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14-18 EMERALD STREET, LONDON

NOISE IMPACT ASSESSMENT

Report **7449-NIA-02**

Prepared on 15 October 2012

Issued For:

Agap Ltd

24 Undine Road

London

E4 9UW

Contents

List of Attachments

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Agap Ltd, 24 Undine Road, London E4 9UW to measure existing background noise levels at 14-18 Emerald Street, London WC1N 3QN. The measured noise levels will be used to determine noise emission criteria for the proposed plant unit installation 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 undertaken at the position shown in indicative site plan 7449-SP2. 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 16:00 on 2 August 2012 and 17:00 on 3 August 2012. Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

Background noise levels at the monitoring positions consisted mainly of traffic noise from surrounding roads.

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.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

3.0 RESULTS

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured at the location shown in site plan 7449-SP2. The measured noise levels are shown as a time history in Figure 7449-TH2.

Minimum background noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)
Daytime (07:00 - 23:00)	46
Night-time (23:00 - 07:00)	45

Table 3.1: Minimum background noise levels

4.0 NOISE CRITERIA

The London Borough of Camden's general criterion for noise emissions of new plant installations is 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."*

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

	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Noise criterion at nearest residential receiver (10 dB below minimum L_{A90})	36 dB(A)	35 dB(A)

Table 4.1: Proposed Noise Emissions Criteria

The proposed plant unit is for commercial use and will only be operational during daytime. This assessment will therefore be based on the daytime criterion of 36 dB(A).

5.0 DISCUSSION

The plant installation is comprised of the following units:

- 4 No. Daikin Unit type: RZQG100L7V1

The selected units and the associated spectral noise emissions levels, as provided by the manufacturer, are shown in Table 5.1. Loudest modes of operation have been used in order to present a robust assessment.

	Sound Pressure Level (dB) in each Frequency Band at 1m							
Unit	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin Unit type: RZQG100L7V1	52	51	50	48	44	42	38	31

Table 5.1 Manufacturer's Sound Pressure Levels at 1m

The proposed plant units will be installed on the main flat roof area of 14-18 Emerald Street. Two units will be installed against the stairwell wall (Location 1) and two units at the opposite end of the roof (Location 2) as shown in indicative site plan 7449-SP2.

The closest noise sensitive window likely to be affected by noise emissions from the proposed plant units is the rear of the residential properties on Great James Street, approximately 12 metres away from Location 1 and 20m away from Location 2. Distances to other noise-sensitive receivers will be relative to both plant unit locations.

5.1 Noise Impact Assessment

Taking all necessary acoustic corrections into consideration, including distance corrections and reflections, noise levels expected at the closest residential window would be as shown in Table 5.2. Detailed calculations are shown in Appendix B2. Note that this is a 'worst-case' level and does not account for any screening that is offered by the building envelope.

Receiver	Daytime Criterion	Noise Level at Receiver (due to proposed plant unit)
Nearest Noise Sensitive Receiver	36 dB(A)	35 dB(A)

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

As shown in Appendix B2 and Table 5.2, transmission of noise to the nearest sensitive window due to the effects of the proposed plant installations would be expected to meet the noise emissions criteria set by the London Borough of Camden, without the need for any particular mitigation measures.

6.0 CONCLUSION

An environmental noise survey has been undertaken at 17-21 Emerald Street, London WC1N 3QN. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant installation 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 noise levels due to the current proposal at nearby noise sensitive receivers.

Calculations show that noise emissions from the proposed plant units would meet the requirements of the London Borough of Camden, without the need for any particular mitigation measures.

Report by
Max Foster TechIOA

Checked by
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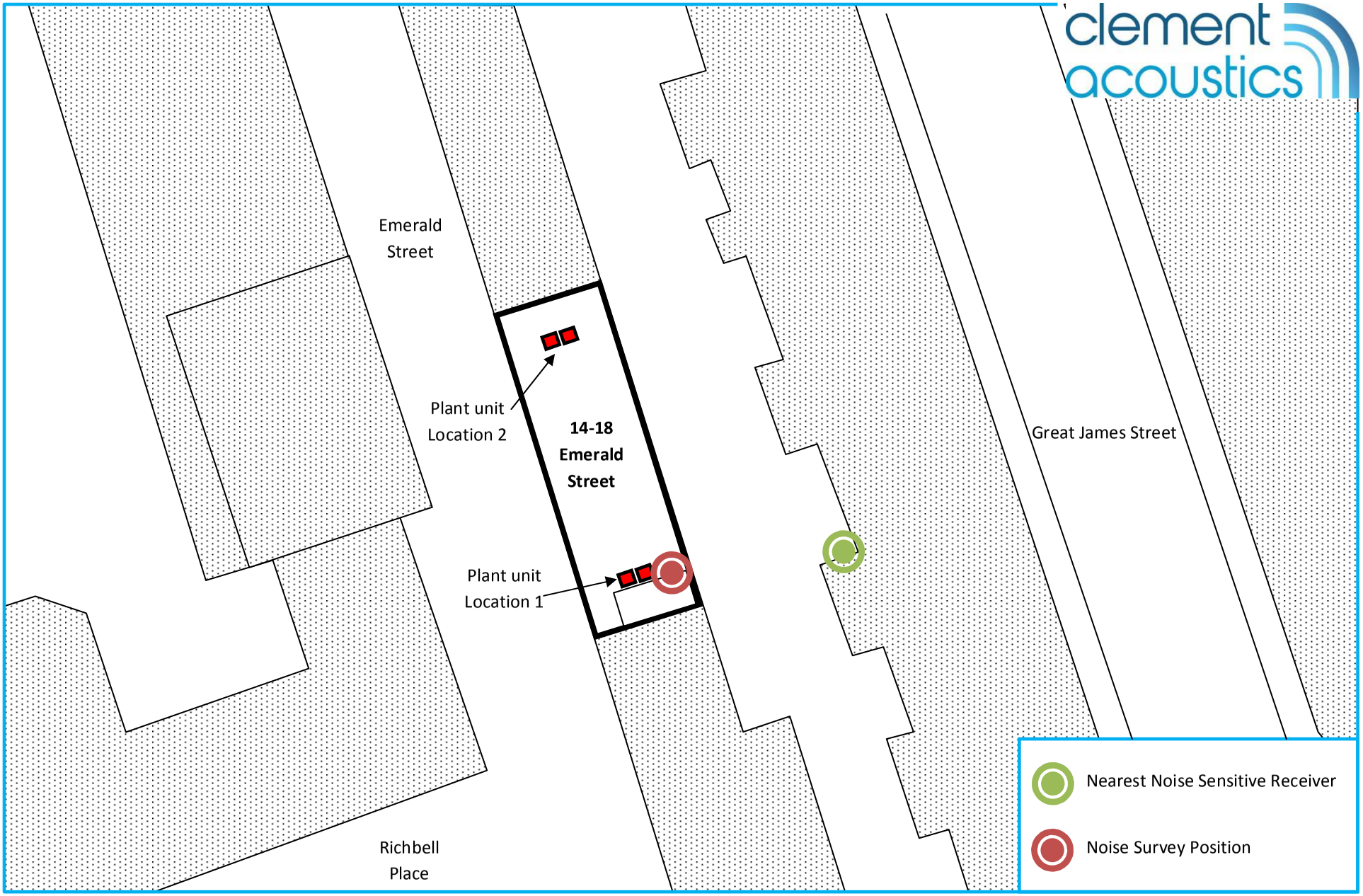

7449-SP2 Indicative site plan showing noise monitoring position and nearest noise sensitive receiver **Date:** 15 October 2012

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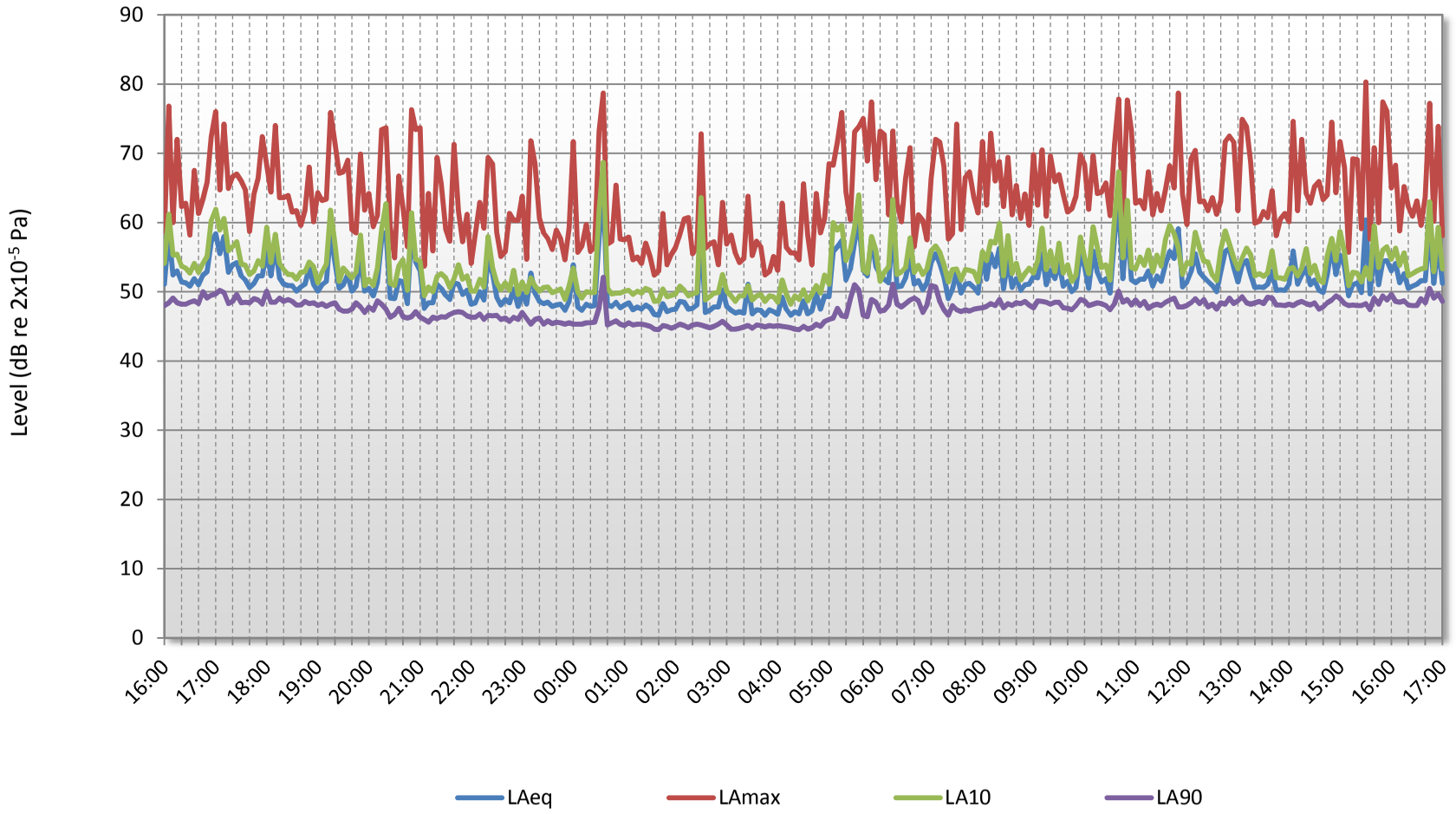
14-18 EMERALD STREET, LONDON

Environmental Noise Time History

2 August 2012 to 3 August 2012



7449-TH2

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 B2

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14-18 EMERALD STREET, LONDON

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Nearest Noise Sensitive Window
Source: Proposed Plant Units

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer's Sound Pressure Level, at 1m									
Daikin Unit type: RZQG100L7V1	52	51	50	48	44	42	38	31	50
Correction for number of units (2)	3	3	3	3	3	3	3	3	
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (12m)	-22	-22	-22	-22	-22	-22	-22	-22	
Sound pressure level at receiver from Location 1 units	**36**	**35**	**34**	**32**	**28**	**26**	**22**	**15**	**34**
Manufacturer's Sound Pressure Level, at 1m									
Daikin Unit type: RZQG100L7V1	52	51	50	48	44	42	38	31	50
Correction for number of units (2)	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (20m)	-26	-26	-26	-26	-26	-26	-26	-26	
Sound pressure level at receiver from Location 2 units	**29**	**28**	**27**	**25**	**21**	**19**	**15**	**8**	**27**
Cumulative Sound Pressure Level At Receiver	**37**	**36**	**35**	**33**	**29**	**27**	**23**	**16**	**35**

Design Criterion	**36**