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100 Hatton Garden London

Planning Compliance Report
Report 25730.PCR.01

MMA Engineers

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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by MMA Engineers, to undertake a noise impact assessment of a proposed plant unit installation serving the building at 100 Hatton Garden, London EC1N 8NX.

A 24 hour 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 London Borough of Camden.

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 units are placed in a courtyard area surrounded by office buildings and residential flats. Outside of this, the site is bounded by various jewellers to the north and east alongside further residential properties to the south, and a gym to the west.

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 existing plant in operation serving the offices.

2.2 Environmental Noise Survey Procedure

Continuous automated monitoring was undertaken for the duration of the noise survey between 11:30 on 12/12/2022 and 11:30 on 13/12/2022.

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

Icon	Descriptor	Location Description
	Noise Measurement Position	The microphone was installed on a tripod, approximately 1.5m from the floor, within the courtyard on a raised platform. A correction of 3dB has been applied to account for non-free field conditions.
	Closest Noise Sensitive Receiver	Rear façade. 1st Floor window. Residential flats to the north.
	Proposed Plant Installation Locations	Proposed plant installations are outlined in Section 5.1.

Table 2.1 Measurement position and description

Figure 2.2 Site measurement position, identified receiver and proposed plant unit installation (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 relative to 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.	Date	Cert no.
Noise Kit 25	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21141-E0	21/07/2022	UK-22-069
	Free-field microphone NTI Acoustics MC230A	A23583		
	Preamp NTI Acoustics MA220	10992		
	NTI Audio External Weatherproof Shroud	-	-	-
B&K Type 4231 Class 1 Calibrator		2147411	24/05/2022	UCRT22/1581

Table 2.2 Measurement instrumentation

3.0 RESULTS

The $L_{Aeq: 5min}$, $L_{Amax: 5min}$, $L_{A10: 5min}$ and $L_{A90: 5min}$ acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figure 25730.TH1.

Representative background noise levels are shown in Table 3.1 for daytime and night-time.

It should be noted that the representative background noise level has been derived from the most commonly occurring $L_{A90,5\ min}$ levels measured during the environmental noise survey undertaken on site, as shown in 25730.Daytime.LA90 and 25730.Night-time.LA90 attached.

Time Period	Representative background noise level L_{A90} dB(A)
Daytime (07:00-23:00)	60
Night-time (23:00-07:00)	53

Table 3.1 Representative background noise levels

4.0 NOISE ASSESSMENT GUIDANCE

4.1 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.

4.2 Local Authority Guidance

The guidance provided by The London Borough of Camden for noise emissions of new plant in this instance is as follows:

The noise criteria, as per the Local Plan 2017 of London Borough of Camden, British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' should be considered as the main reference document for the assessment. The resultant 'Rating Level' would be considered as follows:

Period	Assessment Location	Rating Level Acceptability Range		
		Green: noise is considered to be at an acceptable level	**Amber:** noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development	**Red:** noise is observed to have a significant adverse effect.
Daytime (7:00-23:00)	Garden used for main amenity (free field) and Outside living or dining or Bedroom window (façade)	10dB below background	9 dB below and 5dB above background	5dB above background
Night-time (23:00-7:00)	Outside bedroom window (façade)	10dB below background and no events exceeding 57dB L_{Amax}	9db below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	5dB above background and/or events exceeding 88dB L_{Amax}

Table 4.1 Camden noise criteria for plant and machinery

5.0 NOISE IMPACT ASSESSMENT

5.1 Proposed Plant Installations

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

- 1 No. Mitsubishi PURY – P700YSNW-A2
- 1 No. Mitsubishi PURY – P650YSNW-A2
- 1 No. Mitsubishi PUMY – P250YBM
- 1 No. Mitsubishi PUMY – SP125YKM

The above plant will replace four existing condenser units, which were active during our environmental noise survey. Due to the working hours of the office, the plant will only be being used in the daytime, consequently the daytime targets only have been provided in Table 5.2. The proposed installation location for the condenser units will be in the same location as the existing condensers that are to be replaced, located in the centre of the courtyard, as shown in Figure 2.2 above.

It has been noted that MVHR units are proposed internally with duct termination points situated around the perimeter of the courtyard. Due to the low level of noise produced by these fans in comparison to the proposed condenser units, the noise is considered negligible and therefore had not been considered in calculations.

The noise emission levels as provided by the manufacturer for the units are shown in Table 5.1.

Unit	Descriptor	Octave Frequency Band (Hz)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Mitsubishi PURY – P700YSNW-A2	SPL@1m (dB)	73	67	67	65	60	55	50	44	66
Mitsubishi PURY – P650YSNW-A2	SPL@1m (dB)	77	66	67	64	59	54	49	44	65
Mitsubishi PUMY – P250YBM	SPL@1m (dB)	72	64	61	57	68	51	44	57	61
Mitsubishi PUMY – SP125YKM	SPL@1m (dB)	60	59	56	53	52	46	40	33	56

Table 5.1 Plant Units Noise Emission Levels as provided by the manufacturer

5.2 Closest Noise Sensitive Receiver

The closest noise sensitive receiver to the proposed installation location has been identified as being the residential windows of the flats located approximately 16 metres to the north of the proposed plant installation. The flats also fall under 100 Hatton Gardens and overlook the courtyard area, as shown in Figure 2.2.

5.3 Calculations

The 'Rating Level' of each plant unit installation has been calculated at 1m from the closest receiver using the noise levels shown in Table 5.1, and corrected due to different acoustic propagation features such as distance, reflective surfaces, screening elements, etc.

Detailed calculations for each plant unit installation are shown in Appendix B.

Receiver	Criterion	Noise Level at 1m From the Closest Noise Sensitive Window
1st Floor Window of 100 Hatton Gardens	50dB(A)	48dB(A)

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

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive windows due to the effects of the condenser unit installations satisfies the emissions criterion of The London Borough of Camden.

6.0 CONCLUSION

An environmental noise survey has been undertaken at 100 Hatton Garden, London EC1N 8NX, by KP Acoustics Ltd between 11:30 on 12/12/2022 and 11:30 on 13/12/2022. The results of the survey have enabled a representative background noise level to be set.

Manufacturer's noise data of proposed plant units has been used to obtain Specific and Rated Noise Level at the nearest noise sensitive receiver in accordance with British Standard BS4142:2014 for compliance with London Borough of Camden requirements.

The rating level was compared with the representative background noise level to assess the likelihood of impact considering the environmental noise context of the area as per the requirements of BS4142:2014.

It has been concluded that noise emissions from the proposed plant units would not have an adverse impact on the nearest residential receivers.

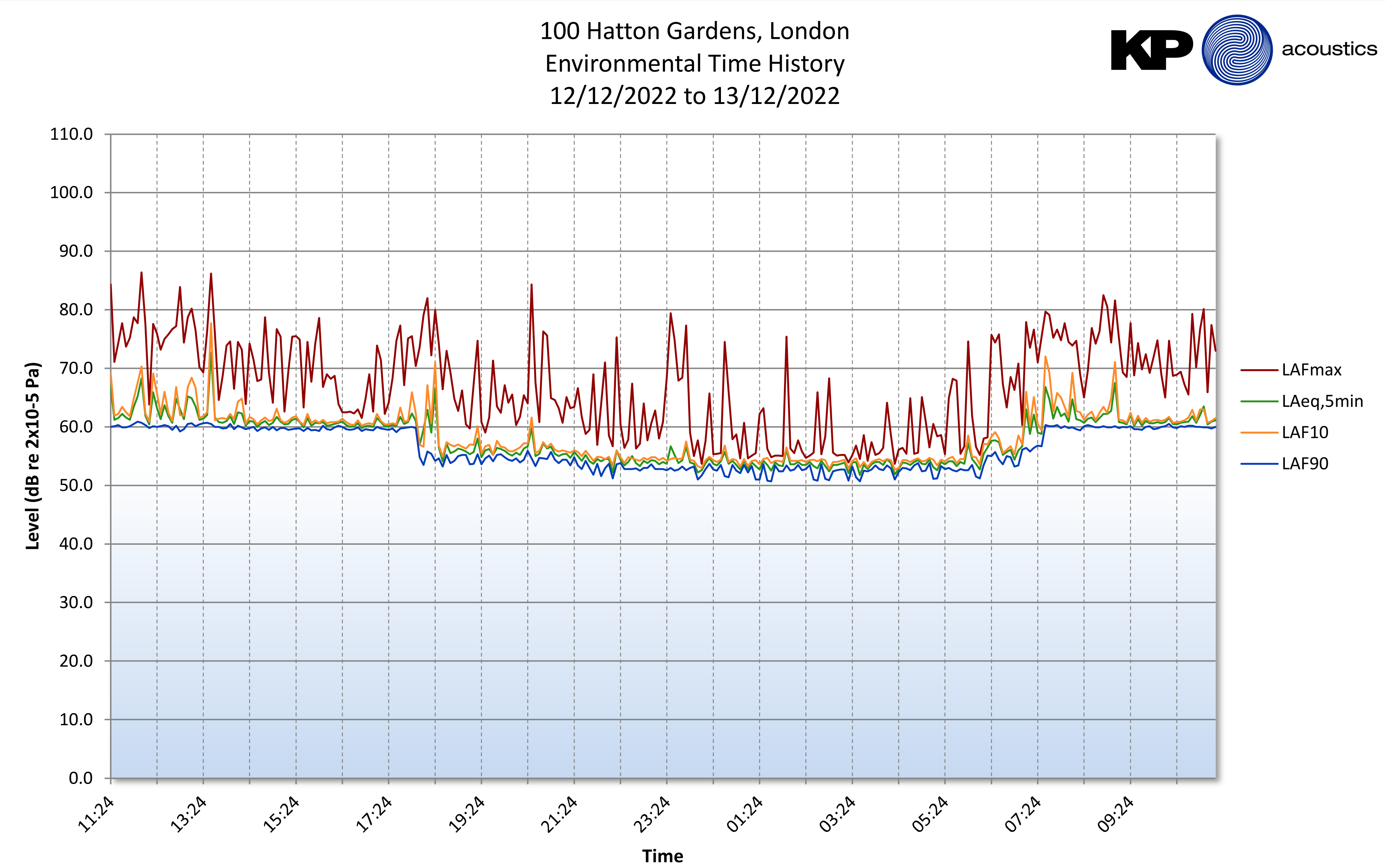

Figure 25730.TH1

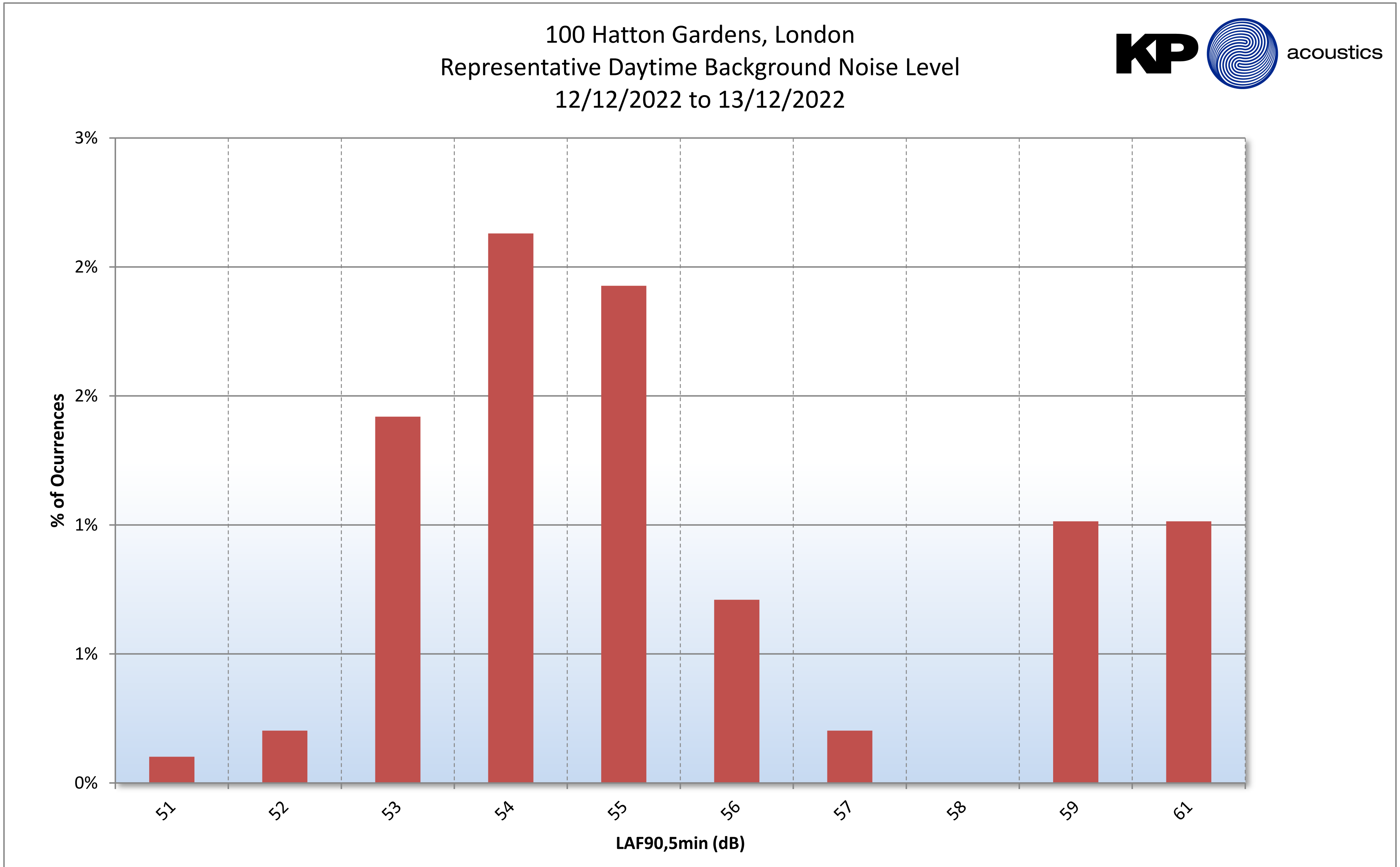

Figure 25730.Daytime L90.TH1

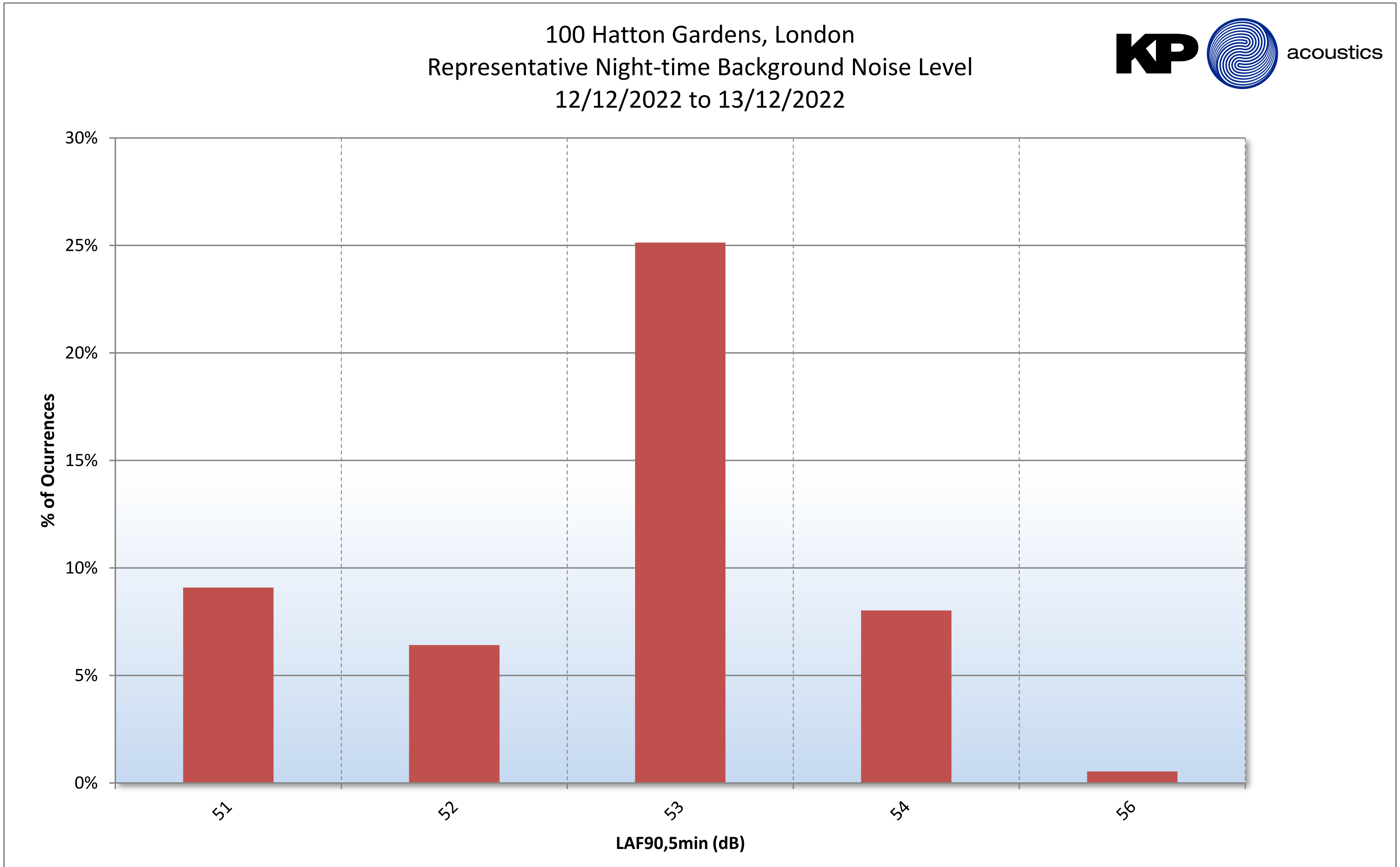

Figure 25730.Night-time L90.TH1

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.

APPENDIX B

100 Hatton Gardens

PLANT NOISE EMISSIONS CALCULATIONS

Source: Courtyard of 100 Hatton Gardens Receiver: 1st Floor Window of Greville Street	*Frequency, Hz* *63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Mitsubishi PURY – P700YSNW-A2 (Sound Pressure Level)	73	67	67	65	60	55	50	44	66
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	3
Minimum attenuation provided by distance (16m), dB	-24	-24	-24	-24	-24	-24	-24	-24	-24
Mitsubishi PURY – P700YSNW-A2 (Sound Pressure Level at NSR)	***52***	***46***	***46***	***44***	***39***	***34***	***29***	***23***	***45***
Mitsubishi PURY – P650YSNW-A2 (Sound Pressure Level)	77	66	67	64	59	54	49	44	65
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	3
Minimum attenuation provided by distance (16m), dB	-24	-24	-24	-24	-24	-24	-24	-24	-24
Mitsubishi PURY – P650YSNW-A2 (Sound Pressure Level at NSR)	***56***	***45***	***46***	***43***	***38***	***33***	***28***	***23***	***44***
Mitsubishi PUMY – P250YBM (Sound Pressure Level)	72	64	61	57	68	51	44	57	61
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	3
Minimum attenuation provided by distance (16m), dB	-24	-24	-24	-24	-24	-24	-24	-24	-24
Mitsubishi PUMY – P250YBM (Sound Pressure Level at NSR)	***51***	***43***	***40***	***36***	***47***	***30***	***23***	***36***	***40***
Mitsubishi PUMY – SP125YKM (Sound Pressure Level)	60	59	56	53	52	46	40	33	56
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	3
Minimum attenuation provided by distance (16m), dB	-24	-24	-24	-24	-24	-24	-24	-24	-24
Mitsubishi PUMY – SP125YKM (Sound Pressure Level at NSR)	***39***	***38***	***35***	***32***	***31***	***25***	***19***	***12***	***35***
Sound Pressure Level at Receiver due to All Units, dB	**58**	**50**	**50**	**47**	**48**	**38**	**32**	**36**	**48**

Design Criterion	**50**