RBA ACOUSTICS

ENGLANDS LANE
LONDON
NW3 4XJ

EXTERNAL BUILDING FABRIC ASSESSMENT

REPORT 6367/EBF
Prepared: 10 December 2014
Revision Number: 1

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External Building Fabric Assessment

ENGLANDS LANE

LONDON

NW3 4XJ

REPORT 6367/EBF

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Revision	Comment	Date	Prepared By	Approved By
0	First Issue	7 August 2014	Andreas Valiantis	Russell Richardson
1	Amendments to local authority requirements	10 December 2014	Andreas Valiantis	Russell Richardson

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1.0 INTRODUCTION

The site is located at the junction of England's lane and Haverstock Hill (A502), approximately 600m North-West of Chalk Farm Underground Station. It is proposed to convert a number of rooms currently used as hostel accommodation at the eastern end of the main block into flats.

Due to the location of the site, an assessment has been carried out in relation to the noise levels likely to be incident on the proposed building façades to demonstrate that noise will not adversely affect the future residential amenity.

RBA Acoustics have been commissioned by Savills to undertake a noise survey and subsequent analysis of noise levels incident on the proposed re-development.

This report presents the results of the noise survey, details of noise criteria which are typically required by the Local Authority and sets out the likely acoustic performance requirements of the external building fabric elements for these to be achieved.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 Survey Methodology

General

Continuous noise monitoring was undertaken at the re-development site between Wednesday 30th July and Thursday 31st July 2014 in order to determine the corresponding noise levels over typical day and night-time periods. Weather conditions over the monitoring period were generally dry with only light wind speeds.

Instrumentation

The following instrumentation was used for the survey:

Table 6367/T1 – Equipment Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
01dB A&V Type 1 Sound Level Meter	Black Solo 01	65678	01651/2	27 January 2016
01dB A&V Pre Amplifier	PRE 21 S	16316		
01dB A&V ½" Microphone	MCE 212	153459		
01dB-Stell Calibrator	Cal 21	35242481	01651/1	27 January 2016
01dB A&V Type 1 Sound Level Meter	Blue Solo 01	60611	U12035	14 September 2014
01dB A&V Pre Amplifier	PRE 21 S	13678		
01dB A&V ½" Microphone	MCE 212	84967	U12034	14 September 2014
01dB-Stell Calibrator	Cal 21	50441920	U12033	13 September 2014

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed.

Measurement Positions

Position 1: Overlooking England's Lane

A microphone was positioned 1m from the South-East façade of the building at second floor level, overlooking England's Lane. The microphone was subject to façade reflection effects and is considered to be representative of worst-case noise levels incident on the proposed residential façade of the re-development.

Position 2: Overlooking Haverstock Hill

A microphone was positioned 1m from the North-East façade of the building at second floor level, overlooking Haverstock Hill. The microphone was subject to façade reflection effects and is considered to be representative of worst-case noise levels incident on the proposed residential façade of the re-development.

The measurement position is also shown on the attached Site Plan 6367/SP1 and Photographs 6367/P1-P2.

2.2 Site Conditions

Since the measurements were unattended it is not possible to comment upon the noise climate at the measurement position over the entire monitoring period with absolute certainty. However, during our time on site it was noted that noise levels were dominated by local road traffic movements in Haverstock Hill and England's Lane.

2.3 Results

The measured L_{Aeq}, L_{A90} and L_{Amax} 15 minute period levels are shown as time-histories on the attached Graphs 6367/G1-2. The averaged (façade reflection corrected) daytime and night-time L_{Aeq} noise levels are summarised in the following Table 6367/T2 below.

Table 6367/T2 – Façade Incident L_{Aeq} Noise Levels

Measurement Positions	Average (Façade Reflection Corrected) $L_{Aeq, 15mins}$ Noise Level (dB)	
	Daytime (07:00 – 23:00)	Night-Time (23:00 – 07:00)
Overlooking England's Lane	65.1	58.2
Overlooking Haverstock Hill	66.4	60.6

The minimum background noise levels ($L_{A90, 15mins}$) at each measurement position are summarised in the following Table 6367/T3 below.

Table 6367/T3 – Measured Minimum $L_{A90, 15mins}$ Noise Levels

Measurement Position	Minimum $L_{A90, 15mins}$ Noise Level During Period (dB)	
	Daytime (07:00 – 23:00)	Night-Time (23:00 – 07:00)
Overlooking England's Lane	48.8	37.7
Overlooking Haverstock Hill	52	37.6

Averaged spectral noise levels are graphically represented on the attached Graphs 6367/G3.

3.0 EXTERNAL BUILDING FABRIC CRITERIA

3.1 Local Authority Requirements

From previous experience of similar schemes, the Planning Department at London Borough of Camden are likely to advise the following conditions in relation to noise levels affecting this proposal:

"Prior to the commencement of the development, an acoustic report including full details of any proposed noise mitigation measures which demonstrates that resultant indoor noise levels will be below British Standard 8233, shall be submitted to and approved by the Council in writing. The development shall not be carried out otherwise than in accordance with any approval given and shall be maintained and retained as such thereafter.

Reason: To safeguard the amenities of the occupiers of the proposed development in accordance with the requirements of policy CS5 of the London Borough of Camden Local Development Framework Core Strategy and policy DP28 of the London Borough of Camden Local Development Framework Development Policies."

The Local Development Framework refers to external noise but does not provide any information regarding internal noise levels. British Standard 8233, mentioned above, does provide such guidance and is explained as follows.

3.2 BS 8233

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings, draws on the results of research and experience such as that detailed in WHO 'Guidelines for Community Noise', to provide information on achieving internal acoustic environments appropriate to their functions.

As part of this document, recommendations are given for the internal noise levels which are commensurate with achieving comfortable resting and sleeping conditions within residential properties. The values given are generally in terms of an L_{Aeq} level*, although guidance is also given on the maximum noise level considered reasonable within bedrooms at night. The values given in Table 6368/T3 below are adapted from section 7.7.2, Table 4 of BS 8233:2014.

Table 6367/T4 – BS8233 Residential Noise Level Guidance

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Sleeping (or Resting in Daytime)	Bedrooms	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Guidance for the maximum noise level considered reasonable within bedrooms at night is not specifically stated for residential spaces, however the following L_{Amax} noise levels are outlined as guidance for the maximum levels to be received in hotel bedrooms:

Table 6367/T5 – BS8233 Maximum Noise Levels in Hotel Bedrooms

Period	Location	Design Range
Night-Time (23:00 - 07:00)	Hotel Bedrooms	45-55 dB $L_{Amax,F}$

- A brief explanation of the acoustic terminology used in this report is shown in Appendix A.

3.3 World Health Organisation: Guidelines for Community Noise

The document describes guideline levels that are *"essentially values for the onset of health effects from noise exposure"*.

A table of guideline values is included, relating to adverse health effects, referred to as any temporary or long term deterioration in physical, psychological, or social functioning that is associated with noise exposure.

The following is an extract from the Table 4.1: Guideline values for community noise in specific environments, as stated in the document.

Table 6367/T6 – Guideline Values for Community Noise

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (hours)	$L_{Amax,f}$ (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-times	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

3.4 Summary of Criteria

Based upon the information from the relevant standards outlined above and our previous experience of Local Authority requirements, we believe the following noise level criteria are suitable in providing comfortable living conditions within the re-development:

- Living Rooms: 35 dBA Daytime (07:00 – 23:00)
- Bedrooms: 35 dBA Daytime (07:00 – 23:00)
  30 dBA Night-Time (23:00 – 07:00)
  45 dB $L_{Amax,F}$ Night-Time (23:00 – 07:00)

4.0 EXTERNAL BUILDING FABRIC ASSESSMENT

4.1 Background

External noise levels are such that noise control measures are required in order for the development to be considered acceptable. Appropriate internal noise levels can be achieved providing suitable building envelope constructions are employed. Analyses of the external building fabric have been undertaken in order to ascertain the required acoustic performance of the glazing and other external fabric elements to achieve the project criteria.

4.2 Assumptions

Our external building fabric analyses have assumed the following:

a) Drawings

Our assessment has been based on the following Chassay Last Architect's proposed drawings.

Drawing Number	Description	Revision
ELH5/P A-02	Proposed First Floor Plan – Scheme B	A
ELH5/P A-09	Proposed First Floor Plan – Scheme B Privacy Distance	-
ELH5/P A-30	Proposed Sections – Scheme B	A

(b) Noise Levels

The assessment has been based on the measured noise levels as detailed in Section 2.3.

(c) Room Absorption

We have assumed the bedrooms to be acoustically "soft" with carpets, curtains and other soft furnishings. For the purposes of our analyses we have assumed the following absorption coefficients.

Table 6367/T7 – Bedroom Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.25	0.27	0.31	0.32	0.32	0.32

We have assumed the living rooms to be less acoustically absorptive (with a hard floor finish, although with furnishings). For the purposes of our analyses we have assumed the following absorption coefficients:

Table 6367/T8 – Living Room Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.20	0.22	0.22	0.22	0.23	0.27

(d) External Wall

We understand that external non-glazed areas are typically brickwork and therefore we have assumed the following sound reduction indices (equating to an overall Rw of 52dB) for all non-glazed façade areas comprising the above construction:

Table 6367/T9 – Non-Glazed SRIs

Assumed Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
36	41	45	45	54	58	58	58

(e) Ventilation

We have assessed various ventilation strategies in order to provide several option for noise mitigation. Ventilation types assessed include through-the-wall trickle ventilators and mechanical ventilation.

4.3 Preliminary Assessment

The glazing performance specifications apply to the glazing package as a whole inclusive of glazing, louvres, spandrel panels, framing, opening lights, doors, seals, etc. The performance of the glazing system will depend on many factors such as the glazing configuration, size of window panels, quality of framing, quality of sealing, etc.

For guidance purposes we would typically expect the proposed internal noise criteria to be achieved with glazing/ventilation similar to that detailed in Tables 6367/T10 and 6367/T11, although a detailed analysis should be undertaken at design stage to confirm this.

Table 6367/T10 – Glazing Guidance Constructions

Façade	Glazing Configuration
England's Lane	Any standard thermal double-glazing, e.g. 4mm glass / 12mm cavity / 6mm glass
Haverstock Hill	Marginally uprated double-glazing, e.g. 6 mm glass / 12mm cavity / 8mm glass

Table 6367/T11 – Guidance Trickle Ventilator Types

Façade	Example Ventilator Type
All	Standard direct air-path in-frame trickle-vent

5.0 CONCLUSIONS

RBA Acoustics have undertaken noise monitoring at the proposed site at England's Lane, London NW3 4XJ. The measured noise levels are presented herein. The resultant noise levels have been used in our assessment of the glazing requirements to demonstrate suitable internal noise levels can be achieved at the proposed development with reference to BS 8233, the WHO and typical Local Authority criteria.

Our analysis indicates acceptable internal noise levels can be effectively controlled using double-glazing and in-frame trickle vents. We therefore conclude planning approval should not be withheld on the basis of noise impact.

Appendix A - Acoustic Terminology

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_{eq}	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 (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10}, L_{A90})	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.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

England's Lane

L_{Aeq} Time History

Measurement Position 1, Wednesday 30th July 2014 to Thursday 31st July 2014

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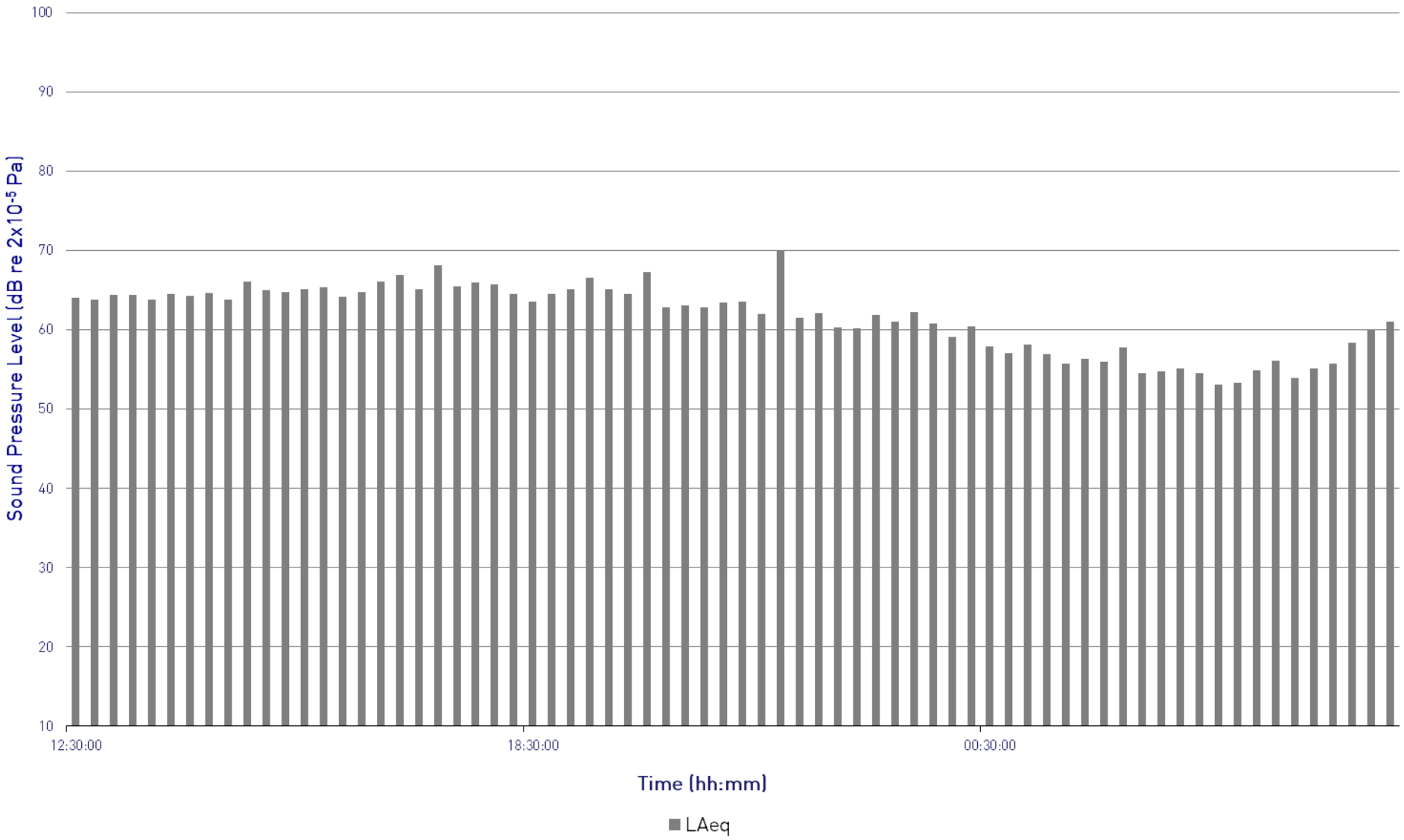
Graph 6367/G1



England's Lane

L_{Amax} and L_{A90} Time History

Measurement Position 1, Wednesday 30th July 2014 to Thursday 31st July 2014

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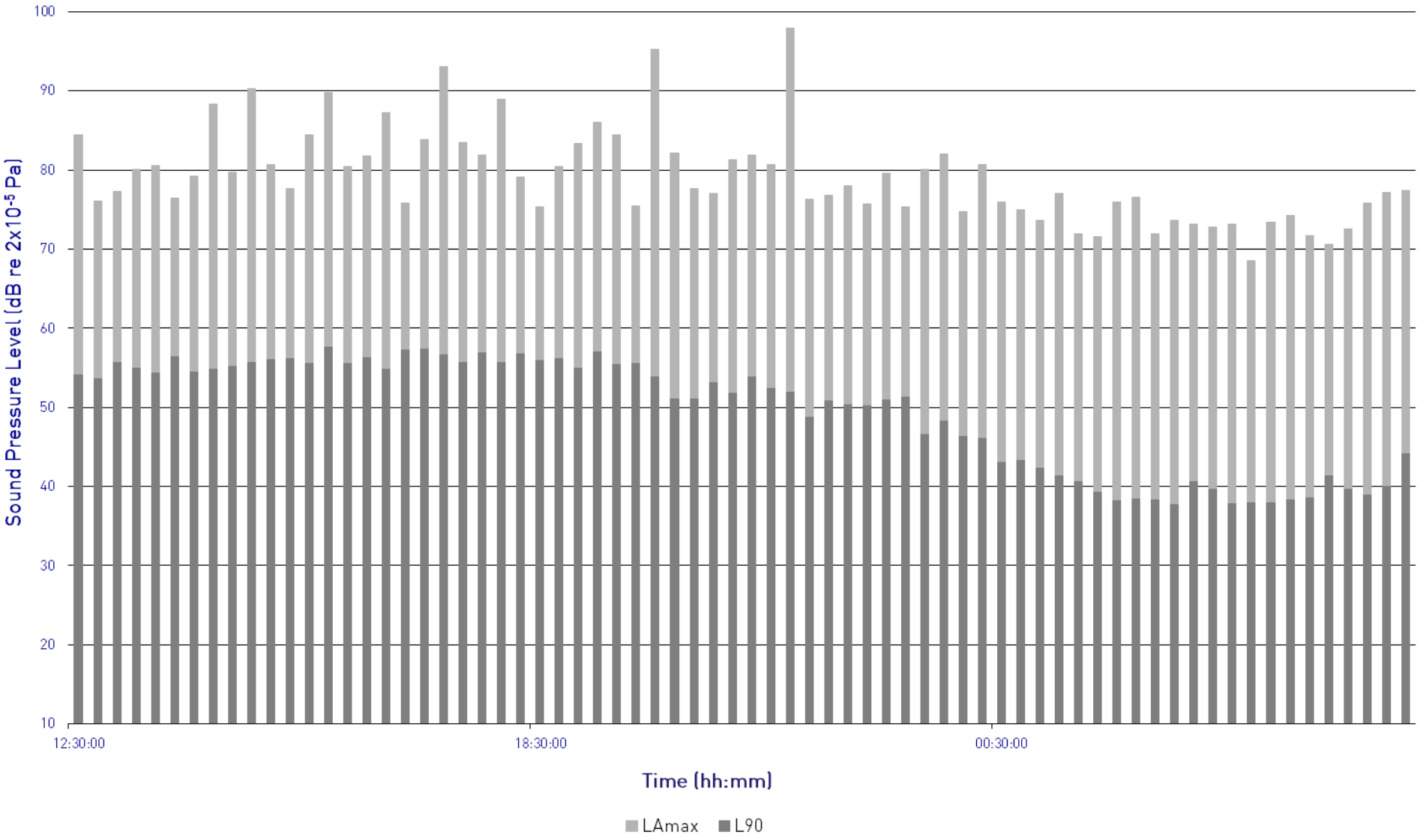
Graph 6367/G2



England's Lane

Measured Octave-band Daytime and Night-time L_{eq}

Measurement Position 1, Wednesday 30th July 2014 to Thursday 31st July 2014

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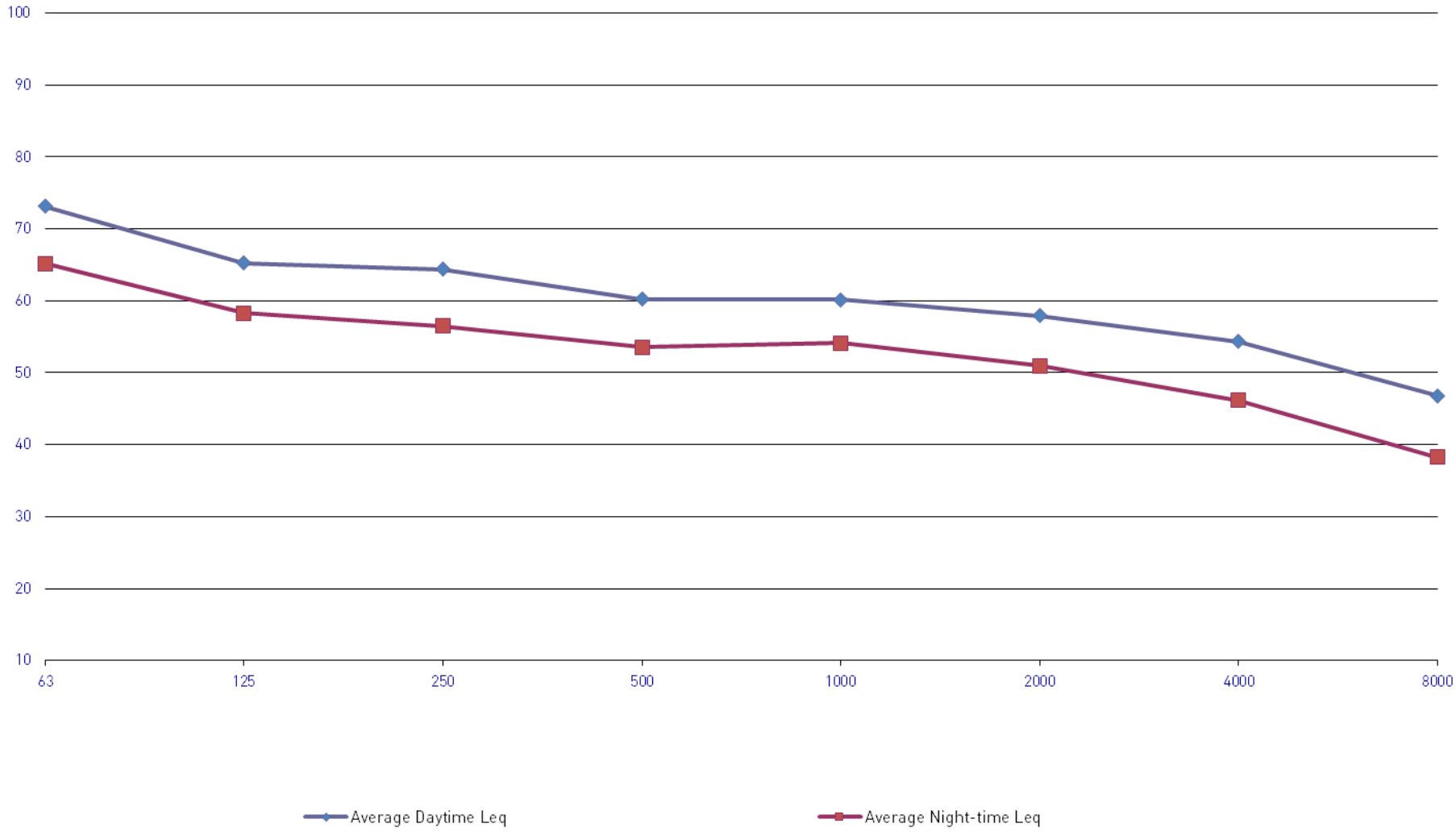
Graph 6367/G3



England's Lane

L_{Aeq} Time History

Measurement Position 2, Wednesday 30th July 2014 to Thursday 31st July 2014

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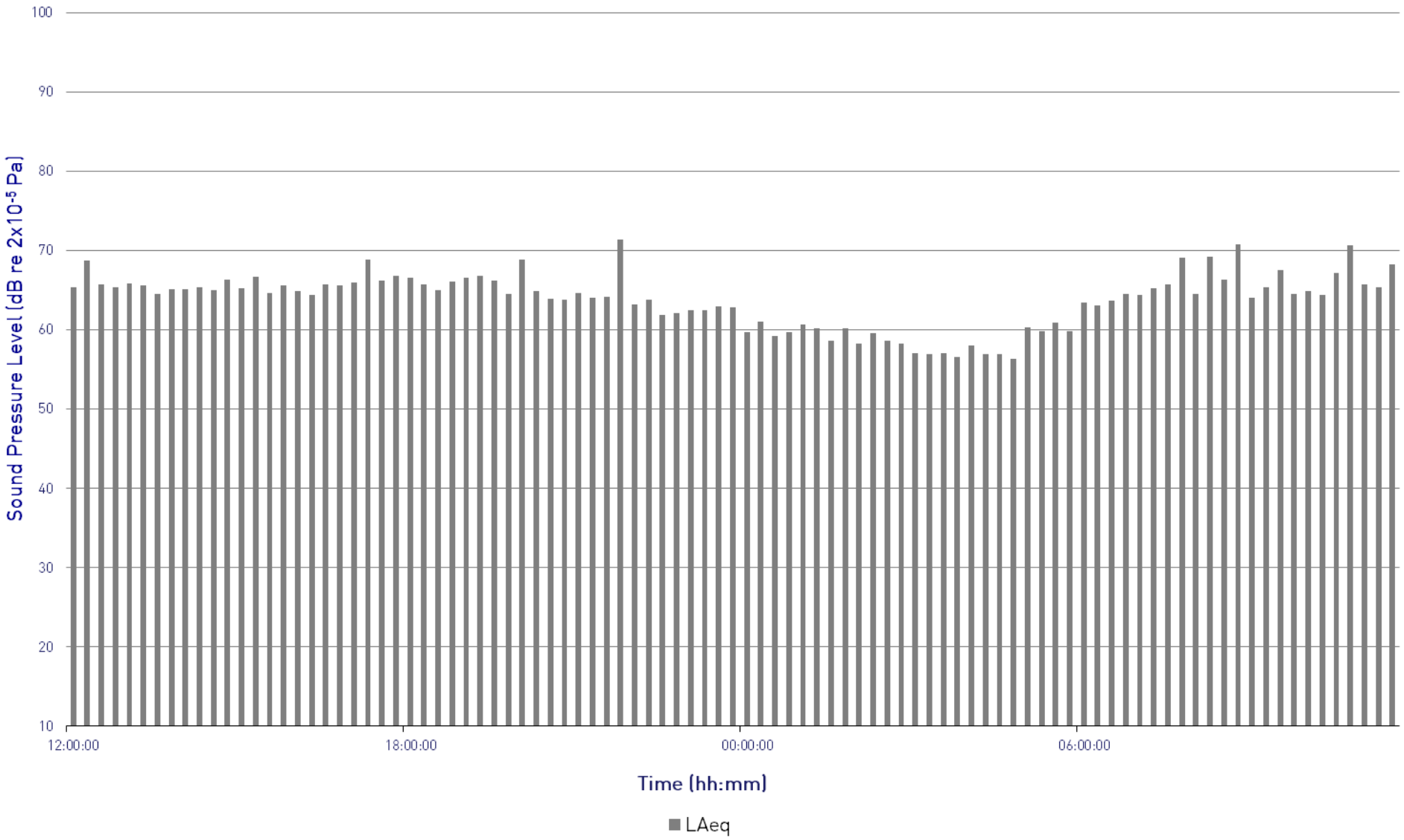
Graph 6367/G1



England's Lane

L_{Amax} and L_{A90} Time History

Measurement Position 2, Wednesday 30th July 2014 to Thursday 31st July 2014

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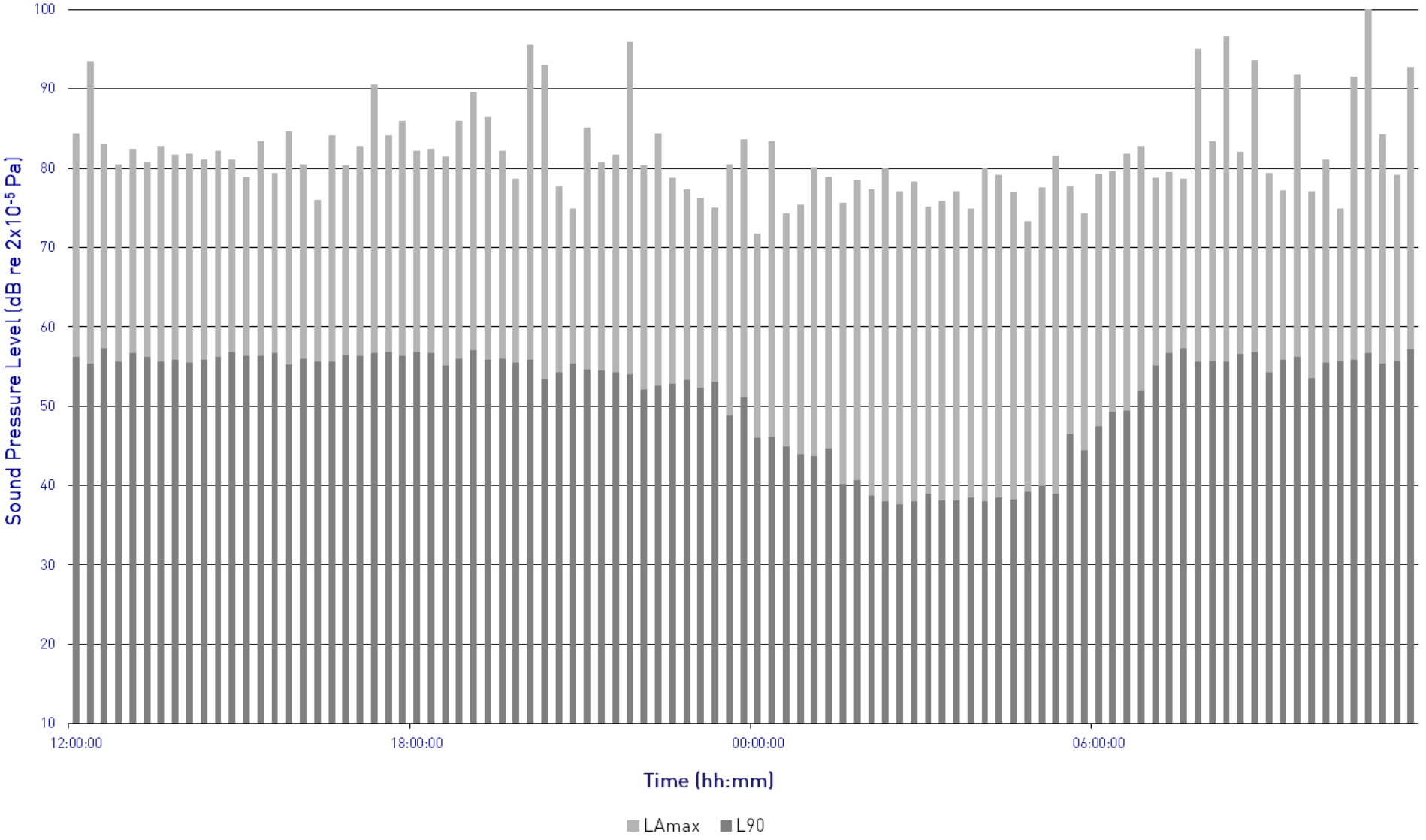
Graph 6367/G2



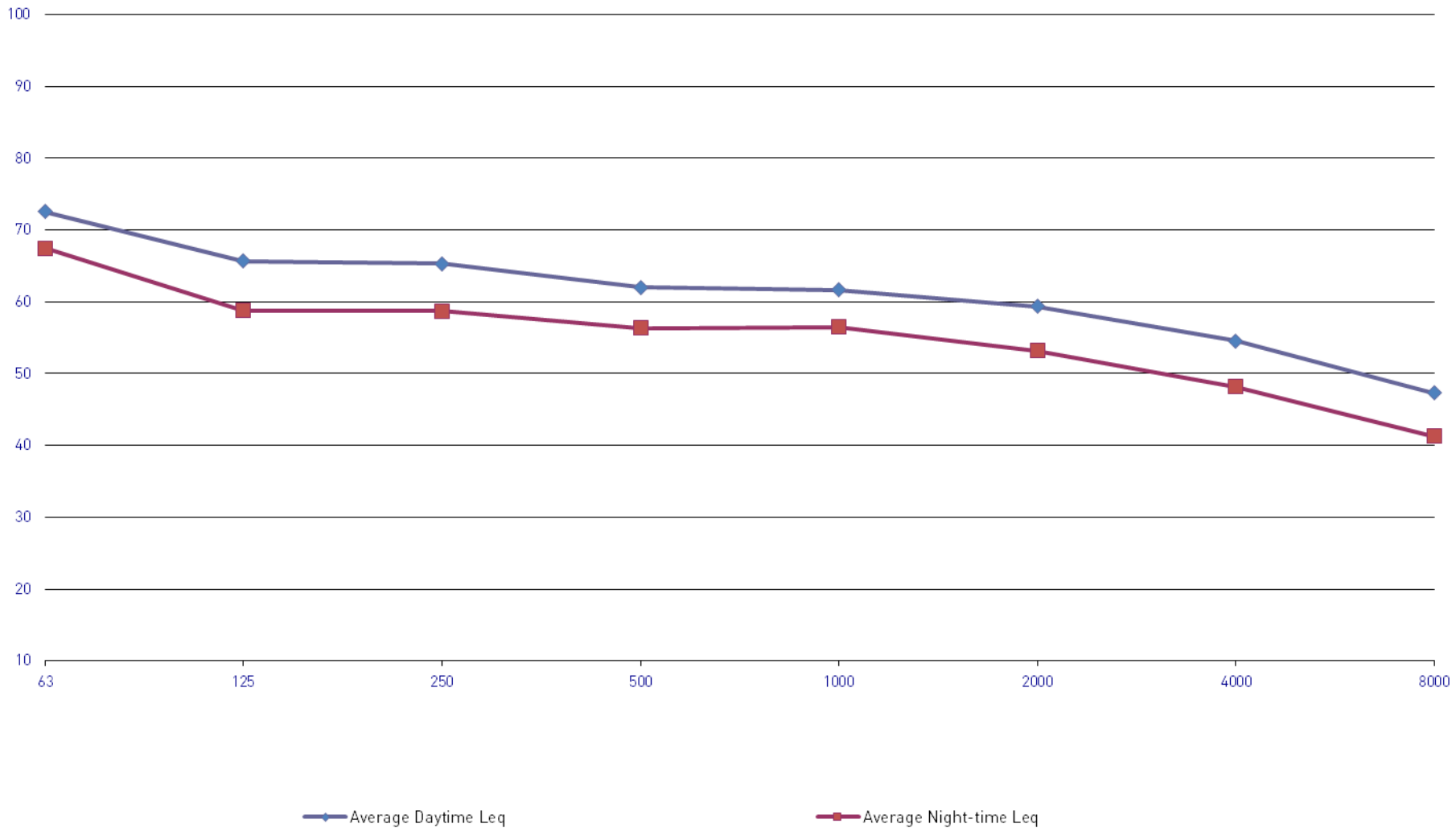
England's Lane

Measured Octave-band Daytime and Night-time L_{eq}

Measurement Position 2, Wednesday 30th July 2014 to Thursday 31st July 2014

RBA ACOUSTICS

Graph 6367/G3



ENGLANDS LANE, LONDON, NW34XJ

Site Plan Showing Measurement Positions 1 & 2 at Second Floor Level

Site Plan 6367/SP1

1 August 2014

Not to Scale

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ENGLANDS LANE, LONDON, NW34XJ

Photograph taken on England's Lane Street Showing

Measurement Position at Second Floor Level

Photograph 6367/P2

1 August 2014

Not to Scale

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ENGLANDS LANE, LONDON, NW34XJ

Photograph Taken on Haverstock Hill Showing

Measurement Position 2 at Second Floor Level

Photograph 6367/P2

1 August 2014

Not to Scale

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