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51-53 FAIRFAX ROAD, LONDON

PLANNING COMPLIANCE REPORT

Report 4412.NIA.01

Prepared on 11 March 2011

For:

Interni Ltd

51-53 Fairfax Road

Swiss Cottage

London

NW6 4EL

CONTENTS

List of Attachments

1.0 INTRODUCTION

Practical Acoustics has been commissioned by Interni Ltd, 51-53 Fairfax Road, Swiss Cottage, London, NW6 4EL to measure existing background noise levels at the above site. The measured noise levels will be used to determine noise emission criteria for the installed plant unit in agreement with the planning requirements of The London Borough of Camden.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 Procedure

Measurements were taken at the position shown in Site Plan 4412.SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver.

Continuous automated monitoring was undertaken for the duration of the survey between 17:30 on 1 March and 17:30 on 2 March 2011.

Noise levels at the monitoring location were influenced by traffic noise from surrounding roads.

Weather conditions were generally dry with light winds, 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 use and no abnormalities were observed.

The equipment used was as follows.

- Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

3.0 RESULTS

The $L_{Aeq: 15min}$, $L_{Amax: 15min}$, $L_{A10: 15min}$ and $L_{A90: 15min}$ acoustic parameters were measured at the location shown in Site Plan 4412.SP1. The levels are shown as a time history in Figure 4412.TH1.

Minimum background noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90: 15min}$ dB(A)
Daytime (07:00-23:00)	43
Night-time (23:00-07:00)	35
Proposed Operating Hours (07:00-23:00)	43

Table 3.1: Minimum background noise levels

4.0 NOISE CRITERIA

The London Borough of Camden's criteria for noise emissions of new plant installations are as follows:

> *"Design measures should be taken to ensure that specific plant noise levels at a point 1 metre external to sensitive façades are at least 5dB(A) less than the existing background measurement (L_{A90}) when the equipment is in operation. Where it is anticipated that equipment will have a noise that has distinguishable, discrete continuous note[...], special attention should be given to reducing the noise at any sensitive façade by at least 10dB(A) below the L_{A90} level."*

In order to provide a more robust assessment, it is proposed that criteria are set at 10dB below the exiting minimum background noise levels, as shown in Table 4.1.

	Daytime (07:00-23:00)	**Night-time (23:00-07:00)**	**Operating Hours (07:00-23:00)**
Noise criterion at nearest residential receiver (10dB below minimum LA90)	33 dB(A)	25 dB(A)	33 dB(A)

Table 4.1: Proposed Noise Emissions Criteria

As the kitchen extract system will only be used for food preparation during daytime hours between 07:00-23:00 the daytime hours criterion of 33 dB(A) will be used in this assessment.

5.0 DISCUSSION

The existing kitchen extract system will be driven by the following motorised fan:

- 1 No. FlaktWoods 50JM/20/4/6/32 fan

The sound power levels as provided by the manufacturer are as shown in Table 5.1*.

	Sound Power Level (dB) in each Frequency Band							
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Flakt Woods 50JM/20/4/6/32 [*Fan Outlet*]	78	80	76	74	72	68	66	60

Table 5.1 Manufacturer's Sound Power Levels

* worst case operational modes have been used in order to provide a more robust assessment

The proposed extract system will comprise of a fan located internally and be extracted via an external duct run from ground floor kitchen level on the rear elevation of 51-53 Fairfax Road which terminates above roof level.

The nearest noise-sensitive receiver has been identified as a residential window situated at third floor level on the rear facade of the same building, located approximately 2m from the duct termination as shown in indicative site plan 4412.SP1.

Due to the close proximity of the nearest residential window to the duct termination it has been deemed necessary to specify mitigation measures for this we recommend an in-line silencer to attenuate noise emissions from the proposed fan unit in order to comply with criterion set out by the London Borough of Camden.

Taking all acoustic corrections into consideration, including distance corrections and proposed mitigation measures, the noise level at the nearest noise sensitive receiver would be as shown in Table 5.2, with detailed calculations shown in Appendix B.

Receiver	**Operational Hours Criterion**	**Noise Level at Receiver (due to proposed plant)**
Nearest Noise Sensitive Window	33 dB(A)	33 dB(A)

Table 5.2: Noise levels and criteria at nearest noise sensitive receiver

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive window due to the effects of the proposed plant installation would meet the requirements of the London

Borough of Camden provided an in-line silencer is selected to meet the spectral attenuation values shown in Table 5.3.

	Attenuation (dB) in each Frequency Band							
Mitigation Type	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
In-line Silencer	-8	-15	-25	-40	-46	-47	-43	-32

Table 5.3: Spectral attenuation required from in-line silencer

For Indication Purposes Only:

Typically, a 1.5m silencer with 30% free area would be capable of achieving attenuation levels shown in Table 5.3.

In addition to the above assessment, further calculations will aim to assess whether the noise emissions from the proposed plant unit would be expected to meet recognised British Standard recommendations in order to further ensure the amenity of nearby noise sensitive receivers.

British Standard 8233:1999 'Sound insulation and noise reduction for buildings – Code of Practice' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS8233:1999 recommends 30dB(A) as being 'good' internal resting/sleeping conditions.

With external levels of 33 dB(A) the window itself would only need to provide 3 dB attenuation in order to meet 'good' conditions. However, according to BS8233:1999, a partially open window offers between 10-15dB attenuation.

It can therefore be predicted that, in addition to meeting the requirements of the London Borough of Camden, the emissions from the proposed plant would be expected to meet the most stringent recommendations of the relevant British Standard, even with windows partially open. Predicted levels are shown in Table 5.4, with detailed calculations shown in Appendix B.

Receiver	**'Good' Conditions Design Range** – ***For resting/sleeping conditions in a bedroom, in BS8233:1999***	**Maximum Noise Level at Receiver (due to plant installation)**
Inside Nearest Residential Space	30 dB(A)	23 dB(A)

Table 5.4: Noise levels and criteria inside nearest residential space

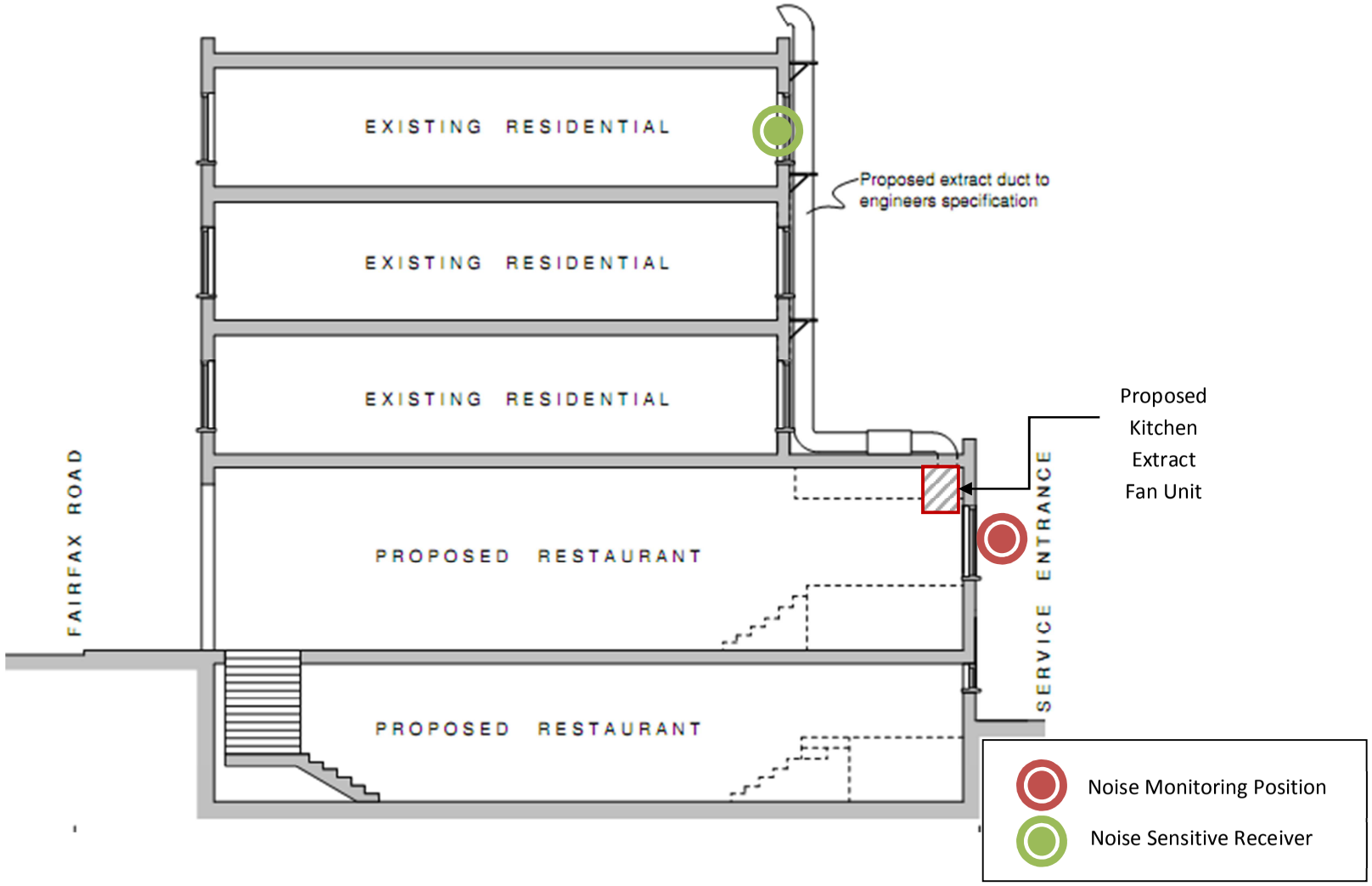
6.0 CONCLUSION

An environmental noise survey has been undertaken at 51-53 Fairfax Road, Swiss Cottage, London, NW6 4EL. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant in accordance with the requirements of the London Borough of Camden.

A noise impact assessment has then been undertaken using manufacturer noise data to predict the noise levels due to the current proposals at the nearby noise sensitive receivers.

Calculations show that noise emissions from the proposed plant installation would meet the requirements of the London Borough of Camden with proposed mitigation measures in place.

Report by	Checked by
Max Foster TechIOA	**Kyriakos Papanagiotou MIOA**



Title:

Indicative site plan showing noise monitoring position and nearest noise sensitive receiver

Date: 11 March 2011

FIGURE 4412.SP1

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Environmental Noise Time History
01 March to 02 March 2011

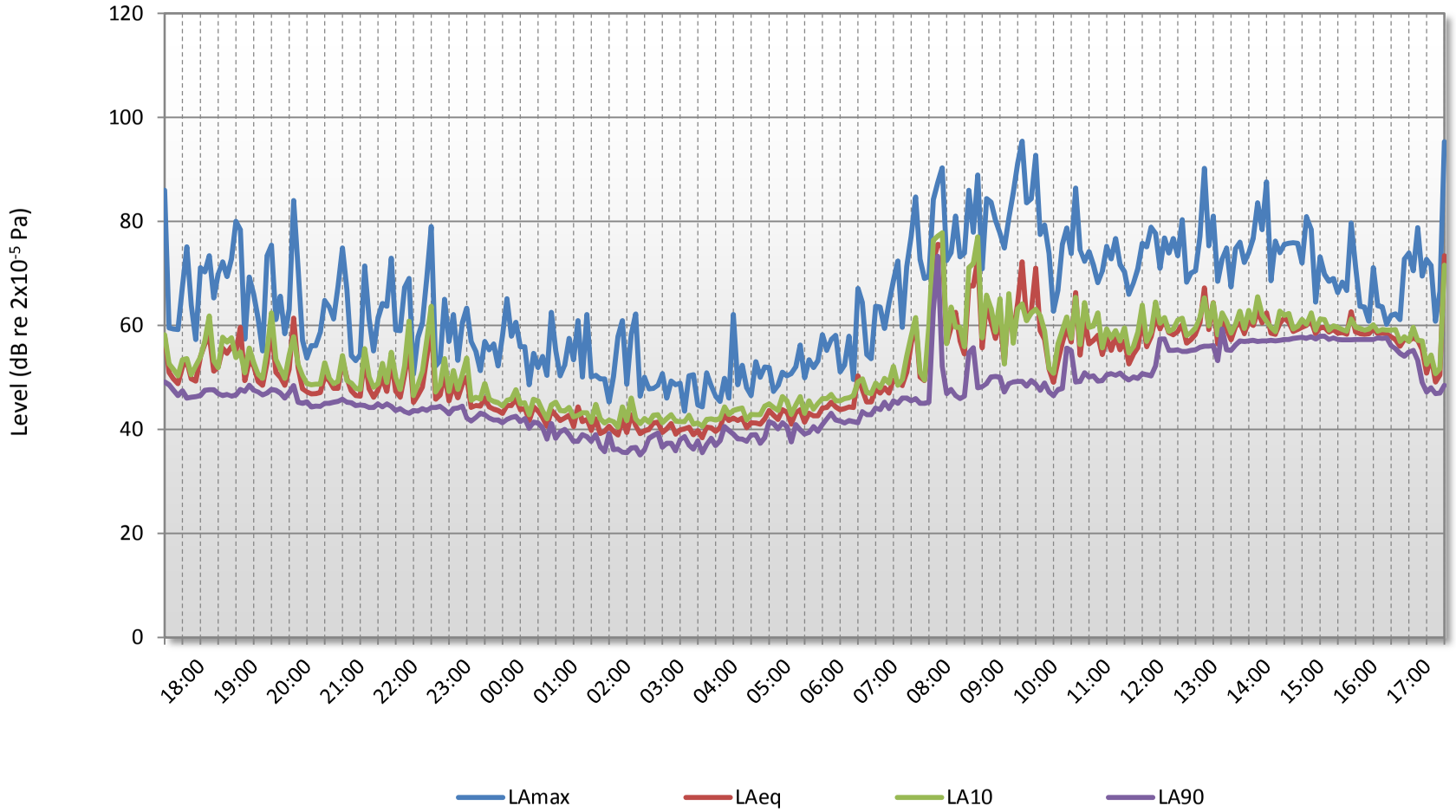

Figure 4412.TH1

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and 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 not 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 not 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 10 such octave bands whose centre frequencies are defined in accordance with international standards.

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 one alone and 10 sources produce a 10dB 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

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception 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 reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

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EXTERNAL PLANT NOISE EMISSIONS CALCULATION

	Frequency, Hz								
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Manufacturer's sound power level - Fan Outlet									
FlaktWoods 50JM/20/4/6	78	80	76	74	72	68	66	60	77
Fan Outlet									
Conversion to sound pressure level incl. correction for reflections, dB	-11	-11	-11	-11	-11	-11	-11	-11	
Attenuation provided by proposed silencer, dB	-8	-15	-25	-40	-46	-47	-43	-32	
Attenuation provided by duct bends (2), dB	0	0	-4	-16	-10	-6	-6	-6	
Distance correction to receiver, dB (2m)	-6	-6	-6	-6	-6	-6	-6	-6	
Cumulative Sound Pressure Level at Receiver	**53**	**48**	**30**	**1**	**0**	**0**	**0**	**5**	**33**

Design Criterion	**33**

BS 8233 ASSESSMENT CALCULATION

Receiver: Inside Nearest Residential Window
Source: FlaktWoods 56JM/20/4/6/32

	Frequency, Hz								
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Sound pressure level outside window	53	48	30	1	0	0	0	5	33
Minimum attenuation from partially open window, dB	-10	-10	-10	-10	-10	-10	-10	-10	
Sound pressure level inside nearest noise sensitive window	**43**	**38**	**20**	**-9**	**-10**	**0**	**0**	**-5**	**23**

Design Range	**30-35**