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HOLBORN TOWER, 137-144 HIGH HOLBORN, LONDON

NOISE IMPACT ASSESSMENT

Report 4504.NIA.01

Prepared on 11 October 2010

For:

EC London

3 Stukeley Street

London

WC2B 5LB

CONTENTS

List of Attachments

1.0 INTRODUCTION

Practical Acoustics has been commissioned by EC London, 3 Stukeley Street, London WC2B 5LB to measure existing background noise levels at Holborn Tower, 137-144 High Holborn, London. The measured noise levels will be used to determine noise emission criteria for the proposed plant units 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 4504.SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receivers.

Continuous automated monitoring was undertaken for the duration of the survey between 18:15 on 6 October 2010 and 18:15 on 7 October 2010.

Weather conditions were 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 and are shown as a time history in Figure 4504.TH1.

Background noise levels were dominated by traffic noise from High Holborn and nearby commercial activity.

Minimum measured background levels are shown in Table 3.1.

	Minimum Background Noise $L_{A90:\ 15min}$ dB(A)
Daytime (07:00-23:00)	52
Night-time (23:00-07:00)	48

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	**Night-time**
Noise criterion at nearest residential receiver (10dB below minimum L_{A90})	42 dB(A)	38 dB(A)

Table 4.1: Proposed Noise Emissions Criteria

As the units are only expected to be used during the proposed restaurant opening hours, the daytime criterion of 42 dB(A) will be used in this assessment.

5.0 DISCUSSION

The proposed plant installation comprises kitchen extract unit, selected as shown in Table 5.1, where the manufacturer's sound power levels are also shown.

	Sound Power Level (dB) in each Frequency Band							
Plant Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
FläktWoods Cased Fan type 56JM/20/4/6/32	84	85	79	78	76	73	70	65

Table 5.1 Manufacturer spectral sound power levels for proposed unit

The proposed unit will be installed within ductwork, terminating within a waste and recycling area at the rear of Holborn Tower, as shown in indicative site plan 4504.SP1. The nearest residential windows are located across a narrow passageway, at a distance of approximately 15m from the proposed flue termination.

A silencer has also been specified in conjunction with the proposed plant unit. The proposed silencer is FläktWoods silencer, with a product code SB301401. This report will use the minimum specified silencer spectrum in that range, in order to present a worst case scenario.

Taking into account all necessary acoustic corrections including proposed mitigation measures, the resulting noise level at the window of the nearest noise sensitive receiver would be as shown in Table 5.2. Detailed calculations are shown in Appendix B.

Receiver	**Daytime Criterion**	**Level at Receiver (due to proposed plant)**
Nearest Residential Window	42 dB(A)	35 dB(A)

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

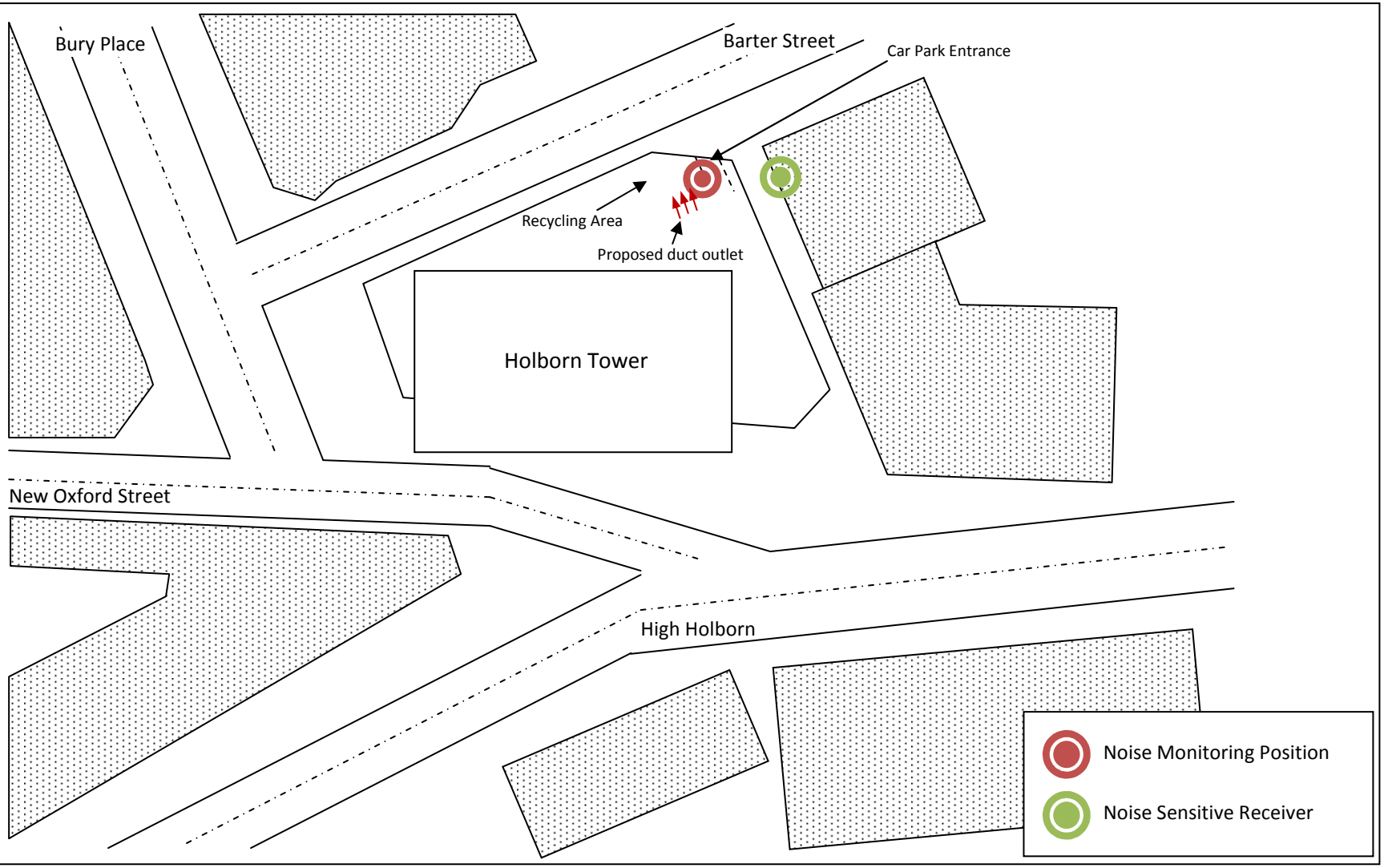
As shown in Table 5.2 and Appendix B, the predicted plant noise emissions would be expected to meet the requirements of the London Borough of Camden with proposed mitigation measures in place.

6.0 CONCLUSION

An environmental noise survey has been undertaken at Holborn Tower, 137-144 High Holborn, London. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant in accordance with the London Borough of Camden's planning conditions.

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

Calculations have shown that with already proposed mitigation measures, the noise emissions of the proposed installation will be within the requirements of the London Borough of Camden for the nearest noise sensitive receiver.



Title:

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

Date: 11 October 2010

FIGURE 4504.SP1

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HOLBORN TOWER, 137-144 HIGH HOLBORN, LONDON

Environmental Noise Time History
6 October 2010 to 7 October 2010

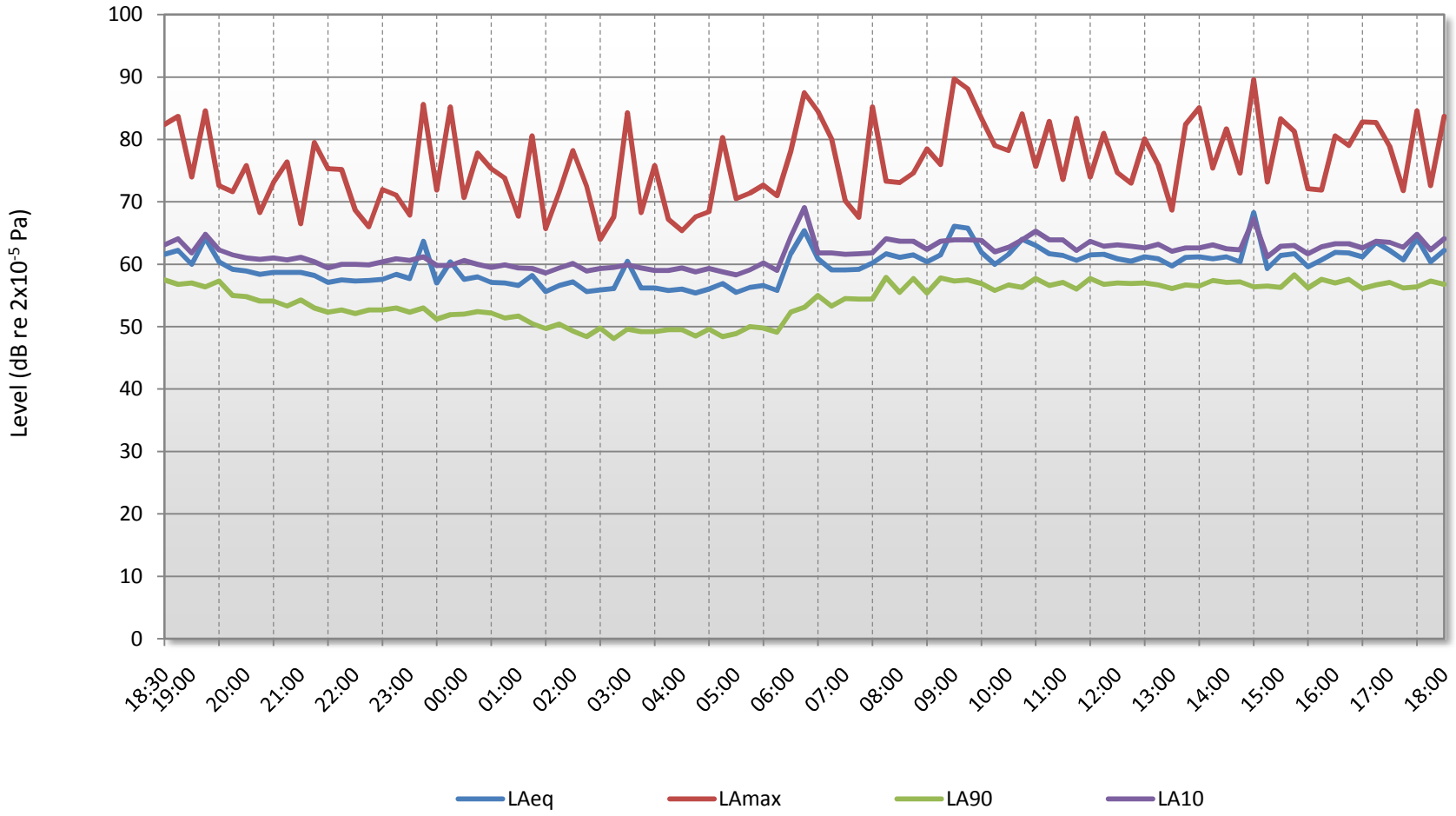

Figure 4504.TH1

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

HOLBORN TOWER, 137-144 HIGH HOLBORN, LONDON

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Nearest Residential Window
Source: Kitchen Extract Fan

	Frequency, Hz								
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Manufacturer's Extract Sound Power Level FlaktWoods Cased Fan type 56JM/20/4/6/32	84	85	79	78	76	73	70	65	81
Attenuation from proposed silencer	-3	-5	-8	-15	-19	-16	-14	-12	
Minimum attenuation from end reflections	-9	-5	-2	0	0	0	0	0	
Conversion to sound pressure level at 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Distance attenuation to receiver, dB 15m	-24	-24	-24	-24	-24	-24	-24	-24	
Sound pressure level at residential window due to exhaust	40	43	37	31	25	25	24	21	35

Design Criterion	**42**

Receiver: Inside Nearest Residential Window
Source: Kitchen Extract Fan

	Frequency, Hz								
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Sound pressure level outside window	40	43	37	31	25	25	24	21	35
Minimum attenuation from partially open window, dB *Taken from British Standard 8233:1999*	-10	-10	-10	-10	-10	-10	-10	-10	
Sound pressure level inside nearest noise sensitive window	30	33	27	21	15	15	14	11	25

Design Range	**30-35**