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2C-2D MAYGROVE ROAD, LONDON

PLANNING COMPLIANCE REPORT

Report 11801.PCR.01

For:

Anthony Lum

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London

NW2 5PY

Site Address	Report Date	Revision History
2C-2D Maygrove Road, London, NW6 2EB	30/10/2014	

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1.0 INTRODUCTION

KP Acoustics Ltd, Britannia House, 11 Glenthorne Road, London, W6 0LH, has been commissioned by, Anthony Lum, 174 Villiers Road, London, NW2 5PY to undertake an environmental noise survey at 2C-2D Maygrove Road, London, NW6 2EB. The background noise levels measured will be used to determine noise emission criteria for a proposed kitchen extraction system, in agreement with the planning requirements of The London Borough of Camden.

This report presents the overall methodology and results from the environmental survey followed by calculations to demonstrate the feasibility of the kitchen extraction systems to satisfy the emissions criterion at the closest noise-sensitive receiver and outline mitigation measures as appropriate.

2.0 ENVIRONMENTAL NOISE SURVEY AND EQUIPMENT

2.1 Procedure

Automated noise monitoring and manual measurements were undertaken on the proposed site as shown in Site Plan 11801.SP1 and 11801.SP2. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the proposed kitchen extraction installations. The duration of the survey was between 11:00 on 24/10/2014 and 11:00 on 27/10/2014.

Initial inspection of the site revealed that the background noise profile at the monitoring location was dominated by road traffic from the surrounding roads and a existing plant unit operating during night time.

The weather during the course of the survey was generally dry with wind speeds within acceptable tolerances and therefore suitable for the measurement of environmental noise. The measurement procedure generally complied with BS7445:1991 "*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*".

2.2 Equipment

The equipment calibration was verified before and after the survey and no calibration irregularities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- B&K Type 4231 Class 1 Calibrator

3.0 RESULTS

The results from the continuous noise monitoring are shown as a time history of L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} averaged over 5 minute sample periods in Figure 11801.TH1.

Operating hours of the proposed kitchen extraction installation would be from 12:00 to 23:00. Minimum background noise level was selected during the aforementioned period as an approximation of the minimum level. This level is shown in Table 3.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)
(12:00-23:00)	50

Table 3.1: Minimum measured background noise level

4.0 NOISE CRITERIA

The criterion of The London Borough of Camden states that noise levels from plant and machinery with no distinguishable discrete continuous note, at 1 metre external to a sensitive façade during day, evening and night (0000-2400) must be at least 5dB lower than LA90.

We therefore propose to set the noise criterion as shown in Table 4.1 in order to comply with the above requirement.

	Operating hours (12:00 to 23:00)
Noise criterion at nearest receiver	45 dB(A)

Table 4.1: Proposed Noise Emissions Criteria

BS8233:2014 Criterion

Internal noise requirements are normally based on BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings'*. This standard recommends internal noise levels for sleeping/resting conditions during daytime (07:00-23:00 hours) and night-time (23:00-07:00). These levels are shown in Table 4.2.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB(A)	-
Dining	Dining Room/area	40 dB(A)	-
Sleeping (daytime resting)	Bedrooms	35 dB(A)	30 dB(A)

Table 4.2 BS8233:2014 recommended internal background noise levels

According to BS8233:2014, even a partially open window offers 10-15dB attenuation, thus leading to a further reduction in interior noise levels. We therefore propose an additional noise criterion as shown in Table 4.3 in order to comply with the above requirement.

	Operating hours (12:00 to 23:00)
Noise criterion at 1m from nearest residential window receiver	45-50 dB(A)

Table 4.3: Proposed BS8233 Noise Emissions Criteria

5.0 DISCUSSION

With regards to this noise assessment exercise, it is understood that the extraction system is comprised of the following units:

- 1 Extractor fan. KBR 315DZ.
- Galvanized steel circular duct work. 300mm diameter.

The proposed kitchen extraction system would be installed on the roof of 2C-2D Maygrove Road, London. The closest noise sensitive receivers to this location will be a residential window, located at a direct approximate distance of 11m away from the extractor fan and exhaust duct termination, as shown in site plan 11801.SP2.

The sound power levels extractor fan and provided by the manufacturer are shown in Table 5.1.

Extractor Motor Fan	Sound Power Level (dB) by octave frequency band (Hz)								
	63	125	250	500	1k	2k	4k	8k	Total A
Lw_A Inlet	-	90	89	84	82	78	72	69	92
Lw_A Outlet	-	92	91	86	84	80	74	71	94
Lw_A Surrounding	-	72	71	66	64	60	54	51	74

Table 5.1 Manufacturer's Sound Power Levels of KBR 315DZ Motor Fan.

5.1 Objective overview

Taking all acoustic corrections into consideration, including mitigation measures, the noise level contribution expected at the closest residential windows for the proposed extraction system would be as shown in Table 5.2. Detailed calculations are shown in Appendix B

Operating hours (12:00-23:00)	Camden Criterion	BS8233:2014 Criterion	Noise Level at 1m from nearest noise-sensitive receiver window.
Proposed extraction system	45	45-50	44 dB(A)

Table 5.2: Predicted noise level and criteria 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 kitchen extraction installations fully satisfies the emissions criteria set by The London Borough of Camden, as well as the most stringent recommendations of the relevant British Standard, provided the following mitigation measures are adopted:

- Relocate proposed extractor fan inside the interior walls of the building to eliminate motor fan breakout noise propagation to receiver.
- In order to reduce the noise emission levels from the exhaust, installation of 2 No. silencers immediately after extractor fan outlet is adviced. Specifications of silencers are shown in Table 5.3.

	Insertion Losses (dB) by octave frequency band (Hz)							
	63	125	250	500	1k	2k	4k	8k
Circular Silencer SLGU100 900mm long, 315mm ø.	9	10	14	18	23	26	25	24
Circular Silencer SLGU100 600mm long, 315mm ø.	2	5	9	17	16	9	6	6

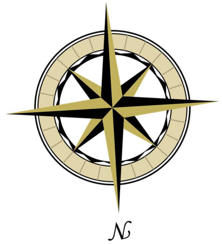
Table 5.3: Silencers insertion losses

6.0 CONCLUSION

An environmental noise survey has been undertaken at 2C-2D Maygrove Road, London, NW6 2EB, by KP Acoustics Ltd between 24/10/2014 and 27/10/2014. The results of the survey have enabled criteria to be set for noise emissions. Using manufacturer noise data and measurements on-site, noise levels are predicted at the nearby noise sensitive receivers for compliance with current requirements.

Calculations show that noise emissions from the proposed kitchen extraction system would meet the requirements of The London Borough of Camden and BS8233:2014 British Standard, providing the aforementioned mitigation measures.

Report by	Checked by
Victor Lindstrom	**Kyriakos Papanagiotou MIOA**
KP Acoustics Ltd	**KP Acoustics Ltd**



Noise Survey Monitoring Position

Closest noise-sensitive receiver

Title:

Indicative site plan showing noise monitoring position and closest noise sensitive receiver. Source: Google Earth

Date: 30 October 2014

FIGURE 11801.SP1

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Title: Indicative site plan showing noise monitoring position, closest noise sensitive receiver and proposed kitchen extraction system location. Source: Google Earth

Date: 30 October 2014

FIGURE 11801.SP2

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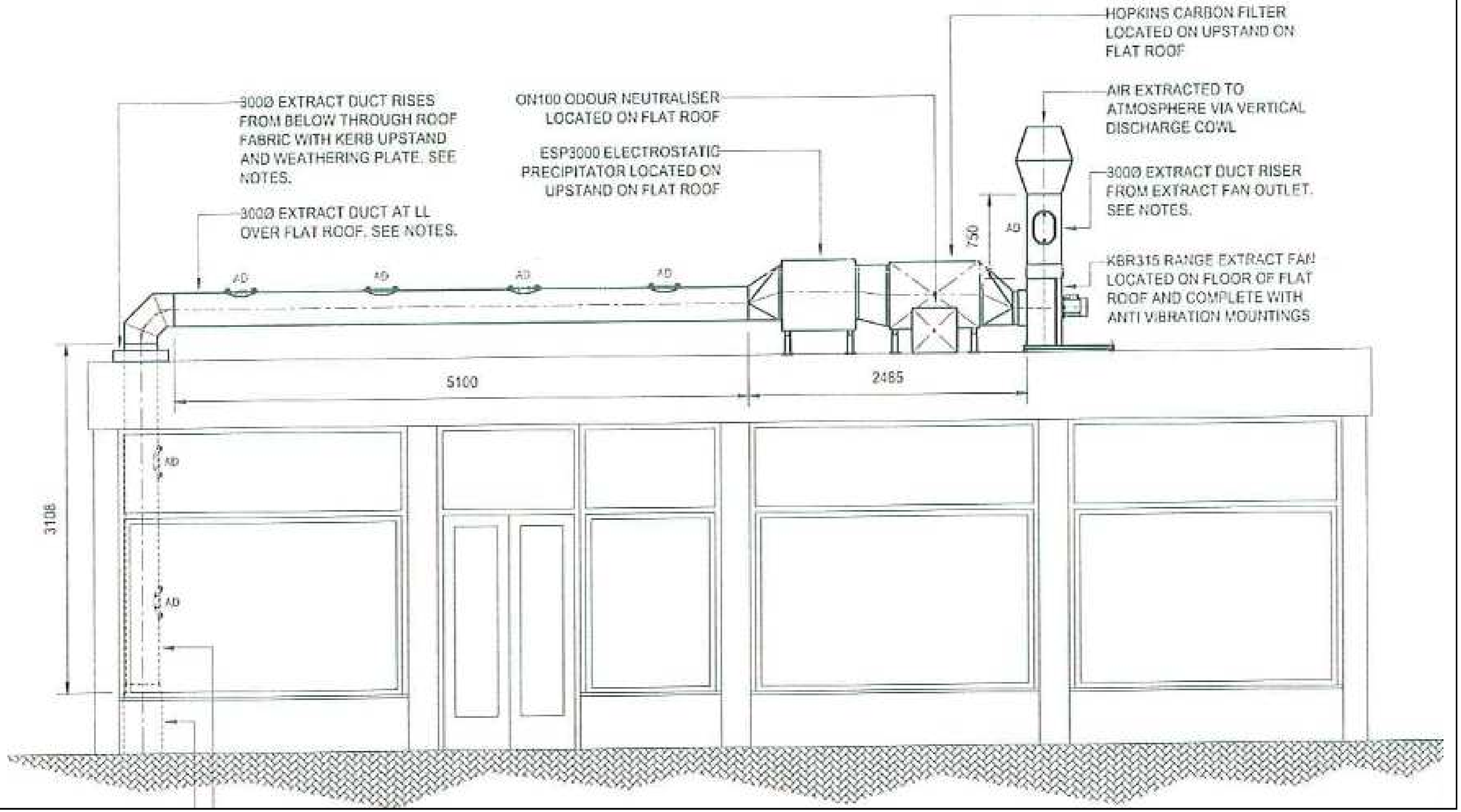

Title: Indicative site elevation showing proposed kitchen extraction system location. Source: Google Earth

Date: 30 October 2014

FIGURE 11801.SP3

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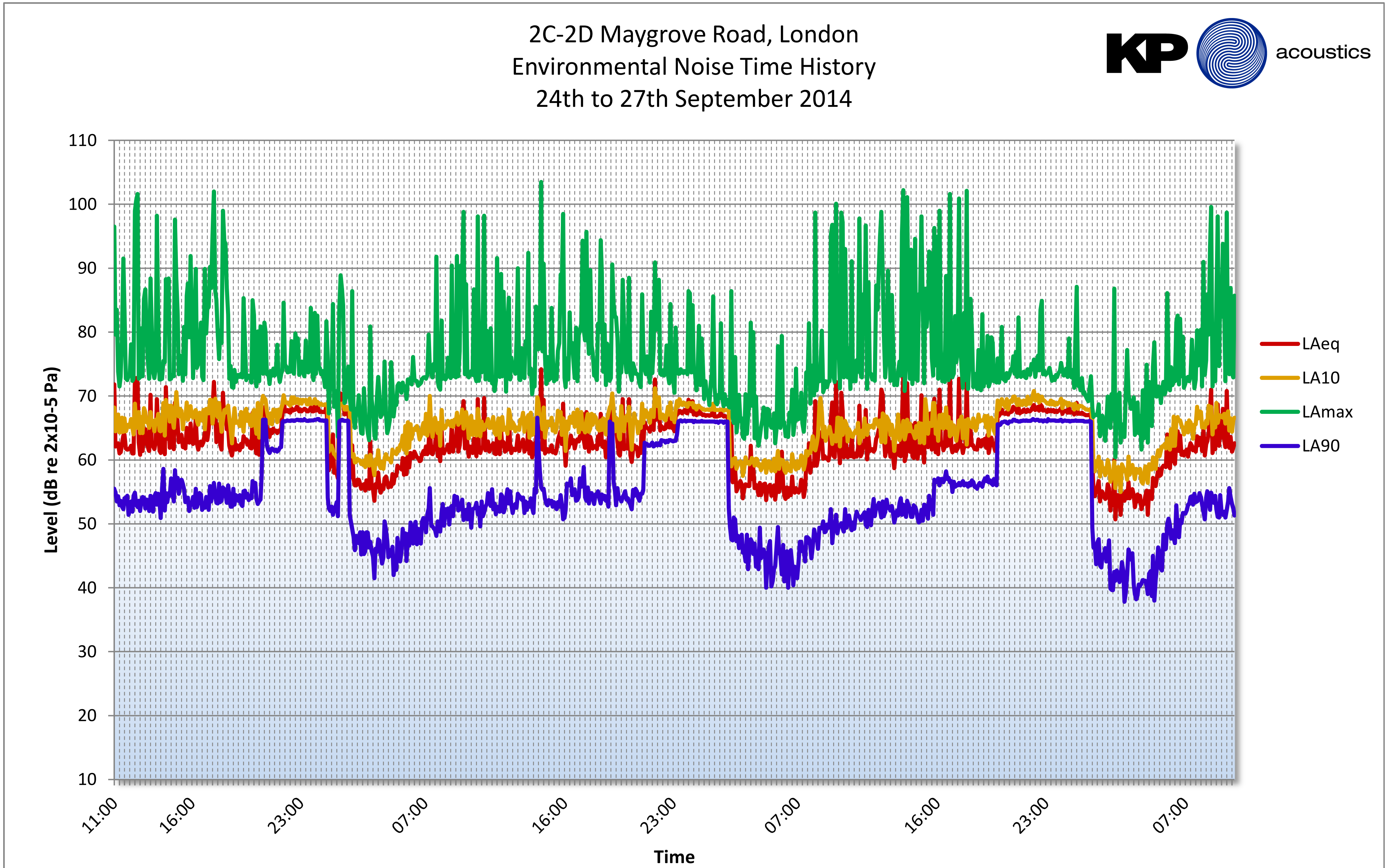

Figure 11801.TH1

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

2C-2D MAYGROVE ROAD, LONDON

PLANT UNIT EMISSIONS CALCULATIONS

Source: Plant Unit Installation	*Frequency, Hz*								
Receiver: Window at front façade of 3A Maygrove Road	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Manufacturer's Sound Power Level (SWL A weighting)									
KBR 315DZ Extract Fan (Outlet SWL A weighting)	92	92	91	86	84	80	74	71	
Correction due to end reflections	-14	-9	-5	-2	0	0	0	0	
Correction to Sound Pressure Level at 1m	-11	-11	-11	-11	-11	-11	-11	-11	
Correction due to distance (11m)	-21	-21	-21	-21	-21	-21	-21	-21	
Correction due to First SLGU100 silencer (900mm, 315 ø)	-3	-6	-14	-23	-24	-13	-8	-8	
Correction due to Second SLGU100 silencer (600mm, 315 ø)	-2	-5	-9	-17	-16	-9	-6	-6	
Sound pressure level 1m from nearest sensitive receiver	**41**	**40**	**31**	**12**	**12**	**26**	**28**	**25**	**44**
					Design Criterion				**45**

Source: Plant Unit Installation	*quency, Hz*								
Receiver: Window at front façade of 3A Maygrove Road	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Sound pressure level outside window									44
Minimum attenuation from partially open window, dB	-10	-10	-10	-10	-10	-10	-10	-10	-10
Sound pressure level inside nearest office window									**34**
					BS8233 Design Criterion				**30**