alan saunders associates | acoustics

mail@alansaunders.com
www.alansaunders.com
T+44(0)1962 872130
F+44(0)1962 872131
westgate house
romsey road
winchester
S022 5BE

**REPORT AS4511/NIA**

# 71-73 GLOUCESTER AVENUE LONDON

## NOISE IMPACT ASSESSMENT



**Prepared: 1st September 2006**

**Colourwash Ltd**
**18 Weir Road**
**Wimbledon**
**SW19 8UG**

## CONTENTS



**List of Attachments**

# 1. INTRODUCTION

There have been complaints following the installation of new plant to the rear of the Colourwash shop at 71-73 Gloucester Avenue, London. The local authority have consequently requested that an environmental noise survey should be undertaken in order to apply for retroactive planning consent.

Alan Saunders Associates has been commissioned by Colourwash Ltd, 18 Weir Road, Wimbledon, SW19 8UG to undertake an environmental noise survey in order to measure the prevailing background noise climate at the site. The background noise levels measured will be used to determine daytime and night-time noise emission limits for new building services plant in accordance with the planning requirements of London Borough of Camden.

# 2. SURVEY PROCEDURE & EQUIPMENT

A survey of the existing background noise levels was undertaken at ground floor level of the existing building at the location shown in site plan AS4511/SP1 in an environment representative of the nearest receiver. Measurements of consecutive 15 minute $L_{Aeq}$, $L_{Amax}$, $L_{A10}$, $L_{A90}$ and spectral sound pressure levels were taken between 16:00 hours on Wednesday 16th August and 16:00 hours on Thursday 17th August 2006.

These measurements will allow suitable noise criteria to be set for the new building services plant, dependent on hours of operation.

The following equipment was used during the course of the survey:

- Norsonic data logging sound level meter type 118
- Norsonic sound level calibrator type 1253

The calibration of the sound level meter was checked before and after use. No calibration drift was detected.

The weather during the survey was dry with light winds, which made the conditions suitable for the measurement of environmental noise.

Measurements were made generally in accordance with BS 7445:1991 *"Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use"*.

Please refer to Appendix A for details of the acoustic terminology used throughout this report.

## 3. RESULTS

Figure AS4511/TH1 shows the $L_{Aeq}$, $L_{Amax}$, $L_{A10}$ and $L_{A90}$ sound pressure levels as time histories at the measurement position.

## 4. DISCUSSION

The background noise climate at the property is determined by road traffic noise in the surrounding streets, rail traffic to the east and air traffic overhead.

Minimum background levels are shown in Table 4.1 below.

| **Monitoring period** | **Minimum $L_{A90,15mins}$** |
|---|---|
| 07:00 - 23:00 hours | 36 dB(A)<br>07:00 - 07:15, Thursday 17th August 2006 |
| 23:00 - 07:00 hours | 30 dB(A)<br>03:30 – 03:45, Thursday 17th August 2006 |
| 24-hour | 30 dB(A) |

**Table 4.1 Minimum measured background noise levels**

## 5. DESIGN CRITERION

The London Borough of Camden sets a criterion for new plant to be 5dB below the background level. In addition, the background level must not be exceeded by more than 1dB in any octave band between 63Hz and 8kHz. The plant in question will only be running during the daytime.

## 6. NOISE IMPACT

### 6.1 Plant

The wall mounted plant is:

- 2 no. Fujitsu Condensing Units Type R410A

The location of the plant is shown in site plan AS4511/SP1.

Background corrected noise levels measured of the type R410A condenser at position 1 are as follows:

| Freq (Hz) | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| Lp @ 1m (dB) | 58 | 62 | 57 | 57 | 54 | 48 | 41 | 36 | 59 |

**Table 6.1 Specific noise level for condenser at position 1**

Background corrected noise levels measured of the type R410A condenser at position 2 are as follows:

| Freq (Hz) | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| Lp @ 1m (dB) | 64 | 60 | 55 | 52 | 50 | 49 | 42 | 36 | 56 |

**Table 6.2 Specific noise level for condenser at position 2**

The spectral data for these items of plant do not display any tonal characteristics.

## 6.2 Noise levels at nearest receiver

Following an inspection of the site, the nearest noise sensitive receiver is situated at 71-73 Gloucester Avenue, London at 2nd floor level directly above the items of plant. The noise sensitive receiver is provided some natural screening by the edge of the roof. Of the flats at 2nd floor level, two positions have been identified as being most likely to be affected.

The first noise sensitive receiver is directly above the condenser at position 1. It is located further back than the condenser and has a balcony providing some natural screening from the plant. The second noise sensitive receiver is located directly above the condenser at position 2 and is again set back from the condenser. Natural screening is provided by a roof rather than a balcony at this position.

The noise level at the nearest noise sensitive receiver, has been assessed according to the guidelines set out in BS4142:1997:'*Method for rating industrial noise affecting mixed residential and industrial areas*' as guidance, using the noise data above.

| Freq (Hz) | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| Criteria | 44 | 43 | 39 | 35 | 31 | 25 | 18 | 13 | 31 |
| Predicted combined level at window above position 1 | 36 | 33 | 26 | 17 | 14 | 14 | 7 | 6 | 27 |
| Predicted combined level at window above position 2 | 37 | 32 | 25 | 24 | 21 | 18 | 11 | 5 | 23 |

**Table 6.2 Predicted noise level and criteria at nearest noise sensitive location**

The full calculations are shown in Appendix B.

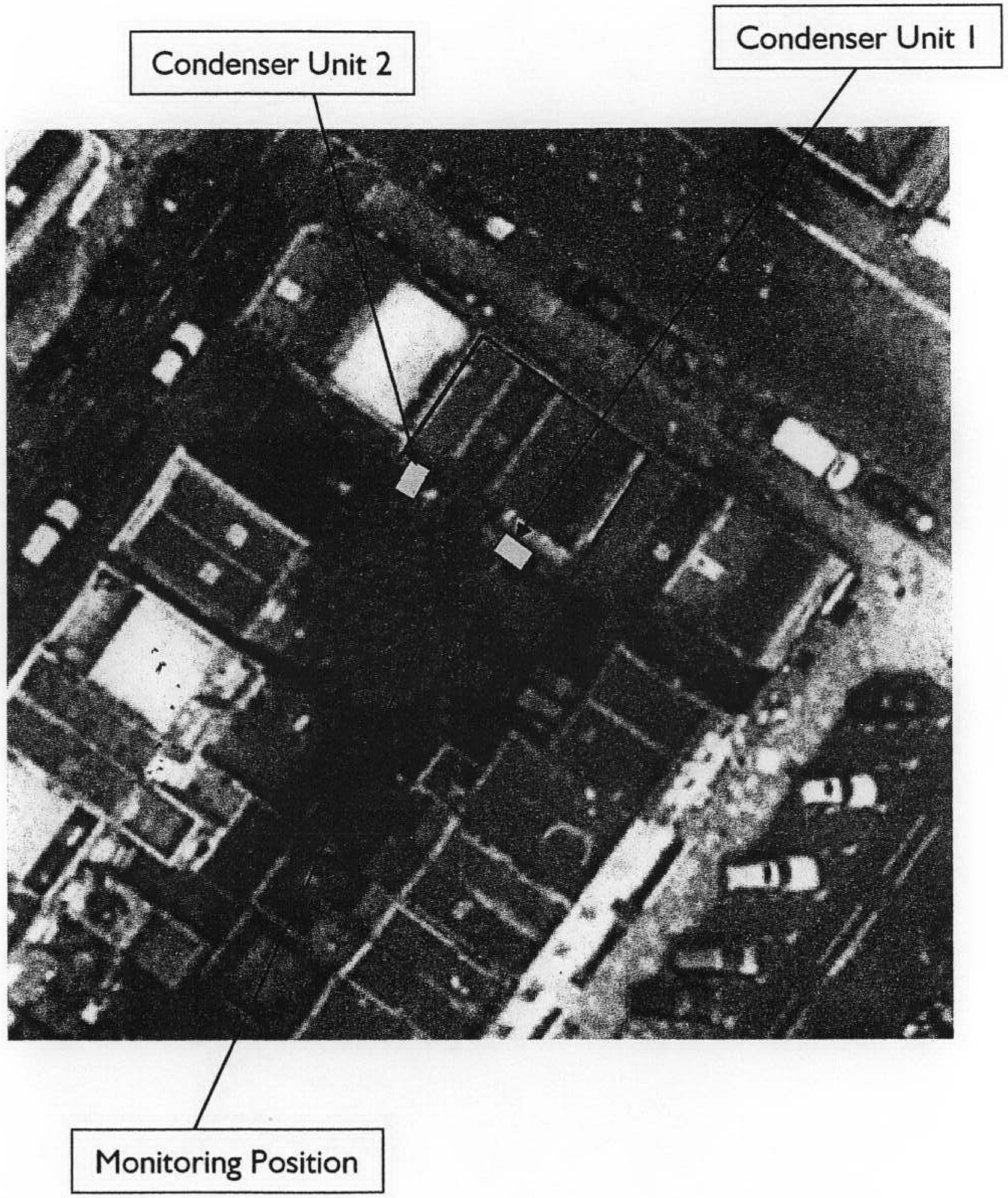
# 7. CONCLUSIONS

An environmental noise survey has been undertaken at 71-73 Gloucester Avenue, London by Alan Saunders Associates between Monday 16th and Wednesday 17th August 2006.

Measurements have been made to establish the current background noise climate. This has enabled design criteria to be set for the control of plant noise emissions to atmosphere, in accordance with the London Borough of Camden requirements.

Measured noise levels for the Fujitsu air conditioning units has been used to assess the noise impact of the plant on neighbouring noise sensitive properties. Compliance with the criteria for controlling plant noise emissions has been demonstrated. No further mitigation measures are necessary.

**Jamie Duncan**
**ALAN SAUNDERS ASSOCIATES**




**Title:** *Site plan showing measurement position and plant locations.*

**Project:** *71-76 Gloucester Avenue, London*

**Figure No:** *AS4511/SP1*

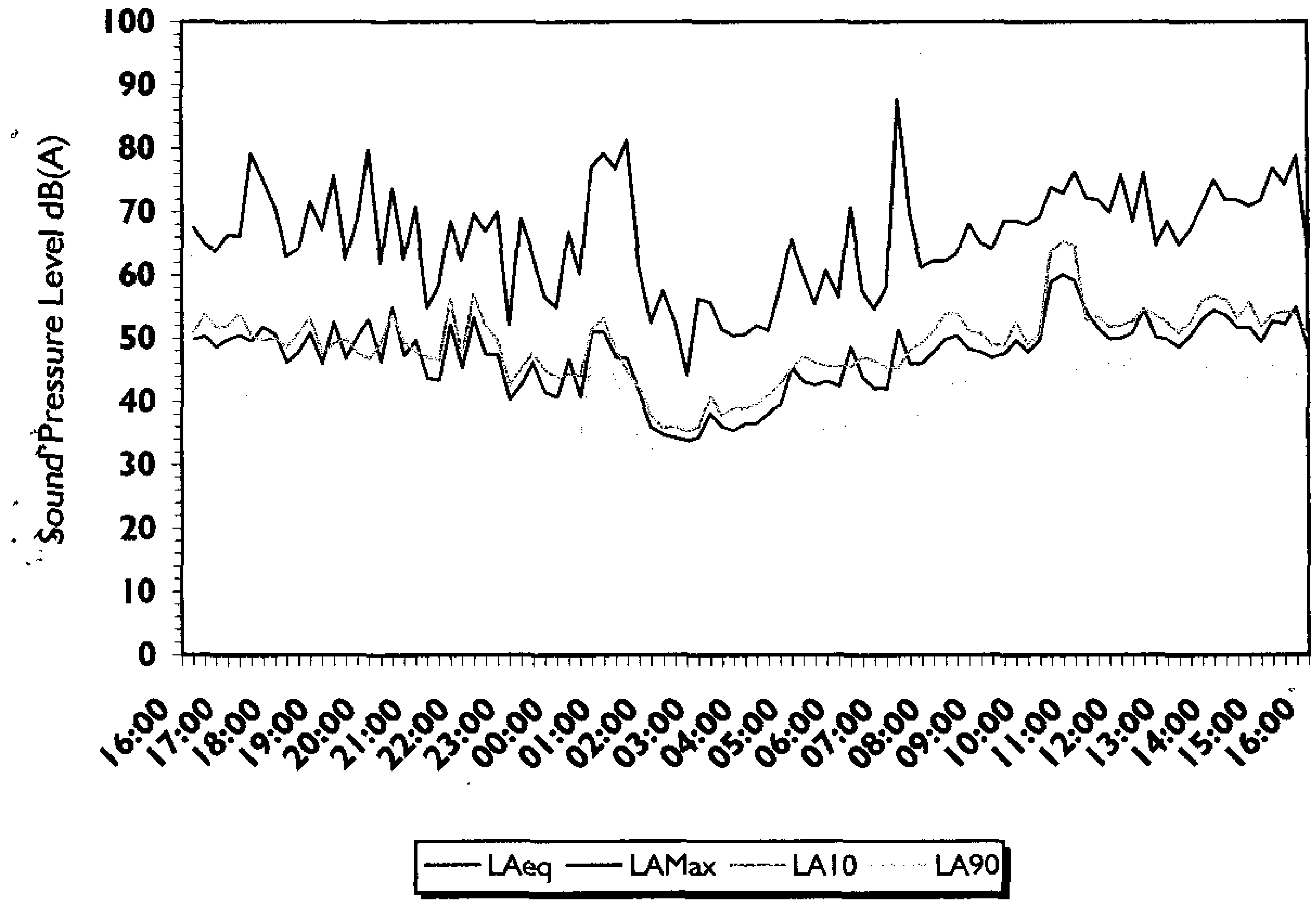
**Date:** *1st September 2006*

**alan saunders associates | acoustics**

mail@alansaunders.com
www.alansaunders.com
T+44(0)1962 872130
F+44(0)1962 872131
westgate house
romsey road
winchester
SO22 5BE

# 71-73 GLOUCESTER AVENUE, LONDON

Environmental Noise Time History




**Wednesday 16th - Thursday 17th August 2006**

Figure AS4511/TH1

# APPENDIX A

## ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

### 1. Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as `loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

**dB (A):** The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the `A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the `A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated `A' weighted noise level is known as the dB(A) level.

**$L_{10}$ & $L_{90}$:** If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The $L_n$ indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence $L_{10}$ is the level exceeded for 10% of the time and as such can be regarded as the `average maximum level'. Similarly, $L_{90}$ is the average minimum level and is often used to describe the background noise.

It is common practice to use the $L_{10}$ index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.

**$L_{eq}$:** The concept of $L_{eq}$ (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

$L_{eq}$ is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. ½ hour, 1 hour, etc).

The use of digital technology in sound level meters now makes the measurement of $L_{eq}$ very straightforward.

Because $L_{eq}$ is effectively a summation of a number of noise events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute noise limit.

**$L_{max}$:** Lmax is the maximum sound pressure level recorded over the period stated. Lmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the Leq noise level.

**OSPL** The overall sound pressure level in decibels with no weighting applied, ie. dB Lin. Commonly used in relation to military aircraft noise levels.

**OASPL** The overall 'A' weighted sound pressure level. Commonly used in relation to military aircraft noise levels.

## 2. Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation have agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, eg. 250 Hz octave band runs from 176 Hz to 353 Hz. The most commonly used bands are:

Octave Centre
Frequency Hz 63 125 250 500 1000 2000 4000 8000

## 3 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in noise level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a 3 metre high barrier exists between a noise source and a listener, with the barrier close to the listener, the listener will perceive the noise source is louder, if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the noise source would seem quieter than it was if he were standing. This may be explained by the fact that the "effective screen height" is changing with the three cases above, the greater the effective screen height, in general, the greater the reduction in noise level.

Where the noise sources are various roads, the attenuation provided by a fixed barrier at a specific property will be greater for roads close to the barrier than for roads further away.

## 4. Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that noise levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) is not twice as loud as 50 dB(A) sound level. It has been found experimentally that changes in the average level of fluctuating sound, such as traffic noise, need to be of the order of 3 dB(A) before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10 dB(A) is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in traffic noise level can be given.

### INTERPRETATION

| Change in Sound level dB(A) | Subjective Impression | Human Response to noise |
|---|---|---|
| 0 to 2 | Imperceptible change in loudness | Marginal |
| 3 to 5 | Perceptible change in loudness | Noticeable |
| 6 to 10 | Up to a doubling or halving of loudness | Significant |
| 11 to 15 | More than a doubling or halving of loudness | Substantial |
| 16 to 20 | Up to quadrupling or quartering of loudness | Substantial |
| 21 or more | More than a quadrupling or quartering of loudness | Very Substantial |

# APPENDIX B

## BS4142 CALCULATIONS

**Calculation 1: Receiver 1**

| | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | **8000** |
|---|---|---|---|---|---|---|---|---|
| **Condensor 1** | | | | | | | | |
| Noise Level, $L_{Aeq}$ @ 1m, dB | 58 | 62 | 57 | 57 | 54 | 48 | 41 | 36 |
| Residual Noise Level, dB | 54 | 56 | 53 | 48 | 43 | 39 | 32 | 23 |
| Specific Noise Level, dB | 58 | 62 | 57 | 57 | 54 | 48 | 41 | 36 |
| Distance from source | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Approx. distance from source to nearest residential property | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Additional Loss for Distance, dB | -17 | -17 | -17 | -17 | -17 | -17 | -17 | -17 |
| Character Correction, dB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Natural Screening | -11 | -13 | -15 | -15 | -15 | -15 | -15 | -15 |
| Rating Level, dB | **31** | **32** | **25** | **25** | **22** | **16** | **9** | **4** |
| **Condensor 2** | | | | | | | | |
| Noise Level, $L_{Aeq}$ @ 1m, dB | 64 | 60 | 55 | 52 | 50 | 49 | 42 | 36 |
| Residual Noise Level, dB | 54 | 56 | 53 | 48 | 43 | 39 | 32 | 23 |
| Specific Noise Level, dB | 63 | 59 | 54 | 51 | 49 | 48 | 41 | 35 |
| Distance from source | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Approx distance from source to nearest residential property | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Additional Loss for Distance, dB | -19 | -19 | -19 | -19 | -19 | -19 | -19 | -19 |
| Character Correction, dB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Natural Screening | -10 | -12 | -15 | -15 | -15 | -15 | -15 | -15 |
| Rating Level, dB | **34** | **27** | **20** | **17** | **14** | **14** | **7** | **1** |
| **Total Level** | **36** | **33** | **26** | **26** | **22** | **18** | **11** | **6** |
| Background Level, $L_{A90,15m}$ | 43 | 42 | 38 | 34 | 30 | 24 | 17 | 12 |
| Excess of Rating Level over Background | -7 | -9 | -11 | -8 | -8 | -6 | -5 | -7 |

**Calculation 2: Receiver 2**

| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|
| **Condensor 1** | | | | | | | | |
| Noise Level, $L_{Aeq}$ @ 1m, dB | 58 | 62 | 57 | 57 | 54 | 48 | 41 | 36 |
| Residual Noise Level, dB | 54 | 56 | 53 | 48 | 43 | 39 | 32 | 23 |
| Specific Noise Level, dB | 58 | 62 | 57 | 57 | 54 | 48 | 41 | 36 |
| Distance from source | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Approx. distance from source to nearest residential property | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Additional Loss for Distance, dB | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 |
| Character Correction, dB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Natural Screening | -11 | -13 | -15 | -15 | -15 | -15 | -15 | -15 |
| Rating Level, dB | **28** | **29** | **22** | **22** | **19** | **13** | **6** | **1** |
| **Condensor 2** | | | | | | | | |
| Noise Level, $L_{Aeq}$ @ 1m, dB | 64 | 60 | 55 | 52 | 50 | 49 | 42 | 36 |
| Residual Noise Level, dB | 54 | 56 | 53 | 48 | 43 | 39 | 32 | 23 |
| Specific Noise Level, dB | 63 | 59 | 54 | 51 | 49 | 48 | 41 | 35 |
| Distance from source | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Approx distance from source to nearest residential property | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Additional Loss for Distance, dB | -17 | -17 | -17 | -17 | -17 | -17 | -17 | -17 |
| Character Correction, dB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Natural Screening | -10 | -12 | -15 | -15 | -15 | -15 | -15 | -15 |
| Rating Level, dB | 36 | 29 | 22 | 19 | 17 | 16 | 10 | 3 |
| **Total Level** | 37 | 32 | 25 | 24 | 21 | 18 | 11 | 5 |
| Background Level, $L_{A90,15m}$ | 43 | 42 | 38 | 34 | 30 | 24 | 17 | 12 |
| Excess of Rating Level over Background | -6 | -10 | -12 | -10 | -9 | -6 | -6 | -7 |