# Ladybarn House
# Fallowfield
# Manchester

## Environmental Noise Survey and Noise Impact Assessment Report

31601/NIA1

3 September 2024

For:
Steyn Group
52 Grosvenor Gardens
1st Floor
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# 31601/NIA1

## Document Control

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# 31601/NIA1

## Contents


| | | Page |
|---|---|---|
| 1.0 | Introduction | 1 |
| 2.0 | Objectives | 1 |
| 3.0 | Acoustic Terminology | 1 |
| 4.0 | Site Description | 2 |
| 5.0 | Proposed Development | 3 |
| 6.0 | Planning Policies, Standards & Guidance | 4 |
| 7.0 | Baseline Noise Survey | 6 |
| 8.0 | Existing Industrial Noise Impacts | 9 |
| 9.0 | Incident Noise Levels | 10 |
| 10.0 | Achieving Internal Noise Levels | 10 |
| 11.0 | External Amenity Area | 15 |
| 12.0 | Conclusions | 15 |


## Attachments


Appendix A – Acoustic Terminology

Appendix B – Relevant Planning Policies and Guidance

Appendix C – Time History Graphs

# 1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by Steyn Group to undertake a noise assessment for a site in Fallowfield, Manchester.

The site is subject to road noise from Moseley Road and Wilmslow Road, as well as from the junction of where these roads meet.

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 level measurements at the nearest site boundary with the surrounding road network to better understand road noise levels.

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

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.

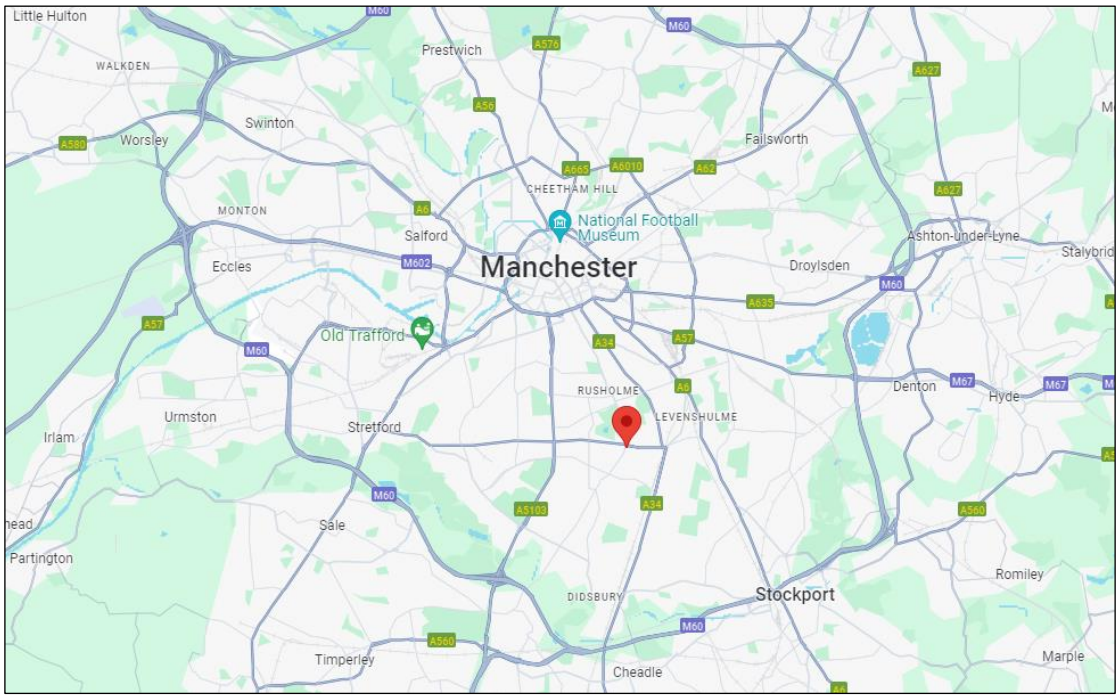
# 3.0 Acoustic Terminology

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 Moseley Road in Fallowfield and is approximately 0.9km west of the A34. The site falls within the jurisdiction of Manchester City Council. The Location Map is shown below.



Location Map (Map data ©2024)

## 4.2 Description

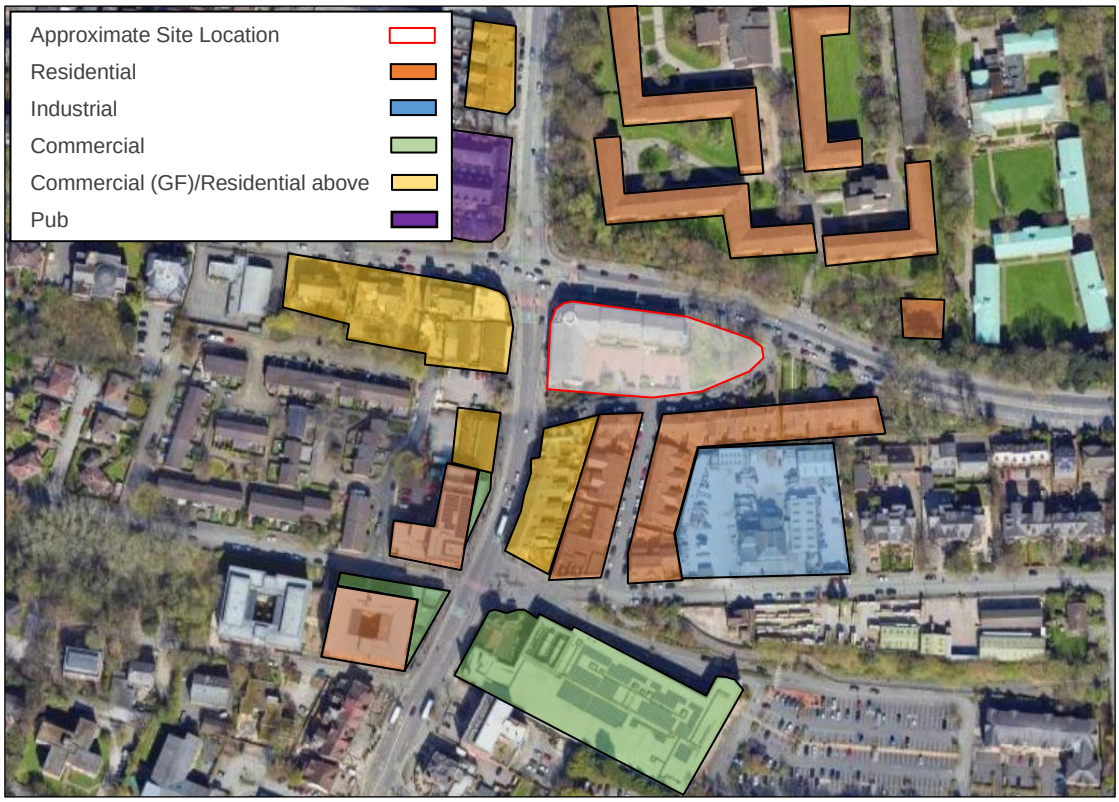
The site is bound by roads on all sides, with Moseley Road spanning the northern perimeter, Carill Drive running along the east and south perimeter, and Wilmslow Road to the west of the site.

To the north of the site, across Moseley Road, is a student residential campus. To the east and south of the site are also residencies. To the south of the site along Wilmslow Road, including the southwest corner of the site itself are commercial units on the ground floor with residential flats above.

The commercial spaces of the site are currently understood to be a hair and tanning studio, as well as a Subway sandwich shop. To the west of the site is the ‘Arabian Nites’ restaurant, as well as a grocery shop named ‘Wimmy Foods’.

To the northwest of the site is '256 Wilmslow Road' Pub, though this is fully screened by an existing building.

The site is shown in the Site Plan below.

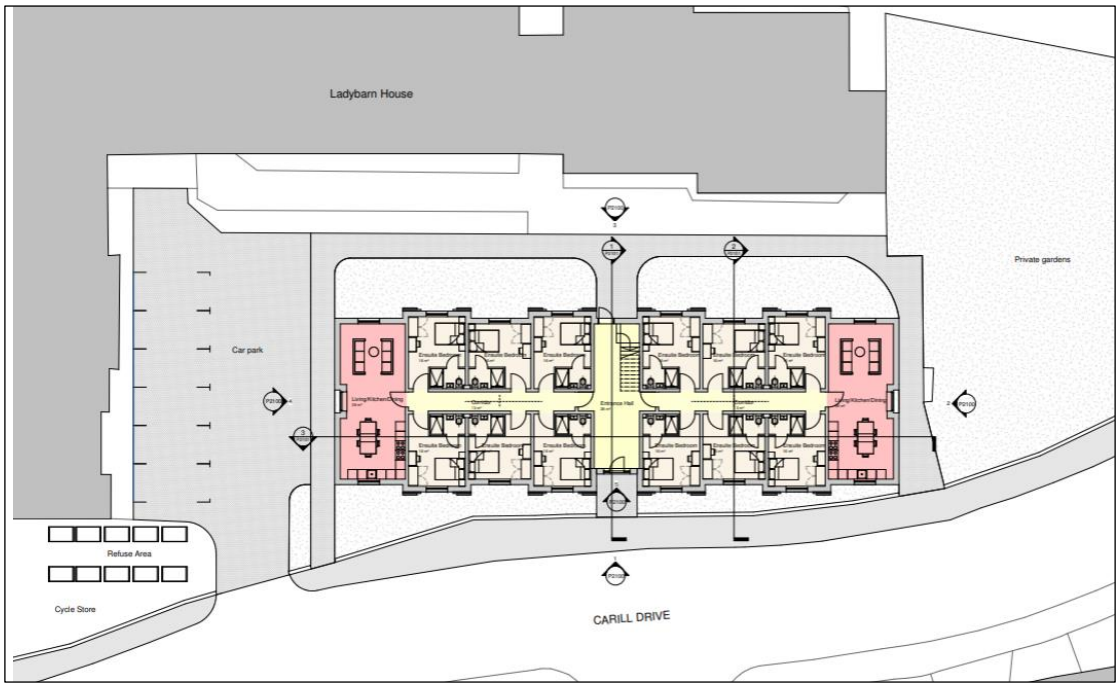



Site Plan (Imagery ©2024 Airbus, Maxar Technologies, Map data ©2024)

## 5.0 Proposed Development

The proposals are for a new student residential block which is to be located in the current carpark area of Ladybarn House. It is proposed to create 36no new rooms within 6no cluster apartments, with 2no wheelchair bedrooms located on the ground floor.

The Project Proposal Plan is shown below.




Plan showing Ground Floor Project Proposals (c/o BAL Architecture)

# 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:

- Manchester City Council Local Planning Policy
- World Health Organisation: 2018
- British Standard BS8233: 2014
- ProPG : Planning & Noise: 2017
- Building Regulations Approved Document O: 2021

- 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 Criteria

Manchester City Council requirements are outlined in Section 3.0 of Manchester City Council Planning and Noise Technical Guidance document (Oct 2022).

### 6.2.1 Noise from Fixed Building Services Plant

Section 3.7.1.5 outlines the noise assessment for fixed plant should be based on BS4142:2014 and the assessment must demonstrate that:

> *'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.*

### 6.2.2 Achieving Suitable Internal Noise Levels

Section 3.7.1.1 outlines that the following noise levels should be achieved for residential developments:

- *Bedrooms (night time – 23:00 – 07:00) 30 dB $L_{Aeq}$ (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ by more than 10 times)*
- *Living Rooms (daytime – 07:00 – 23:00) 35 dB $L_{Aeq}$*
- *Gardens and terraces (daytime) 55 dB $L_{Aeq}$*

Section 5.3.1.6 states the following with regards to maintaining internal ambient noise levels when desired to keep windows closed but still provide adequate ventilation:

> *"Occupants should be provided with a supply of fresh air in habitable rooms without having to open the windows (whilst also having the option to do this for purge ventilation, or at the occupants' discretion i.e. to reduce the potential for overheating).*
>
> *Where ambient noise levels are high a scheme of ventilation will need to be provided that does not compromise the acoustic attenuation afforded by the glazing. This may come in the form of individual window trickle vents or acoustic trickle vents."*

# 7.0 Baseline Noise Survey

## 7.1 Procedure

Fully automated environmental noise monitoring was undertaken by Will Robertson (BSc (Hons), TechIOA) from approximately 14:00 hours on Wednesday 28 August 2024 to 10:45 hours on Friday 30 August 2024, 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.

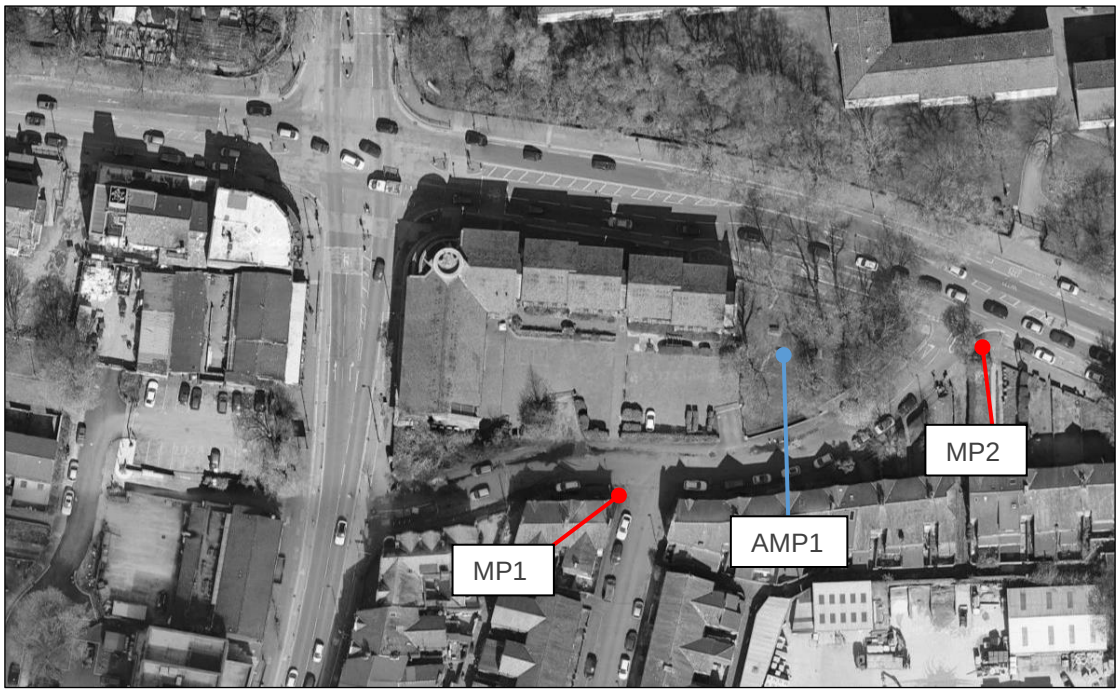
Additional attended measurements were performed between 14:00 hours and 14:45 hours on Wednesday 28 August 2024 with the purpose of establishing specific noise levels associated with the Moseley Road at the site boundary.

## 7.2 Measurement Positions

The noise level measurements were undertaken at 3no positions as described in the table below.

| Position | Type | Description |
|---|---|---|
| 1 | Unattended | To the southwest corner of the site, approx. 2 m from the nearside edge of Carill Drive. Microphone in free-field conditions approx. 3 m above ground. |
| 2 | Unattended | To the northeast corner of the site, approx. 2 m from the nearside edge of Moseley Road. Microphone in free-field conditions approx. 3 m above ground. |
| 3 | Attended | To the west of the site, located within the current site garden area, approximately 10 m from the nearside edge of both Carill Drive and Moseley Road. |

The positions are shown on the plan below.



Plan Showing Measurement Positions (Imagery ©2024 Airbus, Maxar Technologies, Map data ©2024)

## 7.3 Weather Conditions

For the unattended survey between Wednesday 28 August 2024 and Friday 30 August 2024, local weather reports indicated no notable periods of prolonged or heavy rainfall, with temperatures ranging from 10°C (night) to 20°C (day) and wind speeds less than 4 m/s. During our time on site, skies were largely clear with patchy cloud cover, wind conditions were calm, and road surfaces were largely dry.

During the attended survey on Wednesday 28 August 2024, the weather was generally clear and dry with a short period of light rainfall (not sufficient to wet road surfaces) 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 Data Logging Sound Level Meter | Larson Davis | LxT | 5111 | Calibration on 30/05/2024 |
| 2 | Type 1 Data Logging Sound Level Meter | Larson Davis | LxT | 4086 | Calibration on 28/05/2024 |

| Position | Description | Manufacturer | Type | Serial Number | Calibration |
|---|---|---|---|---|---|
| 3 | Type 1 Data Logging Sound Level Meter | Larson Davis | LxT | 5103 | Calibration on 29/05/2024 |
| All | Type 1 Calibrator | Larson Davis | CAL200 | 3083 | Calibration on 27/03/2024 |

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 0.3 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

The results have been plotted on Time History Graphs 31511TH1 to 31511/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 'representative' levels determined through statistical analysis of the 15-minute readings in line with BS 4142. $L_{Afmax}$ values are the '10$^{th}$ highest' 2-minute value in line with Approved Document O (Part O) requirements.

| Position | Date | Daytime (07:00 – 23:00 hrs) | | Night-time (23:00 – 07:00 hrs) | | |
|---|---|---|---|---|---|---|
| | | $L_{Aeq,16hr}$ | Typical $L_{A90}$ | $L_{Aeq,8hr}$ | Typical $L_{A90}$ | $L_{AFmax}$ |
| 1 | 28/08/2024 | 60* | 49 | 55 | 42 | 77 |
| | 29/08/2024 | 60 | | 56 | | 78 |
| 2 | 28/08/2024 | 69* | 53 | 62 | 38 | 78 |
| | 29/08/2024 | 67 | | 64 | | 79 |

*Full measurement period not captured

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

| Position | Date | Period | Sound Pressure Level (dB) | | |
|---|---|---|---|---|---|
| | | | $L_{Aeq,T}$ | $L_{A90,T}$ | $L_{Amax,T}$ |
| AMP1 | 28/08/2024 | 14:00 - 14:15 | 59 | 53 | 79 |
| | | 14:15 - 14:30 | 58 | 49 | 72 |
| | | 14:30 - 14:45 | 58 | 51 | 70 |

### 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 road traffic noise from the surrounding road network, notably Moseley Road due to the speed of the vehicles travelling compared to Wilmslow Road.

## 8.0 Existing Industrial Noise Impacts

This section considers the potential noise impact of the existing adjacent commercial premises and associated activities on proposed residential receptors. The assessment follows subjective methodology set out within BS 4142:2014.

The identified noise sources were HVAC units mounted at approximately 2 m from ground level to the southern façade of Ladybarn House, supplying the ‘Subway’ commercial unit.

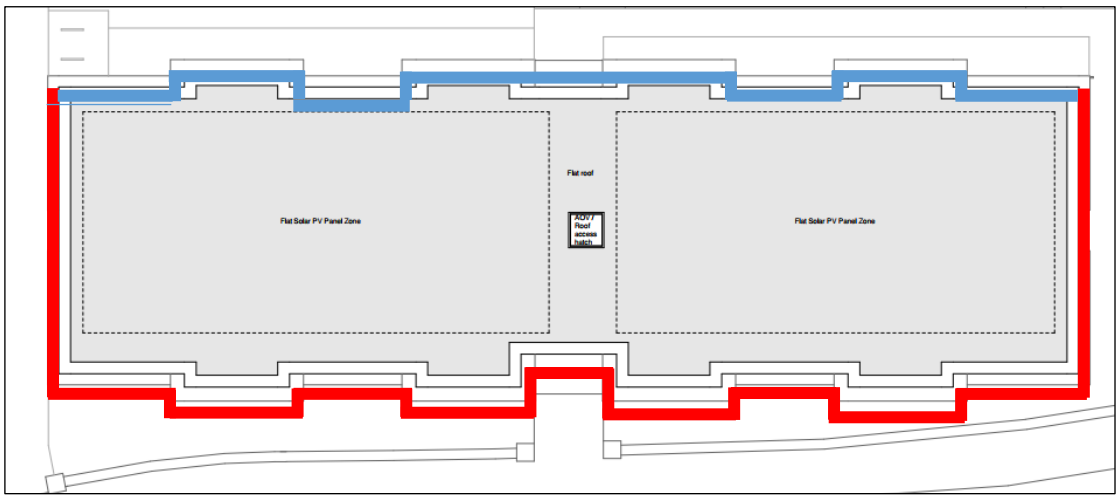
Our assessment is based on a subjective assessment of the attending engineer when on-site. During our time on-site, due to the surrounding noise climate at the time of the visit, the source noise levels could not be captured nor heard at a location representative of the proposed development façade as it was masked by that of the road traffic. As such, it is expected that attenuation of the underlying noise levels measured at the survey positions should provide sufficient protection toward these HVAC units located in the vicinity of the site.

# 9.0 Incident Noise Levels

Using the survey data, we have predicted the incident noise levels upon each elevation of the proposed development.

The following table and associated mark-ups outline the free-field incident noise levels across the development. For purposes of any subsequent assessment, these zones are considered to be the “Façade Zones”).

| Façade zone | Calculated incident noise levels | | |
|---|---|---|---|
| | Daytime $L_{Aeq,16h}$ (dB) | Night $L_{Aeq,8h}$ (dB) | 10th Highest Night $L_{max,2min}$ (dB) |
| A - Red | 60 | 56 | 79 |
| B - Blue | | | 70 |




Rooftop Plans indicating façade zones across proposed development (c/o BAL Architecture)

# 10.0 Achieving Internal Noise Levels

There are 3No ventilation conditions applicable to proposed residential dwellings. These are Background Ventilation as described in Approved Document F (Part F), Overheating as described in Approved Document O (Part O), and Purge Ventilation (odour and smells).

## 10.1 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.

## 10.2 Background Ventilation Condition

### 10.2.1 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 $L_{Amax}$ |

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)

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.

### 10.2.2 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.

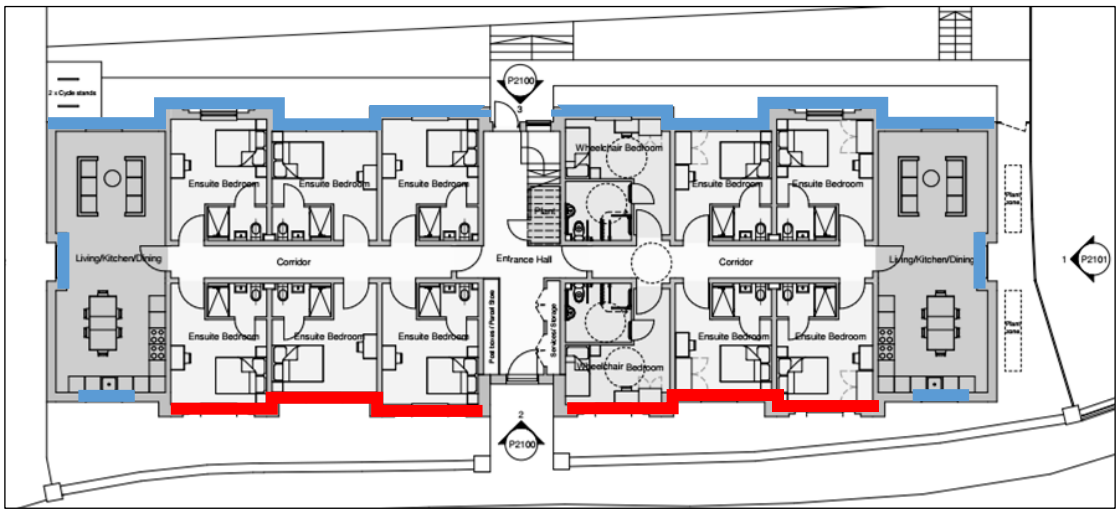
Allowance should be made to provide appropriate sound insulation solutions as required including, where necessary, suitably specified glazing and attenuated ventilators/mechanical ventilation systems. Preliminary calculations have been carried out to determine the likely façade sound insulation performance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

- Insulated SFS with rainscreen cladding
- Typical room volume as per latest drawings
- Typical window area as per latest drawings
- 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 Zone | | Façade Element | Preliminary Minimum Sound Reduction Specification |
|---|---|---|---|
| A | **Red** (Option 1) | Window | 27 dB $R_w + C_{tr}$ |
| | | Ventilator | Local MVHR |
| | **Red** (Option 2) | Window | 30 dB $R_w + C_{tr}$ |
| | | Ventilator | 40 $D_{new} + C_{tr}$ |
| B | **Blue** | Window | 27 dB $R_w + C_{tr}$ |
| | | Ventilator | 33 $D_{new} + C_{tr}$ |

The following plan shows the location across each floor of each façade zone noted in the table above.




Ground Floor Plans indicating façade zones across proposed development (c/o BAL Architecture)

### 10.2.3 Example Glazing Configurations

Example glazing configurations commensurate with achieving the sound insulation specifications noted in Section 10.2.2 are given below.

| Glazing Specification, $R_w + C_{tr}$ (dB) | Example Configuration |
|---|---|
| 30 | double glazed system e.g 10/16/4 mm. |
| 27 | double glazed system e.g 6/16/6 mm. |

### 10.2.4 Example Ventilation Solutions

Example ventilation solutions commensurate with achieving the elemental sound insulation performances noted in Section 10.2.2 are discussed below.

| Ventilator Specification, $D_{new} + C_{tr}$ (dB) | Example Configuration |
|---|---|
| 40 | Acoustic trickle vent per habitable room, or a mechanically assisted supply & extract solution (e.g. local MVHR). |
| 33 | 1 x 2,500mm$^2$ 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 |

## 10.3 Overheating Condition

Approved Document O ‘Overheating’ (ADO) was released in December 2021 and came into effect in England on 15 June 2022. It sets out the suitable methodologies to limit unwanted solar gains in summer and provide adequate means to remove heat from the indoor environment. Requirement O1(2)(a) contains criteria relating to noise with Sections 3.2 to 3.4 of ADO stating the following:

> *“In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*

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

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

Further to the above, the acoustic requirements of ADO relates to bedrooms and night and does not consider daytime hours or other living spaces.

To assess overheating ADO sets out 2No ways this can be done: These are by either using the simplified method or through dynamic thermal modelling (ie a TM59 assessment). For an acoustic assessment suitable to accompany a Planning Application, the simplified method is often used as it splits England into “Moderate” and “High” risk zones depending on the location of the site and provides “minimum free areas” for window openings in bedrooms. These are as follows:

- 13% of the floor area for “High Risk” locations
- 4% of the floor area for “Moderate Risk” locations

Based on the minimum free areas noted above, the IoA & ANC guidance note “Demonstrating Compliance with the Noise Requirements of Approved Document O” sets out the external noise levels above which the simplified method cannot be used and alternative overheating strategy should be developed. These are shown below:

| Zone | Risk Category | Incident Noise Level (dB) | | Notes |
|---|---|---|---|---|
| | | $L_{Aeq,8h}$ | $L_{AFmax,2min}$ | |
| Red | High | >44 | >59 | Open windows based on simplified model not suitable. Detailed modelling via TM59 assessment advised. Limited area opening windows or closed windows may be required to comply with AD-O |
| | Moderate | >49 | >64 | |

The site is located in Manchester (M14) and therefore falls into the “Moderate” risk category.

Based on the table above, all proposed bedrooms are above the point at which the simplified ADO model can be used and detailed modelling thermal modelling and a subsequent acoustic assessment is advisable to show compliance with Requirement O1(2)(a).

At this stage, bedrooms should be designed to avoid or severely restrict the reliance on opening windows to satisfy overheating targets. This can be achieved by use of solar rated glazing, external shutters or fenestration design. In addition, mitigation measures in the form of attenuated or plenum windows, attenuated louvres or vents for overheating and sound attenuating balconies may be suitable. These methods for reducing solar gains can be assisted with mechanical ventilation, such as MVHR with a manual summer boost function.

## 11.0 External Amenity Area

Noise levels in external amenity areas should ideally not be above the range of 50 to 55 dB $L_{Aeq,16hr}$, as stated in BS8233:2014.

It is acknowledged that noise levels in the current shared garden area may be above this noise level. However, in addition to this shared garden, all dwellings will have access to Platt Fields, where noise levels will be below/within the range of 50-55dB $L_{Aeq,16hr}$ as stated in BS8233:2014.

Considering that the scheme is within a 5-minute walk to Platt Fields, we would suggest that noise on the private external balconies proposed should not be a reason for refusal.

## 12.0 Conclusions

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

Appropriate target internal noise levels have been proposed.

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 shows the site, subject to appropriate mitigation measures, is suitable for residential development in terms of noise.

# 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. 30dB + 30dB = 33dB, not 60dB).

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 $_A$ 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.

$L_{90,T}$ — $L_{90}$ 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.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

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

$L_p$ — 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).

$L_w$ — 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 nigh or News 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 (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 Building Regulations Approved Document O

Building Regulations Approved Document O relates to setting standards for overheating in new residential buildings. It aims to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

Requirement O1 of Approved Document O is met by designing and constructing the building to achieve both of the following:

a. Limiting unwanted solar gains in summer.

b. Providing an adequate means of removing excess heat from the indoor environment.

Sections 3.2 to 3.4 of this document relate to noise and state the following:

*"In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*

*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 in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.*

***NOTE:** Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020).*

## B.8 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

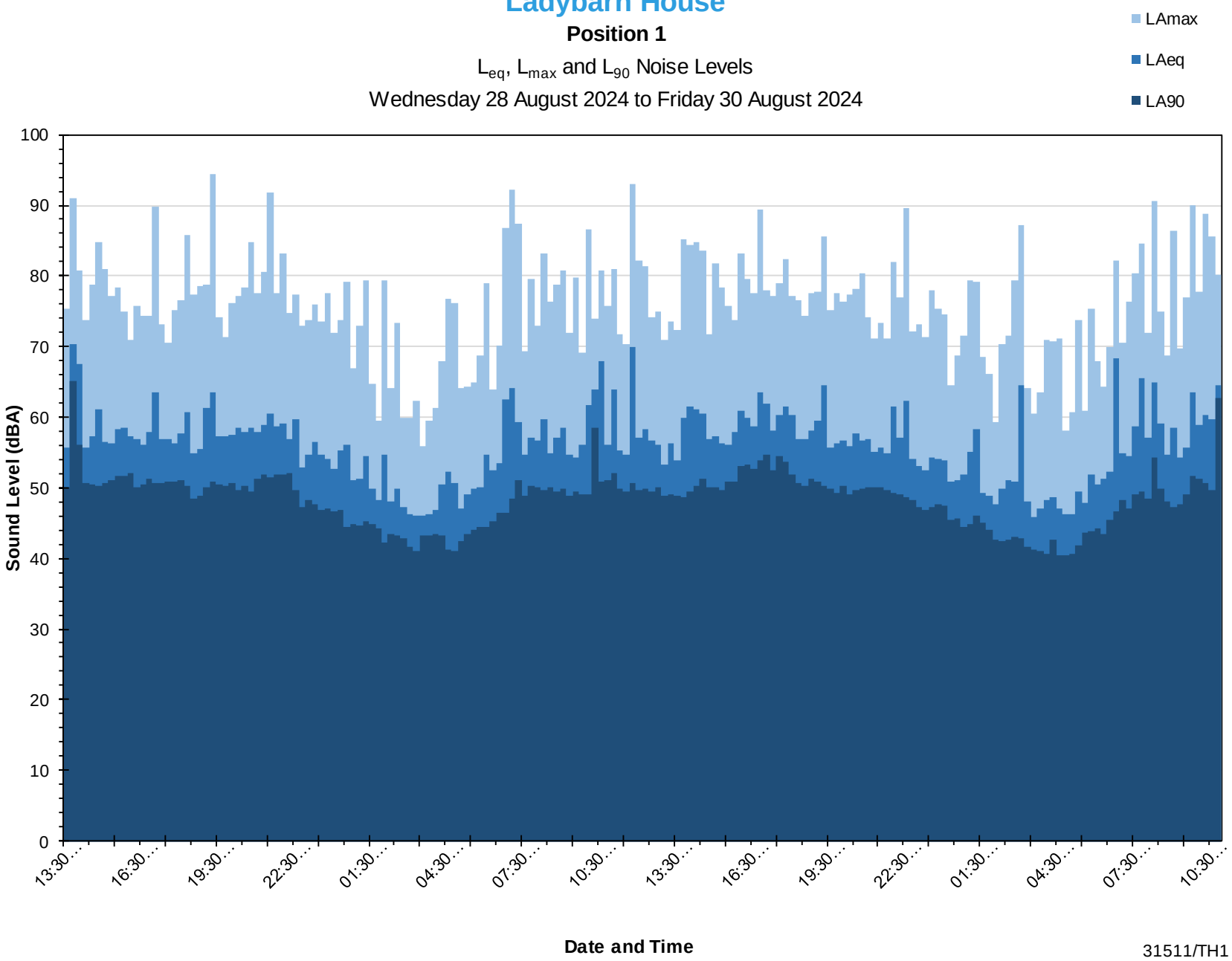
## Time History Graphs

# Ladybarn House

**Position 1**

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

Wednesday 28 August 2024 to Friday 30 August 2024



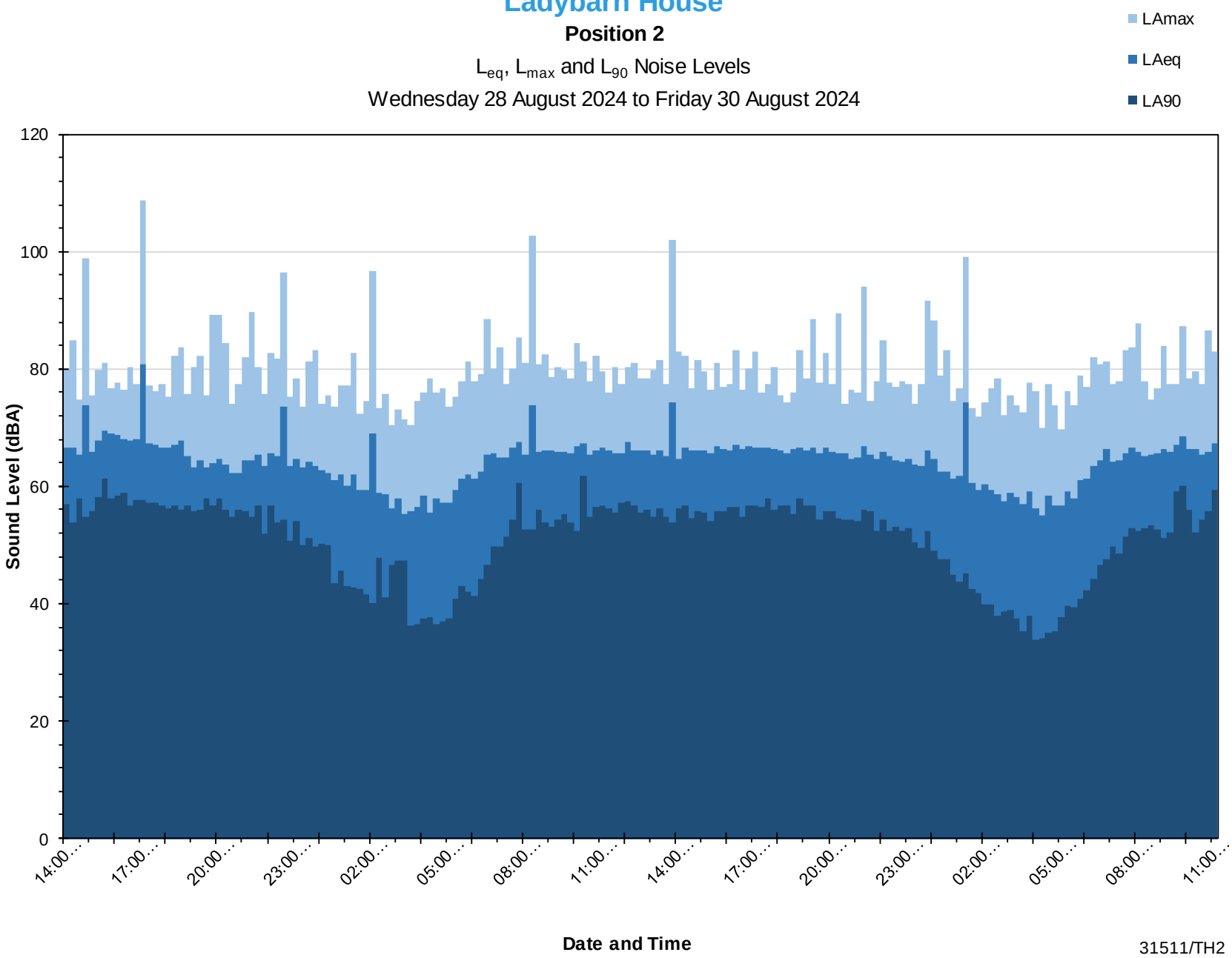

31511/TH1

# Ladybarn House

**Position 2**

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

Wednesday 28 August 2024 to Friday 30 August 2024




31511/TH2