

# 7-13 Queens Street Gravesend

## Environmental Noise Survey and Noise Impact Assessment Report

32146/NIA1

6 February 2025

For:  
Jash



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# **Environmental Noise Survey and Noise Impact Assessment Report 32146/NIA1**

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## **1.0 Introduction**

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by Jash to undertake a noise assessment for a site in Gravesend, Kent

The site, which is located on Queen Street, Gravesend, is being considered for residential development. The proposals are for existing buildings to be extended at the rear to flats with the existing extract flues running through the building.

The site is subject to commercial noise from the restaurants below.

Baseline noise conditions have been established by means of a detailed noise survey, presented herein. The findings have subsequently been used to assess the suitability of the site for residential use. Measures required to mitigate noise impacts for the proposed development (when operational) have been discussed in context with relevant national & local planning policies, design standards and good practice guides.

## **2.0 Objectives**

To undertake an environmental noise survey to establish the existing  $L_{Amax}$ ,  $L_{Aeq}$  and  $L_{A90}$  environmental road, rail and air traffic noise levels at selected accessible positions.

To undertake additional attended noise and vibration level measurements at the rear of the site with commercial noise coming from the restaurants.

To obtain data that can be used to determine the requirements for sound insulation of the external facades at a later date.

Based on the results of the survey, to undertake a noise assessment to assess the suitability of the site for residential use in accordance with the Noise Policy Statement for England (NPSE), National Planning Policy Framework (NPPF), Planning Practice Guidance (ProPG), British Standard BS8233:2014 and Local Authority requirements.

To discuss noise mitigation and acoustic design solutions to achieve acceptable noise levels in residential areas.



### 3.0 Acoustic Terminology

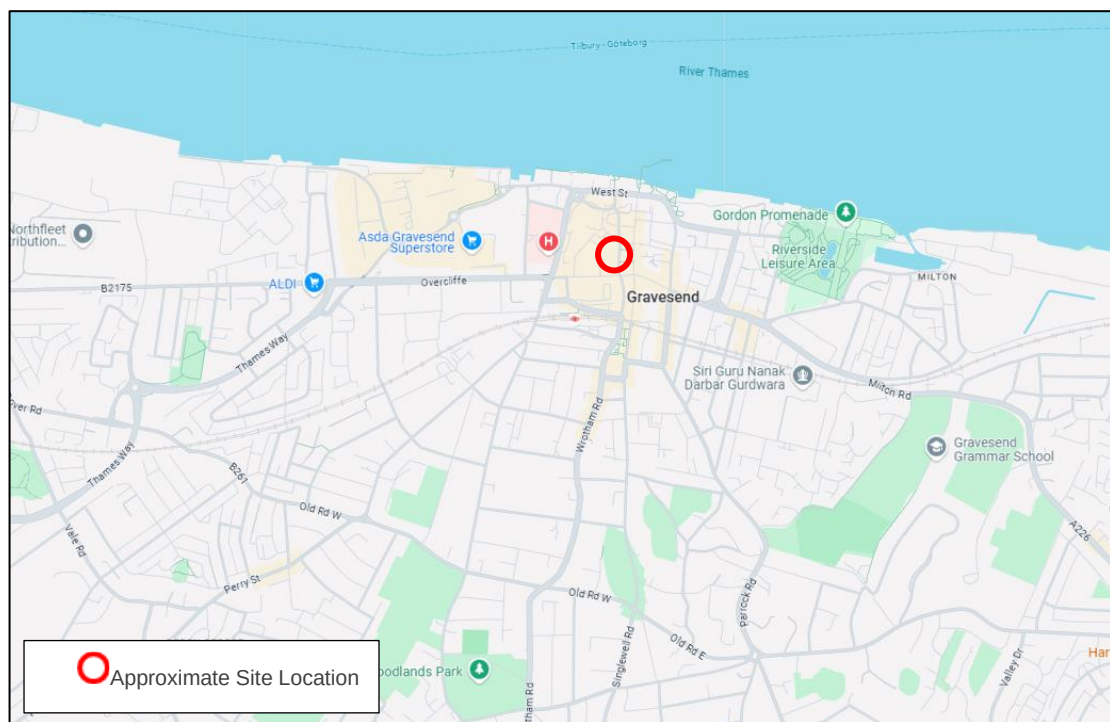
For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

## 4.0 Site Description

### 4.1 Location

The site is located on Queen Street, Gravesend.

The location is shown in the Location Map below.



Location Map (Map Data © 2025)

The site falls within the jurisdiction of Gravesham Borough Council.

### 4.2 Description

The site is located on Queen Street, on the ground floor of 7-9 Queen Street there is a Tops Pizza takeaway along with a hairdresser. On the ground floor of 11-13 Queen Street there is a Chinese restaurant and nail bar. Above both units there are residential flats.

The surrounding buildings are all a similar size and use. The dominant noise source at the rear was noted to be the traffic coming from Milton Road to the south.



The site is shown in the Site Plan below.



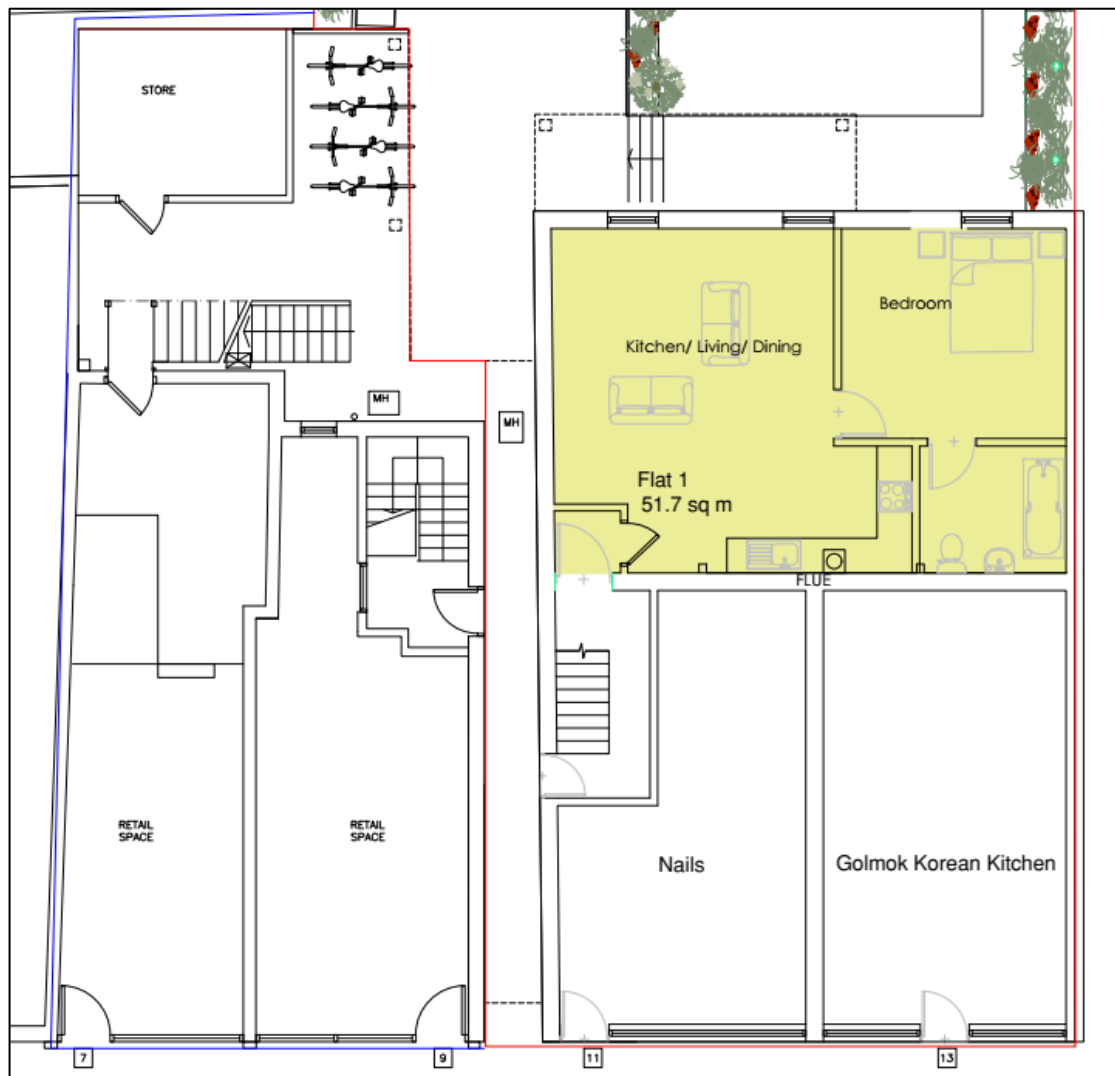
Site Plan (Imagery © 2025, Airbus, Map Data © 2025)

## 5.0 Proposed Development

We understand that it is proposed for the flats at the rear of the site to be extended to include a second storey, as shown in the following drawings.



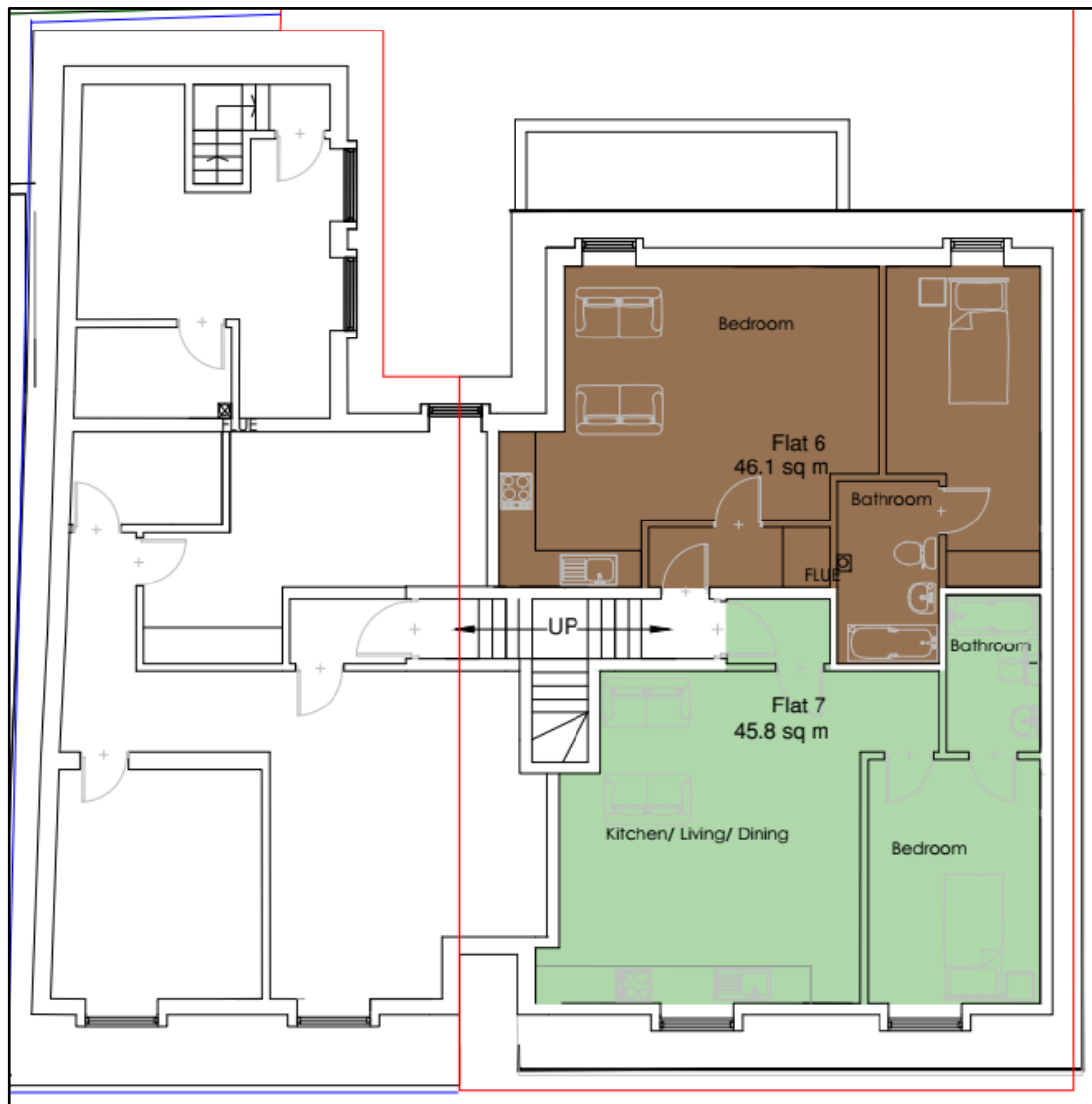
Plan showing Project Proposals (Plans provided by the client)



Ground Floor plan (provided by client)



First Floor plan (provided by client)



Second Floor plan (provided by client)

## 6.0 Planning Policies, Standards & Guidance

### 6.1 Policies & Guides

In order to provide a suitable assessment a number of national planning policies have been considered, including:

- The National Planning Policy Framework (NPPF), 2023
- The Noise Policy Statement for England (NPSE), 2010
- Planning Practice Guidance – Noise (PPGN), 2019

The above documents highlight the importance of considering the potential noise effects on any new residential development and provide a qualitative approach to assessment. However, each



of the above does not provide any quantitative guidance. As such, all quantitative guidance used to form a noise impact assessment is taken from various other standards, guidance, and Local Authority requirements as summarised below:

- Local Planning Condition
- World Health Organisation: 2018
- British Standard BS8233: 2014
- ProPG : Planning & Noise: 2017
- British Standard 4142:2014 + A1:2019

Detailed information for relevant planning policies and guidance can be found within Appendix B.

## **6.2 Specific Local Authority Planning Condition**

We understand Gravesham Council have imposed the following condition on this site:

*“The revised plans recently submitted have revealed an issue that was not evident from the previously submitted plans. This is the existing flue for the food premises on the ground floor which will become enclosed. As for the adjacent premises (7-9 Queen Street), this poses a number of problems.*

*Being enclosed, the flue has the potential to cause noise and vibration problems. It will need to be satisfactorily demonstrated (by way of a noise and vibration impact assessment) that the existing kitchen extract system and flue can continue to be operated without any detrimental impact to the proposed flats. If this cannot be demonstrated, there will be no alternative but to recommend refusal of this application based on the amenity impact on future occupants.*

*In addition, by enclosing the system, there will be no access for maintenance or servicing which will not be acceptable from food hygiene, health and safety or maintenance perspectives. This will also need to be satisfactorily addressed.*

*No details have been provided regarding the layout of the kitchen extract system (ie location of the fan, filters, any silencer etc) and these could also have an impact on the proposed flats.*



*In addition, it's not clear from the plans whether there are existing flats over the commercial units? The recently submitted flats show 7 flats which include flats on both the 1st and 2nd floors of the existing building. If the flat on the 1st floor above the commercial new, then consideration of noise ingress from the commercial must be considered and this should be included in the sound insulation test referred to in the earlier consultation responses."*

### 6.3 Tactile Vibration (BS 6472:2008)

British Standard BS 6472: 2008 "Guide to Evaluation of Human Exposure to Vibration in Buildings" advises that intermittent vibration events should not be judged based on perception alone but using the corresponding vibration dose value over a long period.

BS6472:2008 advises that "the VDV defines a relationship that yields a consistent assessment of continuous, intermittent, occasional and impulsive vibration and correlates well with subjective response" and also "the VDV is much more strongly influenced by vibration magnitude than by duration. A doubling or halving of the vibration magnitude is equivalent to an increase or decrease of exposure duration by a factor of sixteen."

The table below details the Vibration Dose Values ( $\text{m/s}^{1.75}$ ) above which various degrees of adverse comment may be expected in Residential Buildings.

| Time Period              | Low probability of adverse comment | Adverse comment possible | Adverse comment probable |
|--------------------------|------------------------------------|--------------------------|--------------------------|
| Daytime (07:00– 23:00)   | 0.2 to 0.4                         | 0.4 to 0.8               | 0.8 to 1.6               |
| Night-time (23:00–07:00) | 0.1 to 0.2                         | 0.2 to 0.4               | 0.4 to 0.8               |

The perception threshold for continuous whole-body vibration varies widely among individuals. Approximately half a typical population, when standing or seated, can perceive a vertical weighted peak acceleration of  $0.015 \text{ m/s}^2$ . The weighting used is  $W_b$ . A quarter of the population would perceive a vibration of  $0.010 \text{ m/s}^2$  peak, but the least sensitive quarter would only be able to detect a vibration of  $0.020 \text{ m/s}^2$  peak or more. Perception thresholds are slightly higher for vibration duration of less than about 1 second.

## 7.0 Baseline Noise Survey

### 7.1 Procedure

Fully automated environmental noise monitoring was undertaken by Greg Moore BA (Hons) AMIOA from approximately 07:30 hours on Tuesday 28 January 2025 to 13:30 hours on Friday 31 January 2025 to establish full daytime and night-time noise levels over a typical weekday



and weekend period. Measurements were taken continuously of the A-weighted (dBA)  $L_{90}$ ,  $L_{eq}$ , and  $L_{max}$  sound pressure levels over discrete 2 and 15-minute periods.

Additional attended measurements were performed between 12:30 hours and 13:30 hours on Friday 31 January 2025 with the purpose of establishing specific noise levels associated with the operation of the extract fans.

## 7.2 Measurement Positions

The noise level measurements were undertaken at 2No. positions as described in the table below.

| Position | Type       | Description                                                                                                                                                                                                                                                                                                                 |
|----------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Unattended | This position was located at the rear of 7-9 Queen Street on the first floor. The microphone was attached to a pole on the rear stairwell. The microphone was approximately 3m above the ground floor and clear of any reflective surfaces. This position was also representative with regards to the extract fan outlet.   |
| 2        | Unattended | This position was located at the rear of 11-13 Queen Street on the first floor. The microphone was attached to a pole on the rear stairwell. The microphone was approximately 3m above the ground floor and clear of any reflective surfaces. This position was also representative with regards to the extract fan outlet. |

The positions are shown on the following plan.



Plan Showing Measurement Positions (Imagery © 2025, Airbus, Map Data © 2025)

### 7.3 Weather Conditions

For the unattended survey between Tuesday 28 January 2025 and Friday 31 January 2025, local weather reports indicated no notable periods of prolonged rainfall, with temperatures ranging from 2 °C (night) to 8 °C (day) and wind speeds less than 2 m/s. During our time on site, skies were overcast/clear/largely clear with patchy cloud cover, wind conditions were calm and from an easterly direction and road surfaces were dry. If there were notable periods of rainfall then say so. Consider explaining that the duration of the survey was long enough to obtain sufficient measurement data outside of these periods for the subsequently assessments.

During the attended survey on Friday 31 January 2025, the weather was generally clear and dry with no periods of rainfall and calm wind conditions.



## 7.4 Instrumentation

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

| Position      | Description                                 | Manufacturer  | Type   | Serial Number | Calibration                  |
|---------------|---------------------------------------------|---------------|--------|---------------|------------------------------|
| 1             | Type 1<br>½" Condenser<br>Microphone        | Bruel & Kjaer | 4189   | 2470596       | Calibration on<br>12/07/2024 |
| 1             | Preamp                                      | Larson Davis  | PRM902 | 4214          | Calibration on<br>12/07/2024 |
| 1             | Type 1<br>Data Logging<br>Sound Level Meter | Larson Davis  | 824    | 3803          | Calibration on<br>12/07/2024 |
| 2             | Type 1<br>½" Condenser<br>Microphone        | PCB           | 377B02 | 122885        | Calibration on<br>20/08/2024 |
| 2             | Preamp                                      | Larson Davis  | PRM902 | 3692          | Calibration on<br>20/08/2024 |
| 2             | Type 1<br>Data Logging<br>Sound Level Meter | Larson Davis  | 824    | 3444          | Calibration on<br>20/08/2024 |
| All Positions | Type 1 Calibrator                           | Bruel & Kjaer | 4230   | 1511010       | Calibration on<br>26/07/2024 |

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.4 dB).

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

## 7.5 Results of Noise Survey

The results have been plotted on Time History Graphs 32146/TH1 and 32146/TH2 enclosed presenting the 15-minute A-weighted (dBA)  $L_{90}$ ,  $L_{eq}$  and  $L_{max}$  levels at each measurement position throughout the duration of the survey.

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



A summary of the results, as used to inform subsequent assessments against current guidelines, is presented in the table below. The  $L_{A90}$  values presented are the lowest levels.  $L_{Amax}$  values are the '10<sup>th</sup> highest' 2-minute value.

### Position 1

| Day        | Daytime<br>(07:00 – 23:00 hrs) |                            | Night-time<br>(23:00 – 07:00 hrs) |                            |                                               |
|------------|--------------------------------|----------------------------|-----------------------------------|----------------------------|-----------------------------------------------|
|            | $L_{Aeq,16hr}$                 | Lowest<br>$L_{A90,15 Min}$ | $L_{Aeq,8hr}$                     | Lowest<br>$L_{A90,15 Min}$ | 10 <sup>th</sup> Highest<br>$L_{Amax, 2 Min}$ |
| 28/01/2025 | 58                             | 46                         | 54                                | 40                         | 77                                            |
| 29/01/2025 | 57                             | 42                         | 53                                | 39                         | 68                                            |
| 30/01/2025 | 56                             | 43                         | 52                                | 41                         | 71                                            |
| 31/01/2025 | 55                             | 45                         |                                   |                            |                                               |

### Position 2

| Day        | Daytime<br>(07:00 – 23:00 hrs) |                            | Night-time<br>(23:00 – 07:00 hrs) |                            |                                               |
|------------|--------------------------------|----------------------------|-----------------------------------|----------------------------|-----------------------------------------------|
|            | $L_{Aeq,16hr}$                 | Lowest<br>$L_{A90,15 Min}$ | $L_{Aeq,8hr}$                     | Lowest<br>$L_{A90,15 Min}$ | 10 <sup>th</sup> Highest<br>$L_{Amax, 2 Min}$ |
| 28/01/2025 | 53                             | 44                         | 60                                | 39                         | 60                                            |
| 29/01/2025 | 50                             | 43                         | 42                                | 36                         | 55                                            |
| 30/01/2025 | 50                             | 43                         | 46                                | 38                         | 61                                            |
| 31/01/2025 | 52                             | 45                         |                                   |                            |                                               |

The above levels are as measured at the measurement positions and include local reflections.

The following table summarises noise levels recorded at each of the attended measurement positions.

| Position | Date       | Period        | Sound Pressure Level (dB) | Comments                                                       |
|----------|------------|---------------|---------------------------|----------------------------------------------------------------|
|          |            |               | L <sub>Aeq,T</sub>        |                                                                |
| 1        | 31/01/2025 | 12:37-12:40   | 64                        | Extract Fan Turned on, 1m from the terminal of the extract fan |
| 2        |            | 13:46 – 13:50 | 54                        | Extract Fan Turned on, 1m from the flue of the extract fan.    |
|          |            | 13:52 – 13:54 | 47                        | Extract Fan Turned off, 1m from the flue of the extract fan.   |



## 7.6 Discussion of Noise Climate

Due to the nature of the survey, i.e. unattended, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However, at the beginning and end of the survey period the noise climate was noted to be dominated by the road traffic noise coming from Milton Road during the setup and the extract fans during the collection period.

## 7.7 Results of Vibration Survey

The following table presents the results of the vibration survey undertaken at both 7-9 and 11-13 Queen Street.

| Position | Date       | Period        | VDV (m/s <sup>1.75</sup> ) | Comments               |
|----------|------------|---------------|----------------------------|------------------------|
| 1        | 31/01/2025 | 12:37-12:40   | 0.10                       | Extract Fan Turned on  |
| 2        |            | 13:46 – 13:50 | 0.11                       | Extract Fan Turned on  |
|          |            | 13:52 – 13:54 | 0.02                       | Extract Fan Turned off |

## 7.8 Discussion of Vibration Climate

Whilst on site completing our vibration survey, we were able to obtain the levels for the extract fan running at 7-9 Queen Street. However, unfortunately we were unable to obtain the vibration levels with the unit turned off due to the tenant not allowing this to take place

Whilst at 11-13 Queen Street we were able to obtain the levels required for the extract fans being turned on and off. It would be acceptable to use the levels for the fan being turned off at this position as representative of 7-9 Queen Street due to close proximity between the two locations.

## 8.0 Predicted Re-radiated Noise

The following table shows the predicted re-radiated noise levels within the proposed apartments:

| Address            | Predicted Re-Radiated Noise Level (dB) |
|--------------------|----------------------------------------|
|                    | Extract Fan On                         |
| 7-9 Queen Street   | 35                                     |
| 11-13 Queen Street | 42                                     |



## 9.0 Achieving Internal Noise Levels

There are 2No ventilation conditions applicable to proposed residential dwellings. These are Background Ventilation as described in Approved Document F (Part F) and Purge Ventilation (odour and smells).

### 9.1 Purge Ventilation

It should be noted that the internal noise level guidelines are generally not applicable under “*purge ventilation*” conditions as defined by Part F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

As such, acoustic conditions are generally not a concern during purge ventilation.

### 9.2 Background Ventilation Condition

#### 9.2.1 Criteria

With reference to the acoustic standards and guidelines as reviewed in Appendix B, the external noise intrusion levels from environmental sources should be controlled so as to not exceed the following criteria.

| Activity                   | Location         | Desirable Internal Ambient Criteria |                                                          |
|----------------------------|------------------|-------------------------------------|----------------------------------------------------------|
|                            |                  | 07:00 – 23:00                       | 23:00 – 07:00                                            |
| Resting                    | Living Rooms     | 35 dB $L_{Aeq,16hour}$              | -                                                        |
| Dining                     | Dining Room/Area | 40 dB $L_{Aeq,16hour}$              | -                                                        |
| Sleeping (Daytime Resting) | Bedroom          | 35 dB $L_{Aeq,16hour}$              | 30 dB $L_{Aeq,8hour}$<br>45 dB <sup>[1]</sup> $L_{Amax}$ |

[1] regular noise events such as trains, aircraft (10<sup>th</sup> highest)

Note: For this site the  $L_{Aeq,T}$  noise parameter alone is considered to be sufficient given the character of the noise climate we have measured. This is consistent with Section 2.2.2 of The World Health Organisation Environmental Noise Guidelines for the European Region and Note 4 of Section 7.7.2 of BS8233:2014)

Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target noise levels may be relaxed (subject to the requirements of any planning conditions) by up to 5 dB and reasonable internal conditions still achieved.

Section 8.0 considers existing industrial use impacts in line with BS 4142 and advises that



adverse impacts on future occupants could be avoided with suitably specified façade elements to secure suitable internal noise levels. Where existing industrial/commercial noise could ‘contribute’ to incident external noise levels on a given façade but do not ‘dominate’, the BS8233 internal noise level targets should be met. However, where the industrial noise has the potential to dominate the external noise climate, that industrial noise intrusion should achieve limits 5 dB lower than the BS8233 levels.

### 9.2.2 Outline Specifications

Based on the prevailing noise climate at the site, open windows as a means of background ventilation would not be suitable on any façade across the development. As such, alternative ventilation measures would be required.

Allowance should be made to provide appropriate sound insulation solutions as required including, where necessary, suitably specified glazing and attenuated ventilators/mechanical ventilation systems. Preliminary calculations have been carried out to determine the likely façade sound insulation performance requirements for each façade. Calculation methods follow those outlined in BS 8233:2014 Section G.2 and are based on the following:

- Conventional brick
- 75m<sup>3</sup> approximate room volume
- 1.6m<sup>2</sup> approximate window area
- Reverberation time of 0.5 seconds.

From the results of the assessment, the following minimum preliminary acoustic performance specifications are recommended. These are intended for planning use only, and detailed design stage octave band acoustic specifications will need to be developed for tender.

| Façade Element | Preliminary Minimum Sound Reduction Specification | Example Configuration (For Guidance Only)                                     |
|----------------|---------------------------------------------------|-------------------------------------------------------------------------------|
| Window         | 27 dB $R_w + C_{tr}$                              | - 6 / 16 / 6 mm conventional double glazing                                   |
| Ventilator     | 33 dB $D_{ne,w} + C_{tr}$                         | - 1 x 2,500 mm <sup>2</sup> standard trickle vent per habitable room with MEV |

### 9.2.3 Example Glazing Configurations

Example glazing configurations commensurate with achieving the sound insulation specifications noted in Section 9.2.2 are given below.



| Glazing Specification, $R_w + C_{tr}$ (dB) | Example Configuration               |
|--------------------------------------------|-------------------------------------|
| 27                                         | double glazed system e.g 6/16/6 mm. |

#### 9.2.4 Example Ventilation Solutions

Example ventilation solutions commensurate with achieving the elemental sound insulation performances noted in Section 9.2.2 are discussed below.

| Ventilator Specification, $D_{new} + C_{tr}$ (dB) | Example Configuration                                                                                                                               |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 33                                                | 1 x 2,500mm <sup>2</sup> standard hit-miss trickle vent per habitable room, or a mechanically assisted supply & extract solution (e.g. local MVHR). |

The preliminary performance specifications included above are based on the provision of either full MVHR for rooms or 1no. ventilator only per habitable room as required. If additional numbers of ventilators are required to achieve the ventilation rates, the performance requirement for the individual ventilators will need to increase.

The table below provides guidance on the increase in performance specification required for additional numbers of ventilators.

| Number of Ventilators | Performance Increase on Ventilator Specifications Stated Above |
|-----------------------|----------------------------------------------------------------|
| 1                     | +0 dB                                                          |
| 2                     | +3 dB                                                          |
| 3                     | +5 dB                                                          |
| 4                     | +6 dB                                                          |

## 10.0 Mitigation Measures for Vibration

### 10.1 Structure Borne Noise

With regards to the flats proposed at 7-9 Queen Street the predicted Re-radiated noise levels within the proposed flats are above the guidance within BS:8233 for a bedroom.

For the flats proposed flats at 11-13 Queen Street the predicted Re-radiated noise levels are above the guidance within BS:8233 for a bedroom.

Using the above information we recommended the following mitigation measures:



- Redirecting the flues to vent out of the building at ground floor level and then extend up the building and terminating at roof level
- Using antivibration mounts to secure the extract flue.
- Installation of suitable attenuation to the extract fan.

## **11.0 Conclusions**

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

The environmental noise impact upon the proposed dwellings has been assessed in the context of building regulations, and national and local planning conditions.

Appropriate target internal noise levels have been proposed. These are achievable using conventional mitigation measures.

Attended noise and vibration levels have been established and assessed for the re-radiating sound levels produced by the extraction fan.

Preliminary acoustic performance specifications for the external building fabric elements have been recommended such that appropriate internal noise levels should be achieved. These are intended for planning use only, and detailed design stage octave band acoustic specifications will need to be developed for tender.

The assessment outlines the potential mitigation measures pertaining to the above site.

## Appendix A

### Acoustic Terminology

The acoustic terms used in this report are defined as follows:

**dB** Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g.  $30\text{dB} + 30\text{dB} = 33\text{dB}$ , not  $60\text{dB}$ ).

**dBA** The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The <sub>A</sub> subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

**L<sub>90,T</sub>** L<sub>90</sub> is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

**L<sub>eq,T</sub>** L<sub>eq,T</sub> is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

**L<sub>max</sub>** L<sub>max</sub> is the maximum sound pressure level recorded over the period stated. L<sub>max</sub> is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L<sub>eq</sub> noise level.

**L<sub>p</sub>** Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of  $2 \times 10^{-5}$  Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

**L<sub>w</sub>** Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually  $10^{-12}$  W).

## Appendix B

### Planning Policies, Standards & Guidance

#### B.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is to:

*“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”*

That vision is supported by the following NPSE noise policy aims which are reflected in three of the four aims of planning policies and decisions in paragraph 123 of the NPPF (see paragraph 8.2 (b) below):

*“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 Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

##### **NOEL – No Observed Effect Level**

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

##### **LOAEL – Lowest Observable 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.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development.”* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

## **B.2 National Planning Policy Framework (NPPF)**

The following paragraphs are from the NPPF (published December 2023):

191. 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:

- a) 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;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

193. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

Paragraph 185 also references the Noise Policy Statement for England (NPSE). This document does not refer to specific noise levels but instead sets out three aims:

- “Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

### B.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

| Perception                   | Examples of Outcomes                                                                                                                                                                                     | Increasing effect level              | Action                        |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------|
| Not noticeable               | No effect                                                                                                                                                                                                | No Observed Effect                   | No specific measures required |
| Noticeable and not intrusive | Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life. | No Observed Adverse Effect           | No specific measures required |
|                              |                                                                                                                                                                                                          | Lowest Observed Adverse Effect Level |                               |

| Perception                     | Examples of Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Increasing effect level                   | Action                           |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------|
| Noticeable and intrusive       | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.                                                                                                                                                                   | Observed Adverse Effect                   | Mitigate and reduce to a minimum |
|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Significant Observed Adverse Effect Level |                                  |
| Noticeable and disruptive      | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Adverse Effect       | Avoid                            |
| Noticeable and very disruptive | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.                                                                                                                                                                              | Unacceptable Adverse Effect               | Prevent                          |

## B.4 World Health Organisation

The current Environmental Noise Guidelines 2018 for the European Region (ENG) supersede the Guidelines for Community Noise from 1999 (CNG). Nevertheless, the ENG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) remain valid.

A summary of the guidance from the ENG and CNG is shown in the table below.

| Source             | CNG guideline indoors all sources | ENG guideline outdoors noise from specific source only |
|--------------------|-----------------------------------|--------------------------------------------------------|
| Road traffic noise | 35 $L_{Aeq, 16h}$                 | 53 dB $L_{den}$                                        |
|                    | 30 $L_{Aeq, 8h}$                  | 45 dB $L_{night}$                                      |
| Railway noise      | 35 $L_{Aeq, 16h}$                 | 54 dB $L_{den}$                                        |
|                    | 30 $L_{Aeq, 8h}$                  | 44 dB $L_{night}$                                      |
| Aircraft noise     | 35 $L_{Aeq, 16h}$                 | 45 dB $L_{den}$                                        |
|                    | 30 $L_{Aeq, 8h}$                  | 40 dB $L_{night}$                                      |

With regard to single-event noise indicators, Section 2.2.2 of the WHO Environmental Noise Guidelines 2018 state:

*“In many situations, average noise levels like the  $L_{den}$  or  $L_{night}$  indicators may not be the best to*

explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ( $L_{A,max}$ ) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by  $L_{A,max}$ . Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.”

## B.5 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

### Internal Areas

BS8233:2014 Section 7.7.2 titled “Internal ambient noise levels for dwellings” states:

*“In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:*

| Activity                   | Location         | Desirable Internal Ambient Criteria |                       |
|----------------------------|------------------|-------------------------------------|-----------------------|
|                            |                  | 07:00 – 23:00                       | 23:00 to 07:00        |
| Resting                    | Living Rooms     | 35 dB $L_{Aeq,16hour}$              | -                     |
| Dining                     | Dining Room/Area | 40 dB $L_{Aeq,16hour}$              | -                     |
| Sleeping (Daytime Resting) | Bedroom          | 35 dB $L_{Aeq,16hour}$              | 30 dB $L_{Aeq,8hour}$ |

*Note 1 The above table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.*

*Note 2 The levels shown in the above table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the above table.*

*Note 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.*

*Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$  depending on the character and*

number of events per night. Sporadic noise events could require separate values.

*Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.*

*If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.*

*Note 6 Attention is drawn to the Building Regulations.*

*Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”*

### **External Amenity Areas**

BS8233:2014 Section 7.7.3.2 titled “Design criteria for external noise” states:

*“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  $L_{Aeq,T}^{-1}$ , 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.*

*Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. 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. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens, and terraces, which might be intended to be used for relaxation. In high-noise areas consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55dB  $L_{Aeq,T}$  or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”*

## **B.6 ProPG : Planning & Noise : 2017**

The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. It is applicable to noise

from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is “not dominant”.

This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- Element 1 – demonstrating a “Good Acoustic Design Process”;
- Element 2 – observing internal “Noise Level Guidelines”;
- Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
- Element 4 – consideration of “Other Relevant Issues”.

The ProPG considers suitable guidance on internal noise levels found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.

| Activity                      | Location           | 07:00 – 23:00 Hours | 23:00 – 07:00 Hours                      |
|-------------------------------|--------------------|---------------------|------------------------------------------|
| Resting                       | Living Room        | 35dB $L_{Aeq,16hr}$ | -                                        |
| Dining                        | Dining Room / Area | 40dB $L_{Aeq,16hr}$ | -                                        |
| Sleeping<br>(daytime resting) | Bedroom            | 35dB $L_{Aeq,16hr}$ | 30dB $L_{Aeq,16hr}$<br>45dB $L_{Amax,F}$ |

*NOTE 1 the Table provides recommended internal  $L_{Aeq}$  target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources.*

*Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.*

*NOTE 2 The internal  $L_{Aeq}$  target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the  $L_{Aeq}$  target levels recommended in the Table.*

*NOTE 3 These internal  $L_{Aeq}$  target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.*

*NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$ , depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB  $L_{Amax,F}$  more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).*

*NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal  $L_{Aeq}$  target levels should not normally be exceeded, subject to the further advice in Note 7.*

*NOTE 6 Attention is drawn to the requirements of the Building Regulations.*

*NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal  $L_{Aeq}$  target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved. The more often internal  $L_{Aeq}$  levels start to exceed the internal  $L_{Aeq}$  target levels by more than 5dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be*

required to show how the relevant number of rooms affected has been kept to a minimum. Once internal  $L_{Aeq}$  levels exceed the target levels by more than 10dB, they are likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (See Section 3.D).

## **B.7 British Standard 4142:2014 + A1:2019**

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 “Methods for rating and assessing industrial and commercial sound”.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains “a tone, impulse or other characteristic” then various corrections can be added to the specific (source) noise level to obtain the “rating level”.

BS 4142 states that: “The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs”. An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:

- “Typically, the greater this difference, the greater the magnitude of the impact.”
- “A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.”
- “A difference of around +5dB is likely to 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 the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

The determination of the “rating level” and the “background level” are both open to interpretation, depending on the context.

## **Appendix C**

### **Time History Graphs**



# 7-13 Queen Street

## Position 1

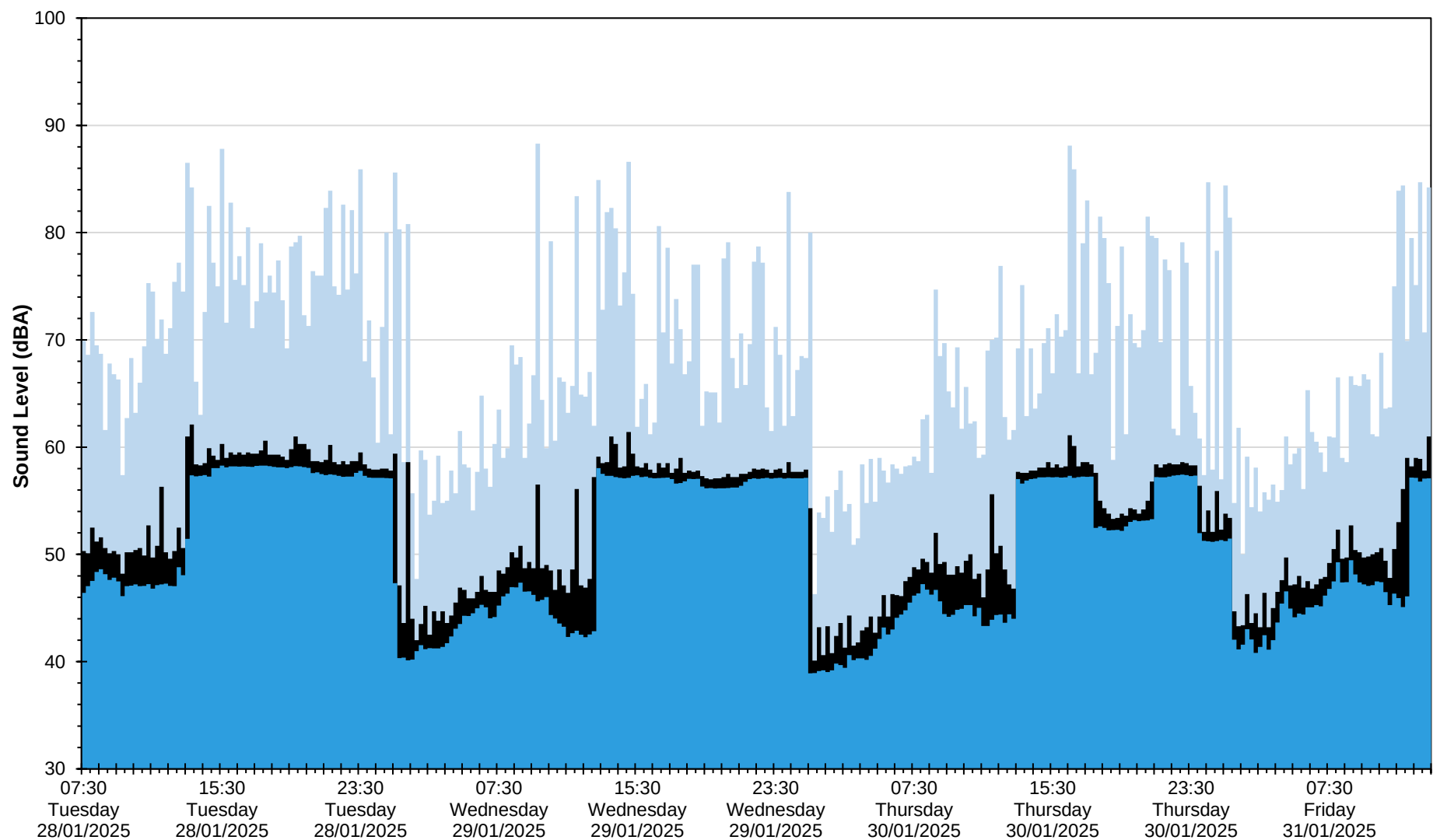
$L_{eq}$ ,  $L_{max}$  and  $L_{90}$  Noise Levels

Tuesday 28 January 2025 to Friday 31 January 2025

■  $L_{max}$

■  $L_{eq}$

■  $L_{90}$



Date and Time

32146/TH1

# 7-13 Queen Street

## Position 2

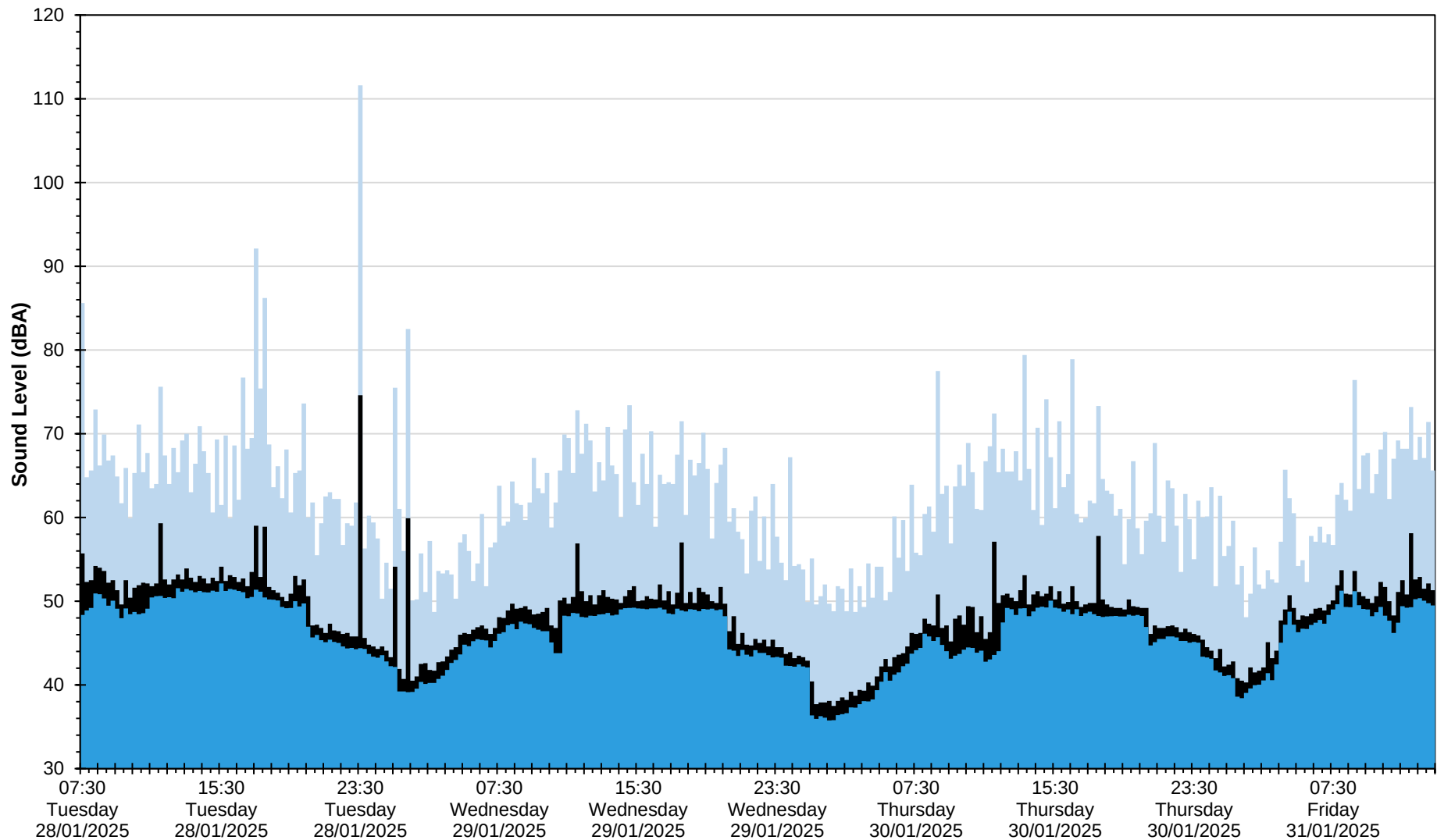
$L_{eq}$ ,  $L_{max}$  and  $L_{90}$  Noise Levels

Tuesday 28 January 2025 to Friday 31 January 2025

■  $L_{max}$

■  $L_{eq}$

■  $L_{90}$



Date and Time

32146/TH2