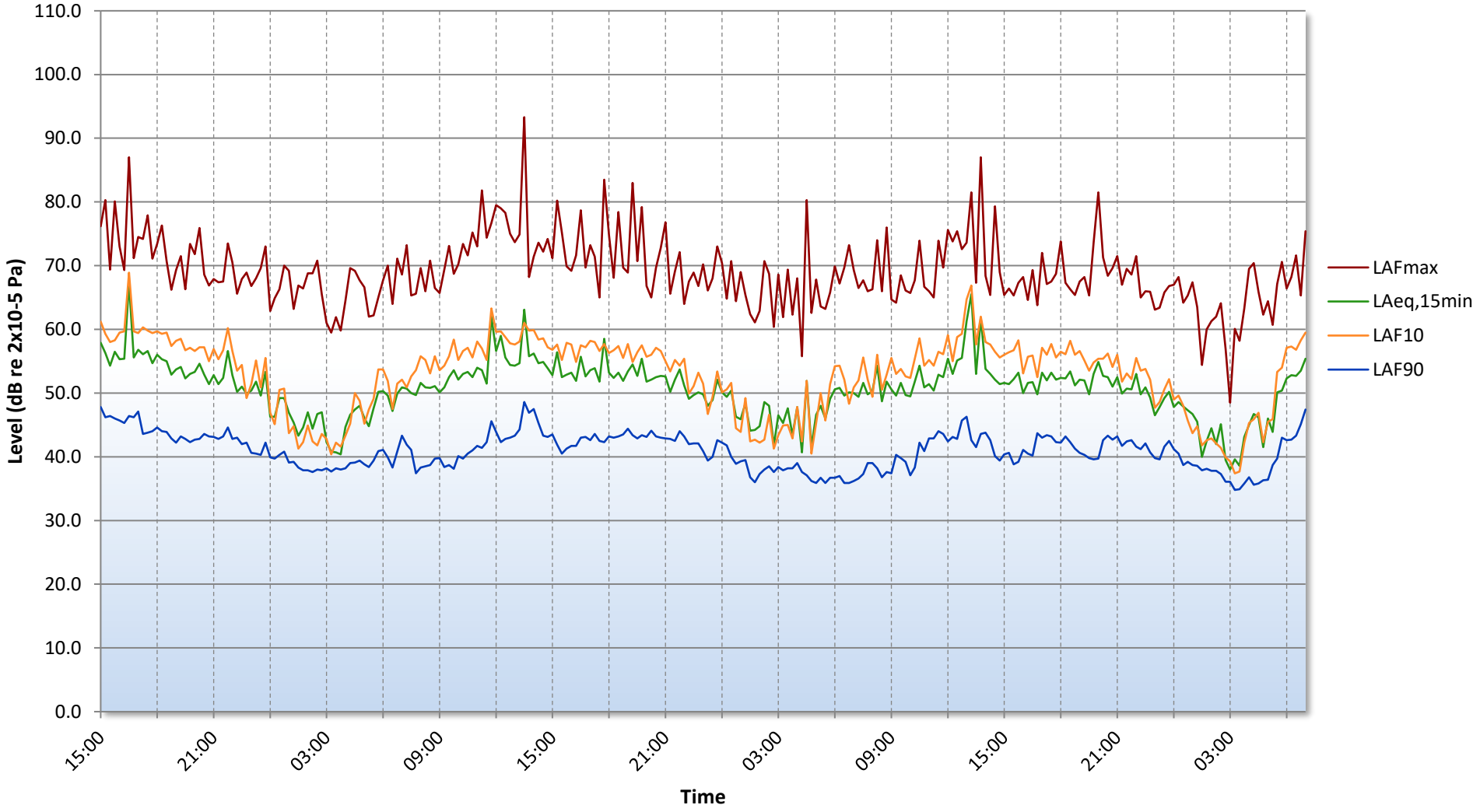


Figure 30777.TH1

APPENDIX A

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPENDIX A

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.