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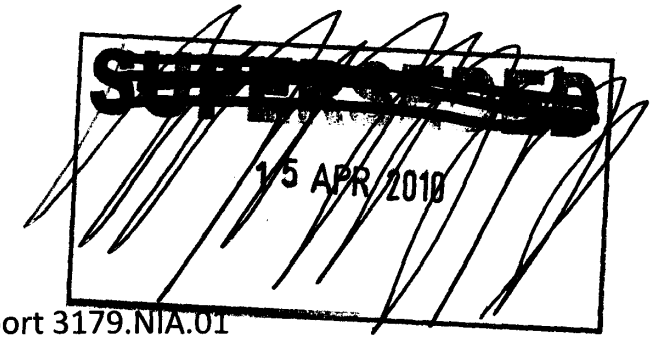
126 ALBERT STREET, LONDON

NOISE IMPACT ASSESSMENT



Report 3179.NIA.01

Prepared on 06/07/2009

For:

World ORT

126 Albert Street

London

NW1 7NE

RECEIVED 04 SEP 2009

CONTENTS

List of Attachments

1.0 INTRODUCTION

Practical Acoustics has been commissioned by World ORT, 126 Albert Street, London, NW1 7NE to measure existing background noise levels at 126 Albert Street, London, NW1 7NE. 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 3179.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 16:00 on 26/06/2009 and 16:00 on 29/06/2009.

Background noise levels at the monitoring position consisted mainly of traffic noise from nearby roads and noise from existing plant at neighbouring premises during the day.

Weekend monitoring was carried out to obtain background noise levels without the influence of any existing plant at 126 Albert Street.

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 at the location shown in Site Plan 3179.SP1. The measured levels are shown as a time history in Figure 3179.TH1.

Average and minimum background levels are shown in Table 3.1.

	Average background noise level $L_{A90: 15min}$ dB(A)	**Minimum background noise level $L_{A90: 15min}$ dB(A)**
Daytime (07:00-23:00)	53	48
Night-time (23:00-07:00)	46	45
Operational Hours (09:00 – 17:00)	53	52

Table 3.1: Average and 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 (LA90) 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 LA90 level."

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

	Daytime (07:00 to 23:00)	**Night-time (23:00 to 07:00)**	**Operational Hours (09:00 to 17:00)**
Noise criterion at nearest residential receiver (10dB below minimum L_{A90})	38 dB(A)	35 dB(A)	42 dB(A)

Table 4.1: Proposed Noise Emissions Criteria

As the units will only be in operation during office hours, the criterion of 42dB(A) will be used. Measurements were taken over the course of a weekend to obtain data that would not be affected by any plant servicing the offices at 126 Albert Street.

5.0 DISCUSSION

It is understood that the plant installations are six new air conditioning units, selected as follows:

- 1 No. of a Daikin Air Conditioning Unit type REYQ8P9Y1B
- 1 No. of a Daikin Air Conditioning Unit type REMQ12P8Y1B
- 1 No. of a Daikin Air Conditioning Unit type REMQ8P9
- 2 No. of a Daikin Air Conditioning Unit type REMQ10P8
- 1 No. of a Daikin Air Conditioning Unit type REMQ16P8

The sound pressure levels as provided by the manufacturer for each unit are as shown in Table 5.1*.

	Sound Pressure Level (dB) in each Frequency Band (at 1m)							
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Daikin Air Conditioning Unit type REYQ8P9Y1B	60	62	61	56	52	45	43	37
Daikin Air Conditioning Unit type REMQ12P8Y1B	63	60	60	57	55	51	45	44
Daikin Air Conditioning Unit type REMQ8P9	61	63	60	55	51	44	43	35
Daikin Air Conditioning Unit type REMQ10P8	61	63	62	57	52	46	38	32
Daikin Air Conditioning Unit type REMQ16P8	66	64	63	59	54	50	45	44

Table 5.1 Manufacturer's Sound Pressure Level at 1m

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

The locations of the units are in the outdoor area at the most northerly boundary of 126 Albert Street, as shown in indicative Site Plan 3179.SP1. The closest noise sensitive window has been identified as a residential window on the rear facade of the Arlington Road houses.

Due to the number of plant being installed, it has been deemed necessary to specify mitigation measures in order to bring emissions from the plant within the requirements of the London Borough of Camden.

We propose that a barrier between the air conditioner units and the rear facade of the Arlington Road houses is necessary to ensure there is no direct line-of-sight which would attenuate the noise emissions from the plant machinery to within acceptable levels.

The barrier should be constructed from timber panels at a height of 2 meters from the ground and 1 meter from the row of air conditioner units, on the Arlington Road elevation. The panel should be wider than the width of the end unit to ensure no direct line-of-sight between it and the closest noise sensitive property.

We would recommend constructing the barrier from timber panels, with a minimum thickness of 10mm and an absorptive backing formed from a 30-50mm layer of non-flammable absorbent layer, such as rock wool or glass fibre, held in place by a strong, permeable (minimum 20% open area) facing. The panels should be arranged so that the absorptive layer is facing the units.

Taking all acoustic corrections into consideration, including distance corrections and proposed mitigation measures the noise levels expected at the first floor window of the Arlington Road building due to the proposed plant units would be as shown in Table 5.2. Detailed calculations are shown in Appendix B.

Receiver	Operational Hours Criterion	Noise Level at Receiver (due to installed plant units)
Nearest Noise Sensitive Window	42 dB(A)	38 dB(A)

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

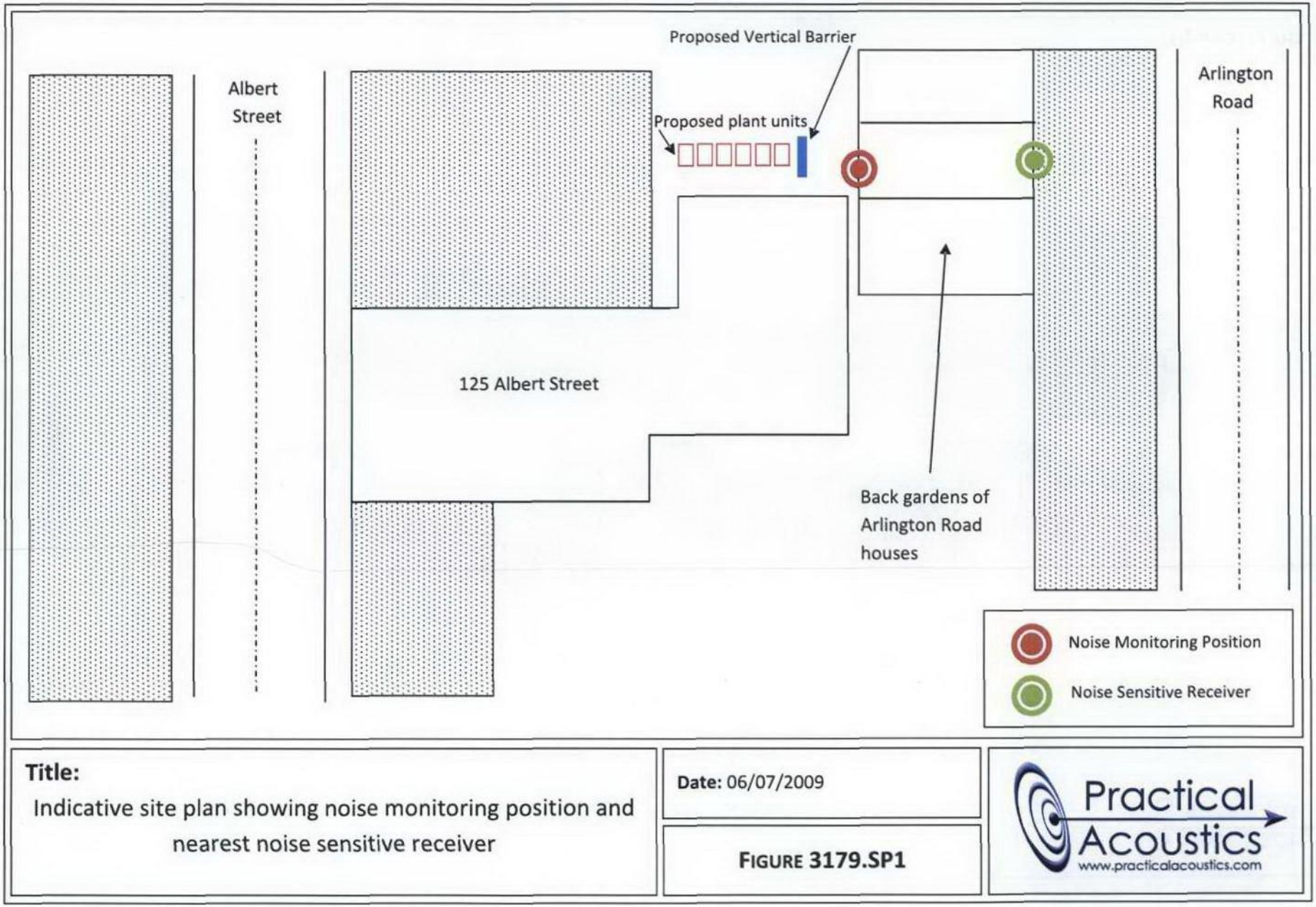
As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive property due to the effects of the proposed plant installations would be expected to meet the emissions criteria set by the London Borough of Camden, provided the specified barrier is installed.

6.0 CONCLUSION

An environmental noise survey has been undertaken at 126 Albert Street, London, NW1 7NE. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant units 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 receiver.

Calculations show that noise emissions from the six proposed air conditioning units would be within the requirements of the London Borough of Camden, provided mitigation measures are put in place.



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

Date: 06/07/2009

FIGURE 3179.SP1

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Environmental Noise Time History
26/06/2009 to 29/06/2009

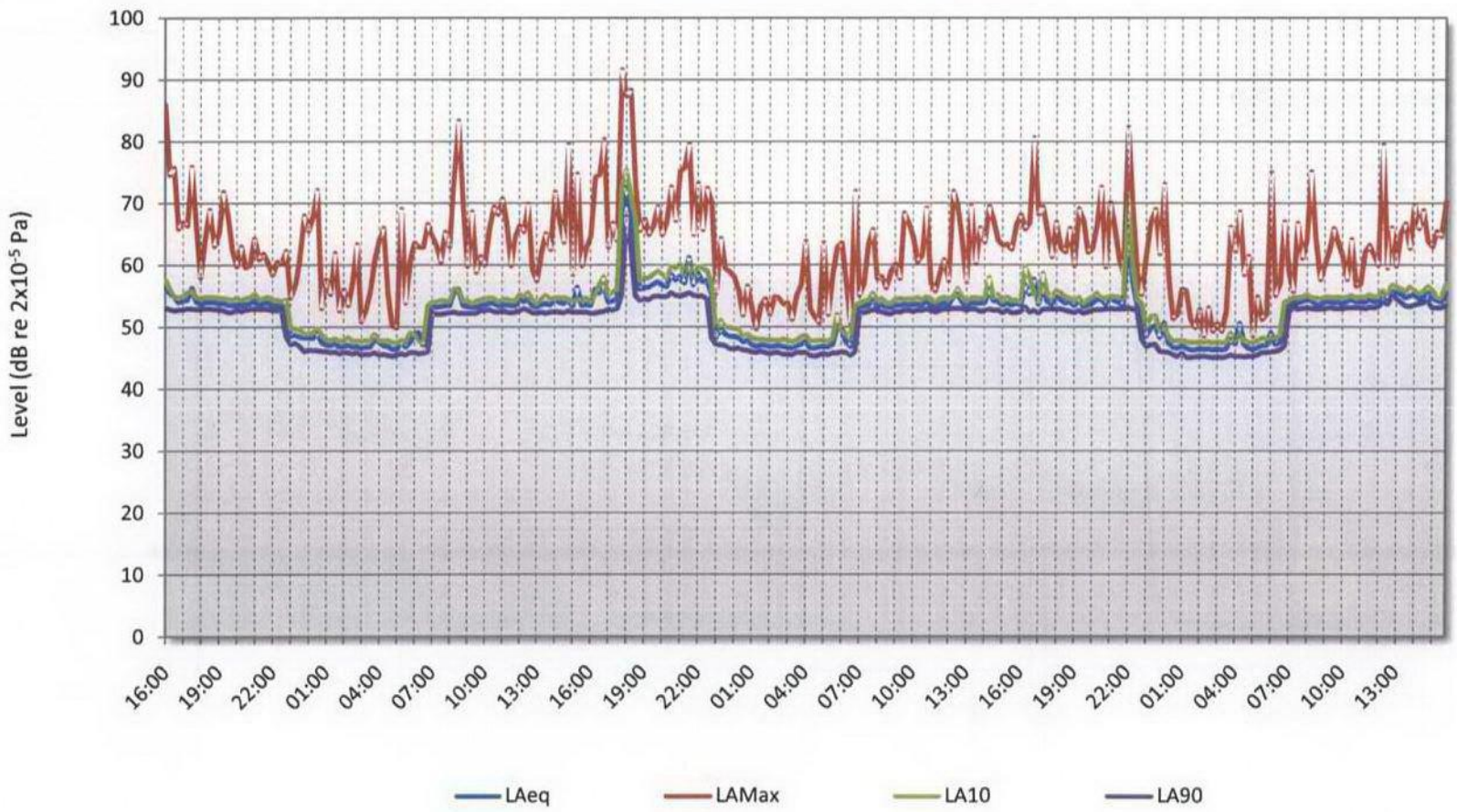

Figure 3179.TH1

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

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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

126 ALBERT STREET, LONDON

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Source: Daikin Air Conditioning Condenser Unit

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Manufacturer's sound pressure level at 1m									
Daikin Air Conditioning unit type REYQ8P9Y1B	60	62	61	56	52	45	43	37	58
Daikin Air Conditioning unit type REMQ12P8Y1B	63	60	60	57	55	51	45	44	60
Daikin Air Conditioning unit type REMQ8P9	61	63	60	55	51	44	43	35	57
Daikin Air Conditioning unit type REMQ10P8	61	63	62	57	52	46	38	32	59
Correction for number of units, dB (2 No.)	3	3	3	3	3	3	3	3	
Daikin Air Conditioning unit type REMQ16P8	66	64	63	59	54	50	45	44	61
Cummulative sound pressure level at 1m	73	73	71	67	63	58	53	51	69
Distance Correction, dB (20m)	-26	-26	-26	-26	-26	-26	-26	-26	
Minimum attenuation from specified barrier	-3	-4	-4	-5	-7	-9	-11	-14	
Cumulative sound pressure level 1m above ground level	44	43	41	36	30	23	16	11	38

Design Criterion	42

Receiver: Inside Nearest Residential Window
Source: Daikin Air Conditioning Unit

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Sound pressure level outside window	44	43	41	36	30	23	16	11	38
Minimum attenuation from partially open window, dB	-10	-10	-10	-10	-10	-10	-10	-10	
Sound pressure level inside nearest noise sensitive window	34	33	31	26	20	13	6	1	28

Design Range	30-35