# UNITE - TRAVIS PERKINS
# 11-13 ST PANCRAS WAY
# CAMDEN NW1 0PT

## ENVIRONMENTAL NOISE SURVEY AND EXTERNAL BUILDING FABRIC REPORT
## 4066/EBF

16 May 2012
Revision Number: 4

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# ENVIRONMENTAL NOISE SURVEY AND EXTERNAL BUILDING FABRIC REPORT 4066/EBF (Rev 4)

**CONTENTS:**

# 1.0 Introduction

It is proposed to demolish the existing buildings occupied by Travis Perkins at 11-13 St Pancras Way, Camden NW1 0PT in order to construct a mixed use student accommodation and commercial scheme in its place. We understand that upon completion of the scheme, Travis Perkins intend to occupy the ground floor of the development. Due to the location of the site, being in close proximity to the busy St Pancras Way, the Royal Veterinary College and the St Pancras Hospital, an assessment was carried out in relation to the noise levels likely to be incident on the proposed building façades.

RBA Acoustics has been commissioned by Unite to carry out an environmental noise survey at the site to determine the prevailing noise climate and to undertake an assessment of the acoustic requirements of the external building fabric based on the typical architectural proposals and the surveyed noise levels.

This report details the results of the noise survey and sets out the acoustic performance requirements of the external building fabric elements.

# 2.0 Survey Methodology

## 2.1 Instrumentation

The following instrumentation was used for the survey:

**Table 4066/T1 – Instrumentation**

| Manufacturer | Model Type | Serial No. | Calibration | |
|---|---|---|---|---|
| | | | Certificate No. | Calibration Date |
| Larson Davis Type 1 Sound Level Meter | SLM824 | 3153 | 13382 | 7 May 2009 |
| Larson Davis Pre Amplifier | PRM902 | 3318 | | |
| Larson Davis ½“ Microphone | 2541 | 8177 | | |
| 01dB A&V Type 1 Sound Level Meter | Blue Solo 01 | 60610 | 5589 | 11 August 2009 |
| 01dB A&V Pre Amplifier | PRE 21 S | 13676 | | |
| Gras ½“ Microphone | MCE 212 | 84948 | | |
| 01dB-Stell Calibrator | Cal 21 | 50441910 | U5569 | 6 August 2009 |

The sound level meters were calibrated both prior to and on completion of the survey with no calibration drifts observed.

## 2.2 Noise Survey

Continuous unattended noise monitoring was undertaken at two measurement locations at the proposed development site over the following period:

Wednesday 5 May to Thursday 6 May 2010

However, upon arrival at the development site on 6 May 2010 it was discovered that an equipment malfunction had occurred at one of the two positions (Position 1). As such, repeat noise monitoring was undertaken over the following period:

Thursday 6 May to Friday 7 May 2010

The locations were selected to enable a detailed assessment of worst case noise levels generated by road traffic movements along St Pancras Way and also to consider variations in the noise environment around the proposed development site.

**Position 1:** A microphone was positioned externally at the South-Eastern boundary of the existing site, overlooking St Pancras Way. The microphone was positioned approximately 1m from the Eastern façade and approximately 4m above ground level. This position was considered representative of the worst-case noise levels incident upon the façades toward the Southern end of the proposed development.

**Position 2:** A microphone was positioned externally at the North-Eastern boundary of the existing site, overlooking St Pancras Way and College Grove. The microphone was positioned approximately 1m from the Eastern façade and approximately 4m above ground level. This position was considered representative of the worst-case noise levels incident upon the Northern and, to a lesser extent, Eastern façades of the proposed development.

The measurement positions are also shown on the attached site plan 4066/SP1.

### 2.3 Weather Conditions

Since the surveys were unattended, it is not possible to comment with certainty as to the meteorological conditions throughout the survey periods. However, at the beginning and the end of the surveys the weather was considered suitable for the noise monitoring exercise, it being dry with little wind.

## 3.0 Site Conditions

As the noise survey was unattended it is not possible to comment on the nature of the noise climate for the full duration of the survey with absolute accuracy. However, it was noted during the visits to the site that the dominant noise source at measurement positions 1 and 2 was road traffic movements along St Pancras Way to the East. Some emergency vehicle sirens were also noted during our time on site. It was also noted that road traffic moving along St Pancras Way was relatively fast and free flowing (approximately 30mph).

## 4.0 Acoustic Terminology

A brief explanation of the acoustic terminology used in this report is given below:

Sound pressure — Sound is a disturbance or fluctuation in air pressure, and sound pressure, measured in Pascals (Pa), is used as a measure of the magnitude of the sound. The human ear can detect sound pressures in the range from 0.00002 Pa to 20 Pa. This is an enormously wide range and so for convenience sound pressures are commonly measured on a decibel (dB) scale.

The decibel scale — The decibel scale is the scale on which sound pressure levels are commonly measured. It is a logarithmic scale and is used for convenience to compress the audible range of sound pressures into a manageable range, from 0 dB to 140 dB. The zero of the scale, 0 dB, corresponds to the threshold of hearing, 0.00002 Pa, and the upper limit, 140 dB, corresponds to 20 Pa, the threshold of pain.

A-weighting — A method of producing a single figure measure of a broad band noise which takes into account, in an approximate way at least, the frequency response of the human hearing system. The idea is that sound levels measured in this way should give an indication of the loudness of the sound.

dBA or $L_A$ — The value of the sound pressure level, in decibels, measured using an A-weighting electronic circuit built into the sound level meter. The vast majority of noise measurements are carried out in this way.

$L_{Aeq,T}$ — Equivalent continuous sound level, in dBA. It represents a measure of the 'average' sound level over the measurement period. It corresponds to the steady level of sound which, over the same period of time, T, would contain the same amount of (A-weighted) sound energy as the time varying noise.

This is the most common method of measuring time varying noise, and within certain limits gives the best correlation with human response to noise, for example with annoyance.

$L_{A90,T}$ — This is the $90^{th}$ percentile of the statistical noise level distribution, or, more simply, the noise level that is exceeded for 90% of the measurement time. Thus over one hour for example it represents the noise level which is exceeded for all but (the quietest) six minutes of that hour.

It is commonly used as a measure of the background noise in any given situation, against which the level of any new, potentially intrusive source of noise is often compared. Background noise itself often varies with time and so the $L_{A90,T}$ is almost universally used as the best measure of the 'more or less always present' noise level which underlies short term variations from other sources of 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 $L_{Aeq,T}$ value.

# 5.0 Results

The noise levels monitored at the unattended measurement positions are shown as time-histories and spectra on the attached charts 4066/TH1-4 and 4066/S1-2.

Combining the noise levels measured during the daytime (07:00 – 19:00 hrs), evening (19:00 – 23:00 hrs), daytime and evening (07:00 – 23:00 hrs) and night-time (23:00 – 07:00 hrs) periods the overall $L_{Aeq}$ levels at all measurement positions were as follows:

**Table 4066/T2 – Combined Unattended Noise Levels**

| Position | Period | $L_{Aeq}$ Noise Level (dB re $2x10^{-5}$ Pa) |
|---|---|---|
| 1 | Daytime (07:00 – 19:00) | 70.0 |
| | Evening (19:00 – 23:00) | 66.3 |
| | Daytime and Evening (07:00 – 23:00) | 69.4 |
| | Night-time (23:00 – 07:00) | 64.3 |
| 2 | Daytime (07:00 – 19:00) | 67.7 |
| | Evening (19:00 – 23:00) | 67.6 |
| | Daytime and Evening (07:00 – 23:00) | 67.6 |
| | Night-time (23:00 – 07:00) | 62.6 |

The minimum background noise levels ($L_{90}$) measured at all positions are shown in the table below; this data can be used to assess noise emissions from any proposed plant at the development.

**Table 4066/T3 – Minimum Background Noise Levels**

| Position | Minimum $L_{A90}$ (dB) | |
|---|---|---|
| | Daytime (07:00 – 23:00) | Night-time (23:00 – 07:00) |
| 1 | 53.5 | 53.1 |
| 2 | 56.7 | 55.3 |

# 6.0 Plant Noise Emission Criteria

## 6.1 Camden Council LDF

The requirements of Camden Council are set out in their Local Development Framework (LDF) in Table E of DP28. Noise levels from new plant and machinery are confirmed as follows.

**Table 4066/T4 – Camden Council Noise Thresholds**

| Noise description and Location of measurement | Period | Time | Noise level |
|---|---|---|---|
| Noise at 1 metre external to a sensitive façade | Day, evening and night | 0000-2400 | 5dB(A) $<L_{A90}$ |
| Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade | Day, evening and night | 0000-2400 | 10dB(A) $<L_{A90}$ |
| Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade | Day, evening and night | 0000-2400 | 10dB(A) $<L_{A90}$ |
| Noise at 1 metre external to sensitive façade where $L_{A90}$ >60dB | Day, evening and night | 0000-2400 | 55dB $L_{Aeq}$ |

In line with such requirements we would propose such items of mechanical services be designed so that noise emissions from the cumulative plant do not exceed the following levels when assessed at the nearest noise sensitive locations;

**Table 4066/T5 – Plant Noise Emission Criteria**

| Position | $L_{Aeq}$ Noise Level of all operating plant (dB re $2x10^{-5}$ Pa) at 1m from the nearest noise sensitive façade | |
|---|---|---|
| | Daytime (07:00 – 23:00) | Night-time (23:00 – 07:00) |
| 1 | 49 | 48 |
| 2 | 52 | 50 |

A further reduction of 5dBA should be applied to the stated criteria in the case of tonal and/or impulsive items of plant.

## 6.2 Camden Council Planning Condition Notice

We understand from previous projects in Camden that the Local Authority's requirements for items of fixed plant are likely to be as follows:

> "*The design and installation of items of fixed plant shall be such that, when operating, the cumulative noise level $L_{Aeq\ Tr}$ arising from the proposed plant, measured or predicted at 1 m from the façade of the nearest noise sensitive premises, shall be a rating level of 5dB(A) below the background noise level $L_{AF90\ Tbg}$.*"

The above planning condition has the same basic requirement as Camden's LDF and as such, we consider that the plant noise emission criteria as described in Table 4066/T5 above are appropriate.

# 7.0 Planning Criteria

## 7.1 PPG 24

The Department of the Environment's Planning Policy Guidance note PPG24: Planning and Noise, dated September 1994, sets out the Government's planning policies with respect to noise. Local Authorities must take the guidance notes into account.

When assessing a proposal for residential development near a source of noise both daytime and night-time $L_{Aeq}$ noise levels should be used to determine into which of the four Noise Exposure Categories (NECs) the site falls. Consideration should then be given to the advice given for each NEC as shown below.

**Table 4066/T6 – Planning Categories and Advice**

| NEC | Planning Advice |
|---|---|
| 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. |

It should be noted that PPG24 also states within Section 8.0 that "Categories B and C deal with situations where noise mitigation measures may make development acceptable".

The following table indicates the ($L_{Aeq}$) noise levels defined within PPG24 for each Noise Exposure Category.

**Table 4066/T7 – Noise Exposure Categories**

| Noise Source | Noise Exposure Category | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Road Traffic | | | | |
| 07:00 – 23:00 | <55 | 55 – 63 | 63 – 72 | >72 |
| 23:00 – 07:00 | <45 | 45 – 57 | 57 – 66 | >66 |
| Rail Traffic | | | | |
| 07:00 – 23:00 | <55 | 55 – 66 | 66 – 74 | >74 |
| 23:00 – 07:00 | <45 | 45 – 59 | 59 – 66 | >66 |
| Air Traffic | | | | |
| 07:00 – 23:00 | <57 | 57 – 66 | 66 – 72 | >72 |
| 23:00 – 07:00 | <48 | 48 – 57 | 57 – 66 | >66 |
| Mixed Sources | | | | |
| 07:00 – 23:00 | <55 | 55 – 63 | 63 – 72 | >72 |
| 23:00 – 07:00 | <45 | 45 – 57 | 57 – 66 | >66 |

**Night-time noise levels (23:00 – 07:00):** sites where individual noise events regularly exceed 82dB $L_{Amax}$ (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).

With respect to night-time $L_{Amax}$ noise levels, a High Court Ruling in 1996 on an appeal against the Secretary of State for the Environment clarified the point that "several times in any hour" should be interpreted as "more than two in any hour".

It should be noted that with regard to NEC levels, PPG24 states that "in some cases it may be appropriate for local planning authorities to determine the range of noise levels which they wish to attribute to any or each of the NEC's. For example, where there is a clear need for new residential development in an already noisy area some or all NECs might be increased by up to 3dB(A) above the recommended levels. In other cases, a reduction of up to 3dB(A) may be justified."

## 7.2 Camden Council LDF

Camden Council's Local Development Framework (LDF) sets out their planning policies with respect to noise – Tables A & B of DP28. When assessing a proposed residential development near a source of road or rail noise daytime, evening and night-time $L_{Aeq}$ noise levels and night-time $L_{Amax}$ noise levels should be used to determine if residential sites should be granted planning permission or where mitigation measures are deemed necessary.

Consideration should therefore be given to the noise levels detailed within the following table.

**Table 4066/T8 – Noise Threshold Levels for Sites Adjoining Roads and Railways**

| | Decision | Road and Rail Traffic Noise Sources $L_{Aeq,\,T}$ | | |
|---|---|---|---|---|
| | | Day 07:00-19:00 | Evening 19:00-23:00 | Night-time 23:00-07:00 |
| **Railways** | Planning permission will not be granted | ≥74 dB | ≥74 dB | ≥66 dB |
| **Roads** | | ≥72 dB | ≥72 dB | ≥66 dB |
| **Railways** | Attenuation measures will be required | ≥65 dB | ≥60 dB | ≥55 dB |
| **Roads** | | ≥62 dB | ≥57 dB | ≥52 dB |

In addition Camden's LDF states that where individual noise events exceed 82dB $L_{Amax,S}$ several times an hour then attenuation measures will be required.

# 8.0 Planning Assessment

## 8.1 PPG 24

With reference to Table 4066/T2 and Table 4066/T7, the daytime and night-time free-field noise levels calculated at the measurement positions fall within the following noise exposure categories as defined in PPG24.

**Table 4066/T9 – Site NECs**

| Measurement Position | Period | $L_{Aeq}$ Noise Level (dB) | Applicable NEC | Overall NEC |
|---|---|---|---|---|
| 1 | Day (07:00 – 23:00) | 69.4 | C | C |
| | Night-time (23:00 – 07:00) | 64.3 | C | |
| 2 | Day (07:00 – 23:00) | 67.6 | C | C |
| | Night-time (23:00 – 07:00) | 62.6 | C | |

It should be noted that road traffic noise was the dominant source at measurement positions 1 and 2.

PPG24 states that for NEC C "noise mitigation measures may make development acceptable."

For sites falling within NEC C, PPG 24 states "*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.*"

Based on our experience, however, sites falling in to NEC C are normally granted planning permission subject to appropriate noise control measures.

It should be noted that very few proposed development sites within central London and the surrounding boroughs do not fall into NEC C on at least one of the proposed façades. This fact, combined with the lack of land for new developments, means that such sites are normally granted planning permission by the Local Authority subject to appropriate conditions stipulating the need for the application of noise control measures.

## 8.2 Camden Council LDF

With reference to Table 4066/T8 detailing Camden Council's LDF requirements and the noise levels calculated at the measurement positions and reported in Table 4066/T2 we have determined the following.

The measured noise levels over all time periods at Positions 1 and 2 fall within the criteria range requiring attenuation measures, such that external noise may be controlled to an acceptable level. At no point do the noise levels fall in to the category where planning permission will not be granted. Therefore, attenuation measures are required at measurement Positions 1 and 2.

It should be noted that since the Local Authority criteria refer to façade incident noise levels we have not corrected our measured noise levels to allow for any façade reflection effect.

### 8.3 Other Considerations

The adjacent site at No's 15-23 St Pancras Way is occupied by another Unite scheme, which was completed in August 2006. The installed glazing at this site was 4/16/4 standard thermal double glazing. To our understanding, no complaints have been received due to either noise intrusion levels or affected external amenity space. This confirms that an acceptable residential development in this area can be achieved.

## 9.0 External Building Fabric Assessment Criteria

### 9.1 BS 8233 & WHO

BS 8233:1999 Sound insulation and noise reduction for buildings – Code of Practice draws on the results of research and experience to provide information on achieving internal acoustic environments appropriate to their functions.

The noise level values given are generally in terms of an average ($L_{Aeq}$) level, although guidance is also given on the maximum ($L_{Amax}$) noise level considered reasonable within bedrooms at night.

The standard advises the following internal ambient noise levels for achieving good/reasonable resting and sleeping conditions within residential properties. A brief explanation of the acoustic terminology used in this report is shown within Section 4.0.

**Table 4066/T10 – BS 8233 Criteria**

| | **Good $L_{Aeq,T}$ (dB)** | **Reasonable $L_{Aeq,T}$ (dB)** |
|---|---|---|
| Bedrooms* | 30 | 35 |
| Living Rooms | 30 | 40 |

* In addition individual noise events within bedrooms at night should not normally exceed 45dBA $L_{max}$ (measured with F time-weighting).

Although the document does not specifically outline the time periods over which these criteria should be considered suitable, it does note the time period should be appropriate for the activity involved. It is therefore common for the following assessment time periods to be adopted:

Bedrooms 23:00 – 07:00 hrs (night-time)
Living Rooms 07:00 – 23:00 hrs (daytime)

Guidelines for Community Noise detailed within World Health Organisation, 1999, suggests that for bedrooms, individual noise events should not normally exceed 45dB $L_{Amax}$ during the night-time. It should however be noted that, despite setting this apparent 'absolute' design limit of 45dBA $L_{max}$, the WHO guidelines also advise that, for good sleeping conditions, sound levels of about 45dB $L_{Amax}$ should not occur more than 10-15 times per night. This therefore reinforces the argument against the inclusion of emergency siren noise, etc. in our assessment as the number of such "worst case" events only occurred a maximum of 10 times per night during the entire survey period at the two measurement positions.

### 9.2 Local Authority

We understand from previous projects within Camden that the Local Authority's requirements for internal noise conditions as a result of extraneous noise sources are as follows:

**Table 4066/T11 – Local Authority Criteria**

| | $L_{Aeq,T}$ (dB) |
|---|---|
| Bedrooms* | 30 |
| Living Rooms | 35 |
| Kitchens, bathrooms, WC compartments and utility rooms | 45 |

* In addition individual noise events within bedrooms at night should not exceed 45dBA $L_{max}$ (measured with F time-weighting).

The following assessment time periods are stated in the typical planning condition:

| | |
|---|---|
| Bedrooms | 23:00 – 07:00 hrs (night-time) |
| Living Rooms | 07:00 – 23:00 hrs (daytime) |
| All other areas | 07:00 – 23:00 hrs (daytime) |

### 9.3 Summary

The design requirement for bedrooms (where individual noise events within bedrooms at night should not exceed 45dBA $L_{max}$) will ensure that in all cases the BS 8233 $L_{Aeq}$ 'good' requirement has been met.

For kitchens (which we have also considered to be living areas for the purposes of this assessment) we have adopted a design target of 35dBA $L_{Aeq}$ in line with those proposed by the Local Authority for living rooms. Toilets and bathrooms are contained within bedrooms and have no glazed elements.

## 10.0 External Building Fabric Assessment

An assessment of the external building fabric elements has been undertaken and guidance is given in the following section regarding glazing configurations and ventilation systems suitable to achieve the required internal noise levels. The specification for bedrooms is typically dictated by the achievement of the $L_{max}$ criterion and therefore the resultant $L_{Aeq}$ levels usually achieve the "good" criterion as stated in BS 8233.

## 10.1 Assumptions

Our external building fabric analyses have assumed the following:

### (a) Noise Levels

The assessment has been based on the measured noise levels as detailed in Section 5.0.

### (b) 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 4066/T12 – Bedroom Absorption Coefficients**

| Absorption Coefficient 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 room/kitchens to be "hard rooms" (with hard flooring and no soft furnishings). For the purposes of our analyses we have assumed the following absorption coefficients.

**Table 4066/T13 – Living Room/Kitchen Absorption Coefficients**

| Absorption Coefficient 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 | 0.23 |

### (c) External Wall

We understand that external non-glazed areas will generally comprise various finishes in front of a lightweight inner leaf, i.e.

- Facing brickwork / render finish / terracotta cladding, etc.
- 12mm cement particle board (CPB), e.g. Pyrok, Versapanel, etc.
- Metsec type metal studwork (or similar) with mineral wool infill
- 2 layers of 15mm dense plasterboard, e.g. BG SoundBloc

We have assumed the following sound reduction indices (equating to an overall $R_W$ of 53dB) for all non-glazed façade areas comprising the above construction:

**Table 4066/T14 – Non-Glazed SRIs**

| Assumed Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **63** | **125** | **250** | **500** | **1k** | **2k** | **4k** | **8k** |
| 21 | 32 | 45 | 55 | 55 | 55 | 55 | 55 |

Should the proposals for non-glazed areas change, it is critical we are informed at the earliest opportunity as this could have a significant impact on the sound insulation performance requirements of the glazing systems.

**(d) Ventilation**

We understand two possible ventilation systems are being considered; the first being a mechanical system and the second being natural ventilation via trickle ventilators.

A “whole-house” mechanical ventilation system is being considered to be installed throughout the development. Such a system is likely to be similar to the Villavent systems used on other Unite projects. This comprises a low speed encased fan within a fully ducted system. We have therefore assumed that external noise break-in to the bedrooms and studios via the ventilation system will be negligible (when compared to the glazing).

We have also analysed the acoustic requirements for trickle ventilators, if this method of ventilation was to be adopted. The acoustic performance specification for such trickle ventilators is detailed below.

It should be noted the MVHR or trickle vents provide background trickle ventilation only and that windows are to generally be openable to provide rapid or purge ventilation. During those periods where windows are opened for purge / rapid ventilation, noise levels will naturally be increased internally.

## 10.2 Performance Specifications and Guidance Constructions

As discussed, the site at 11-13 St Pancras Way, Camden NW1 is subject to noise from the adjacent St Pancras Way, which is a busy thoroughfare used by many different vehicles, including emergency services and heavy vehicles (such as lorries, buses, etc.). As a result, noise incident on the proposed façade from passing vehicles along St Pancras Way is of a relatively high level. The guidance glazing configurations provided for the bedrooms on these façades are commensurate with achieving ‘good’ internal $L_{Aeq}$ levels. In general, internal $L_{max}$ levels in bedrooms are likely to be commensurate with the 45dBA design target for “typical” peak events. However, in some cases, for example emergency sirens, excesses of the design target criterion by approximately 2-3dB may occur in the worst case. This is perceived as a reasonable compromise and in line with WHO guidelines.

Appendix A (attached) details the sound reduction performance specification for the ventilators and glazed elements of the external building fabric.

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 following glazing configurations detailed below to prove commensurate with achieving the sound insulation performance specifications detailed within Appendix A.

**Table 4066/T15 – Glazing Guidance Constructions**

| Type | Configuration |
|---|---|
| G1 | Low spec thermal double glazing, e.g. 4/12/8 |
| G2 | Any standard thermal double glazing, e.g. 4/12/4. Please note, however, a better performance will be achieved through differing pane thicknesses. |

It should be noted that due to the likely necessity for security laminated glass in some (accessible) locations, the actual proposed configurations may exceed those stated above.

For guidance purposes we would typically expect either of the following ventilation types to prove commensurate with achieving the sound insulation performance specifications detailed within Appendix A.

**Table 4066/T16 – Ventilator Guidance Constructions**

| Type | Configuration |
|---|---|
| V1 | Either; a whole house mechanical ventilation with heat recovery system, e.g. Villavent; |
| V2 | Or; an above-the-window / through-the-frame high spec acoustically rated trickle ventilator, e.g. Renson Invisivent AK49 or similar |

Please note that the whole house mechanical ventilation with heat recovery system (V1) will achieve a better performance than the above specified trickle ventilator (V2), but either system should be acceptable in terms of achieving the required internal noise levels.

*Please note – The guidance constructions described in Table 4066/T15 and Table 4066/T16 are given for costing purposes only. All glazing systems and ventilators should be capable of meeting the performance specifications shown in Appendix A, with laboratory test certificates being made available in support of the quoted performance. Glazing proposals which simply reflect the guidance constructions indicated in this report will not, in isolation, be sufficient evidence that a glazing configuration will meet the performance specification.*

## 10.3 Façade Zones

For guidance purposes we would typically expect the glazing configurations detailed above to be required in the following areas:

**Table 4066/T17 – Glazing Zones**

| Type | Configuration |
|---|---|
| G1 | All bedrooms on all façades at all levels |
| G2 | All other rooms on all façades at all levels |

Either ventilation strategy could be employed, i.e. either the Villavent system or acoustic trickle ventilators, but the same specification trickle vent should be installed throughout the development, i.e. all room types on all façades at all levels.

## 11.0 Conclusions

RBA Acoustics have undertaken noise monitoring at the buildings currently occupying the site at 11-13 St Pancras Way, Camden, NW1 0PT. The measured noise levels are presented herein and have been used in our preliminary assessment of the glazing and ventilation requirements to ensure suitable internal noise levels are achieved at the proposed development with reference to BS 8233, WHO and Camden Council's Local Development Framework and typical Planning Condition.

General guidance configurations have been suggested for the glazing constructions and ventilators that should be capable of achieving the performance specification and therefore the required internal noise levels. Only a nominal glazing configuration is required to effectively attenuate the noise levels. As such, we do not consider planning approval should be rejected on the basis of noise.

The data has also been used to set plant noise emission criteria for future assessment of any proposed plant at the development to ensure the adjacent neighbour's amenity spaces are protected.

# Appendix A – External Building Fabric Acoustic Specification

## 1.0 Glazing Sound Insulation Performance

Glazed units (inclusive of glazing, louvres, timber panels, spandrel panels, infill panels, framing, opening lights, balcony/terrace doors, seals, etc. as appropriate) should achieve the following minimum sound reduction indices as tested in general accordance with BS EN ISO 140-3:1995:

| Type | Minimum Recommended Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz) | | | | | | | | $R_w$ (dB) |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| G1 | 19 | 26 | 22 | 28 | 38 | 41 | 42 | 42 | 34 |
| G2 | 16 | 20 | 19 | 23 | 32 | 36 | 35 | 35 | 30 |

Note: $R_w$ is the "overall weighted sound reduction index" tested in a laboratory.

N.B. as the internal noise criteria are expressed in dBA terms, other frequency specific performance levels may ultimately prove possible. Test data for representative samples of all glazing systems shall be submitted to RBA Acoustics for approval to demonstrate compliance with the above performance specifications.

## 2.0 Trickle Ventilator Sound Insulation Performance

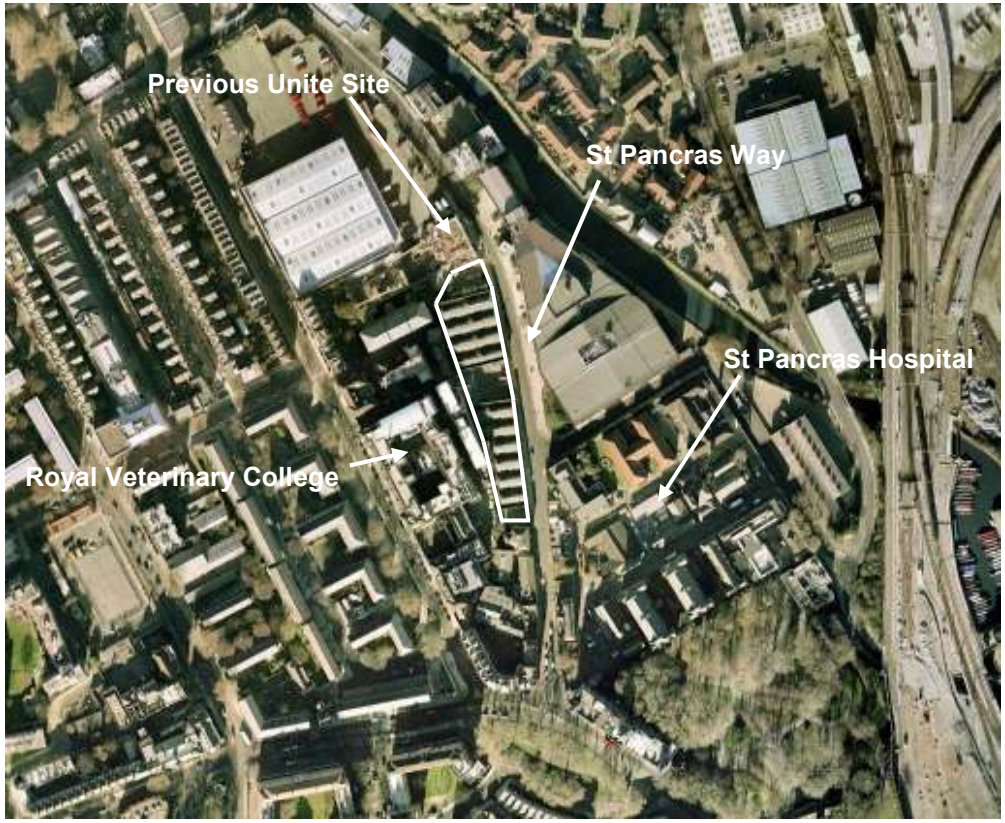
Trickle ventilators (in their open state) should achieve the following minimum element-normalised level differences as tested in accordance with BS EN 20140-10:1992:

| Type | Minimum Recommended $D_{n,e}$ (dB) at Octave Band Centre Frequency (Hz) | | | | | | | | $D_{n,e,w}$ (dB) |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| V1 | Whole house mechanical ventilation system with heat recovery | | | | | | | | |
| V2 | 40 | 41 | 35 | 45 | 52 | 57 | 65 | 65 | 49 |

Note: $D_{n,e,w}$ is the "overall weighted element normalised level difference" tested in a laboratory.

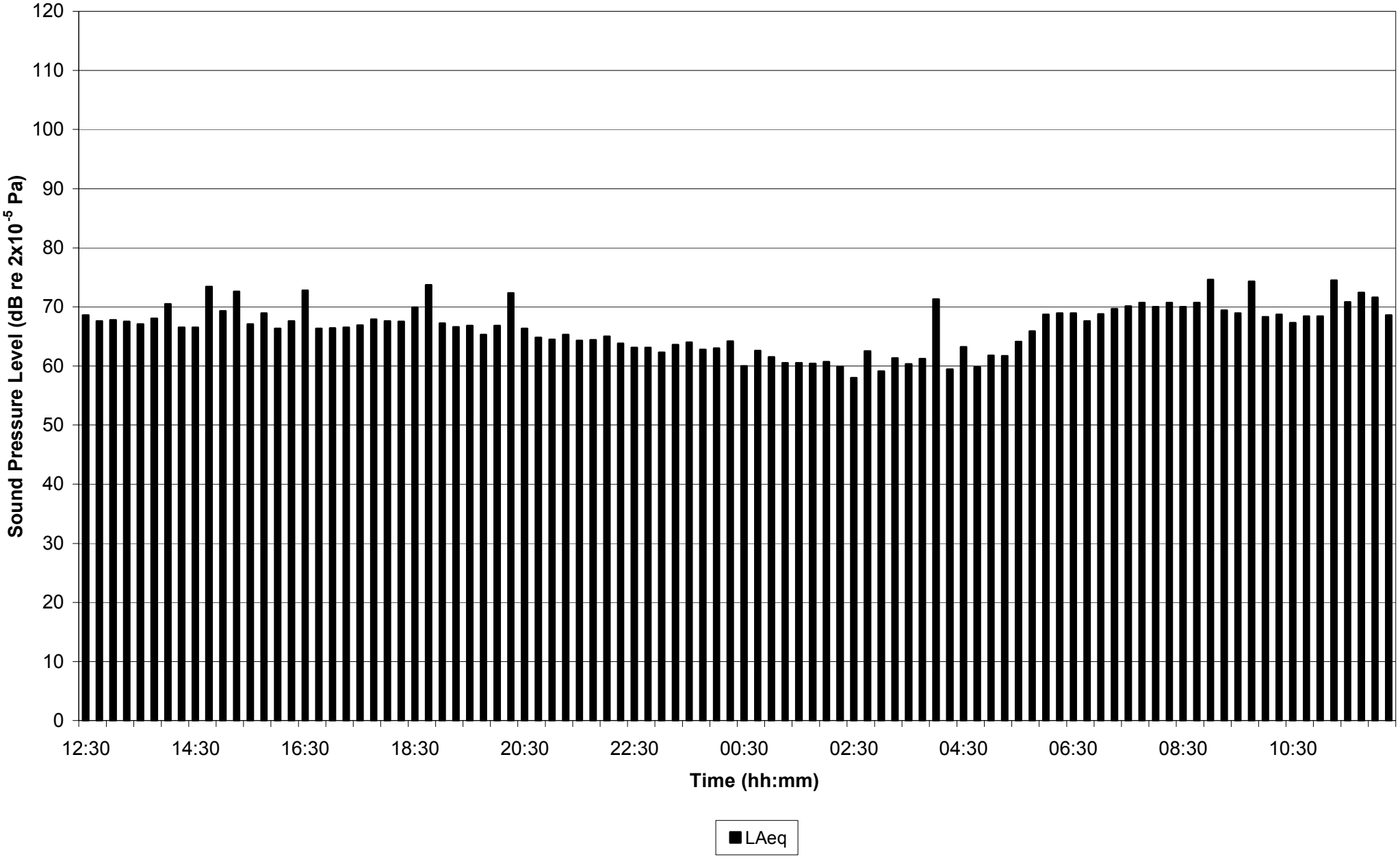
Please note the above specification(s) assumes one trickle ventilator will be installed per room, i.e. a continuous mechanical extract system (ADF System 3) will be utilised. The specification(s) should be increased by a factor of 10Log(N) should N ventilators be required per room, i.e. increase by +3dB or +5dB respectively should two or three ventilators be required per room.

N.B. as the internal noise criteria are expressed in dBA terms, other frequency specific performance levels may ultimately prove possible. Test data for the trickle vents in their open state shall be submitted to RBA Acoustics for approval.

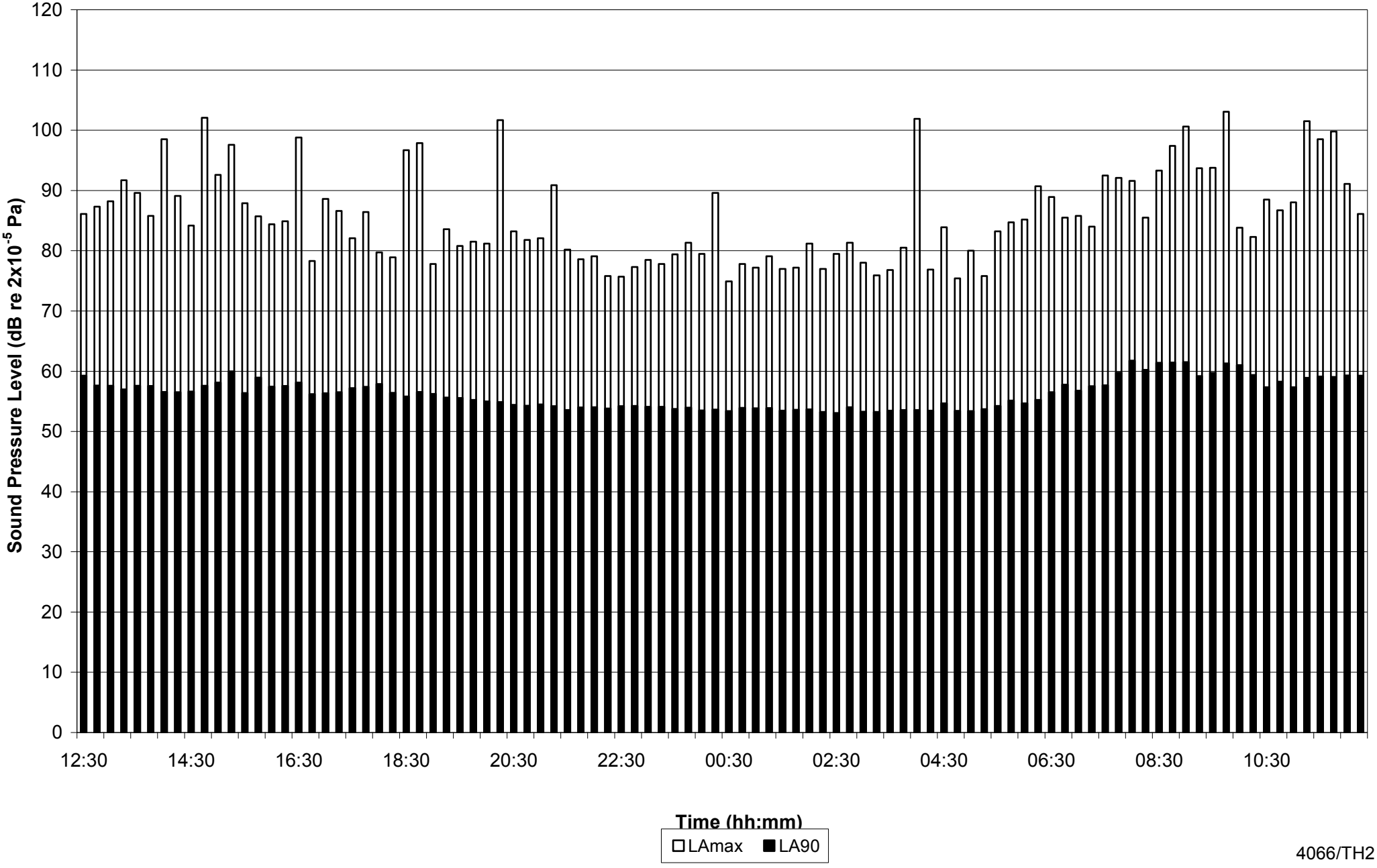

| | | |
|---|---|---|
| Site Plan showing Measurement Positions | Figure 4066/SP1 | RBA ACOUSTICS |
| | 16 May 2012 | |
| Unite - Travis Perkins<br>11-13 St Pancras Way, Camden NW1 | Not to Scale | 104 The Foundry Annexe, 65 Glasshill St, London SE1 0QR<br>Telephone: 020 7953 7233 Facsimile: 020 7953 7236 |

**Unite, Travis Perkins**
**$L_{Aeq}$ Time History**
**Position 1**



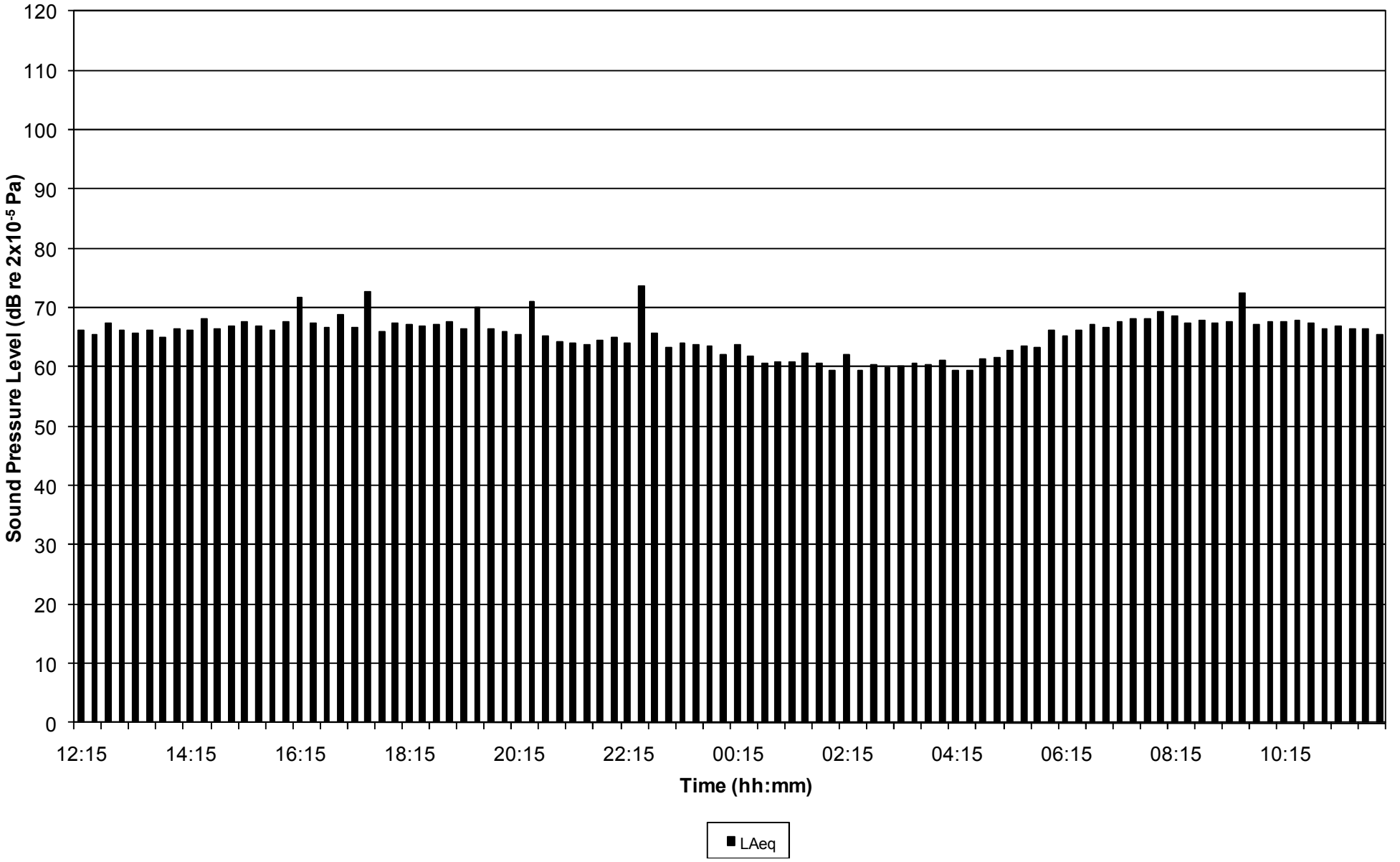

4066/TH1

**Unite, Travis Perkins**
**$L_{Amax}$ and $L_{A90}$ Time Histories**
**Position 1**



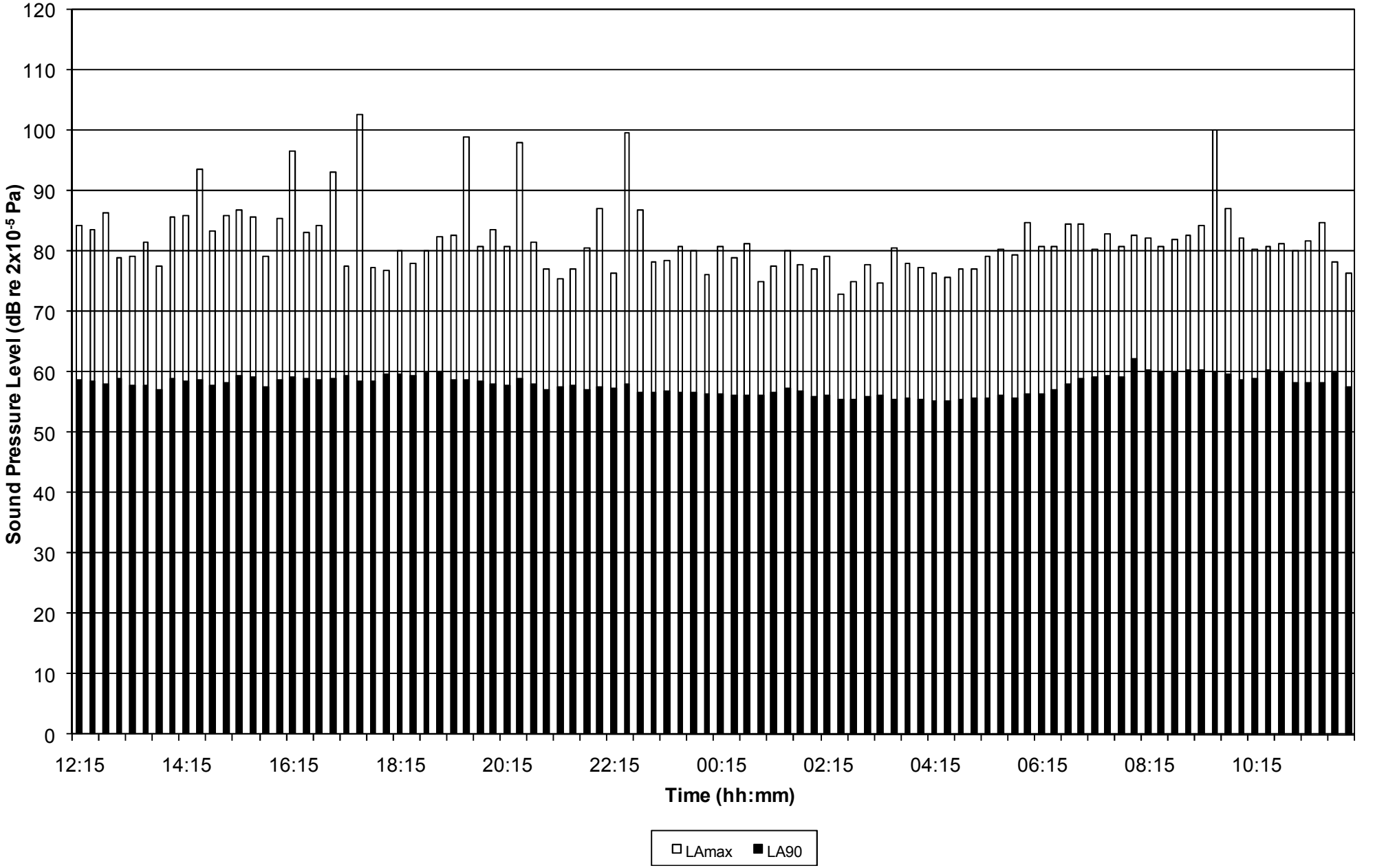

4066/TH2

**Unite, Travis Perkins**
**$L_{Aeq}$ Time History**
**Position 2**

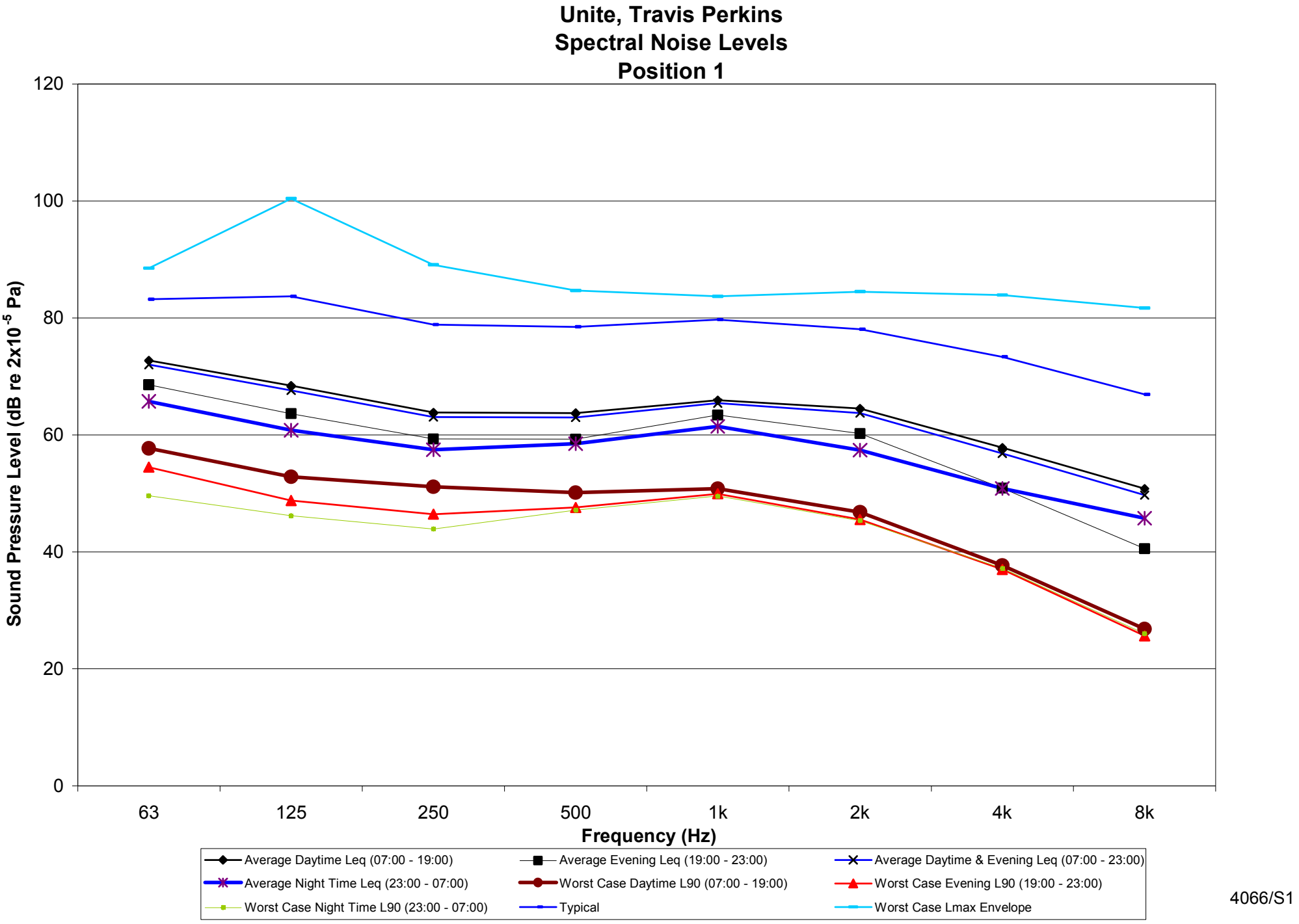



4066/TH3

**Unite, Travis Perkins**
**$L_{Amax}$ & $L_{A90}$ Time Histories**
**Position 2**

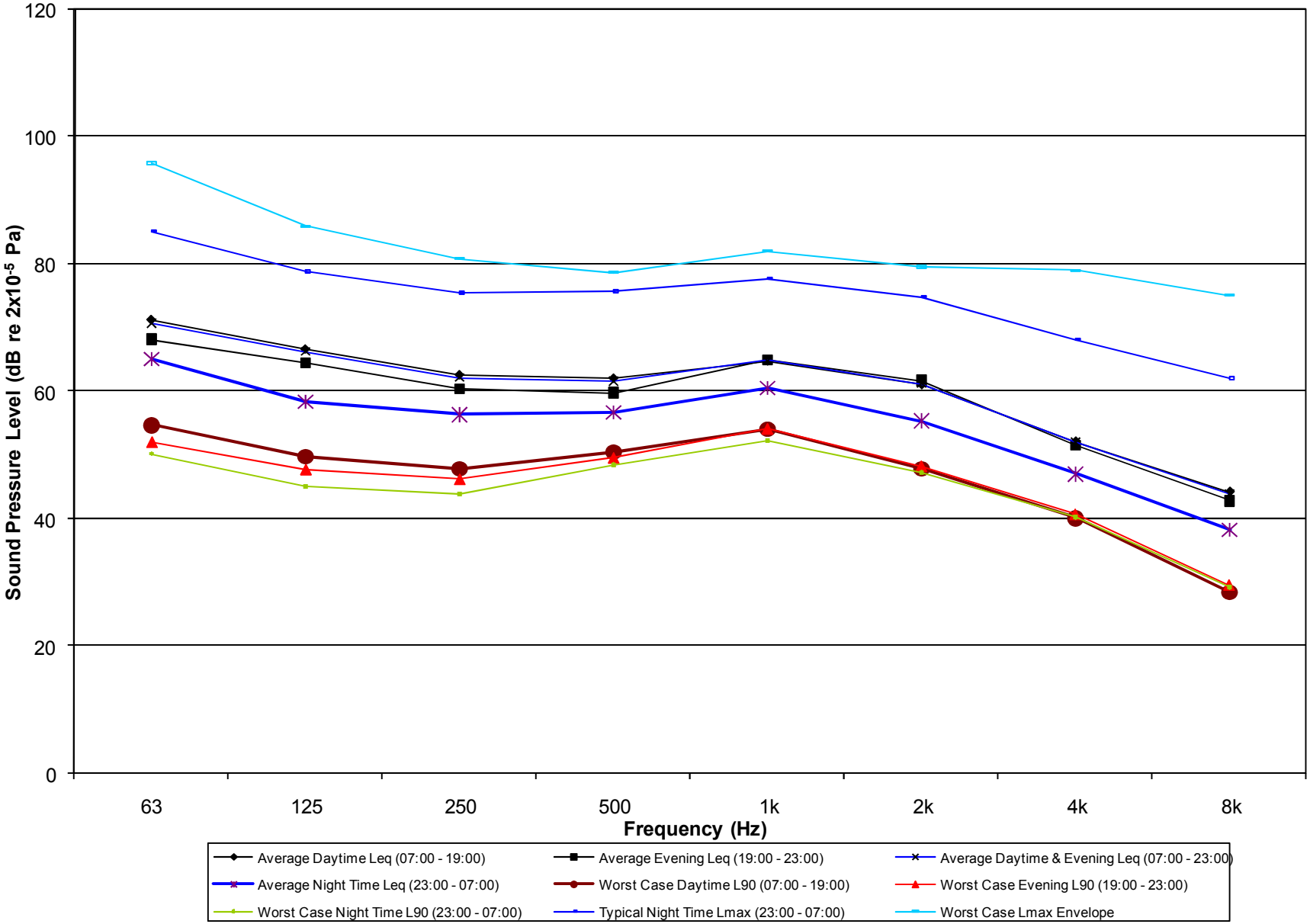



4066/TH4


Unite, Travis Perkins
Spectral Noise Levels
Position 1
Sound Pressure Level (dB re 2x10-5 Pa)
120
100
80
60
40
20
0
63
125
250
500
1k
2k
4k
8k
Frequency (Hz)
Average Daytime Leq (07:00 - 19:00)
Average Evening Leq (19:00 - 23:00)
Average Daytime & Evening Leq (07:00 - 23:00)
Average Night Time Leq (23:00 - 07:00)
Worst Case Daytime L90 (07:00 - 19:00)
Worst Case Evening L90 (19:00 - 23:00)
Worst Case Night Time L90 (23:00 - 07:00)
Typical
Worst Case Lmax Envelope

4066/S1

# Unite, Travis Perkins
# Spectral Noise Levels
# Position 2




4066/S2