81 Charlotte Street & 6 Tottenham Mews, London

ENVIRONMENTAL NOISE SURVEY
AND PPG24 ASSESSMENT
REPORT 16156/PPG24

For :

Cyril Leonard
22 Gilbert Street
Grosvenor Square
London
W1K 5EJ

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HANN TUCKER ASSOCIATES
Consultants in Acoustics
Noise and Vibration

Head Office
Duke House
1-2 Duke Street
WOKING
Surrey GU21 5BA

Tel : 01483 770595
Fax : 01483 729565

Northern Office
First Floor
346 Deansgate
MANCHESTER
M3 4LY

Tel : 0161 832 7041
Fax : 0161 832 8075

E-mail : Enquiries@HannTucker.co.uk
www.hanntucker.co.uk

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1.0 INTRODUCTION

A redevelopment is proposed at 6 Tottenham Mews and 81 Charlotte Street, London to convert existing offices into residential dwellings on Tottenham Mews and construct an additional storey of residential dwellings to the existing building on Charlotte Street.

Hann Tucker Associates have therefore been commissioned to undertake a detailed environmental noise survey, and to carry out a PPG24 assessment to assess the suitability of the proposed development for residential use in accordance with the procedure described in PPG24: Planning and Noise.

This report presents the methodology and findings of our noise survey, and PPG24 Assessment.

2.0 OBJECTIVES

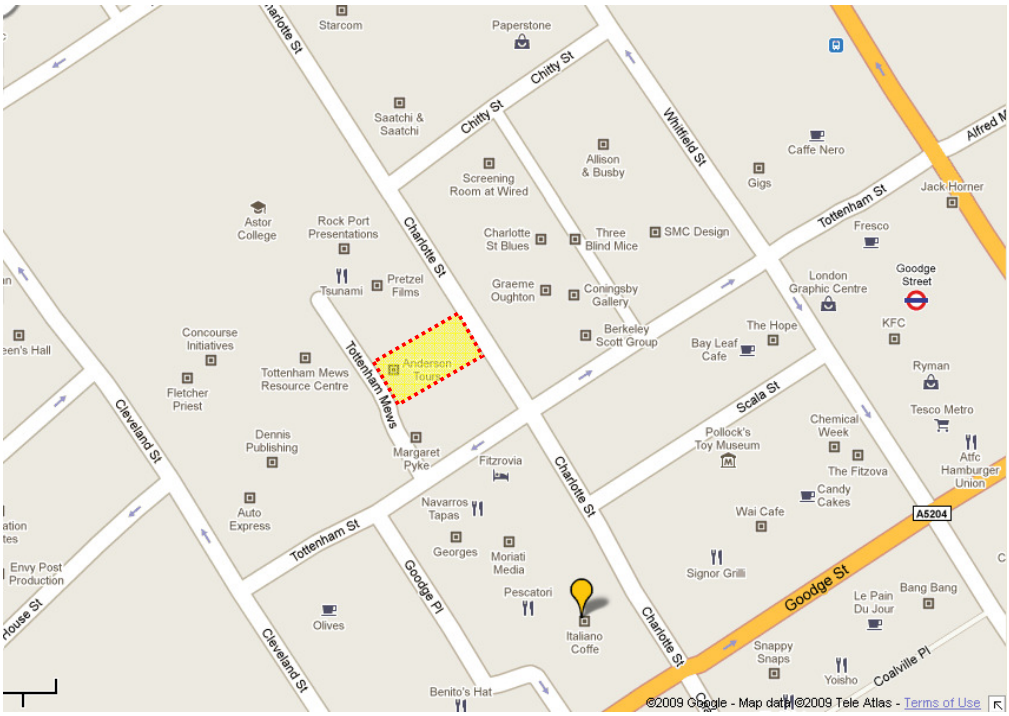
To establish by means of a detailed 24 hour survey the existing $L_{Amax,}$ $L_{A10,}$ L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at up to 2No. secure and accessible on-site positions, using fully computerised unmanned monitoring equipment.

Based on the results of the unmanned survey, to determine from the measured environmental noise levels the corresponding Noise Exposure Categories (NEC) of the site and undertake a noise assessment to assess the suitability of the proposed development for residential use in accordance with the procedure described in PPG24: Planning and Noise.

3.0 SITE DESCRIPTION

3.1 Location

The site is located at 6 Tottenham Mews and 81 Charlotte Street and falls within Camdens's jurisdiction. See Location Map on the following page.



Location Map (maps.google.co.uk)

3.2 Description

The current site consists of two terraced buildings. The two buildings are joined via a communal entrance at ground floor level.

81 Charlotte Street is a 4No. storey building, currently used for commercial use on the ground floor and residential dwellings on floors 1 – 3.

The existing building on Tottenham Mews comprises a 3No. storey commercial/office building.

The ground floor of 81 Charlotte Street and 6 Tottenham Mews façade is made up of existing commercial/office premises. The site is bound by Charlotte Street to the East and Tottenham Mews to the West. It is surrounded by various commercial and residential properties on all other boundaries.

Site Plan (maps.google.co.uk)

4.0 ACOUSTIC TERMINOLOGY

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 METHODOLOGY

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12.00 hours on Monday 14 December 2009 to 12.00 hours on Tuesday 15 December 2009.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the wind conditions were calm. The sky was generally clear with some patchy cloud. We understand that generally throughout the survey period the weather conditions were similar to this.

These conditions are considered suitable for obtaining representative measurement results.

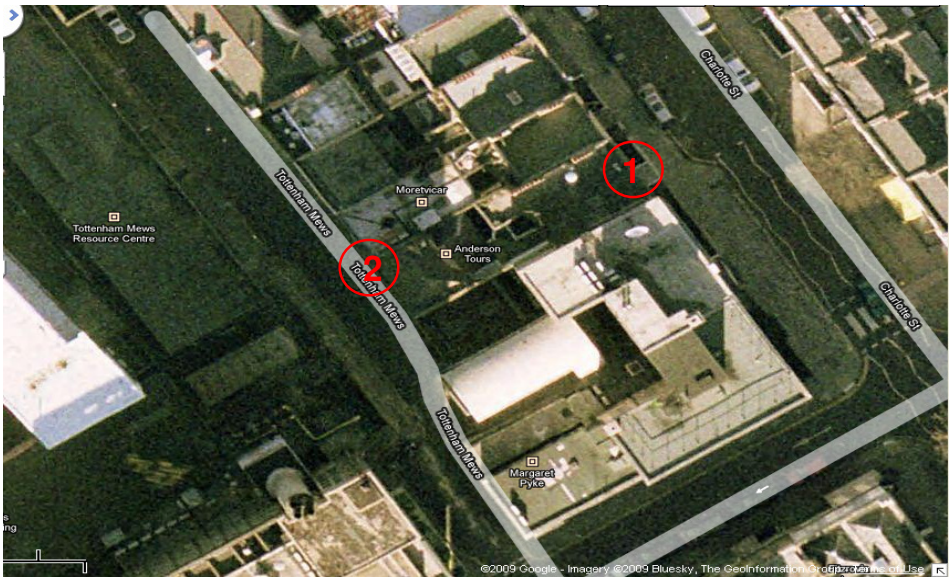
Measurements were taken continuously of the A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Positions

The survey was undertaken at 2No. positions on the premises. The measurement positions are described in the table below.

Position No	Description
1	The microphone was attached to a pole and positioned approximately 1.5m from the East façade of 81 Charlotte Street at 2nd floor level, overlooking Charlotte Street.
2	The microphone was attached to a pole and positioned approximately 1.5m from the West façade of 6 Tottenham Mews at 2nd floor level, overlooking Tottenham Mews and existing commercial premises.

The positions were selected in order to measure noise incident on the 2No. façades of the proposed development and are shown on the plan below.



Plan Showing Unmanned Measurement Positions (maps.google.co.uk)

5.3 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Description	Manufacturer	Type	Serial Number	Latest Verification
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3825	LD calibration on 11/03/2008
Position 1 Type 1 ½" Condenser Microphone	PCB	377B02	107842	LD calibration on 11/03/2008
Position 2 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3541	LD calibration on 29/09/2008
Position 2 Type 1 ½" Condenser Microphone	PCB	377B02	109063	LD calibration on 29/09/2008
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 02/11/2009

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred.

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. Each microphone was fitted with a Larson Davis windshield.

6.0 RESULTS

The results have been plotted on Time History Graphs 16156/TH1 to 16156/TH4 enclosed presenting the 15 minute A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

6.1 L_{eq} Noise Levels

In order to compare the results of our survey with the guidelines stated within PPG24, it is necessary to convert the measured $L_{Aeq(15\ minute)}$ noise levels into single figure daytime $L_{Aeq(16\text{-}hour)}$ (07:00-23:00 hours) and night-time $L_{Aeq(8\text{-}hour)}$ (23:00-07:00 hours) levels.

The daytime $L_{Aeq(16\text{-}hour)}$ and night-time $L_{Aeq(8\text{-}hour)}$ noise levels for each position are presented in the following Tables.

Position	Daytime $L_{Aeq(16\text{-}hour)}$	Night Time $L_{Aeq(8\text{-}hour)}$
1	66dB	61dB
2	58dB	56dB

N.B. The above levels have been corrected for façade reflections where appropriate, for comparison with the free field levels stated in PPG24.

6.2 Night-time L_{max} Results

The following Table presents the number of $L_{max(slow)}$ events which exceeded 82dBA during the night time period.

Time	No of Events	
	Position 1*	Position 2*
23:00-00:00	0	0
00:00-01:00	0	0
01:00-02:00	1	0
02:00-03:00	0	0
03:00-04:00	0	0
04:00-05:00	1	0
05:00-00:00	0	0
06:00-07:00	0	0

*Corrected for façade effect

7.0 DISCUSSION OF NOISE CLIMATE

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be road traffic from the surrounding road network and plant from various installations in close proximity to the building. The most apparent source of plant noise was from Arthur Stanley House (NHS Building Opposite 6 Tottenham Mews).

8.0 PPG24 ASSESSMENT

8.1 PPG24 Planning Policy Guidance

Annex 1 of PPG24 states the following:

Noise Exposure Categories for Dwellings

When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) the proposed site falls, taking account of both day and night-time noise levels. Local planning authorities should then take into account the advice in the appropriate NEC, as shown on the following page:

NEC	
A	*Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.*
B	*Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.*
C	*Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.*

D	*Planning permission should normally be refused.*

Recommended Noise Exposure Categories for New Dwellings Near Existing Noise Sources

Noise Levels Corresponding to the Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ dB				
Noise Source	*Noise Exposure Category*			
	A	*B*	*C*	*D*
Road Traffic *07.00 – 23.00* *23.00 – 07.00*	*<55* *<45*	*55 - 63* *45 - 57*	*63 - 72* *57 - 66*	*>72* *>66*
Rail Traffic *0700 – 2300* *2300 – 0700*	*<55* *<45*	*55 - 66* *45 - 59*	*66 - 74* *59 - 66*	*>74* *>66*
Mixed Sources *0700 – 2300* *2300 – 0700*	*<55* *<45*	*55-63* *45-57*	*63-72* *57-66*	*>72* *>66*

In addition to the above, PPG 24 also states that during the night (23:00 - 07:00 hrs):

> *"Sites where individual noise events regularly exceed 82dB L_{Amax} several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq(8\text{-}hour)}$ (except where the $L_{Aeq(8\text{-}hour)}$ already puts the site into NEC D)."*

8.2 Measured NECs

With reference to the above noise exposure categories for road traffic noise sources, the measured noise levels (corrected to free field conditions where appropriate) fall within the following categories for daytime and night-time periods.

Noise Exposure Category		
Position	**Daytime**	**Night time**
1	C	C
2	B	B

N.B. The above levels have been corrected for façade reflections where appropriate, for comparison with the free field levels stated in PPG24.

8.3 Discussion

With reference to the noise exposure categories for dwellings, as detailed in Section 8.1, when assessing planning applications for sites which fall into NEC C, PPG24 advises planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure an adequate level of protection against noise.

It should be recognised that PPG24 does not reflect the situation that in London noise levels and the demand for housing are both high, relative to the country in general. In our experience the majority of proposed residential sites in London fall into NEC C (or D) along at least one boundary. PPG24 unfortunately does not reflect the situation that higher noise levels are expected, and so the guidance is rather conservative. For these reasons it is common for planning permission to be granted for sites which partially fall into Noise Exposure Category C (or D).

Furthermore purchasers buying a property in London are able to exercise choice and accept a higher degree of noise, especially if acceptable internal noise levels can be achieved as discussed in the following sections.

Paragraph 8 of PPG24 states:

"Categories B and C deal with situations where noise mitigation measures may make development acceptable."

9.0 SUITABLE INTERNAL NOISE LEVELS

PPG24 and the previous sections of this report consider the external noise levels. However noise levels within the proposed dwellings should be the overriding consideration.

9.1 BS 8233

PPG24 states in Annex 6: Paragraph 8 that *"Guidance on suitable internal noise levels can be found in BS 8233: 1987".*

BS 8233: 1987 has been withdrawn and replaced by British Standard 8233: 1999: "Sound insulation and noise reduction for buildings". Section 7.6.1 of BS 8233: 1999 states that reasonable resting and sleeping conditions in living rooms and bedrooms can be achieved by the following target $L_{Aeq,T}$ internal noise levels:

Room Type	$L_{Aeq,T}$	
	Good	Reasonable
Living Room	30dB	40dB
Bedrooms	30dB	35dB

The Standard also states *"For a reasonable standard in bedrooms at night, individual noise events (measure with F time-weighting) should not normally exceed 45dB L_{Amax}."*

9.2 World Health Organisation

The World Health Organisation document on "Guidelines for Community Noise" states the following guideline values for community noise in specific environments.

Specific Environment	Critical Health Effect(s)	L_{Aeq}	$L_{Amax,fast}$
Dwelling, indoors	Speech intelligibility and moderate annoyance	35dB	-
Inside Bedrooms	Sleep disturbance, night-time	30dB	45dB

The document also states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dBA L_{Amax} more than 10-15 times per night, (Vallet & Varnet 1991)."*

The above levels are however the subject of much controversy, as indicated by one of the feature articles in the January/February 2003 edition of the Institute of Acoustics' publication.

In our opinion the above criteria for bedrooms should thus be regarded as preferred, rather than mandatory maxima to be achieved in all cases.

9.3 Local Unitary Development Plan

Camden's Unitary Development Plan has no reference to internal noise criteria for dwellings.

We understand Camden use the WHO guidelines outlined in Section 9.2.

10.0 MITIGATION MEASURES

Provisions exist to provide additional sound insulation as required. At this stage of the design scheme the precise types of window to be used is not known. Nor have selections of acoustic vents been made.

The Local Planning Authority would expect to be provided with details of the sound insulation treatments when available. Therefore in granting consent it would be appropriate for planning condition to be imposed along the following lines, based on example condition 1 drawn from PPG24:

Construction work shall not begin until a scheme for protecting the dwellings against noise from road traffic has been submitted to and approved by the Local Planning Authority; for each applicable dwelling all works which form part of the scheme for that dwelling shall be completed before the dwelling is occupied.

11.0 ACHIEVABLE INTERNAL NOISE LEVELS

Annex 6 of PPG24 states the following:

"Typical noise reduction of a dwelling façade with windows set in brick/block wall."

Difference Between External and Internal Noise Levels			
Noise Source	**Single Glazing**	**Thermal Double Glazing**	**Secondary Glazing**
Road Traffic	28dBA	33dBA	34dBA

Note: The values in the above Table are the difference between dB(A) levels measured outside and inside typical dwellings, therefore 3dB(A) should be added to free field noise levels to determine outside levels.

A simple assessment based on the above indicates the following noise levels may be expected within the proposed worst case dwellings with conventional secondary glazing.

Daytime $L_{Aeq(16\text{-}hour)}$ dBA	**Night-time $L_{Aeq(8\text{-}hour)}$**
35dBA	30dBA

These predicted worst case internal noise levels meet the proposed criteria. It is thus demonstrated that acceptable internal noise levels are achievable.

12.0 CONCLUSIONS

A detailed 24 hour environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

From the measured environmental noise levels the corresponding noise exposure category of the site has been determined.

The worst case façades fall into Noise Exposure Category C. With reference to the noise exposure categories for dwellings, noise should be taken into account when determining planning applications and, where appropriate conditions imposed to ensure an adequate level of protection against noise.

Appropriate internal noise criteria have been proposed. These are achievable using conventional constructions.

Prepared by
Paul Hill
Assistant Consultant
HANN TUCKER ASSOCIATES

Checked by
Simon Hancock
Director
HANN TUCKER ASSOCIATES

Appendix A

The acoustic terms used in this report are explained below:

dB : Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

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.

Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.

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 Ln 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. 1 hour).

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

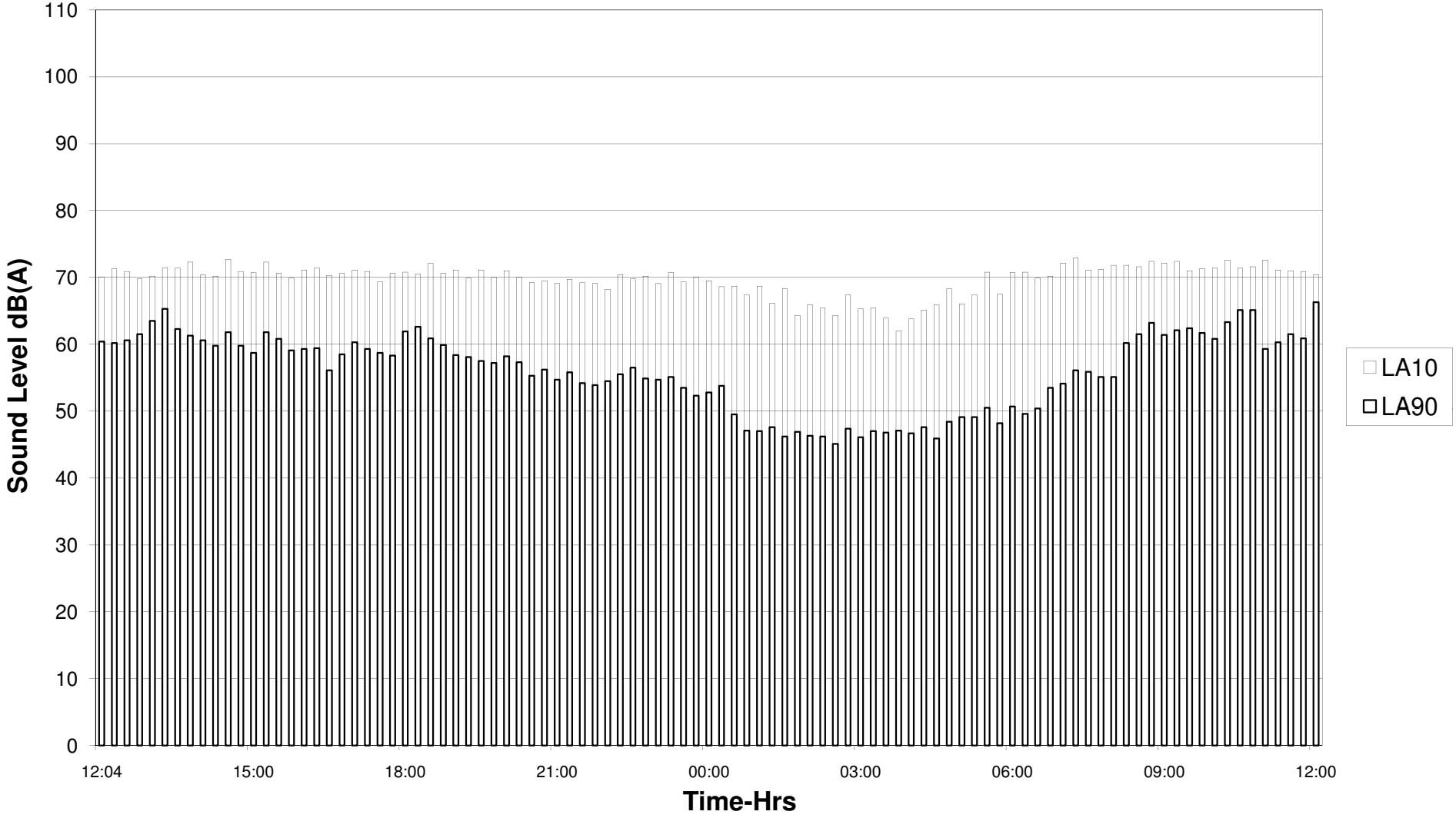
L_{max} : L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

81 Charlotte Street / 6 Tottenham Mews

Position 1

L_{A10} and L_{A90} Noise Levels

Monday 14/12/2009 - Tuesday 15/12/2009



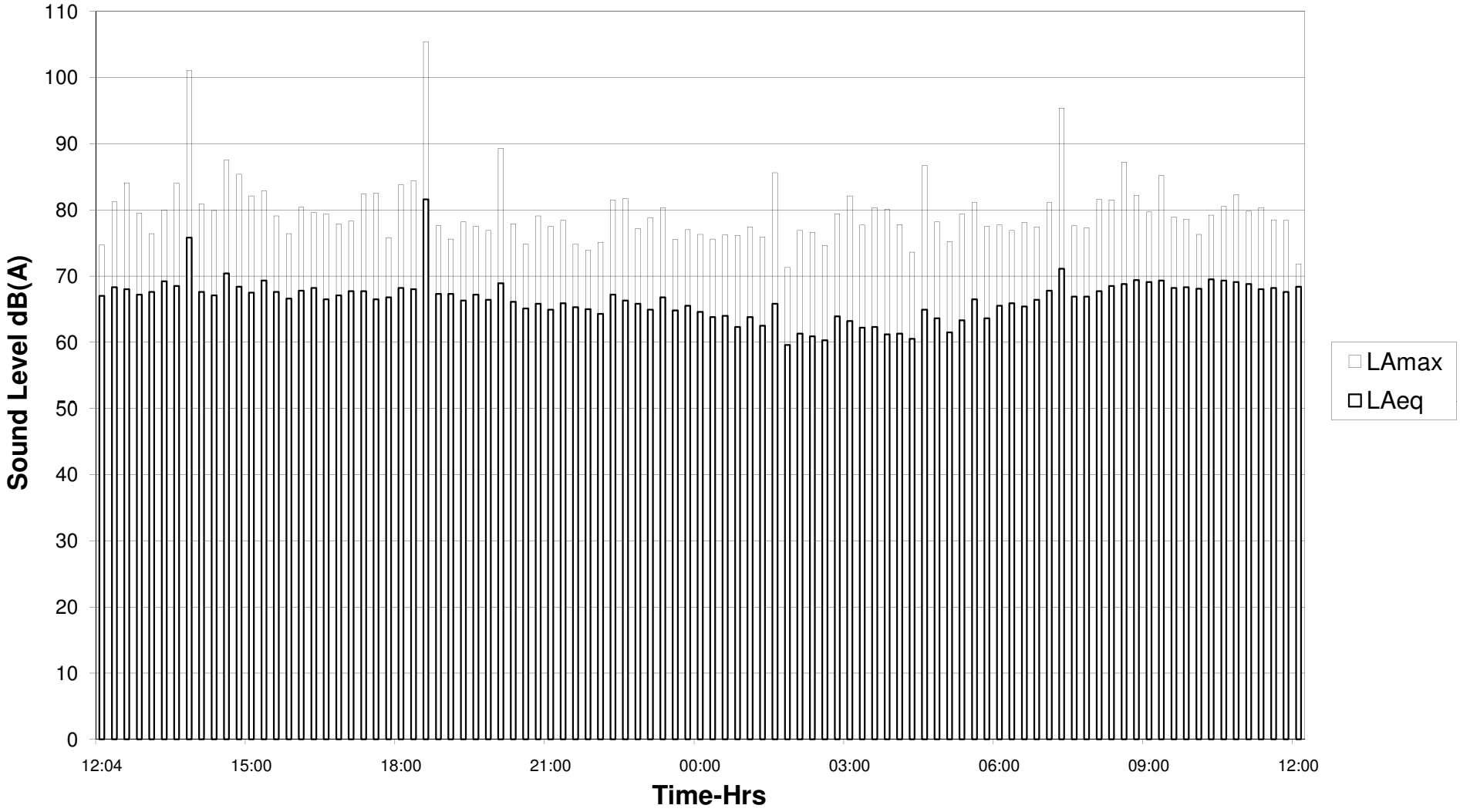
Time History Graph 16156/TH1

81 Charlotte Street / 6 Tottenham Mews

Position 1

L_{Aeq} and L_{Amax} Noise Levels

Monday 14/12/2009 - Tuesday 15/12/2009



Time History Graph 15165/TH2

6 Tottenham Mews / 81 Charlotte Street

Position 2

L_{A10} and L_{A90} Noise Levels

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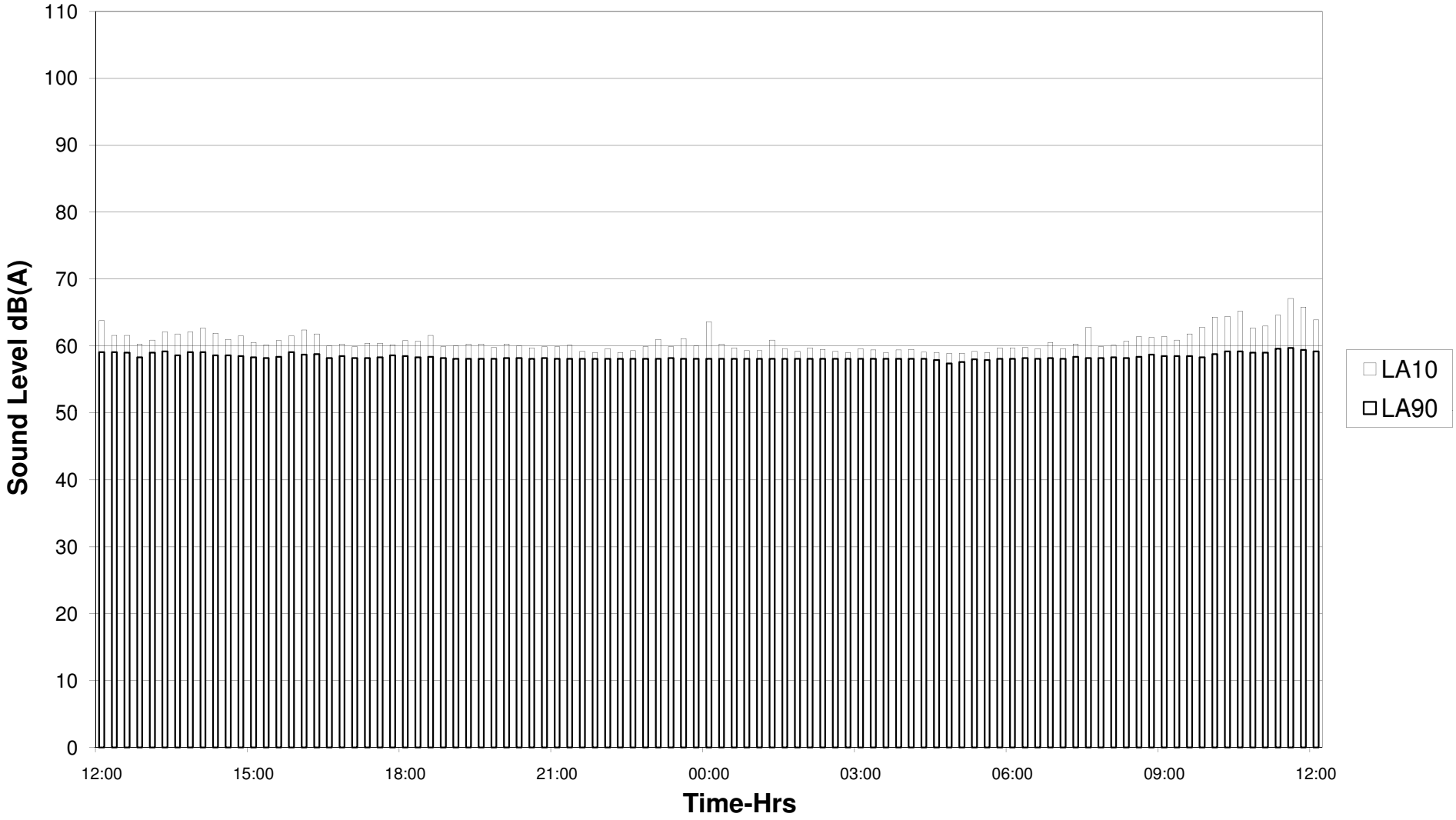


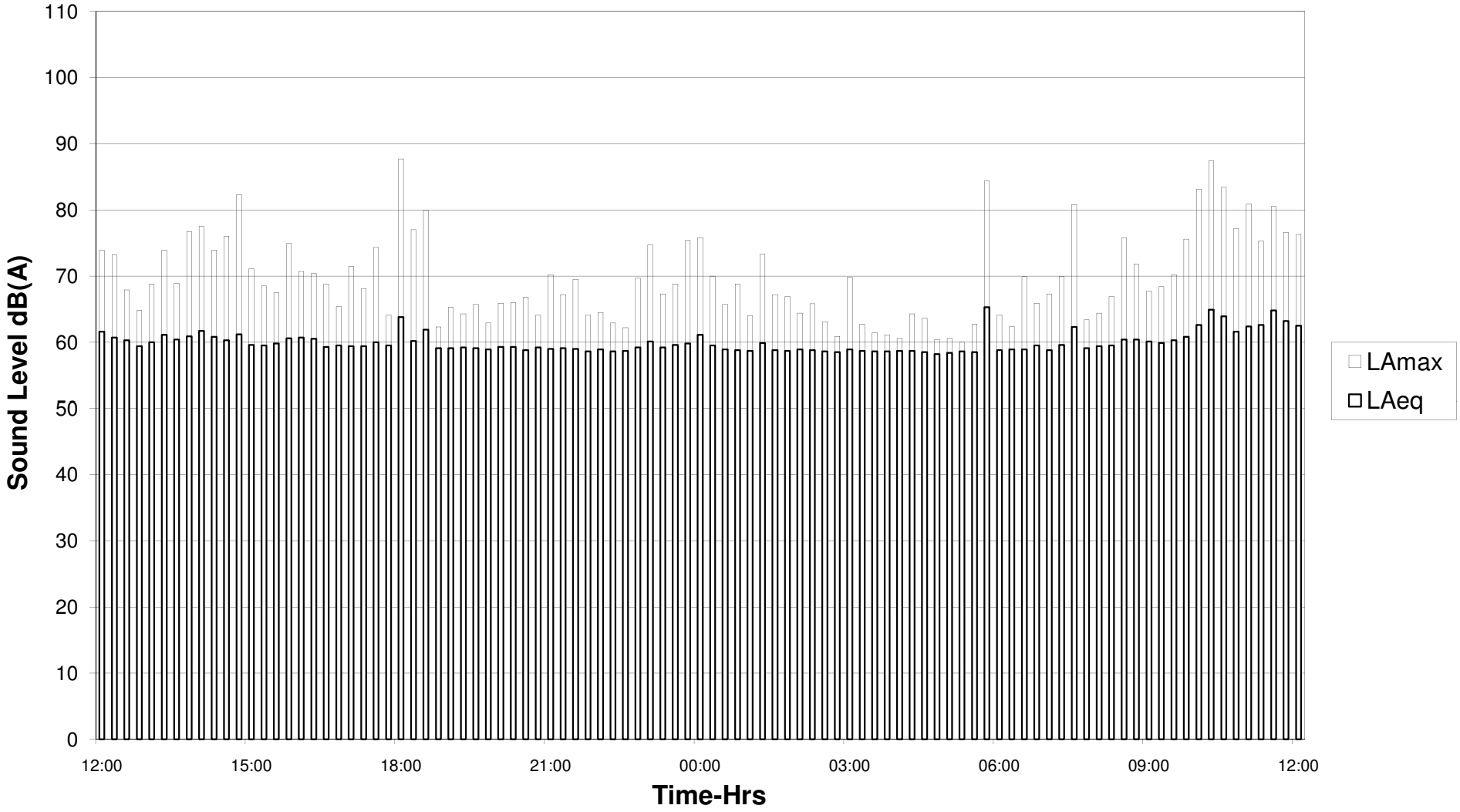
Time History Graph 16156/TH3

6 Tottenham Mews / 81 Charlotte Street

Position 2

L_{Aeq} and L_{Amax} Noise Levels

Monday 14/12/2009 - Tuesday 15/12/2009



Time History Graph 16156/TH4