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238 Kilburn High Road, London

Noise Impact Assessment Report
Report 29818.NIA.01

AHK Legal Estate
77 Baker Street
London
W1U 6RF

Report 29818.NIA.01 Revision History			
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C		F	
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Contents

List of Attachments

29818.TH1-2	Environmental Noise Time Histories
29818.TH3	Environmental Noise Time History for a custom period
29818.Daytime L90.TH1-2	Statistical analysis for representative daytime L_{A90}
29818.Night-time L90.TH1-2	Statistical analysis for representative night-time L_{A90}
Appendix A	Glossary of Acoustics Terminology
Appendix B	Acoustic Calculations
Appendix C	Anti-Vibration Mounting Specification Reference Document

1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by AHK Legal Estate 77 Baker Street London W1U 6RF, to assess the suitability of the site at 238 Kilburn High Road NW6 2BS for a residential development in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

This report presents the results of the A 72-hour environmental noise survey undertaken in order to measure prevailing background noise levels and outlines any necessary mitigation measures.

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed elements in order to meet the requirements of BS8233:2014, taking into consideration the non-glazed external building fabric elements. The results of these calculations and the sound reduction performance requirements for the glazed elements are shown in Table 5.2.

Further advice can be provided with regards to the overheating strategy to assess the noise implications once thermal modelling calculations have been undertaken.

Noise levels within external amenity areas would be expected to meet the recommended levels provided within BS8233:2014.

No further mitigation measures should be required in order to protect the proposed habitable spaces from external noise intrusion.

2.0 SITE SURVEYS

2.1 Site Description

The site is bounded by residential and commercial buildings to the north, Gangway Road to the east, and Kilburn High Road to the south and west. The entrance to the site is located on Kilburn High Road.

At the time of the survey, the background noise at Locations 01 and 02 was primarily dominated by road traffic from Kilburn High Road and Gangway Road, along with noise from plant units serving nearby buildings. Additionally, the background noise at Location 02 was affected by noise from the kitchen extract system of the ground-floor restaurant at 238 Kilburn High Road.

As per discussions with the client, it was not possible to switch off the kitchen extract system of the ground-floor restaurant for the duration of the restaurant's operation time during the noise survey.

2.2 Environmental Noise Survey Procedure

A noise survey was undertaken on the proposed site as shown in Figure 2.1. The location was chosen in order to collect data representative of the worst-case levels expected on the site due to all nearby sources.

Continuous automated monitoring was undertaken for the duration of the survey between 10.30 on 27/01/2025 and 10.30 on 29/01/2025.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.3 Measurement Positions

Measurement positions are as described within Table 2.1 and shown within Figure 2.1.

Icon	Descriptor	Location Description
1	Noise Measurement Position 1	The microphone was installed on a tripod at the roof top of the front façade, as shown in Figure 2.1. The microphone was positioned within free-field conditions at least approx. 1.5 metres from the nearest surface.
2	Noise Measurement Position 2	The microphone was installed on a tripod at the roof top of the rear façade, as shown in Figure 2.1. The microphone was positioned within free-field conditions at least approx. 1.5 metres from the nearest surface.

Table 2.1 Measurement positions and descriptions

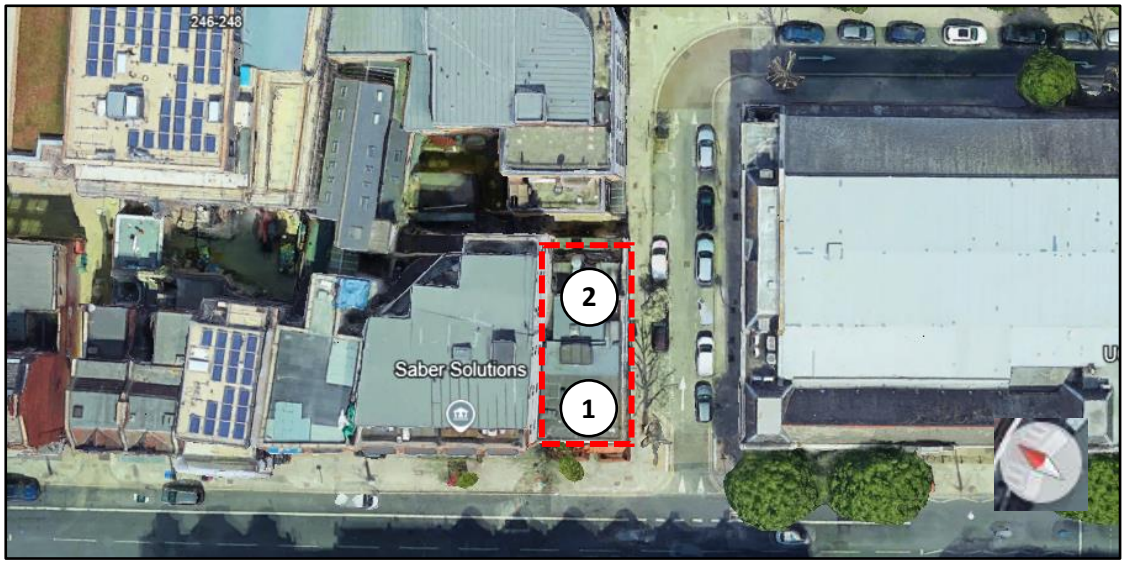

Figure 2.1 Site Location and site measurement positions (Image Source: Google Maps)

2.4 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

Measurement instrumentation		Serial no.	Date	Cert no.
Noise Kit 27	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21174-E0	23/07/2024	TCRT24/ 1570
	Free-field microphone NTI Acoustics MC230A	A23366		
	Preamp NTI Acoustics MA220	11034		
	NTI Audio External Weatherproof Shroud	-	-	-
Noise Kit 28	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21140-E0	23/05/2023	UK-23-063
	Free-field microphone NTI Acoustics MC230A	A23592		
	Preamp NTI Acoustics MA220	10981		
	NTI Audio External Weatherproof Shroud	-	-	-

Table 2.2 Measurement instrumentation

3.0 RESULTS

The $L_{Aeq: 5min}$, $L_{Amax: 5min}$, $L_{A10: 5min}$ and $L_{A90: 5min}$ acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figure 29818.TH1 & 29818.TH2.

Measured noise levels are representative of noise exposure levels expected to be experienced by all facades of the proposed development, and are shown in Table 3.1.

Time Period	Noise Measurement Position 1 (Measured Noise level – dBA)	Noise Measurement Position 2 (Measured Noise level – dBA)
Daytime $L_{Aeq,16hour}$	66	*63
Night-time $L_{Aeq,8hour}$	63	59

Table 3.1 Site average noise levels for daytime and night time

*With effect of the existing kitchen extract system

Following further discussions with the client, it is understood that due to the proposed demolition of the building, the existing kitchen extract system will no longer be in operation.

The time history 29818.TH.02 shows that the noise levels measured at Noise Measurement Position 2 over an 8.5-hour daytime period (from 07:00 am to 03:30 pm on 28/01/2025) indicate that the existing plant unit (kitchen extract system) was not operational. Therefore, the data used for glazing calculations remains unaffected by noise from the existing kitchen extract system. The noise levels measured during the specified period are presented in Table 3.2.

Time Period	Noise Measurement Position 2 (Measured Noise level – dBA)
Daytime $L_{Aeq,9hour}$	61

Table 3.2 during a 8.5 hour daytime custom period (without plant noise)

4.0 NOISE ASSESSMENT GUIDANCE

4.1 Noise Policy Statement for England 2023

The National Planning Policy Framework (NPPF) has superseded and replaces Planning Policy Guidance Note 24 (PPG24), which previously covered issues relating to noise and planning in England. Paragraph 180 of NPPF 2023 states that planning policies and decisions should aim to:

- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

In addition, Paragraph 191 of the NPPF states that '*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should':*

- Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010 with the aim to 'Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.'

Noise Policy Statement England (NPSE) noise policy aims are as follows:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life*

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- NOEL – No Observed Effect Level

- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

- LOAEL – Lowest Observed Adverse Effect Level
  - This is the level above which adverse effects on health and quality of life can be detected.

- SOAEL – Significant Observed Adverse Effect Level
  - This is the level above which significant adverse effects on health and quality of life occur.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

4.2 ProPG: Planning and Noise

As outlined above, the National Planning Policy Framework encourages improved standards of design, although it provides no specific noise levels which should be achieved on site for varying standards of acoustic acceptability, or a prescriptive method for the assessment of noise.

ProPG: Planning and Noise was published in May 2017 in order to encourage better acoustic design for new residential schemes in order to protect future residents from the harmful effects of noise. This guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development, but without the nuance of 'good acoustic design' as outlined in ProPG.

ProPG allows the assessor to take a holistic approach to consider the site's suitability, taking into consideration numerous design factors which previously may not have been considered alongside the noise level measured on site, for example the orientation of the building in relation to the main source of noise incident upon it.

It should be noted this document is not an official government code of practice, and neither replaces nor provides an authoritative interpretation of the law or government policy, and therefore should be seen as a good practice document only.

4.3 BS8233:2014

BS8233:2014 *'Sound insulation and noise reduction for buildings'* describes recommended internal noise levels for residential spaces. These levels are shown in Table 4.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB(A)	-
Dining	Dining Room/area	40 dB(A)	-
Sleeping (daytime resting)	Bedrooms	35 dB(A)	30 dB(A)

Table 4.1 BS8233 recommended internal background noise levels

It should be noted that the recommended internal noise levels outlined above are not applicable under "purge ventilation" conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally (e.g. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods.

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

In addition to guidance on internal levels, BS8233:2014 also states the following with regards to noise within external amenity spaces:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$, which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.'

As outlined above, the resulting noise levels in external amenity areas should not be a reason for refusal, providing that the noise levels are designed to be as low as practically possible within external amenity areas.

Expected levels within the proposed external amenity areas are outlined in Section 7.0 in more detail.

4.4 WHO Guidelines for Community Noise (1999)

WHO Guidelines for Community Noise (1999) recommends that internal noise levels for individual events should not exceed 45dB L_{Amax} more than 10-15 times per night.

It should be noted that this impact is increasingly being regarded as 'LOAEL' for this number of exceedances, as described in Section 4.1.

The external building fabric would need to be carefully designed to ensure that the above guidance is achieved.

4.5 Approved Document O (ed. 2021)

Approved Document O (ADO) supports Part O of Schedule 1 to the Building Regulations 2010. ADO introduces requirements for residential premises in order to prevent overheating from occurring. There are two specific requirements from ADO:

Requirement O1 (1):

To limit unwanted solar gains in summer and to provide adequate means to remove heat from the indoor environment.

Requirement O1 (2):

(a) Account must be taken of the safety of the occupant, and their reasonable enjoyment of the residence.

(b) Mechanical cooling may only be used where sufficient heat cannot be removed from the indoor environment without it.

The statutory guidance to support Requirement O1(2)(a) contains requirements relating to noise at night.

4.5.1 Application

The guidance within ADO applies to new residential buildings only and are defined within the following table:

Title	Purpose for which the building is intended to be used.
Residential (dwellings)	Dwellings, which includes both dwellinghouses and flats.
Residential (institutions)	Home, school or other similar establishment, where people sleep on the premises. The building may be living accommodation for the care or maintenance of any of the following. A. Older and disabled people, due to illness or other physical or mental condition. B. People under the age of 5 years.

Title	Purpose for which the building is intended to be used.
Residential (other)	Residential college, hall of residence and other student accommodation, and living accommodation for children ages 5 years or older.

Table 4.2 Residential buildings within the scope of ADO (ref. Table 0.1 of Approved Document O)

Paragraphs 3.2 and 3.3 of ADO specifically refer to noise within bedrooms at night. Whilst any habitable room could be used as a bedroom, it is proposed that the scope is confined to those rooms specifically designated as bedrooms.

4.5.2 Internal Noise Level Targets

ADO sets internal noise level targets within Paragraph 3.3 of the document:

"Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)

b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)."

Where an openable window for the removal of excess heat is predicted to result in the above internal noise levels to be exceeded, then the overheating mitigation strategy must adopt one of the alternative means listed within Paragraph 2.10 of ADO (presented within Section 4.7.3 of this report). This constraint applies regardless of which method is used to demonstrate compliance with Requirement O1 (1).

4.5.3 Methods to Remove Excess Heat

Paragraph 2.10 of ADO lists the means for removing excess heat from dwellings according to the following:

- Openable windows
- Ventilation louvres in external walls
- A mechanical ventilation system
- A mechanical cooling system

5.0 EXTERNAL BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed and non-glazed elements in order to achieve the recommended internal noise levels shown in Table 4.1, taking into account average and maximum noise levels monitored during the environmental noise survey.

As a more robust assessment, L_{Amax} spectrum values of night-time peaks have also been considered and incorporated into the glazing calculation in order to cater for the interior limit of 45 dB L_{Amax} for individual events, as recommended in WHO Guidelines.

Please note that the glazed and non-glazed element calculations would need to be finalised once all design proposals are finalised.

5.1 Non-Glazed Elements

At this project stage, the exact construction of the non-glazed external building fabric is unknown, however, it is understood that it would be based upon the construction proposed in Table 5.1 and would be expected to provide the minimum figures shown in the following table when tested in accordance with the BS EN ISO 10140 series of standards.

Element	Octave band centre frequency SRI, dB					
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Brickwork Cavity Wall	41	43	48	50	55	55

Table 5.1 Assumed sound reduction performance for non-glazed elements

5.2 Glazed Elements

Minimum octave band sound reduction index (SRI) values required for all glazed elements to be installed are shown in Table 5.2.The performance is specified for the whole window unit, including the frame, seals, etc. as appropriate. Sole glass performance data would not demonstrate compliance with this specification.

Glazing performance calculations have been based both on average measured night-time noise levels as well as verified against the L_{Amax} spectrum of individual events in order to comply with a maximum internal noise level of 45dB(A) in bedrooms as recommended by World Health Organisation Guidelines. The combined most robust results of these calculations are shown in Table 5.2.

Elevation	Octave band centre frequency SRI, dB						R_w ($C;C_{tr}$), dB
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	
West and South Elevations (Kilburn road & Grange way road) as shown in Figure 5.1 -5.4	26	27	34	40	38	46	37(-1;-4)
South Elevations and East Elevations (Grange way road & rear side) as shown in Figure 5.1 -5.4	20	19	29	38	34	45	31(-1;-4)

Table 5.2 Required glazing performance

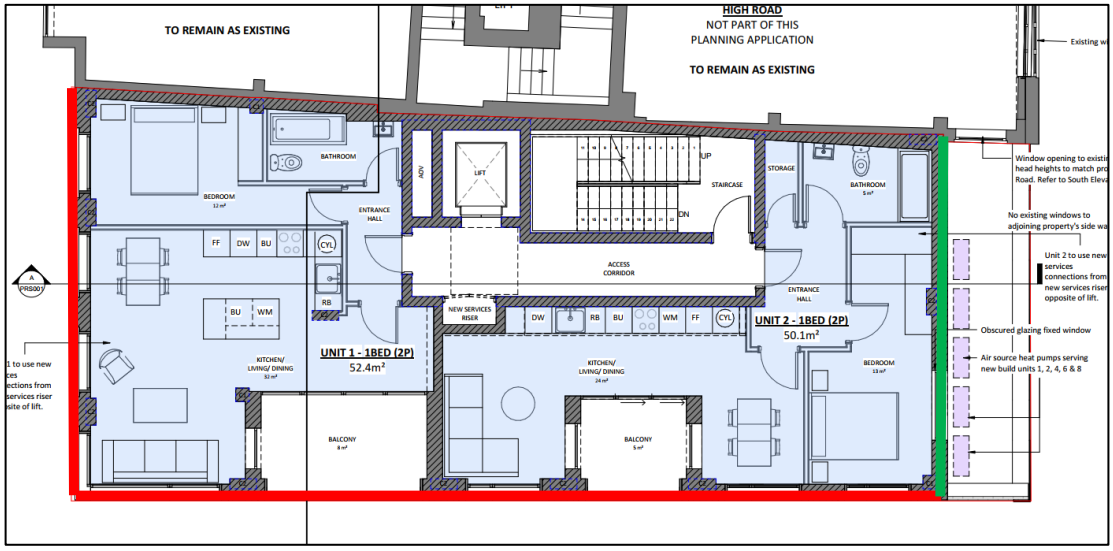

Figure 5.1 Required glazing types for level 1 (Image Source: Osel Architecture)

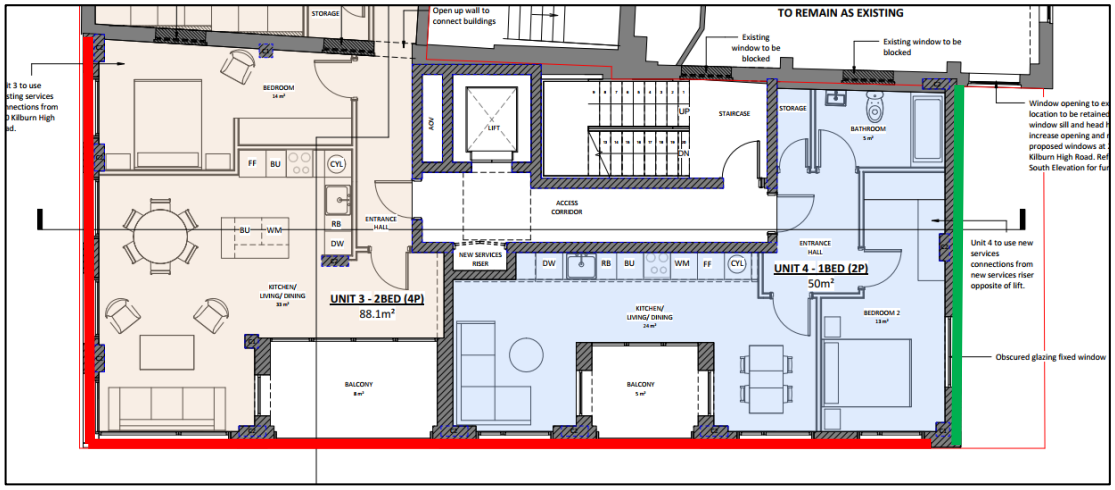

Figure 5.2 Required glazing types for level 2 (Image Source: Osel Architecture)

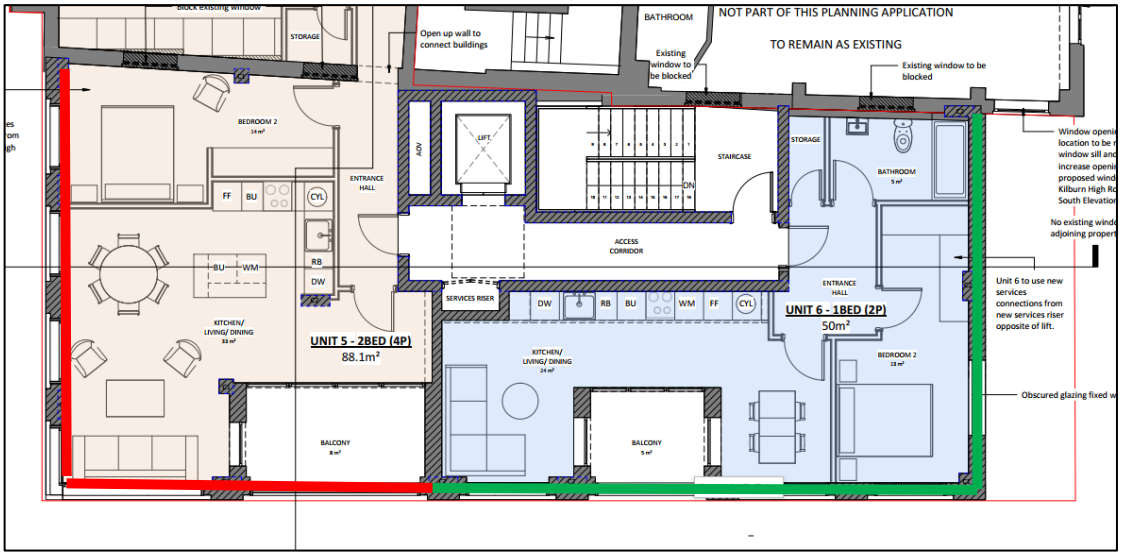

Figure 5.3 Required glazing types for level 3 (Image Source: Osel Architecture)

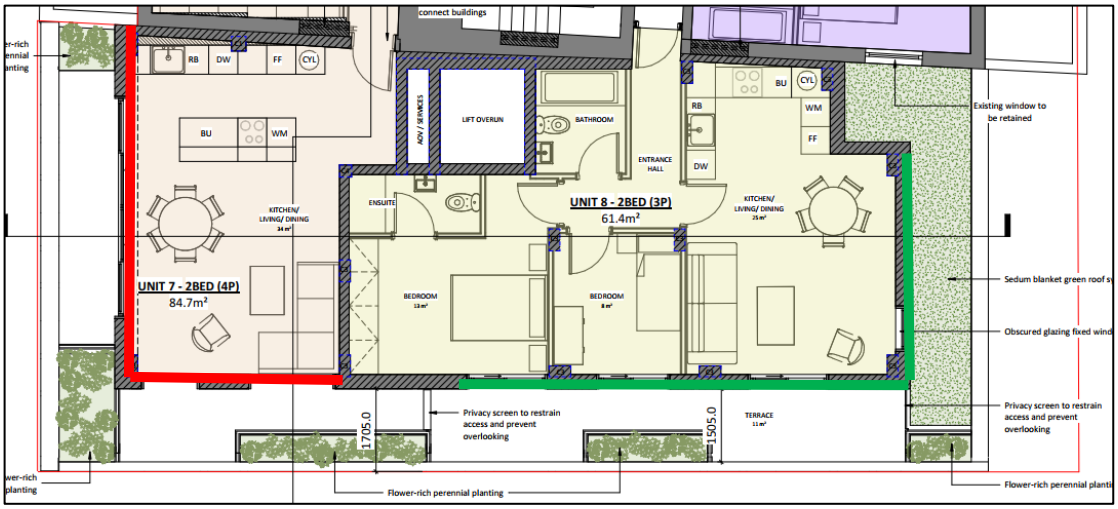

Figure 5.4 Required glazing types for level 4 (Image Source: Osel Architecture)

The nominated glazing supplier should verify that their proposed window system meets the attenuation figures shown at each centre frequency band as shown in Table 5.2.

Example glazing types that would be expected achieve the above spectral values are shown in Table 5.3.

Elevation	Example glazing type
West and South Elevations (Kilburn road & Grange way road) as shown in Figure 5.1 -5.4	10/12/6mm double glazing
South Elevations and East Elevations (Grange way road and rear side) as shown in Figure 5.1 -5.4	6/12/6mm double glazing

Table 5.3 Example glazing types

All major building elements should be tested in accordance with the BS EN ISO 10140 series of standards.

Independent testing at a UKAS accredited laboratory will be required in order to confirm the performance of the chosen system for an 'actual' configuration.

6.0 VENTILATION AND OVERHEATING

6.1 Ventilation Strategy

Based on the noise levels measured on site, appropriate ventilation systems are outlined in Table 6.1 below in order to ensure the internal noise environment is not compromised.

Ventilation System	Whole Dwelling Ventilation	Extract Ventilation
ADF system 01 West and South Elevations (Kilburn road & Grange way road) as shown in Figure 5.1 -5.4	Trickle vents providing a minimum performance of 40dB $D_{,n,e,w}$	Intermittent extract fans
ADF system 01 South Elevations and East Elevations (Grange way road & rear side) as shown in Figure 5.1 -5.4	Trickle vents providing a minimum performance of 38dB $D_{,n,e,w}$	Intermittent extract fans

Table 6.1 Ventilation systems

Where trickle vents are proposed, a typical number has been assumed based on the room size and number of windows. As trickle vents introduce a weak point in the building façade, it should be noted that increasing the number of trickle vents will reduce the composite performance of the facade. If more trickle vents are required, the required insulation should be increased by '+10*LOG(N)' where N is the number of vents proposed. If trickle vents are

proposed, the total number of trickle vents for each sensitive space should be confirmed so that calculations can be accurately revised.

In the case of mechanical ventilation, systems should be designed to meet the internal noise levels as defined in CIBSE Guide A (2015), as shown in Table 6.2.

Room Type	LAeq, dB	NR
Bedrooms	30	25
Living Rooms	35	30
Kitchen	45-50	40-45

Table 6.2 CIBSE Guide A 2015 guidance levels for mechanical building services

In all cases, purge ventilation would be provided by openable windows. As outlined in Section 6.2 the internal noise level requirement would not be applicable during purge conditions as this would only occur occasionally.

6.2 Openable Windows

Approved Document O (ADO) only applies to Bedrooms during night. The advice within this section would therefore only apply to Bedrooms during night-time hours (23:00-07:00) to ensure that the internal noise level targets of 40dB(A) $L_{eq,T}$ and 55dB(A) L_{max} are not exceeded.

Table 6.3 presents the open area of the window as a % of the floor area which would need to be achieved to ensure that sufficient attenuation is provided from outside to inside.

Elevation	Sound Reduction Required to Achieve ADO Target Internal L_{Aeq} Noise Levels	Sound Reduction Required to Achieve ADO Target Internal L_{Amax} Noise Levels	Maximum Open Area of the Window as a Percentage of the Floor Area to Achieve ADO Target Internal Noise Levels
West	23 dB	25 dB	0 %
South	19 dB	21 dB	0 %
East	19 dB	21 dB	0 %

Table 6.3 Window open areas

The overheating model should inform the design team whether the % open areas above would be sufficient to remove excess heat. In the event they are insufficient, other options to limit solar gains into the building should be investigated (such as those outlined in Section 2.7 of

Approved Document O), or other means of removing excess heat should be explored (as outlined in Section 2.10 of the Approved Document).

Note: Acoustic open area is the measurable, cross-sectional, geometric area of an opening. For a partially open window, this is considered to be the lesser of either the size of the hole in the window frame that is left by the opening light, or the combined cross-sectional area around the opening light through which air must pass to move from outside to inside. The area around a hinged opening light includes the triangular areas on the sides adjacent to the hinge, and the rectangular area on the side opposite the hinge. This should not be used for comparing the air-flow performance of elements because this will also be dependent on factors such as depth (length of air-path), surface roughness and tortuosity.

6.3 Overheating Control Strategies

Where the open areas specified above are not sufficient for controlling overheating, then one or more of the following strategies will need to be adhered to:

- Fixed shading devices comprising any of the following:
  - Shutters
  - External blinds
  - Overhangs
  - Awnings
- Glazing design, involving any of the following solutions
  - Size
  - Orientation
  - G-value
- Building design, e.g. the placement of balconies
- Shading provided by adjacent buildings structures or landscaping.
- Ventilation louvres in external walls
- A mechanical ventilation system
- A mechanical cooling system

KP Acoustics would be happy to review any proposals to ensure that they adhere to the internal noise levels targeted within ADO.

7.0 EXTERNAL AMENITY AREA ASSESSMENT

External amenity areas are proposed for units on levels one to four, consisting of several balconies and a terrace on level four.

Based on the measured noise levels provided in Table 3.1, the predicted ambient noise levels at each of the external amenity areas is as follows:

- South Façade – 59-63dB $LA_{eq,T}$

BS8233:2014 target guidance for noise in external amenity areas, it is desirable that the external noise level does not exceed 50 dB $LA_{eq,T}$, with an upper guideline value of 55 dB $LA_{eq,T}$, which would be acceptable in noisier environments.

However, BS 8233:2014 guidance also states:

'it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited'

Additionally, BS 8233:2014 states:

"Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses"

It is considered that this guidance applies to the small balconies and small terrace area on the south façade. Therefore, the above noise levels would be considered suitable for external amenity areas.

8.0 PLANT NOISE ASSESSMENT

Additionally, KP Acoustics Ltd has been appointed to undertake a noise impact assessment for a proposed plant unit installation serving the building at the above address.

An environmental noise survey has been undertaken on site in order to prepare a noise impact assessment in accordance with BS4142:2014 '*Method for rating and assessing industrial and commercial sound*' as part of the planning requirements of The London Borough of Camden.

This report presents the results of the environmental survey undertaken in order to measure prevailing background noise levels and presents the methodology and results from the environmental survey, followed by calculations in accordance with BS4142 to provide an indication as to the likelihood of the noise emissions from the proposed plant unit installation having an adverse impact on the closest noise sensitive receiver. Mitigation measures will be outlined as appropriate.

8.1 Nearest noise sensitive receptors and Proposed plant installation location

The nearest noise sensitive receptors and the proposed plant installation location described within Table 8.1 and shown within Figure 8.1.

Icon	Descriptor	Location Description
	Nearest noise sensitive receptor	Rear façade. 1st Floor window of Flat 7 at 240 Kilburn High Road
	Proposed plant installation location	The proposed plant installation is detailed in Section 11.1, with Plant 1 identified as the closest to the noise-sensitive receiver and Plant 5 as the farthest.

Table 8.1 Nearest noise sensitive receptor and proposed plant installation location

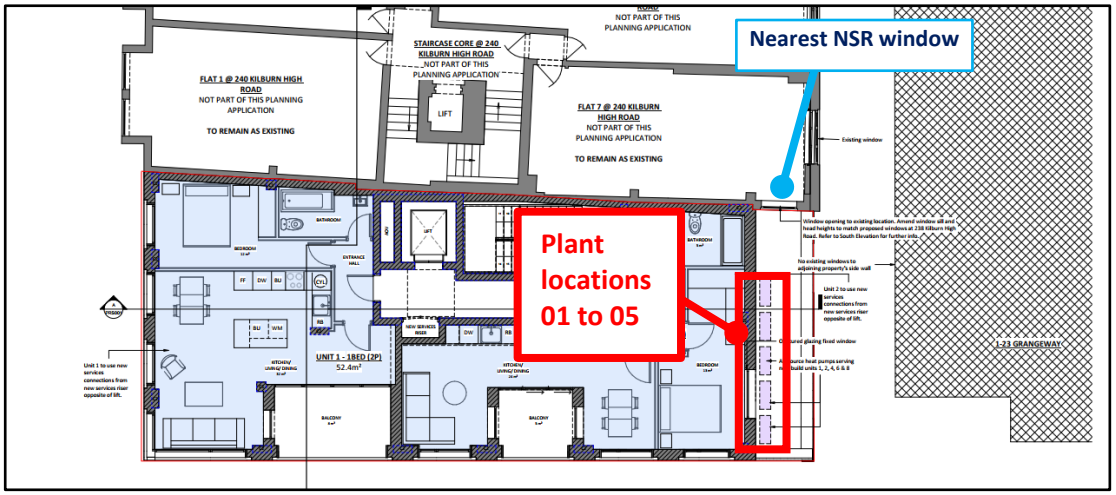

Figure 8.1 Proposed plant installation location & nearest noise sensitive receptor (Image Source: Osel Architecture)

9.0 RESULT

9.1 Plant Noise Survey Results

Noise Measurement Position 2 is considered to be representative of the noise climate at the receptors close to the proposed plant unit's location.

Minimum background noise levels are shown in Table 9.1 for daytime and night-time, in order to comply with the assessment criteria of The London Borough of Camden.

Time Period	Noise Measurement Position 2 Minimum background noise level L_{A90} dB(A)	Noise Measurement Position 2 Average ambient noise level $L_{Aeq,T}$ dB(A)
Daytime (07:00-23:00)	58	61
Night-time (23:00-07:00)	45	59

Table 9.1 Minimum background noise levels and average ambient noise levels.

10.0 NOISE ASSESSMENT GUIDANCE

10.1 BS4142: 2014 '*Methods for rating and assessing industrial and commercial sound*'

British Standard BS4142:2014 '*Methods for rating and assessing industrial and commercial sound*' describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

This Standard compares the Rating Level due to the noise source/s under assessment for a one-hour period during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours) with the existing background noise level in terms of an L_{A90} when the noise source is not operating.

It should be noted that the Rating Level is the Specific Sound Level in question ($L_{Aeq,\ Tr}$), including any relevant acoustic feature corrections, as follows:

- **Tonality** – '*For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible'*
- **Impulsivity** – '*A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall*

change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible'

- **Intermittency** – '*If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied'*
- **Other sound characteristics** – '*Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied'*

Once the Rating Level has been obtained, the representative background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact, as follows:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context

NOTE: Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

10.2 Local Authority Guidance

The guidance provided by The London Borough of Camden for noise emissions of new plant in this instance is as follows:

The noise criteria, as per the Local Plan 2017 of London Borough of Camden, British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' should be considered as the main reference document for the assessment. The resultant 'Rating Level' would be considered as follows:

Period	Assessment Location	Rating Level Acceptability Range		
		Green: noise is considered to be at an acceptable level	**Amber:** noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development	**Red:** noise is observed to have a significant adverse effect.
Daytime (7:00-23:00)	Garden used for main amenity (free field) and Outside living or dining or Bedroom window (façade)	10dB below background	9 dB below and 5dB above background	5dB above background
Night-time (23:00-7:00)	Outside bedroom window (façade)	10dB below background and no events exceeding 57dB L_{Amax}	9db below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	5dB above background and/or events exceeding 88dB L_{Amax}

Table 10.1 Camden noise criteria for plant and machinery

10.3 Noise Emissions Criterion

As the proposed condenser units could be used at any time of the day or night, the criterion has been set as shown in Table 9.2 in order to comply with the above requirements.

Time Period	Noise Criterion at Nearest Residential Receiver North Elevation
Night-time (23:00 to 07:00)	35 dB(A)

Table 9.2 Proposed noise emissions criterion

11.0 NOISE IMPACT ASSESSMENT

11.1 Typical Plant Installations

It is understood that the M&E proposals are still not yet finalised. However, the client has requested the use of typical plant unit details to demonstrate the existing conditions. The following plant unit details have been provided as typical example for indicative purposes only:

- 5 No. Mitsubishi PUZ-WM60VAA(-BS) ASHP

The proposed installation location for the typical plant is shown in Figures 8.1, with Plant location 1 being the closest to the noise-sensitive receiver and Plant location 5 the farthest.

The noise emission level as provided by the manufacturer for the unit is shown in Table 11.1.

Unit	Descriptor	Octave Frequency Band (Hz)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Mitsubishi PUZ-WM60VAA	SPL@1m (dB)	54	48	44	43	38	39	31	24	45

Table 11.1 Plant Units Noise Emission Levels as provided by the manufacturer

It should be noted that the proposed plant unit will be in the line of sight of the receiving window without any screening from the building envelope.

11.2 Calculations

Taking all acoustic corrections into consideration, the noise level contribution expected at the closest residential window from the proposed plant would be as shown in Table 11.2. Detailed calculations are shown in Appendix B.

Receiver	Criterion	Noise Level at 1m From the Closest Noise Sensitive Window
Rear façade. 1st Floor window of Flat 7 at 240 Kilburn High Road	35dB(A)	33dB(A)

Table 11.2 Predicted noise level and criterion at nearest noise sensitive location

As shown in Appendix B and Table 11.2, the transmission of noise to the nearest sensitive windows due to the typical plant unit installation satisfies the emissions criterion of the Local Authority, provided that the mitigation measures outlined in Section 12 are implemented.

Please note that this is done strictly under the scope of undertaking noise emissions calculations, and not under the scope of the project's actual plant requirements. Therefore, further calculations would need to be undertaken once all M&E proposals are finalised in order to demonstrate compliance.

12.0 NOISE CONTROL MEASURES

In order to achieve the specific sound level and subsequent rating level shown in the assessment above, the following noise control strategy should be adopted.

12.1 Acoustic Enclosure

To control the noise emissions from the plant installation, we would recommend that an acoustic enclosure is installed according to the insertion loss specification below.

Unit Ref.	Insertion Loss Levels (dB) in each octave frequency band (Hz)							
	63	125	250	500	1k	2k	4k	8k
Mitsubishi PUZ-WM60VAA unit 1 & 2 (closest units to NSR)	6	6	9	13	21	20	16	13
Mitsubishi PUZ-WM60VAA unit 3,4 & 5 (furthest to NSR)	4	5	8	9	12	9	7	8

Table 12.1 Insertion loss figures to be provided by acoustic enclosure

The relevant plant units must be completely enclosed for optimal noise reduction (including a top panel/weather hood). Ventilation openings for cooling must not compromise sound insulation. Doors, access panels, windows, ducts, and cable penetrations shall be treated so as to maintain the proposed acoustic specification when fully assembled.

The manufacturer/supplier will need to ensure that the enclosure can achieve the above specifications in-situ.

In instances where a manufacturer/supplier proposes an enclosure that deviates from this specification, KPA should be informed so that we may comment upon the acceptability.

12.2 Anti-Vibration Mounting Strategy

In the case of all plant units, appropriate anti-vibration mounts should be installed in order to ensure that vibrations do not give rise to structure-borne noise. Appendix C outlines detailed advice in order to ensure that the system installer selects the appropriate anti-vibration mount for the installation.

It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail.

13.0 CONCLUSION

An environmental noise survey has been undertaken at 238 Kilburn High Road NW6 2BS allowing the assessment of daytime and night-time levels likely to be experienced by the proposed development.

Measured noise levels allowed a robust glazing specification to be proposed which would provide internal noise levels for all residential environments of the development commensurate to the design range of BS8233:2014.

No further mitigation measures should be required in order to protect the proposed habitable spaces from external noise intrusion.

The maximum openable area for bedroom windows with the development has been presented based upon the requirements of Approved Document O.

An assessment of the external amenity areas with the development has been undertaken. The noise levels within the external amenity areas are in line with the guidance presented within BS8233:2014.

The results of the survey have also enabled a minimum background noise level to be established and set a maximum noise emissions criterion for the proposed plant unit installations, based on the requirements of The London Borough of Camden.

Manufacturer's noise data of typical plant units has been used to obtain Specific and Rated Noise Level at the nearest noise sensitive receiver in accordance with British Standard BS4142:2014 for compliance with The London Borough of Camden requirements.

The typical plant unit installation satisfies the emissions criterion of the Local Authority, provided that the noise control strategy presented in Section 12.1 is followed.

Further calculations would need to be undertaken once all M&E proposals are finalised in order to demonstrate compliance.

238 Kilburn High Road, London - Position 1
Environmental Time History
27/01/2025 to 29/01/2025

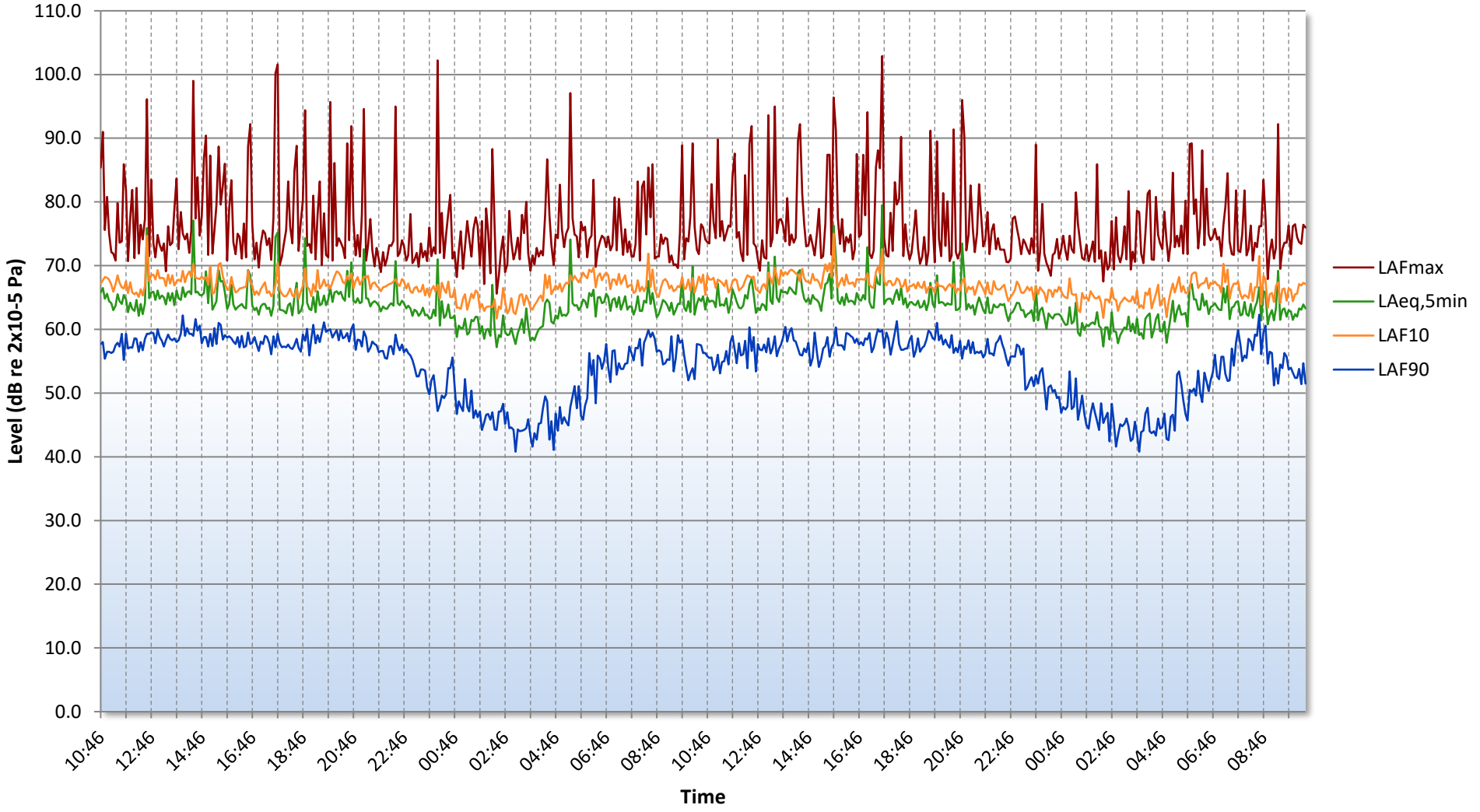

Figure 29818.TH1

238 Kilburn High Road, London - Position 2
Environmental Time History
27/01/2025 to 29/01/2025

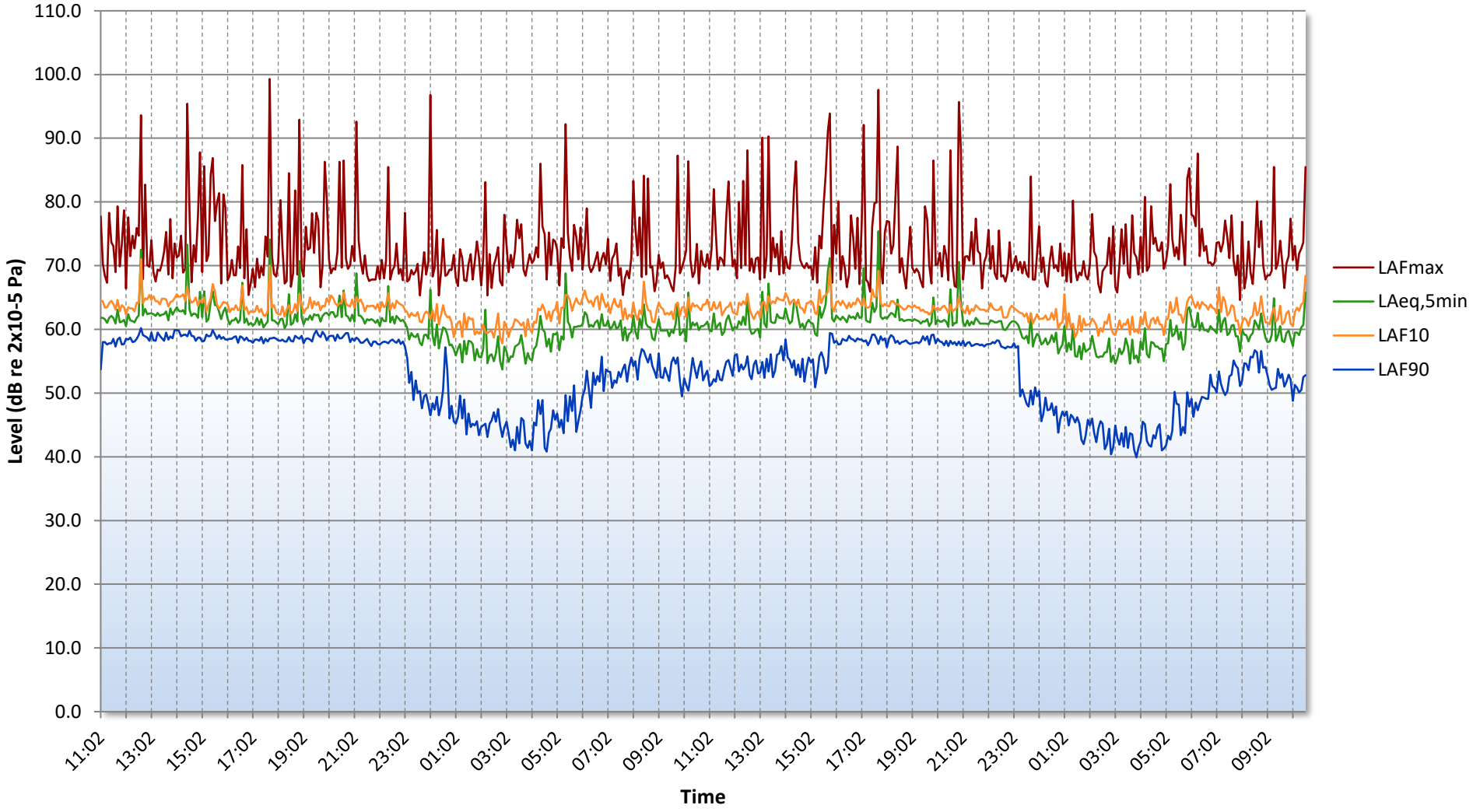

Figure 29818.TH2

238 Kilburn High Road, London - Position 2 (Custom period)
Environmental Time History
28/01/2025 to 28/01/2025

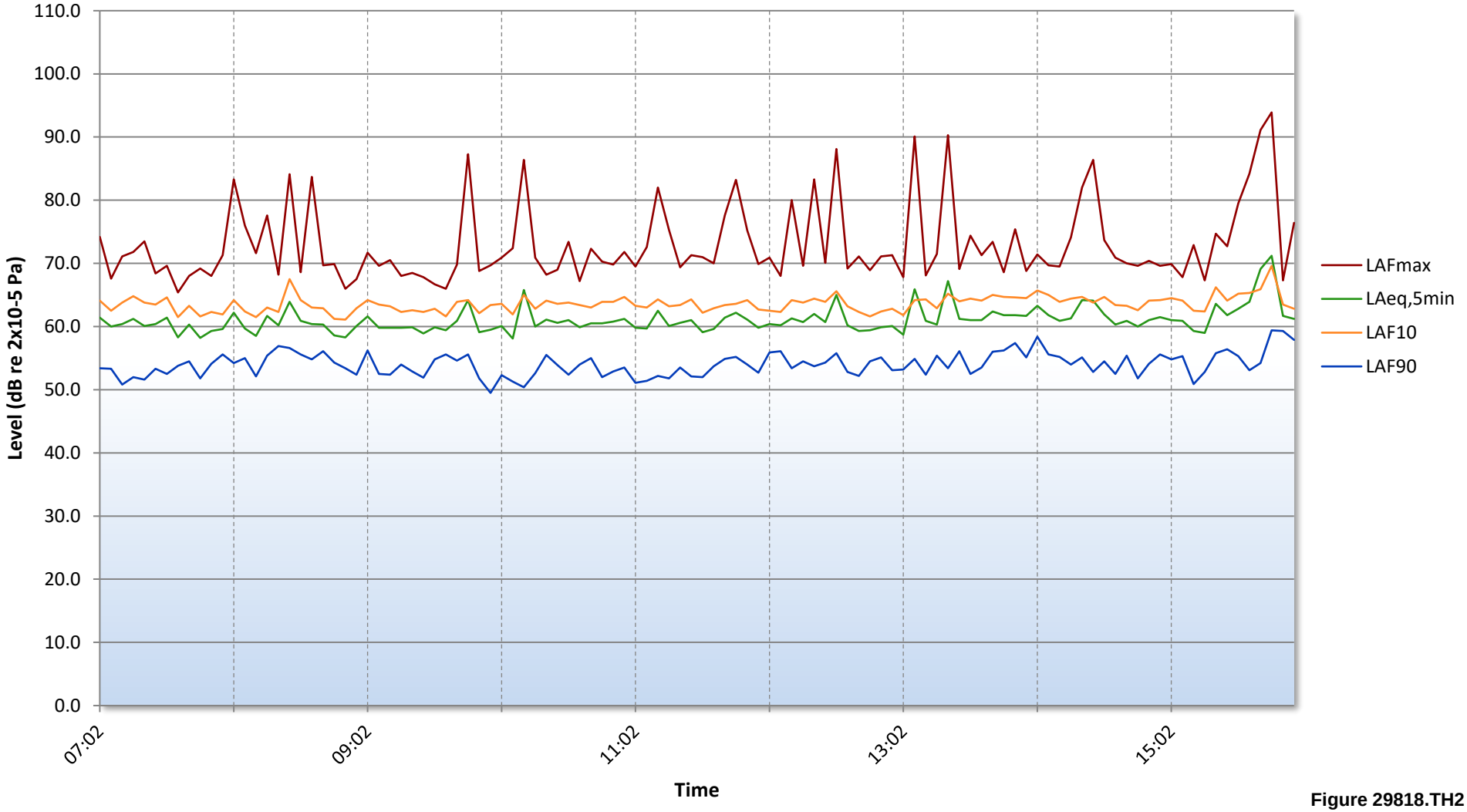

Figure 29818.TH2
(Custom period)

238 Kilburn High Road, London - Position 1
Representative Daytime Background Noise Level
27/01/2025 to 29/01/2025

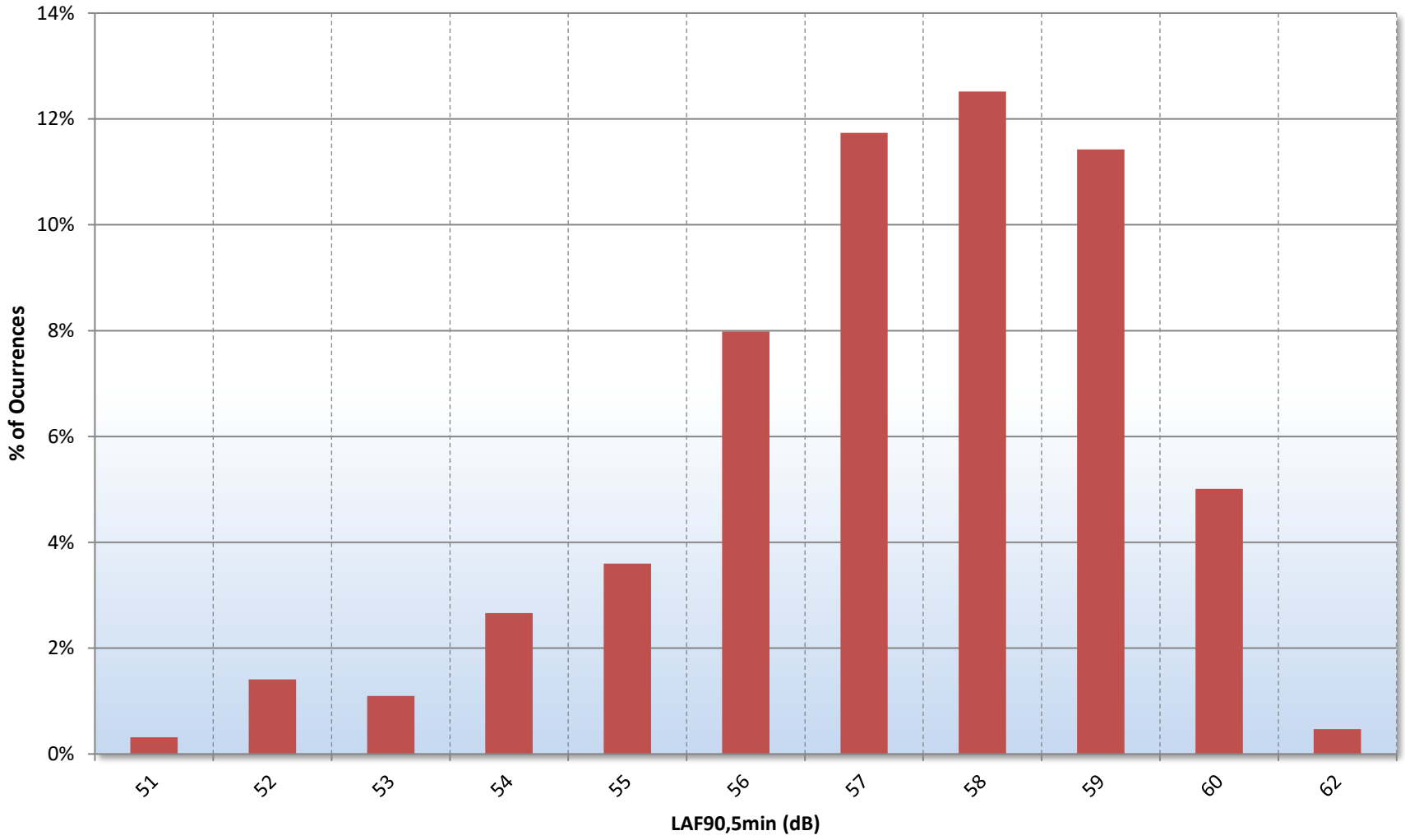

Figure 29818.Daytime L90.TH1

238 Kilburn High Road, London - Position 1
Representative Night-time Background Noise Level
27/01/2025 to 29/01/2025

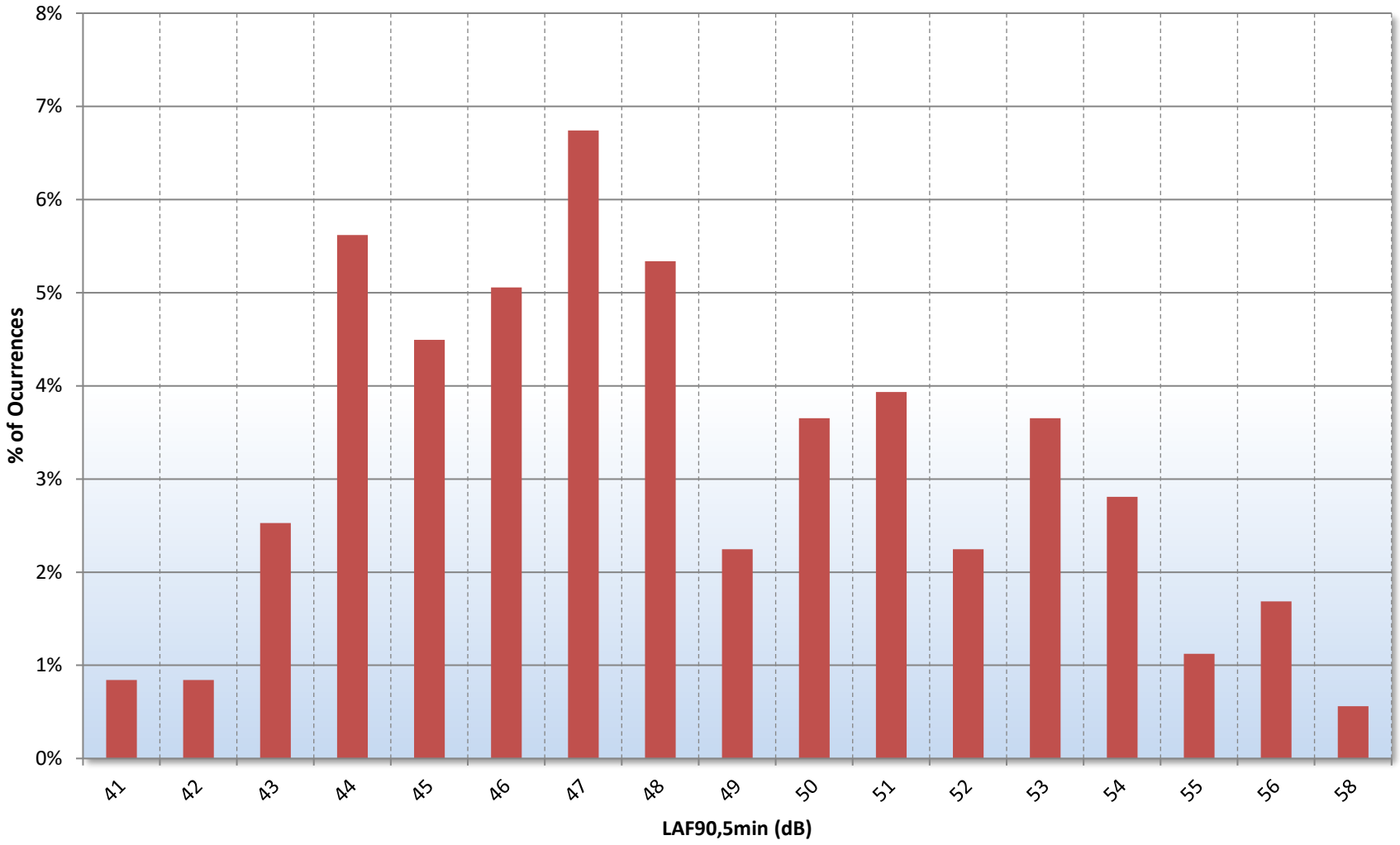

Figure 29818.Night-time L90.TH1

238 Kilburn High Road, London - Position 2
Representative Daytime Background Noise Level
27/01/2025 to 29/01/2025

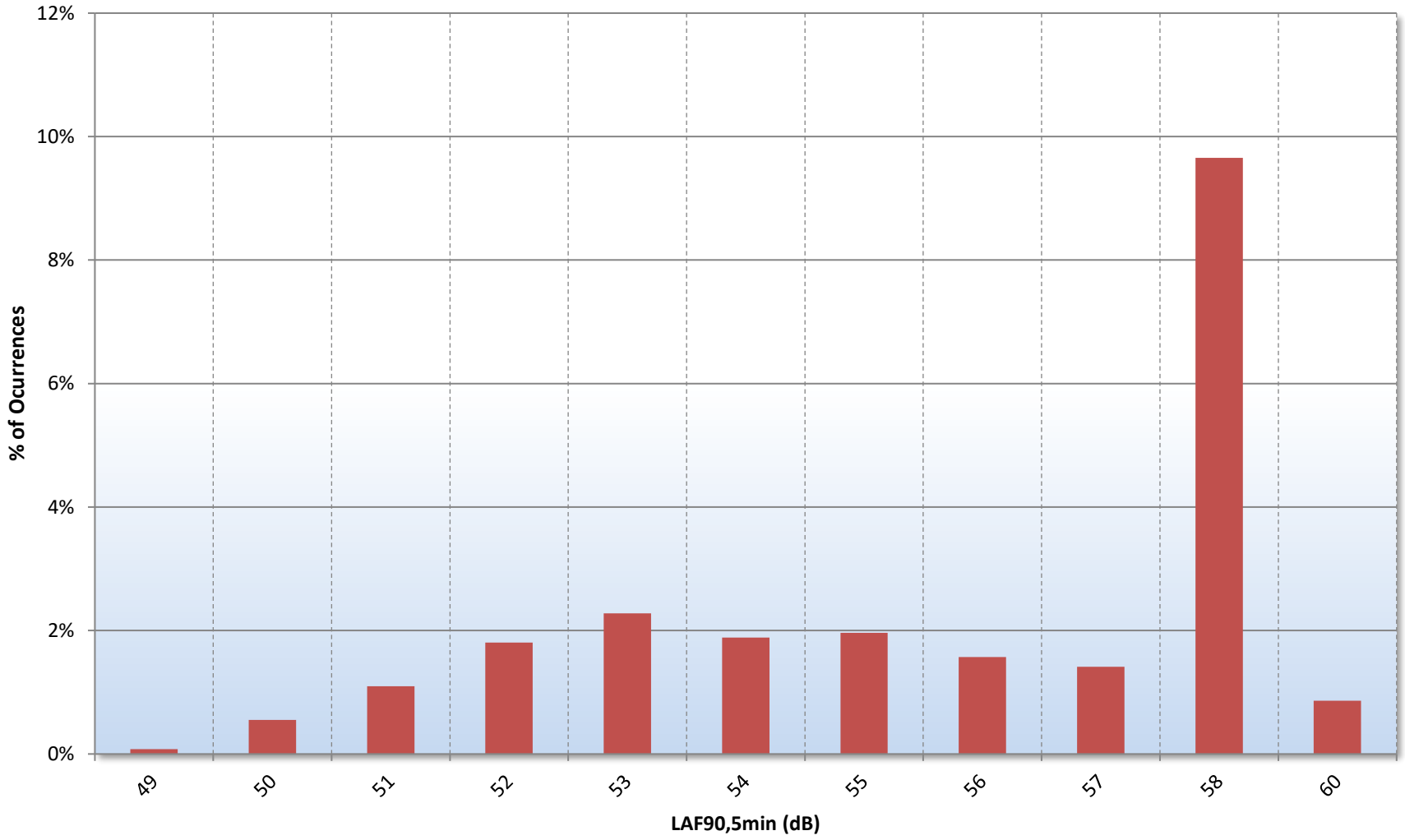

Figure 29818.Daytime L90.TH2

238 Kilburn High Road, London - Position 2
Representative Night-time Background Noise Level
27/01/2025 to 29/01/2025

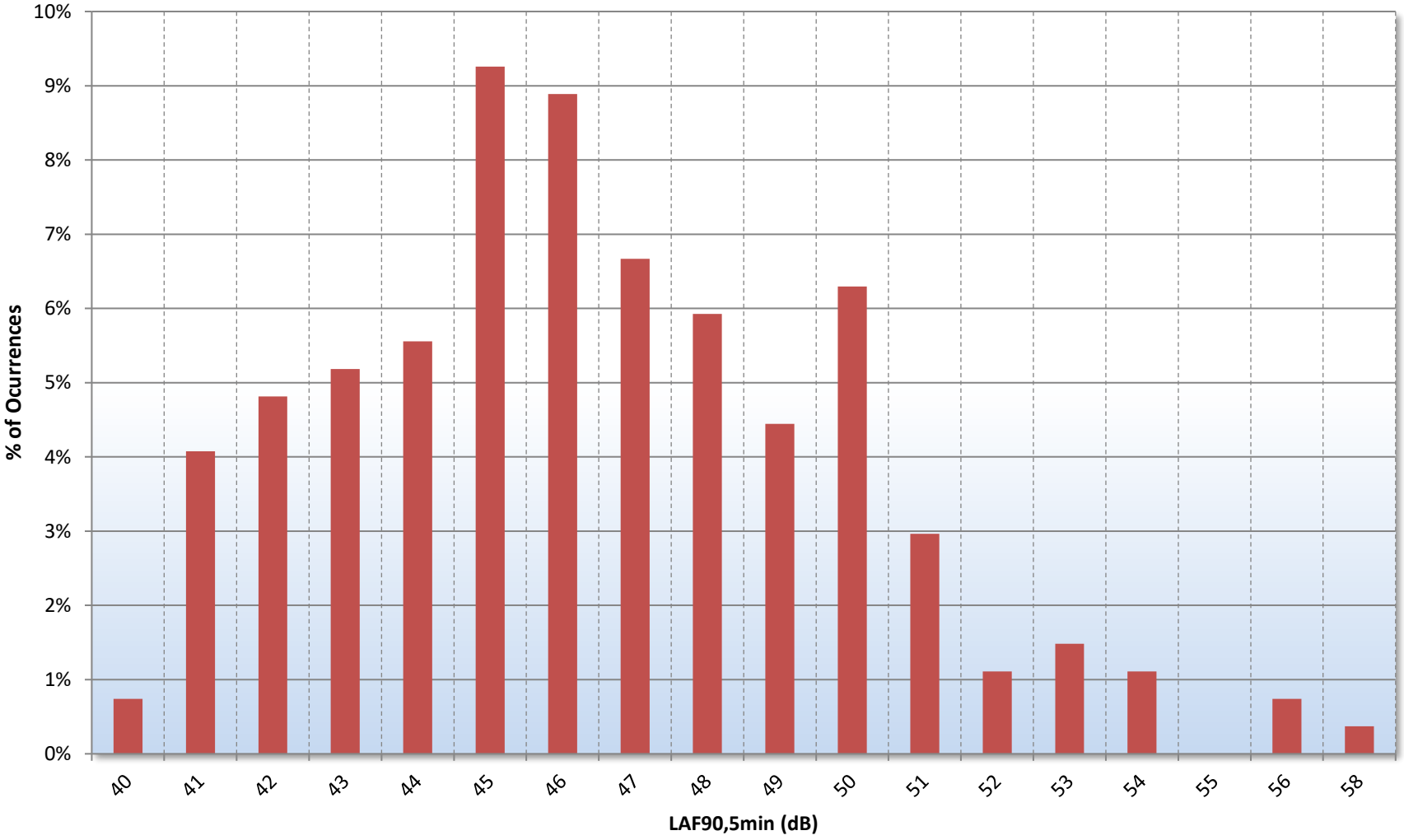

Figure 29818.Night-time L90.TH2

APPENDIX A

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPENDIX A

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

APPENDIX B

238 Kilburn High Road, London

PLANT NOISE EMISSIONS CALCULATIONS

Source: Plant Installation **Receiver: Rear façade. 1st Floor window of Flat 7 at 240 Kilburn High Road**	***Frequency, Hz***								***dB(A)***
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	
Mitsubishi PUZ-WM60VAA(-BS) (Sound Pressure Level @1m)	54	48	44	43	38	39	31	24	45
Correction for number of units (2),dB	3	3	3	3	3	3	3	3	
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	
Minimum attenuation provided by distance (2.5m), dB	-8	-8	-8	-8	-8	-8	-8	-8	
Minimum attenuation required by proposed acoustic enclosure, dB	-6	-6	-9	-13	-21	-20	-16	-13	
Total Noise Emissions from Above Units, dB	**46**	**40**	**33**	**28**	**15**	**17**	**13**	**9**	**30**
Mitsubishi PUZ-WM60VAA(-BS) (Sound Pressure Level @1m)	54	48	44	43	38	39	31	24	45
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	
Minimum attenuation provided by distance (5m), dB	-14	-14	-14	-14	-14	-14	-14	-14	
Minimum attenuation required by proposed acoustic enclosure, dB	-4	-5	-8	-9	-12	-9	-7	-8	
Total Noise Emissions from Above Units, dB	**39**	**32**	**25**	**23**	**15**	**19**	**13**	**5**	**26**
Mitsubishi PUZ-WM60VAA(-BS) (Sound Pressure Level @1m)	54	48	44	43	38	39	31	24	45
Correction for number of units (2),dB	3	3	3	3	3	3	3	3	
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	
Minimum attenuation provided by distance (6.5m), dB	-16	-16	-16	-16	-16	-16	-16	-16	
Minimum attenuation required by proposed acoustic enclosure, dB	-4	-5	-8	-9	-12	-9	-7	-8	
Total Noise Emissions from Above Units, dB	**40**	**33**	**26**	**24**	**16**	**20**	**14**	**6**	**26**
Total Rating Noise Level of all Plant Unit Installations at Receiver	**48**	**41**	**34**	**30**	**20**	**24**	**18**	**12**	**33**

Design Criterion	**35**

APPENDIX C

ANTI-VIBRATION MOUNTING SPECIFICATION REFERENCE DOCUMENT

1.0 General

1.1 All mountings shall provide the static deflection, under the equipment weight, shown in the schedules. Mounting selection should allow for any eccentric load distribution or torque reaction, so that the design deflection is achieved on all mountings under the equipment, under operating conditions.

1.2 It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail. Particular attention should be paid to mountings which will be exposed to atmospheric conditions to prevent corrosion.

1.3 All mountings shall be colour coded, or otherwise marked, to indicate their load capacity, to facilitate identification during installation.

Where use of resilient supports allows omission of pipe flexible connections for vibration/noise isolation, it shall be the Mechanical Service Consultant's or Contractor's responsibility to decide whether such devices are required to compensate for misalignment or thermal strain.

2.1 Type A Mounting (Caged Spring Type)

2.1.1 Each mounting shall consist of cast or fabricated telescopic top and bottom housings enclosing one or more helical steel springs as the principle isolation elements, and shall incorporate a built-in levelling device. The housing should be designed to permit visual inspection of the springs after installation, i.e. the spring must not be totally enclosed.

2.1.2 The springs shall have an outside diameter of not less than 75% of the operating height, and be selected to have at least 50% overload capacity before becoming coil-bound.

2.1.3 The bottom plate of each mounting shall have bonded to it a rubber/neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

2.1.4 Mountings incorporating snubbers or restraining devices shall be designed so that the snubbing, damping or restraining mechanism is capable of being adjusted to have no significant effect during the normal running of the isolated machine.

2.1.5 All nuts, bolts or other elements used for adjustment of a mounting shall incorporate locking mechanisms to prevent the isolator going out of adjustment as a result of vibration or accidental or unauthorised tampering.

2.2 Type B Mounting (Open Spring Type)

2.2.1 Each mounting shall consist of one or more helical steel springs as the principal isolation elements, and shall incorporate a built-in levelling device.

2.2.2 The springs shall be fixed or otherwise securely located to cast or fabricated top and bottom plates, shall have an outside diameter of not less than 75% of the operating height, and shall be selected to have at least 50% overload capacity before becoming coil-bound.

2.2.3 The bottom plate shall have bonded to it a rubber/ neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

2.3 Type C Mounting (Rubber/Neoprene Type)

Each mounting shall consist of a steel top plate and base plate completely embedded in oil resistant rubber/neoprene. Each mounting shall be capable of being fitted with a levelling device, and should have bolt holes in the base plate and a threaded metal insert in the top plate so that they can be bolted to the floor and equipment where required.

3.0 Plant Bases

3.1 **Type A Bases (A.V. Rails)**

An A.V. Rail shall comprise a steel beam with two or more height-saving brackets. The steel sections must be sufficiently rigid to prevent undue strain in the equipment and if necessary should be checked by the Structural Engineer.

3.2 **Type B Bases (Steel Plant Bases)**

Steel plant bases shall comprise an all-welded steel framework of sufficient rigidity to provide adequate support for the equipment, and fitted with isolator height saving brackets. The frame depth shall be approximately 1/10 of the longest dimension of the equipment with a minimum of 150 mm. This form of base may be used as a composite A.V. rail system.

3.3 **Type C Bases (Concrete Inertia Base: for use with steel springs)**

These shall consist of an all-welded steel pouring frame-work with height saving brackets, and a frame depth of approximately 1/12 of the longest dimension of the equipment, with a minimum of 100 mm. The bottom of the pouring frame should be blanked off, and concrete (2300 kg/m^3) poured in over steel reinforcing rods positioned 35 mm above the bottom. The inertia base should be sufficiently large to provide support for all parts of the equipment, including any components which over-hang the equipment base, such as suction and discharge elbows on centrifugal pumps.