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# Noise Impact Assessment of Entertainment Noise at Pauline's

28 Queen Street, Huddersfield HD1 2SP

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## LIST OF ATTACHMENTS

# 1 INTRODUCTION

ES Acoustics Ltd have been instructed by Pauline's Bites to produce an acoustic report to assess the potential noise impacts associated with entertainment proposed at Pauline's, 28 Queen Street, Huddersfield HD1 2SP.

The structure of this report is as follows:

- Review appropriate national and local planning policy, legislation and good practice guidance relevant to the proposal;
- Present the results of an environmental noise survey undertaken on site to determine background noise levels at nearby noise sensitive receptor locations;
- A noise assessment of direct noise transfer via the separating walls and floor of the bar to the neighbouring office and a noise break out assessment to the nearby residential dwellings. This includes:
    - Details of the sound insulation testing undertaken on site to establish the airborne sound insulation performance of the separating walls and floor;
    - Details of the noise break-out testing of the front façade (facing Queen Street);
    - The noise impact assessment outcomes;
    - A set of maximum permissible levels that could be generated within the bar while still maintaining the noise criteria; and
    - Recommendations and conclusion of assessment.

Whilst efforts have been made to ensure that this report is easy to understand, it is technical in nature. To aid the reader, a glossary of Acoustic Terminology has been provided in Appendix A.

# 2 POLICY, LEGISLATION AND GUIDANCE

## 2.1 National Policy

National planning policy forms the backbone of any noise impact assessment. In this case, however, most of the national planning policy is not relevant to this assessment. It has been provided in Appendix B for reference.

There is no specific good practice guidance for a direct transfer assessment of entertainment noise. Therefore, suitable noise criteria should be established based on recognised British Standards, research papers and publicly available guidance to ensure that the closest noise sensitive receptors are adequately protected from the proposed use.

### 2.1.1 BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings'

The most commonly referenced document with regards to internal noise levels within dwelling houses/flats and rooms in residential use (when unoccupied) from steady external sources is BS 8233:2014 'Guidance on s*ound insulation and noise reduction for buildings'*. The noise levels referenced in this document are based on the existing guidelines issued by the World Health Organization (WHO) and assume normal diurnal fluctuations in external noise. The levels are based on annual average data and do not have to be achieved in all circumstances (e.g. it is normal to exclude one off or very occasional, atypical events, such as night-time fireworks). Whilst the levels relate to external, steady, anonymous noise sources, they cannot simply be read across when determining the appropriate noise criteria for the closest noise sensitive residential receptors when considering noise associated with the proposed use. For reference, the dB $L_{Aeq,\,T}$ noise levels referenced within BS 8233:2014 are shown in the table below:

| Room | Daytime (07:00-23:00) | Night-time (23:00-07:00) |
|---|---|---|
| Living Room | ≤ 35 dB $L_{Aeq,16hr}$ | N/A |
| Dining Room | ≤ 40 dB $L_{Aeq,16hr}$ | N/A |
| Bedroom | ≤ 35 dB $L_{Aeq,16hr}$ | ≤ 30 dB $L_{Aeq,8hr}$ |
| Office | 40 – 50 dB $L_{Aeq,T}$ | N/A |

**Table 1 BS 8233:2014 indoor ambient noise levels for dwellings**

Whilst it is accepted that the levels presented above are for anonymous noise sources (which would not describe the noise sources under assessment), the guidance provides useful context as to what acceptable internal noise levels are in an ideal situation. The standard suggests that lower noise limits might be appropriate in cases where noise sources contain a specific character, however it doesn't not specify how such limits should be applied.

### 2.1.2 Noise From Pubs and Clubs Phase I (2005)

This report was prepared by The University of Salford and Hepworth Acoustics with the aim of determining how a rigorous UK method for assessing noise from pubs and clubs might be devised. Whilst it is accepted that the proposed planning use in question is not a pub or a club, the guidance would be used

in the absence of more appropriate guidance, considering that the main aspects of noise would be similar i.e. music and noise from patrons/attendees.

The report details several candidate assessment methods which were identified and considered. The methods identified included those for general low frequency noise, those relying on an absolute criteria, and those based on relative assessments (e.g. comparison against background).

With regards to 'relative' assessment methods, reference is made to British Standard 4142:1997: *'Method for rating industrial noise affecting mixed residential and industrial areas'.* Whilst this assessment method is aimed at industrial noise, it compares the source noise level against the prevailing background noise level (whilst including for a +5 dB source character correction where applicable). The resulting difference is used to indicate the likelihood of complaints. This assessment method is subject to a lower level cut off, below which the assessment result is not valid. This lower level cut off (a background level of below 30 dBA $L_{A90,T}$, which is described as 'very low') is incorporated because at such low levels, the likelihood of complaints is not solely dictated by the identified 'difference' but is also dependant on the absolute noise level. In other words, a greater difference may be acceptable where the overall level is low.

Reference is also made to work undertaken by the Institute of Acoustics in 1996. An Institute of Acoustics working group was tasked with producing guidance and criteria on the control of noise from pubs and clubs.

Unfortunately, due to the withdrawal of industry representatives, and because the results of the completed test work were not considered reliable, there was no associated publication. However, the annex containing the proposed criteria was published in an article (Hinton and Summerville, 2003) to stimulate discussion.

With regards to absolute criteria, consideration is given in this document to the possible application of Noise Rating Curves, which are also frequency dependant, and A-weighted target values for music intrusion based on World Health Organisation guideline values which are not frequency dependant.

In conclusion, the document identifies 6 different assessment methods which are proposed for further consideration in the determination of a validated assessment criteria for noise from pubs and clubs. The six identified assessment methods are presented in Table 2 below.

| Name | Parameter | Type |
|---|---|---|
| IoA working group annex | $L_{Aeq}$ vs $L_{A90}$ plus $L_{10}$ vs $L_{A90}$ in 40-160Hz 1 / 3 octave bands | Relative |
| BS4142 / Noise Act 1996 | $L_{Aeq}$ vs background ($L_{A90}$, $L_{A99}$, etc.) | Relative |
| Noise Rating Curve | 1/3 octave ($L_{eq}$, $L_{10}$ or $L_{max}$) vs NR curve | Absolute |
| Absolute $L_{Aeq}$ | $L_{Aeq}$ | Absolute |
| DIN 45680 / Moorhouse | 10-160Hz 1 / 3 octave $L_{eq}$ vs reference curve | Absolute |
| Inaudibility | Subjective | Relative |

**Table 2 Schedule of proposed criteria for validation**

**Noise From Pubs and Clubs Phase II Final Report (2006)**

Produced by the Building Research Establishment and Capita Symonds for the Department for Environment Food and Rural Affairs, this document presents the results of laboratory testing of different assessment methodologies and criteria for noise from pubs and clubs. This report draws on the recommendations of the Phase I report, but the number of candidate assessment test methods considered was expanded from the 6 proposed in the Phase I report, to a total of 18 variations of 9 separate methods.

It is concluded within this report that the noise metric that provided the best overall prediction of subjective ratings was the Absolute $L_{Aeq}$. With respect to this metric, subjects considered that noise was acceptable up to a level of 30.6 dB $L_{Aeq,5minute}$ within a habitable room with windows closed. The full range of levels and acceptability values are shown in Table 3.

| Semantic Descriptor | Score | Absolute $L_{Aeq,\ 5\ minutes}$ |
|---|---|---|
| Clearly Acceptable | 1 | 17.0 |
| | 2 | 20.4 |
| | 3 | 23.8 |
| | 4 | 27.2 |
| Just Acceptable | 5 | 30.6 |
| Just Unacceptable | 6 | 34.0 |
| | 7 | 37.4 |
| | 8 | 40.8 |
| | 9 | 44.2 |
| Clearly Unacceptable | 10 | 47.5 |

**Table 3 Semantic descriptor and associated value of acceptability ("Noise From Pubs and Clubs (Phase 2), Final Report" (Contract no. NANR163), Capita Symonds**

### 2.1.3 Established Criteria

Based on the guidance reviewed above, we would propose to assess the levels of noise transfer as follows:

- Assessment of **overall noise levels** against the Absolute $L_{Aeq}$ value of 30.6 dB(A), representing an acceptable outcome.

## 2.2 Local Policy – Kirklees Council

The development lies within the jurisdiction of Kirklees Council. Whilst there is no quantitative guidance in any of the Local Authority's current planning documentation regarding entertainment noise, there is a superseded document that details limits for new sources of entertainment noise.

This superseded document has been referenced by the planning department at Kirklees Council in recent, similar applications. In planning application 2026/90232 for a development at New Mills, Brougham Road, Marsden, Huddersfield, HD7 6AZ, Kirklees Council imposed the following planning condition.

**PC1 Entertainment Noise Inaudibility – Condition**

*Where entertainment events take place more than once per week or continues beyond 2300hrs, entertainment noise (e.g. noise from amplified and non-amplified music, singing and speech) at the premises shall be controlled so as to be inaudible inside the nearest residential premises. Inaudibility being defined as:*

- *if the external $L_{Aeq}$, (1min) (of the music etc. noise) at the façade of the nearest residential premises is not greater than the external $L_{A90}$ (of the background with no music etc. noise) at the façade of the nearest residential premises, and;*
- *if the external $L_{10}$ (5min) (of the music etc. noise) at the façade of the nearest residential premises is not greater than the external $L_{90}$ (of the background with no music etc. noise) in each 1/3rd octave band between 40Hz and 160Hz at the façade of the nearest residential premises.*

*Where entertainment events take place more than 30 times per year, not more than once in a single week and ends by 2300hrs, entertainment noise (e.g. noise from amplified and non amplified music, singing and speech) at the premises shall be controlled such that:*

- *the external $L_{Aeq}$, (1min) (of the music etc. noise) at the façade of the nearest residential premises does not exceed the external $L_{A90}$ (of the background with no music etc. noise) by more than 5 dB at the façade of the nearest residential premises, and;*
- *the external $L_{10}$ (5min) (of the music etc. noise) at the façade of the nearest residential premises does not exceed the external $L_{90}$ (of the background with no music etc. noise) by more than 5 dB in each 1/3rd octave band between 40Hz and 160Hz at the façade of the nearest residential premises.*

*Where entertainment events take place up to 30 times per year, suitable alternative external noise limits will be allowed based on the criteria set out the 'Code of Practice on Environmental Noise Control at Concerts' (Noise Council, 1995).*

*Reason: To ensure the proposed development does not cause harmful noise pollution within neighbouring noise sensitive locations, in the interest of amenity, to comply with the aims and objectives of Policies LP24 and LP52 of the Kirklees Local Plan and Chapters 12 and 15 of the National Planning Policy Framework.*

Given the clear criteria in this planning condition, these have been taken as the accepted criteria for Kirklees Council and so will be used in this assessment.

# 3 SITE CONTEXT AND BACKGROUND INFORMATION

## 3.1 Site Description

Pauline's at 28 Queen Street is an existing, licenced bar located in the middle of a row of ground floor commercial units. Adjacent to Pauline's to the south is a solicitor's office, Makin Dixon Solicitors. It is understood that they operate from 09:00 to 17:00, Monday to Friday.

Above and directly adjacent to the north of Pauline's is a derelict office block that is currently uninhabited. Observations from site were that it is currently under renovation, with large sections of walls and floors missing. The client informs ES Acoustics that they have not seen any works being done on the renovation since they took over the lease of the bar.

A review of the planning applications on Queen Street has been undertaken as it is not clear which buildings on Queen Street are residential. From this, it has been determined that 24 Queen Street is the closest noise sensitive receptor.

Across Queen Street from the bar, is the eastern façade of Huddersfield Art Gallery, which was open during 'normal' work day hours Monday to Sunday. It is currently being redeveloped, however. To the south lies Queensgate, one of the large urban roads that forms part of the Huddersfield ring road. Please see Figure 1, below, which shows the site and surrounding area.

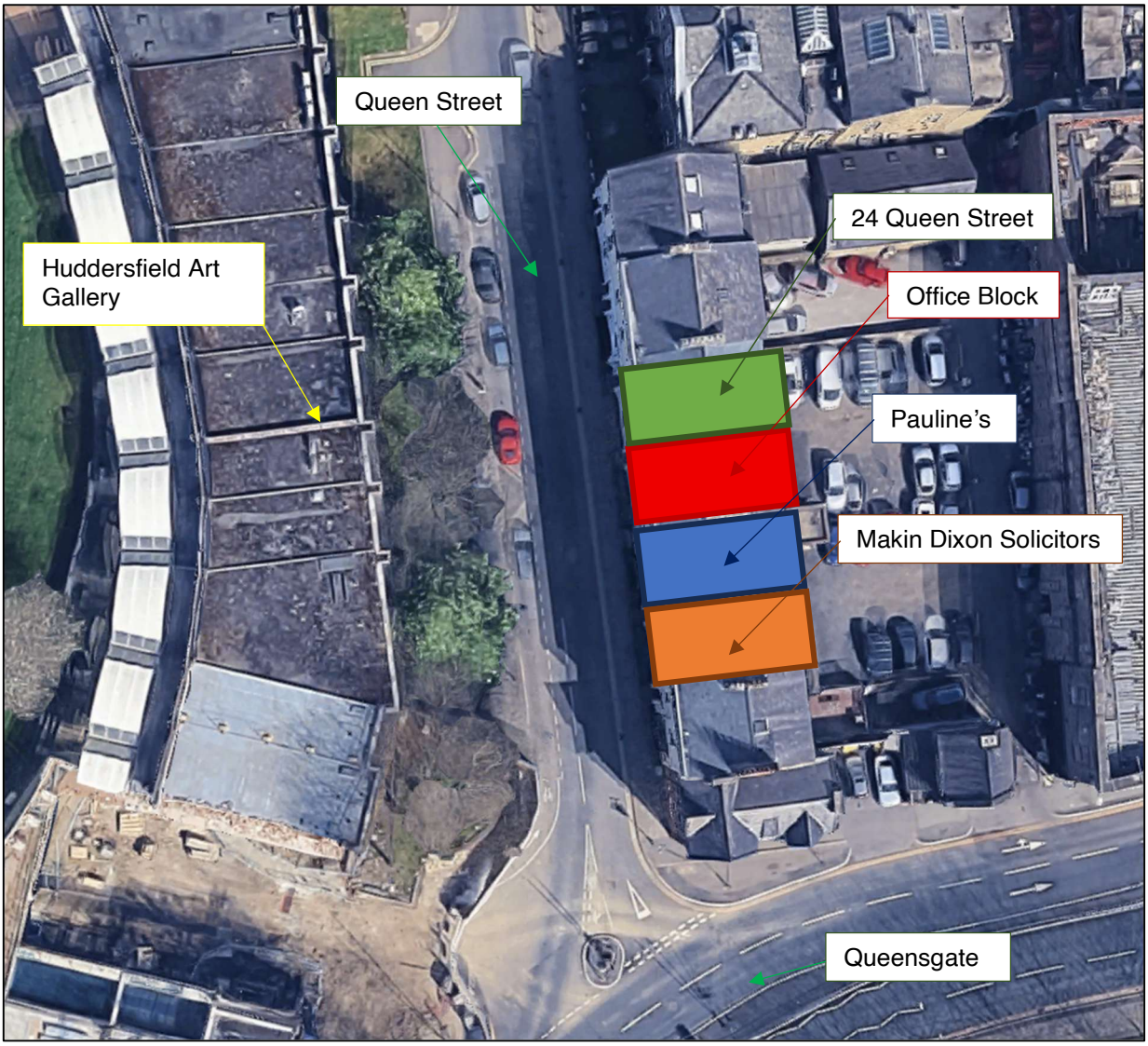


**Figure 1 Site and Surrounding Area**

# 4 ENVIRONMENTAL NOISE SURVEY

## 4.1 Measurement Location and Procedure

Noise surveys were undertaken on the proposed site, as shown in the figure below:

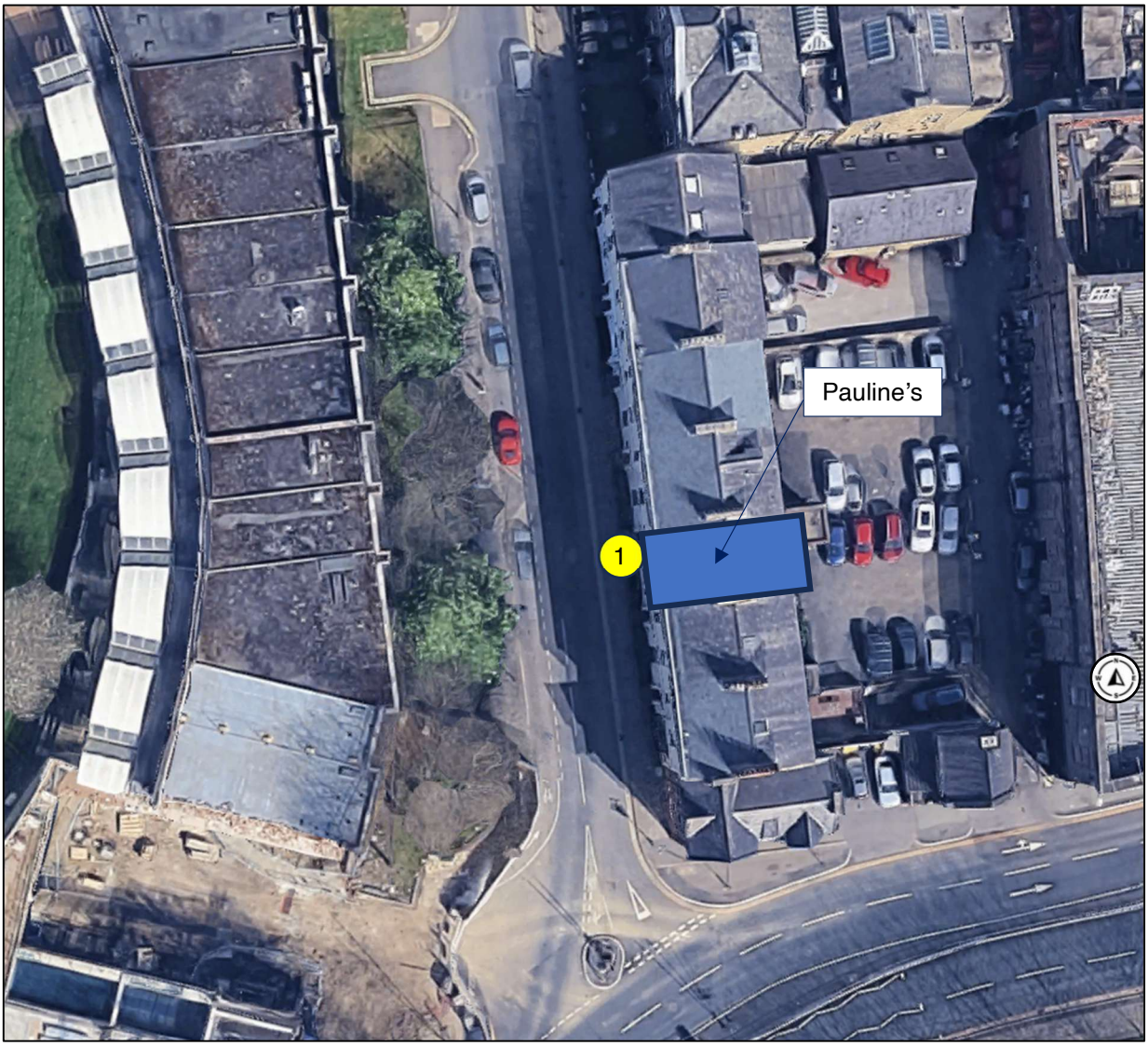


**Figure 2 Noise survey measurement locations (Image Reference: Google Earth)**

The location was chosen to measure the typical background noise levels at the nearby residential dwellings.

Noise Monitoring Position 1 was placed on an extendable pole approximately 1.5m away from the western façade overlooking Queen Street. This position was in the free-field. The noise environment at this location was dominated by road traffic noise from Queensgate, with additional contributions from road traffic movements on Queen Street. Background noise was due to distant road traffic.

The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels'*, with automated monitoring undertaken between 13:00 on Friday 3rd and 11:00 on Tuesday 7th July 2026.

The key acoustic descriptors measured for this assessment are as follows:

- *$L_{Aeq,T}$ (the continuous equivalent A-weighted noise level over a given time period, T);*
- *$L_{AFMax,T}$ , the maximum sound level over each measurement period;*
- *$L_{A90,T}$ (the noise level exceeded for 90% of the measurement period T, referred to as the 'background' noise level).*

## 4.2 Measurement Equipment

The table below presents the equipment used for the baseline noise surveys. The equipment calibration was verified before and after use and no abnormalities were observed.

| Equipment | Make and Model | Serial Number |
|---|---|---|
| Sound Level Meter | Svantek 977 Class 1 Sound Level Meter | 34191 |
| Microphone Capsule | ACO Pacific 7052E | 77747 |
| Microphone Preamplifier | Svantek SV 12L | 32446 |
| Calibrator | Svantek SV33 Class 1 Calibrator | 125829 |

**Table 4 Noise survey equipment**

## 4.3 Weather Conditions

Weather conditions during the automated monitoring were dry with little/no wind and therefore suitable for the measurement of environmental noise.

Data on temperature, wind speed and precipitation have been sourced from the closest weather station[1] with accessible data.

Analysis of the time history and measurement results shows that the levels of wind speed and precipitation have had no impact on the measured results.

## 4.4 Survey Results

Noise time histories of the measurement data are presented in Appendix C, with a summary of the measurement results is presented in Table 5. The loudest ambient noise levels for the daytime and night-time periods have been presented.

In the case of background sound levels ($L_{A90}$), a statistical analysis has been undertaken, as shown in Appendix D. The representative values presented above would be used for the assessment of proposed external building services plant and equipment.

[1] Met Office DCNN Number: 4043 OS Grid Reference: SE 4113 4177

| Measurement Position | Period | Ambient Sound Level (dB $L_{Aeq, T}$) | Representative Background Sound Levels (dB $L_{A90,T}$) |
|---|---|---|---|
| 1 | Daytime 07:00-23:00 | 66 | 50 |
| | Night-time 23:00-07:00 | 60 | 43 |

**Table 5 Measured noise levels**

# 5 NOISE TRANSFER ASSESSMENT FROM BAR TO ADJACENT NOISE-SENSITIVE DWELLINGS

## 5.1 Noise Breakout Assessment

Kirklees Council require that entertainment noise breaking out of the façade of the bar be controlled. The client has informed ES Acoustics that they intend to have amplified music every weekend, which would be more than 30 times per year. The client also wishes to have amplified music extending into the night-time period.

On this basis, Kirklees Council's previous planning conditions states that the ambient noise breakout from the bar must be controlled to be than 5 dB above the typical background noise level at the nearest noise sensitive receptor.

In addition, they require the top 10% of entertainment noise, dB $L_{A10,T}$, to be controlled to 5 dB above the typical background noise levels in the third octave bands between 40Hz and 160Hz. This is equivalent to the 63Hz and 125Hz octave bands.

It is impossible to accurately predict a dB $L_{A10,T}$ value without directly measuring it. As the bar doesn't yet have a licence to have amplified music, it cannot be measured.

As a 'worst case' assessment then, the maximum permissible ambient noise level spectra will be taken as representative of a dB $L_{A10,T}$ spectra. If the calculated noise break out from the bar is significantly below the typical background noise level, then it can be assumed that the dB $L_{A10,T}$ criteria would be fulfilled. This is on the basis that an ambient noise level is broadly equivalent to a dB $L_{A50,T}$ value.

To assess the entertainment noise breakout from the bar, a noise breakout measurement was conducted by ES Acoustics during our site visit on 3rd July 2026. The bar was used as a source room with a loudspeaker generating levels of pink noise. All the doors and windows of the bar were closed and measurements were taken 1m away from the façade externally. A background noise level measurement was then taken externally so that a normalised level difference, dB $D_n$, value could be calculated. This gives a representative measured value of the sound insulation of the external façade of the bar. The calculated normalised level difference, dB $D_n$, is presented in the table below.

| **Calculated Normalised Level Difference (dB $D_n$)** | **Octave band centre frequency (Hz)** | | | | | | | | **Overall** |
|---|---|---|---|---|---|---|---|---|---|
| | **63** | **125** | **250** | **500** | **1k** | **2k** | **4k** | **8k** | |
| Bar to External Normalised Level Difference (dB $D_n$) | 28 | 35 | 39 | 42 | 46 | 48 | 44 | 36 | 39 |

**Table 6 Measured normalised level difference**

Using this normalised level difference and the calculated maximum permissible noise level, the maximum entertainment noise breakout at the nearest noise sensitive receptor can be calculated. The nearest window of the closest noise sensitive receptor has been measured as being 15m away.

The calculated entertainment noise breakout has been compared to the typical night-time background noise level as per the requirements of Kirklees Council. This is shown in the table below. The Local

Authority only require a low frequency noise assessment, as such, only the octave bands between 63 and 500Hz are shown. The full calculations are provided in Appendix F.

| Noise Level | Octave band centre frequency (Hz) | | | | Overall |
|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | |
| Typical Night-time Background Noise Level | 52 | 48 | 43 | 41 | 43 dB $L_{A90,T}$ |
| Kirklees Council Entertainment Noise Requirement | 57 | 53 | 48 | 46 | 48 dB $L_{Ar}$ |
| Calculated Noise Breakout from Bar at nearest noise sensitive receptor | 57 | 52 | 48 | 46 | 48 dB $L_{Aeq,T}$ |
| Difference | 0 | -1 | 0 | 0 | 0 dB |
| Meets Kirklees Council requirements? | YES | YES | YES | YES | YES |

**Table 7 Noise Breakout Assessment**

As shown by Table 11 above, the predicted entertainment noise break out levels meet the requirements of Kirklees Council when the calculated maximum permissible ambient noise level is used.

This assessment requires both the entrance door and the lobby door to be closed during the entertainment noise. Access to the venue will still be required. To keep the doors closed for as long as possible, it is recommended that door shutters are installed on these doors.

As the noise break-out performance of between the bar and the nearby noise sensitive receptor is the most sensitive route, this will be the limiting factor in determining the maximum permissible noise levels in the bar. Table 8 shows the calculated maximum permissible noise levels in the bar.

| Maximum Permissible Noise Level of Amplified Music | Octave band centre frequency (Hz) | | | | | | | | dB $L_{Aeq,T}$ |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| Reverberant Sound Pressure Level | 97 | 99 | 99 | 100 | 95 | 90 | 90 | 90 | 101 |

**Table 8 Maximum permissible reverberant sound pressure level from amplified music**

Referencing the noise spectra in the *Little Red Book of Acoustics*, an ambient noise level of 101 dB $L_{Aeq,T}$ would classify as a 'live music venue/DJ'. This maximum permissible noise level is likely suitable for the intended use.

## 5.2 Sound Insulation Testing

To establish the current sound insulation performance of the separating walls and floor between the bar and the adjacent office premises, investigative sound insulation tests were undertaken, as described throughout this section.

Airborne sound insulation testing has been undertaken in accordance with BS EN ISO 140-4:1998 'Acoustics - Measurement of sound insulation in buildings and of building elements. Field measurements of airborne sound insulation between rooms'.

The test equipment used was as follows. Calibration was verified before and after the assessment with no irregularities reported.

| Equipment | Make and Model | Serial Number | Calibration Expiry | Certificate No. |
|---|---|---|---|---|
| Sound Level Meter | NTi XL3 | A3A-01427-F0 | 02-Feb-27 | UCRT25/1203<br>UCRT25/1205<br>UCRT25/1208 |
| Microphone Capsule | NTi MC230A | A30063 | | |
| Microphone Preamplifier | NTi MA230 | 1887 | | |
| Loudspeaker | RCF ART 310-A | VBCC01229 | n/a | n/a |
| Calibrator | Svantek SV33 Class 1 Calibrator | 125829 | 04-Feb-27 | UCRT26/2970 |

**Table 9 Test Equipment**

Sound insulation testing was undertaken between the bar area and the office area above and the bar area and the adjacent solicitors office. Please be aware that it was not possible to test to the adjacent offices at 30 Queen Street due to there being a large hole present in the separating wall. As all of the buildings on Queen Street have the same ground floor layout as the solicitors office, the test between the bar and the solicitors office can be taken as representative of the sound insulation performance between the bar and 30 Queen Street.

The results of the sound insulation testing are presented in the table below. In the case of airborne sound insulation, a greater figure denotes a better performance. The test certificates are presented in Appendix E.

| Test No. | Source Room | Receiving Room | Test Element | On-Site Airborne Sound Insulation (dB $D_{nTw} + C_{tr}$) | Apparent Sound Reduction Index (dB $R'_w$) |
|---|---|---|---|---|---|
| **AF1** | Bar | Unoccupied office above | Floor | 59 | 60 |
| **AW1** | Bar | Solicitors Office | Wall | 71 | 73 |

**Table 10 Airborne Test Results**

## 5.3 Direct Sound Transfer Assessment

Based on the airborne sound insulation performances measured on site, direct noise transfer calculations are presented.

Full details of the calculations are shown in Appendix F.

With this maximum noise level, the predicted noise levels in the adjacent offices and have been calculated. These are shown in the table below.

| Receptor | Octave band centre frequency (Hz) | | | | | | | | dB $L_{Aeq,T}$ |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| Unoccupied Office above Bar | 60 | 57 | 49 | 43 | 29 | 22 | 17 | 12 | 46 |
| Solicitors Office adjacent to Bar | 42 | 39 | 31 | 28 | 18 | 14 | 5 | 0 | 29 |

**Table 11 Calculated Internal Ambient noise levels in receptors adjacent to the Bar**

As shown, the direct noise through the ceiling of the bar to the office above would lead to an ambient noise level of 46 dB $L_{Aeq,T}$ in the office above. Although the guidance from *Noise from Pubs and Clubs* suggest that this would be a 'just unacceptable' noise level, it must be considered that this is an office receptor and not a residential receptor. BS 8233:2014 gives guidance that office receptors should have an internal ambient noise level of 40 – 50 dB $L_{Aeq,T}$, which is met by this assessment.

It should also be noted that the offices operate during the 'normal' work day hours. The intended amplified music is proposed in the evening and night-time hours, so when the offices will be closed.

To prevent any disturbance to the office receptors, amplified music should be limited to a period **after the working hours of the offices.** In this case, it would not be reasonable to assume that people are working in the neighbouring offices during the evening and night-time periods.

# 6 NOISE MANAGEMENT PLAN

The management of the Bar would play a crucial role in ensuring that noise emissions associated with the entertainment noise are reasonably controlled. This Section outlined various management functions that must be adopted to ensure that the likelihood of complaints due to noise and the use of the function room are minimised in accordance with BPM (Best Practical Means).

## 6.1 Noise Limiter Installation

A noise limiter would ensure that any amplified music within the Bar is controlled to an agreed level. Most typical premises License's would note that "*the noise limiter level shall be set by agreement with the Client's appointed acoustic consultant and the Environmental Health Officer's recommendations*."

The noise limiter therefore must be calibrated to this level prior to any amplified music occurring within the venue by a suitably qualified acoustic or audio engineer, with a report detailing the calibration process and set level issued to the venue management for permanent record.

For clarity, the noise limiter should be a 'cut-off' style noise limiter that requires the hired band to use specific power sockets. Upon exceedance of the agreed source noise level, power provision to the sockets is eliminated, thereby silencing all powered equipment.

An alternative is to enforce use of a limiter on the house PA system. A digital limiter is a cost effective solution and can be programmed to the required octave band noise limits so that they cannot be exceeded. Live drums would likely need to be surrounded by a Perspex screen with microphones forcing them through the house PA limiter system or remain purely acoustic.

Such limiters would include a 'traffic light display' that would be mounted on a wall in a location clearly visible to the performing artist and provides a visual aid when noise levels reach the threshold level.

It is important that the entertainment provider (band, DJ, etc) is made aware of the limiter in advance so they can conduct sound checks with the limiter to ensure that their desired output level conforms with the threshold of the limiter (with sufficient headroom to avoid the power being cut off).

The noise limiter must be maintained in good working order, with appropriate records kept by the venue management.

Should any damage or failure occur with the noise limiter, the system must be repaired or replaced within a two-week period (note that due to the reliance on specialist contractors it would be unreasonable to expect a faster repair or replacement). Any report for calibrating the noise limiter will be kept on record by the venue management and provided to the Local Authority upon request.

The noise limiter should be set in accordance with the sound pressure levels noted in the table below:

| Maximum Permissible Music Noise Levels | Octave band centre frequency reverberant sound pressure levels, dB | | | | | | | | Overall Sound Pressure Level |
|---|---|---|---|---|---|---|---|---|---|
| | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | dB $L_{Aeq,T}$ |
| Live music / DJ | 97 | 99 | 99 | 100 | 95 | 90 | 90 | 90 | 101 |

**Table 12 Noise limiter calibration levels**

## 6.2 Management Responsibilities

Venue management would fulfil a critical role in ensuring that certain aspects of the Noise Management Plan are implemented which include the following:

### 6.2.1 General

- The manager shall ensure that all staff are briefed on the licensing objectives in particular, no underage drinking, no drunkenness on the premises or outside the premises, no use of drugs, no violence or anti-social behaviour and that there is a need to protect children from harm.
- An incident log will be maintained showing a detailed note of incidents and the log will be inspected and signed by the DPS or the bar manager.
- The premises will be responsibly managed at all times.
- There will be zero tolerance to drunken, anti-social behaviour.
- All staff will be trained to promote quiet departure of patrons.
- All training undertaken by staff members shall be fully documented and recorded and this should be completed every six months.
- All events will be carefully managed to minimise the impact on neighbouring residential properties.

### 6.2.2 Indoor Noise

- External doors and windows of the main building will be kept closed at any time when amplified music for the purposes of entertainment is being played above background level inside any areas of the building, except for access and egress. All staff are briefed during training to ensure they remain vigilant on closing doors and windows should they be opened by patrons.
- Self-closers will be installed on the doors in the main building in order to keep the doors closed whilst music is being played above background level in the building, except during access and egress.

### 6.2.3 Amplified Music

- Management will make music suppliers aware of the venue closing times and require them to adhere to this. To meet the requirements of Kirklees Council, all entertainment noise must not be

allowed to occur until after the 'normal' working hours of the adjacent office premises, i.e. the offices must be closed when the entertainment noise occurs.

- Management will ensure that music suppliers are made aware of the noise limiter system prior to arrival on site. Music suppliers will be briefed that a sound check is recommended at a lower noise level than they would ideally play at to be sure that the limited level on the traffic light limiter display is met. The band can then increase their noise level in a proportional manner whilst keeping within the limiter limits.
- Management will ensure music suppliers are aware of the responsible person on site and the requirement to accept instruction from them.
- Management must be permitted to control volume levels.
- Management will intervene should excessive noise be created by musicians outside.
- The manager on duty will encourage patrons leaving the premises to do so in such a manner that it does not unreasonably disturb residents by noise, unruly or unsociable behaviour.
- Signage will be displayed prominently inside and outside asking guests to respect the amenity of nearby residents and to leave the premises and the area quietly.

# 7 CONCLUSION AND SUMMARY

ES Acoustics Ltd have been instructed by Chloe James to produce an acoustic report to assess the potential noise impacts associated with entertainment proposed at “Pauline’s”, 28 Queen Street, Huddersfield, HD1 2SP

Following sound insulation testing, noise breakout testing and a background noise survey, calculations have been undertaken to ensure that any entertainment noise from the bar is kept to an acceptable level to the nearby noise sensitive receptors.

A maximum permissible noise spectrum has been calculated, and using this spectrum, the requirements of Kirklees Council are met in full.

A noise management plan has been provided. The key aspects are that all entertainment noise must not occur until the surrounding office premises are closed, a noise limiter must be installed to keep entertainment noise emissions below the maximum permissible spectrum, and that door closers be provided to the lobby and entrance doors.

On this basis, live music at Pauline’s is deemed acceptable from an acoustic point of view.

# APPENDIX A

## GLOSSARY OF ACOUSTIC TERMINOLOGY

**Decibel scale - dB**

The decibel (dB) is a relative unit of measurement used in acoustics. The dB is a logarithmic ratio between a measured level and a reference level of 0 dB (i.e the threshold of human hearing). Simply put, the decibel compresses the wide range of sounds we hear into more manageable numbers.

**Addition of noise from several sources**

Sound produced by multiple sound sources are added logarithmically e.g. power ratio of 2 = 3dB, power ratio of 10 = 10dB. Therefore, two equally intense sound sources operating simultaneously produce a sound level which is 3dB higher than a single source e.g. 60dB + 60dB = 63dB.

**Subjective impression of noise**

Human response to sound is highly individualized and often based on psychological factors such as emotion and expectation. Sensitivity to sound typically depends on the loudness, pitch, duration of the occurrence, and time of occurrence (e.g. a sound source could cause annoyance during the night where it would not during the day). The following table is a guide to explain increases or decreases in sound levels for many scenarios.

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

**'A' Weighted Frequency Filter - dB(A)**

The human ear is not equally sensitive in all frequencies. The A-weighting filter was devised to take this into account when undertaking noise measurements and allows a sound level meter to replicate the human ears response to sound.

**$L_{Aeq, T}$**

Sound can fluctuate widely over a given period. $L_{Aeq}$ is the A-weighted equivalent continuous sound level, with T denoting the time period over which the fluctuating sound levels were averaged e.g. $L_{Aeq,16h}$ is the equivalent continuous noise level over an 16 hour period.

**$L_{A90}$**

A-weighted sound level exceeded for 90% of the measurement period, calculated via statistical analysis. The $L_{A90}$ descriptor is typically used to establish background sound levels for noise impact assessments

**$L_{A10}$**

A-weighted sound level exceeded for 10% of the measurement period, calculated via statistical analysis.

**$L_{AFmax}$**

A-weighted sound level maximum sound pressure level that has been measured over a given time period

# APPENDIX A

## GLOSSARY OF ACOUSTIC TERMINOLOGY

**Octave Bands**

The audio or frequency spectrum of the human ear is in the range of 20Hz to 20 kHz. The spectrum tells how the energy of the sound signal is distributed in frequency. Octave bands divides the audio spectrum into 10 equal parts. The International Standards Organisation defines the centre frequency of these bands as 31.5Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz.

**Noise Rating (NR) Curves**

A method of rating noise using a set of curves relating octave band sound pressure levels. Typically used for building services systems within offices

**Airborne sound**

Sound radiated from a source into the surrounding air e.g. musical instruments, tv/radio, machinery/equipment. Airborne sound insulation refers to the reduction or attenuation of airborne sound, usually via a solid partition between a source and receiver.

**Impact sound**

Sound resulting from the impact between colliding objects, e.g. footfall impact upon a floor. Impact sound insulation refers to the resistance of a floor to the transmission of impact sound, typically via the installation of a 'resilient layer'

**Flanking sound**

The transmission of airborne sound between two adjacent rooms by paths other than via the separating partition between the rooms, e.g. the abutment point of a wall and floor.

**Structure-borne noise**

Noise caused by the vibration of elements of a structure. This can result in reradiated noise, whereby the vibrating element transmits airborne sound into a space e.g. vibration caused by mechanical plant installed within a plant room which is not adequately isolated from the structure, or construction/demolition work in an adjacent building.

**Reverberant sound**

Sound in an enclosed space (usually a room), which results from repeated reflections at the boundaries. Reverberation time is the time taken for a steady sound level in an enclosed space to decay by 60dB, measured from the moment the sound source is switched off. A example of a typically reverberant space would be a classic church. Absorptive materials can be used to reduce reflections and reverberation times.

# APPENDIX B

## PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

## 1 NATIONAL POLICY

### 1.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) covers issues relating to noise and planning in England.

The paragraphs relating to noise state:

*187. Planning policies and decisions should contribute to and enhance the natural and local environment by; […]*

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

*198. 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; […]*

*200. 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.*

### 1.2 Noise Policy Statement for England (NPSE)

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

The NPSE vision noted above is supported by the following aims:

*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 NPSE outlines observed effect levels relating to the above, as follows:

- *No observed effect level (NOEL): this is the level of noise exposure below which no effect at all on health or quality of life can be detected;*
- *Lowest observed adverse effect level (LOAEL): this is the level of noise exposure above which adverse effects on health and quality of life can be detected;*
- *Significant observed adverse effect level (SOAEL): This is the level of noise exposure above which significant adverse effects on health and quality of life occur;*

Noise effect levels are not set at absolute noise level targets, but instead vary depending on the context and character of the noise and site-specific factors which may impact on the severity of the effect. The NPSE states:

*'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'*

### 1.3 National Planning Practice Guidance (NPPG)

The NPPG provides practical guidance on how the NPPF should be applied as well as and guidance on the factors influencing whether noise may be a concern at the planning stage and how adverse effects can be mitigated. The table below summarises the effect levels presented within the NPSE, as follows:

| Response | Examples of Outcomes | Increasing Effect Level | Action |
|---|---|---|---|
| Not present | No Effect | No Observed Effect | No specific measures required |
| Present and not intrusive | Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life. | No Observed Adverse Effect | No specific Measures required |
| Present and intrusive | Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life. | Observed Adverse Effect | Mitigate & reduce to a minimum |

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## PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

| Response | Examples of Outcomes | Increasing Effect Level | Action |
|---|---|---|---|
| Present and disruptive | The noise causes a material change in behaviour, attitude or other physiological response, 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 |
| Present and very disruptive | Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory | Unacceptable Adverse Effect | Prevent |

**Table 1 Noise exposure hierachy**

# APPENDIX B

## PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

## 2 BEST PRACTICE AND GUIDANCE

### 2.1.1 World Health Organization (WHO) Guidelines

WHO Guidelines for Community Noise (1999) provides guideline values for community noise in specific environments. This has since been supplemented by WHO Environmental Noise Guidelines for European Region (WHO, Regional office for Europe, 2018).

The WHO guideline values most relevant to new residential development are outlined in the table below:

| Specific Environment | Critical Health Effects | $L_{Aeq,\ T}$ [dB] | $L_{Afmax}$ [dB] | Time Base |
|---|---|---|---|---|
| Dwelling, indoors | Speech intelligibility and moderate annoyance, daytime and evening | 35 | n/a | 07:00-23:00 |
| | Sleep disturbance night-time | 30 | 45 | 23:00-07:00 |
| Dwelling, outdoors | Sleep disturbance, window open (outdoor values) | 45 | 60 | 23:00-07:00 |
| Outdoor living area | Serious annoyance, daytime and evening | 55 | n/a | 07:00-23:00 |
| | Moderate annoyance, daytime and evening | 50 | n/a | 07:00-23:00 |

**Table 2 Guideline Values from WHO Guidelines for Community Noise (1999)**

The effects of noise in dwellings are typically sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms at night are 30dB $L_{Aeq}$ for continuous noise and 45dB $L_{Amax}$ for single sound events, but the guidance also notes that lower noise levels may be disturbing depending on the nature of the noise source.

### 2.2 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Table 4 of BS 8233:2014 (reproduced below) provides guidance on recommended internal ambient noise levels in residential spaces based on World Health Organization (WHO) research.

| Room | Daytime (07:00-23:00) | Night-time (23:00-07:00) |
|---|---|---|
| Living Room | ≤ 35 dB $L_{Aeq,16hr}$ | N/A |
| Dining Room | ≤ 40 dB $L_{Aeq,16hr}$ | N/A |
| Bedroom | ≤ 35 dB $L_{Aeq,16hr}$ | ≤ 30 dB $L_{Aeq,8hr}$ |

**Table 3 BS 8233:2014 indoor ambient noise levels for dwellings**

The following notes should be considered alongside the levels presented above:

- *The levels presented above are for steady external noise sources without a specific character. Noise is considered to have a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate*
- *The levels are based on annual average data and do not have to be achieved in all circumstances e.g. it is normal to exclude occasional events, such as fireworks night or New Year's Eve*

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

It should be noted that the 2014 version of BS 8233:2014 does not include any specific requirement for maximum instantaneous noise levels ($L_{max}$) within dwellings. However, methodology for the assessment of maximum noise levels is included in ProPG and referenced in WHO guidelines.

Section 7.7.3.2 of BS 8233:2014 *'Guidance on sound insulation and noise reduction for buildings'* presents desirable guideline levels for amenity areas. The section is presented in its entirety below:

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

*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 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."*

# APPENDIX B

## PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

### 2.3 ProPG: Professional Practice Guidance on Planning and Noise

ProPG was published to provide practitioners with guidance and a recommended approach for the assessment of noise impact on residential developments during the planning stage.

The guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development but without the nuance of the key elements described in ProPG.

The guidance seeks to assist in the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise and encourage a good acoustic design in and around proposed new residential development whilst considering national policy on planning and noise.

The recommend approach for assessment is summarised below:

- *Stage 1 – an initial noise risk assessment of the proposed development site*
- *Stage 2 – a systematic consideration of four key elements:*
    - *Element 1 – Demonstrating a "Good Acoustic Design Process" (including feasibility of reducing or relocating existing noise sources, site orientation and building layout and appropriate constructions methods to meet performance requirements);*
    - *Element 2 – Observing internal "Noise Level Guidelines" (as presented in Section 3.3.1 of this report, with additional consideration of individual noise events which should normally not exceed $L_{AFmax}$ 45 dB more than 10 times in bedrooms at night);*
    - *Element 3 – Undertaking an "External Amenity Area Noise Assessment" (ProPG aligns with BS 8233:2014 and suggests that noise levels in external amenity areas should ideally not be above $L_{Aeq,16hr}$ 50-55dB. However, there is an acceptance that these guideline values may not be achievable in all circumstances where development might be desirable, and in such situations, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.); and*
    - *Element 4 – Consideration of "other relevant issues" (including compliance with national and local policy, acoustic design vs unintended adverse consequences, acoustic design vs wider planning objectives)*

To help consider noise at a site at an early stage an initial noise risk assessment should assess the Noise Risk Category of the site to help provide an indication of the likely suitability of the site for new residential development from a noise perspective. The table below sets out the indicative noise levels for the Noise Risk Categories and a description of the potential effect of noise where no further noise mitigation is to take place as well as additional guidance.

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## PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

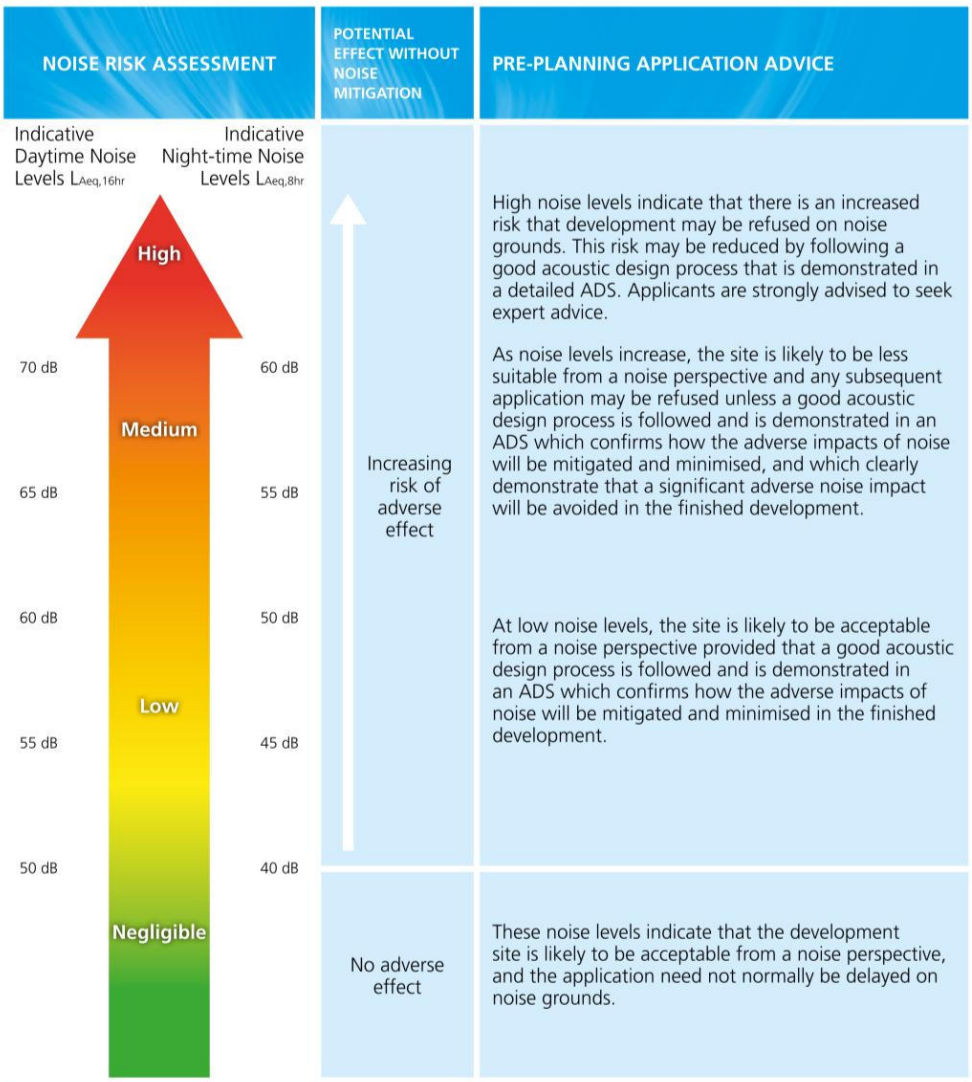


Figure 1. Stage 1– Initial Site Noise Risk Assessment

### 2.3.1 Possible Options for the Identification of SOAELs and LOAELs in Support of the NPSE (2014)

Commissioned by Defra and developed through research conducted by AECOM, the study titled "Possible Options for the Identification of SOAELs and LOAELs in Support of the NPSE" explores potential numerical values for SOAELs and LOAELs, which are concepts introduced within the Noise Policy Statement for England (NPSE). Following the revocation of PPG24: Planning and Noise in 2012, which previously outlined Noise Exposure Categories with defined numerical thresholds, the NPSE faced criticism for lacking specific quantitative guidance. Although both the NPSE and the National Planning Policy Framework (NPPF) advocate for context-driven,

location-specific noise criteria, the absence of numerical benchmarks posed challenges in applying the NPSE effectively.

To address this, the research project proposes indicative values and potential value ranges for SOAELs and LOAELs across various noise sources, with the findings summarised in Table 4.

| Source | Effect | LOAEL | SOAEL |
|---|---|---|---|
| Road | Annoyance (Daytime) | **56** (53-59) | **66** (64-68) |
| | Sleep (Night-time) | **46** (43-52) | **56** (51-64) |
| Rail | Annoyance (Daytime) | **63** (61-66) | **72** (70-74) |
| | Sleep (Night-time) | **55** (52-63) | **68** (61-77) |
| Air | Annoyance (Daytime) | **52** (50-54) | **60** (58-62) |
| | Sleep (Night-time) | **41** (40-49) | **53** (47-60) |

**Table 4 Possible Value & Ranges of Values for LOAEL & SOAEL**

### 2.3.2 Approved Document O: Overheating

Approved Document O took effect on 15 June 2022 with the aim to protect the health and welfare of occupants of a building by reducing the occurrence of high indoor temperatures with residential buildings.

Paragraph 3.3 covers the noise consideration and is presented below:

*3.3 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).*

Following the adoption of ADO, the 'Approved Document O Noise Guide' has been published by the Institute of Acoustics and Association of Noise Consultants to provide guidance for practitioners when implementing the standards within ADO relating to noise.

Requirement O1 requires reasonable provision for limiting unwanted solar gain as well as providing an adequate means of removing excess heat from the indoor environment. Compliance with Requirement O1 can be demonstrated via a simplified method or via dynamic thermal modelling.

The simplified method presents minimum free areas for bedrooms as a percentage of the floor area for high and medium risk locations, which are 13% and 4% respectively. The ADO Noise Guide clarifies the following external noise levels above which the simplified method cannot be used:

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## PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

| Parameter | High Risk Location | Moderate Risk Location |
|---|---|---|
| $L_{Aeq,8h}$ averaged over 8 hours (between 11pm and 7am) | 45 dB | 50 dB |
| $L_{AFmax}$ more than 10 times a night (between 11pm and 7am) | 60 dB | 65 dB |

**Table 5 External noise levels above which the simplified method cannot be used (Ref: ADO Noise Guide)**

Note that these values do not account for façade elements in front of the window (e.g. balconies).

The thermal modelling method requires a CIBSE TM59 assessment and consideration of acceptable strategies for reducing overheating risk via limiting solar gains and removing excess heat from the building.

Paragraphs 2.7 and 2.10 are presented below:

*2.7 Solar gains in summer should be limited by any of the following means.*

*a. Fixed shading devices, comprising any of the following.*

- *i. Shutters, ii. External blinds, iii. Overhangs, iv. Awnings.*

*b. Glazing design, involving any of the following solutions.*

- *i. Size, ii. Orientation, iii. g-value, iv. Depth of the window reveal.*

*c. Building design – for example, the placement of balconies.*

*d. Shading provided by adjacent permanent buildings, structures, or landscaping.*

*2.10 Excess heat should be removed from the residential building by any of the following means.*

*a. Opening windows (the effectiveness of this method is improved by cross-ventilation).*

*b. Ventilation louvres in external walls.*

*c. A mechanical ventilation system.*

*d. A mechanical cooling system*

In meeting the obligations noted above, consideration must be given to noise during night, pollution, security, protection from falling and protection from entrapment.

The ADO Noise Guide suggests that in the case of dynamic thermal modelling (when noise and air quality are not a constraint), the primary approach to remove excess heat should be via an open window. From the established external noise exposure at each bedroom window, the outside to inside level difference should be calculated, and then the target Equivalent Area should be predicted using the following equations (depending on whether the required level difference is free-field or façade):

Equation 1[8]

$$EA\ based\ on\ façade\ level\ difference = V \times 10^{\left(\frac{-(D_{2m,nT}+5)}{10}\right)}$$

Where

$D_{2m,nT}$ is the is the façade level difference between the A-weighted level 2m in front of the façade ($L_{1,2m}$), and the standardised internal A-weighted level ($L_{eq,2,nT}$). In the absence of any better alternative method, the same principle can be applied to $L_{AFmax}$.

$V$ is the room volume ($m^3$)

$EA$ is the Equivalent Area of the open window ($m^2$)

Equation 2[8]

$$EA\ based\ on\ freefield\ level\ difference = V \times 10^{\left(\frac{-(D_{nT}+8)}{10}\right)}$$

The total maximum Equivalent Area for each bedroom to meet the required standardised level difference should then be communicated to the dynamic thermal modelling consultant to verify whether or not the building is still at risk of overheating with the Equivalent Areas calculated.

In the case where openable windows are not suitable and a mechanical ventilation system is required, the following noise limits should be observed:

| Parameter | Bedrooms |
|---|---|
| Mechanical ventilation or mechanical cooling system noise | $L_{Aeq,T}$ 30 (±5) dB |

**Table 6 Recommended noise level for mechanical ventilation or mechanical cooling systems**

Higher noise levels than those in Table 2, e.g. by up to 10 dBA, may be appropriate in some operating scenarios, where rapid changes to the cooling or ventilation rates quickly improve the thermal comfort of the occupant. Equally, lower noise levels may be appropriate for some types of residential development.

The ADO Noise Guide suggests the following assessment steps:

*To determine if an open window can be used for removing excess heat, it is recommended that the acoustic consultant adopts the following process:*

1. *Establish the night-time noise exposure at all bedroom windows as advised in this document;*
2. *Determine the outside to inside sound insulation for each bedroom window required to meet the noise threshold;*
3. *Determine the Equivalent Area to achieve the required outside to inside sound insulation as determined in 2) above; and*
4. *Communicate the required total maximum night-time Equivalent Area via an open window for the dynamic thermal modeller to use.*

*For bedrooms that cannot rely on an open window to remove excess heat at night due to noise constraints, the thermal modeller should identify the solution to remove excess heat. The acoustic consultant can then advise the acoustic requirements for any proposed provisions.*

*One clear way of communicating the advice is to provide a mark-up showing the required performance at each façade / window.*

*The dynamic thermal modelling report should contain sufficient reference to any associated noise assessment, the required sound insulation performance and maximum night-time Equivalent Area and the basis for defining these.*

### 2.4 BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

BS 4142:2014+A1:2019 provides a methodology for rating and assessing the impacts of industrial and commercial sound at noise sensitive receptors. In the context of this report, this guidance would be relevant for any new fixed plant installations that might be installed for the scheme.

The methodology involves comparing the Rating Noise Level due to the sound source/s under assessment with the existing background sound level ($L_{A90}$) when the noise source is not operating to estimate the initial impact, as follows (Typically, the greater this difference, the greater the magnitude of the impact):

a) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context*

b) *A difference of around +5 dB could be an indication of an adverse impact, depending on the context*

c) *The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context*

The standard notes that a noise source under assessment will have a 'low impact' when the 'rating level' of a noise source is less than the existing background sound. It is also important to note that any quantitative assessment results are assessed considering the context in which the sound occurs.

The standard notes three types of context within Clause 11, which are:

1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

   *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*

   *Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound to assess the degree to which the specific sound*

*source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as i. facade insulation treatment, ii. ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation, and iii. acoustic screening.*

The definitions noted above are described below:

- ***Specific sound*** *– sound source being assessed ($L_s = L_{Aeq,\ Tr}$)*
- ***Residual sound*** *– Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound ($L_r = L_{Aeq,\ T}$)*
- ***Ambient sound*** *– totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far ($L_a = L_{Aeq,\ T}$)*
- ***Background level*** *– sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval ($L_{A90,\ T}$)*
- ***Rating level*** *– specific sound level plus any adjustment for the characteristic features of the sound ($L_{Ar,Tr}$)*

With regards to background sound levels, BS 4142:2014+A1:2019 notes:

*"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."*

With regards to the 'rating level', the adjustments for the characteristic features of the sound are outlined below:

- *Tonality – +2 dB for a tone which is 'just perceptible' at the noise receptor, +4 dB where it is 'clearly perceptible', and +6 dB where it is 'highly perceptible'*
- *Impulsivity – +3 dB for a tone which is 'just perceptible' at the noise receptor, +6 dB where it is 'clearly perceptible', and +9 dB where it is 'highly perceptible'*
- *Intermittency – +3 dB if the intermittency is readily distinctive against the residual acoustic environment*
- *Other sound characteristics – where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.*

It must be noted that as the rating level is determined at the closest noise sensitive receptor, the acoustic feature corrections should be applied based on the level at receptor location, not at source. This is particularly relevant when noise propagation characteristics cause differences in sound reduction at various frequency bands.

Note that the assessment reference periods that should be considered for daytime and night-time, as defined within the standard, are:

- *One hour period for a sound source operating during daytime hours (07:00-23:00 hours)*
- *Fifteen-minute period for a sound source operating during the night-time (23:00-07:00 hours)*

**ES Acoustics Notes regarding Context:**

The notes presented below are informed by the BS 4142:2014+A1:2019 Technical Note prepared by the Association of Noise Consultant Good Practice Working Group. Assessment context is often misunderstood or applied incorrectly, and the notes are therefore presented to provide a clear picture on what aspects of context should be considered when assessing the overall impact of a particular scenario:

**Subclause 11(1)**

*The second paragraph notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low. It is important to note that both background and rating levels would need to be low for this particular caveat to apply.*

*BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than the difference between the two values. It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. For example, a situation might be considered acceptable where a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels. However, there may be situations where the opposite is true, and it is for the assessor to justify any modifications to the initial estimate of impact.*

*BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB $L_{A90}$, and low rating levels as being less than about 35 dB $L_{Ar,Tr}$. We would consider that similar values would not be unreasonable in the context of the current edition of BS 4142.*

*The third paragraph states that "where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts".*

*In the ordinary application of BS 4142 the residual sound level is not compared with the background sound level to determine the level of impact. The third paragraph is therefore taken to mean that the level of impact caused by the residual level has been determined by professional judgement or with reference to another document, such as the Noise Insulation Regulations 1975 (as amended 1988). Where professional judgement is used, it should be appropriately justified.*

*Where the residual sound levels are very high, a significant adverse impact might be declared in a situation where the rating level exceeds the background sound level by, say, 4dB, i.e. since the residual sound levels are already considered to cause a significant impact, any worsening of the situation would be considered a significant adverse*

*impact, even if the difference between the rating level and background sound level would not suggest this to be the case.*

**Subclause 11(2)**

*The second aspect of context described in BS 4142 relates to the character and level of the specific sound. In essence, whether or not the character of the sound is distinguishable from the character of the ambient or residual acoustic environment or is incongruous.*

*BS 4142 does not provide instruction as to how to treat the assessment outcomes in these circumstances, nor does it explain how to distinguish between this contextual consideration and the process for applying rating penalties. The latter is itself informed by the distinctive characteristics of the specific sound in the context of the residual sound environment.*

*Where character-based contextual matters are taken into account, the assessor should make it clear how these matters are distinct from those that informed the rating level corrections, and what the implications of these further character assessments should be. For example; new deliveries on an estate entailing rating penalties for reversing alarms and impulsive noise but these types of noise are already present at other existing premises, so contextually the impact is reduced. Conversely, where the residual level is largely comprised of natural sounds, such as the sea or birdsong, so the impact from the specific source might be increased.*

**Subclause 11(3)**

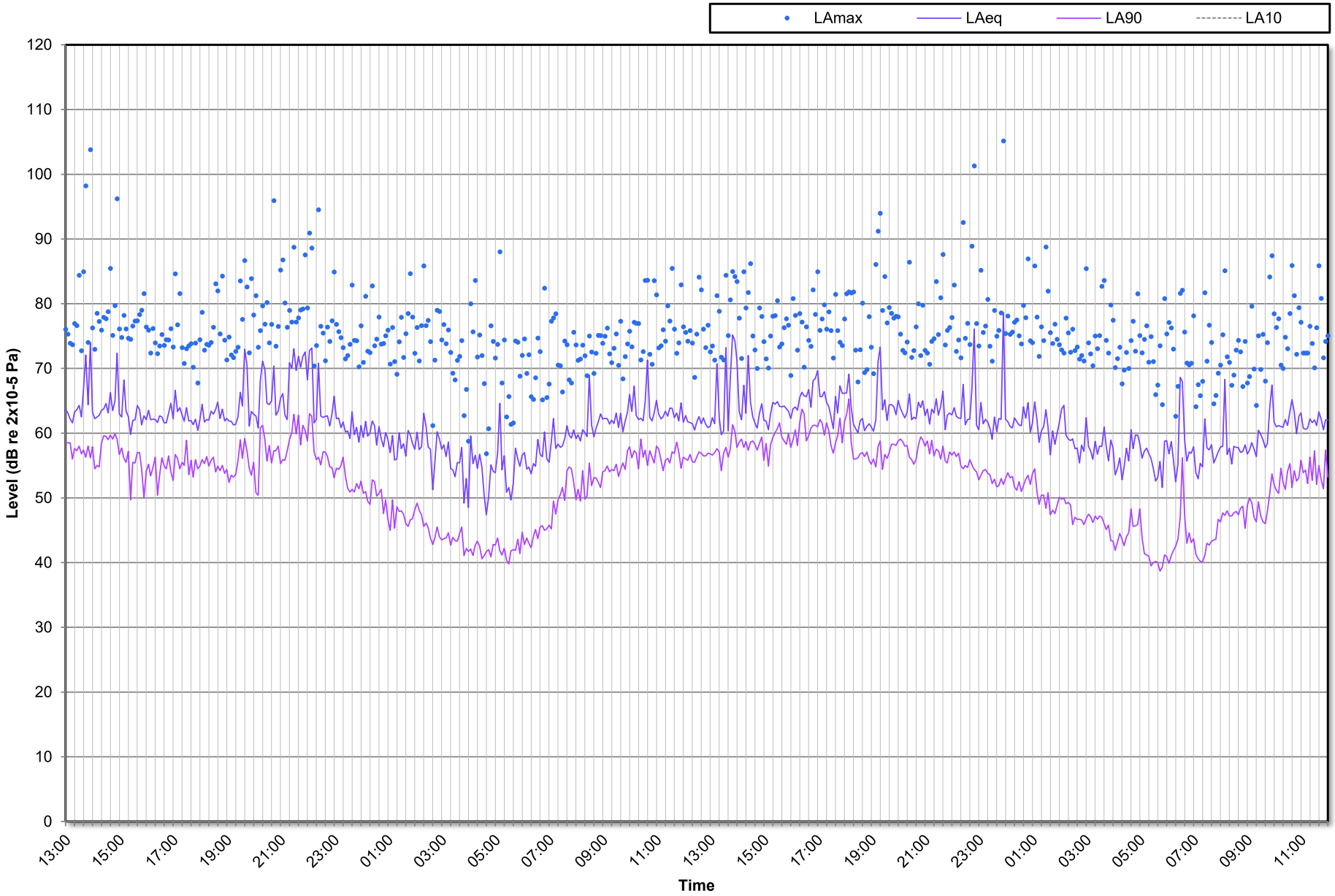
*The third contextual matter described in Clause 11 relates to the receptor itself. It is important to note that the reference at the start of this section of BS 4142 to 'the sensitivity of the receptor' refers to a generic receptor type, i.e. a dwelling, and not to the particular attitudes or responses of a particular person (although if the residential receptor type is specific it may have a bearing e.g. student accommodation).*

*The ANC working group notes that this part of BS 4142 allows the internal noise environment to be considered, despite BS 4142 excluding such matters from its Scope (Subclauses 1.1, 1.2 and 1.3). The working group considers that the consideration of the internal noise environment is only valid in a BS 4142 assessment where it relates to the contextual elements of the assessment.*

# APPENDIX C

## ENVIRONMENTAL NOISE TIME HISTORY

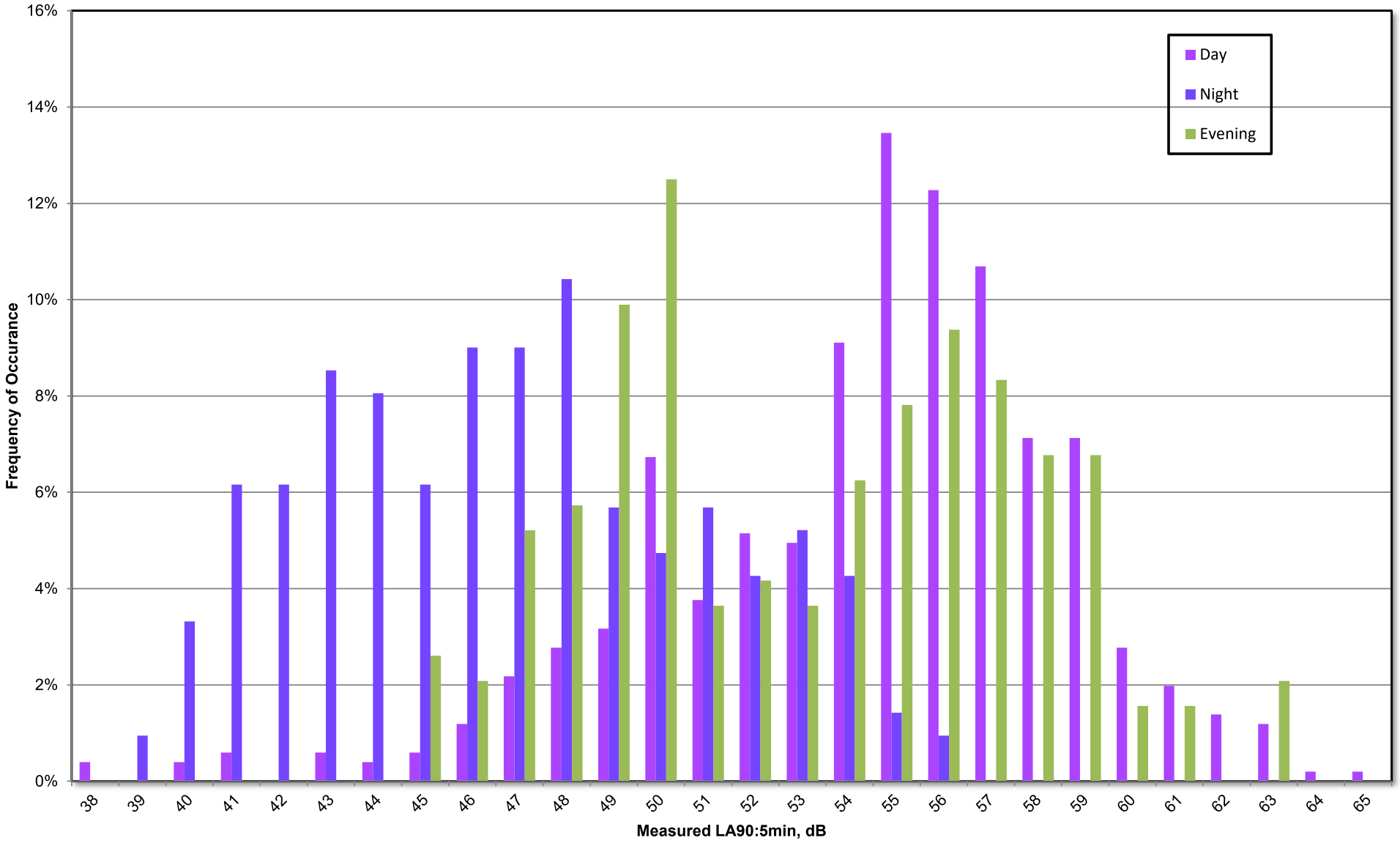
Monitoring Position 1
13:00 on Friday 3rd July to 13:00 on Tuesday 7th July 2026



# APPENDIX D

## ENVIRONMENTAL NOISE STATISTICAL DISTRIBUTION

22722.NIA-RPT.01
Statistical Distribution of Background Levels



# APPENDIX E

## SOUND INSULATION TEST CERTIFICATES

Sound Insulation Test Certificates on Following Pages

**Standardized level difference in accordance with Approved Document E (2003)**
**Field measurements of airborne sound insulation between rooms**

Client: Chloe James Date of test: 03/07/2026

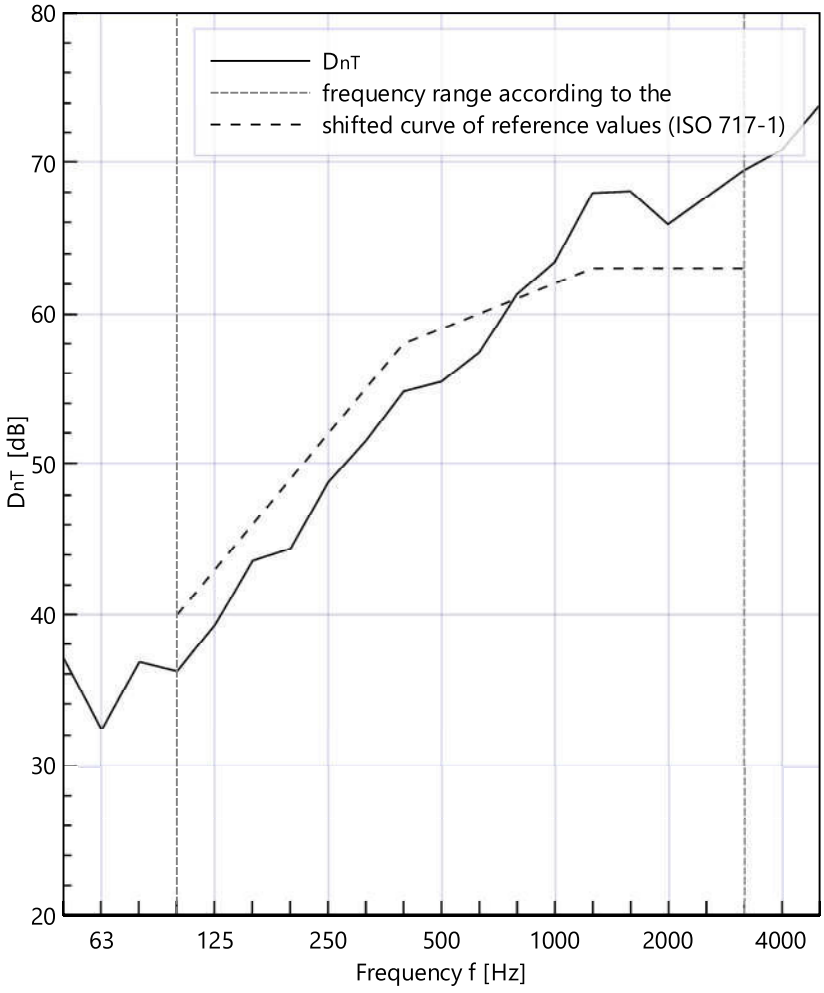
Location: 28 Queens Street, Huddersfield

Airborne test between Ground Floor Bar area and Unoccupied Office above

Sound Level Meter: A3A-01427-F0 (M2340: 1887)
Area of common partition: 12.00 m²
Source room volume: 58.00 m³ (Bar)
Receiving room volume: 28.00 m³ (Bedroom)

| Frequency f Hz | $D_{nT}$ 1/3 octave dB |
|---|---|
| 50 | 37.0 |
| 63 | 32.4 |
| 80 | 36.8 |
| 100 | 36.2 |
| 125 | 39.3 |
| 160 | 43.6 |
| 200 | 44.4 |
| 250 | 48.8 |
| 315 | 51.5 |
| 400 | 54.8 |
| 500 | 55.4 |
| 630 | 57.4 |
| 800 | 61.3 |
| 1000 | 63.4 |
| 1250 | ≥ 68.0 |
| 1600 | ≥ 68.1 |
| 2000 | ≥ 65.9 |
| 2500 | ≥ 67.7 |
| 3150 | ≥ 69.4 |
| 4000 | ≥ 70.8 |
| 5000 | ≥ 73.8 |

≥: 1.3 dB correction applied,
value at the limit of measurement




Rating in accordance with ISO 717-1:

$D_{nT,w}(C;C_{tr})$ = 59 (-2; -7) dB

$C_{50\text{-}3150}$ = -3 dB; $C_{50\text{-}5000}$ = -2 dB; $C_{100\text{-}5000}$ = -1 dB

$C_{tr,50\text{-}3150}$ = -10 dB; $C_{tr,50\text{-}5000}$ = -10 dB; $C_{tr,100\text{-}5000}$ = -7 dB

Evaluation based on field measurement using results obtained by an engineering method.

Report No.: 22722/AF1 Name: Matt Jones

Date: 09/07/2026 Signature:

**Apparent sound reduction index in accordance with Approved Document E (2003)**
**Field measurements of airborne sound insulation between rooms**

Client: Chloe James Date of test: 03/07/2026

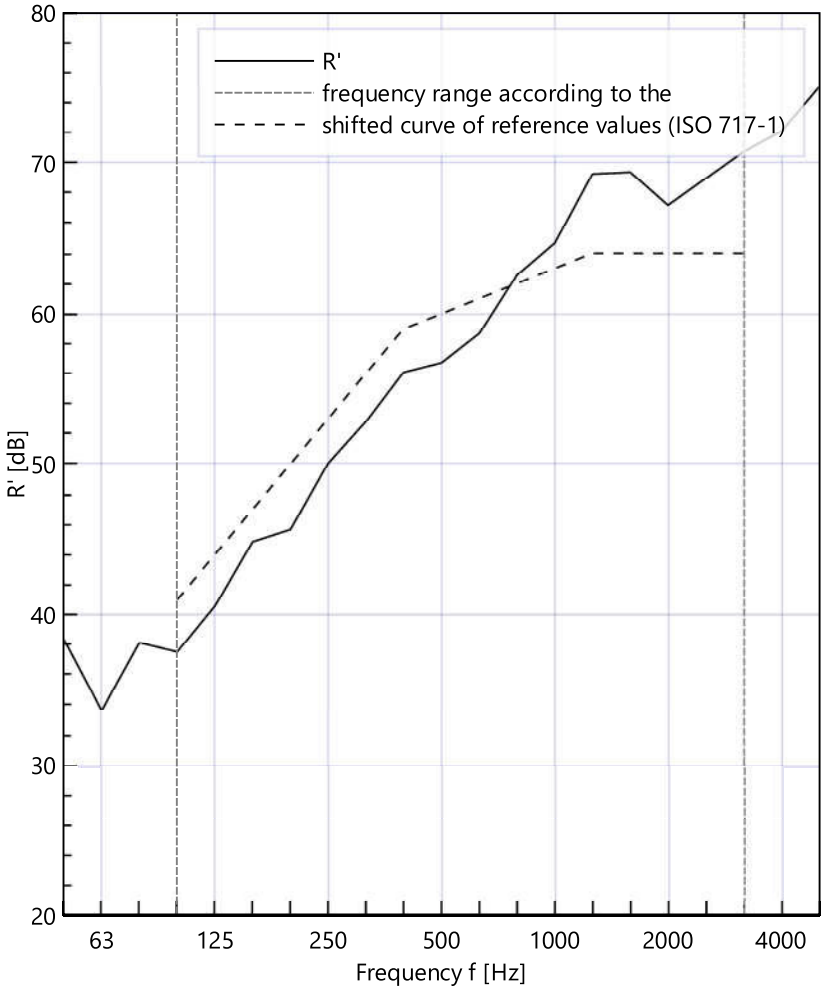
Location: 28 Queens Street, Huddersfield

Airborne test between Ground Floor Bar area and Bedroom above

Sound Level Meter: A3A-01427-F0 (M2340: 1887)
Area of common partition: 12.00 m²
Source room volume: 58.00 m³ (Bar)
Receiving room volume: 28.00 m³ (Bedroom)

| Frequency f Hz | R' 1/3 octave dB |
|---|---|
| 50 | 38.3 |
| 63 | 33.6 |
| 80 | 38.1 |
| 100 | 37.5 |
| 125 | 40.6 |
| 160 | 44.8 |
| 200 | 45.7 |
| 250 | 50.1 |
| 315 | 52.8 |
| 400 | 56.1 |
| 500 | 56.7 |
| 630 | 58.7 |
| 800 | 62.6 |
| 1000 | 64.7 |
| 1250 | ≥ 69.2 |
| 1600 | ≥ 69.4 |
| 2000 | ≥ 67.2 |
| 2500 | ≥ 68.9 |
| 3150 | ≥ 70.7 |
| 4000 | ≥ 72.1 |
| 5000 | ≥ 75.0 |

≥: 1.3 dB correction applied,
value at the limit of measurement




Rating in accordance with ISO 717-1:

$R'_w(C;C_{tr})$ = 60 (-2; -7) dB

$C_{50\text{-}3150}$ = -2 dB; $C_{50\text{-}5000}$ = -1 dB; $C_{100\text{-}5000}$ = -1 dB

$C_{tr,50\text{-}3150}$ = -9 dB; $C_{tr,50\text{-}5000}$ = -9 dB; $C_{tr,100\text{-}5000}$ = -7 dB

Evaluation based on field measurement using results obtained by an engineering method.

Report No.: 22722/AF1 Name: Matt Jones

Date: 09/07/2026 Signature:

**Standardized level difference in accordance with Approved Document E (2003)**
**Field measurements of airborne sound insulation between rooms**

Client: Chloe James Date of test: 03/07/2026

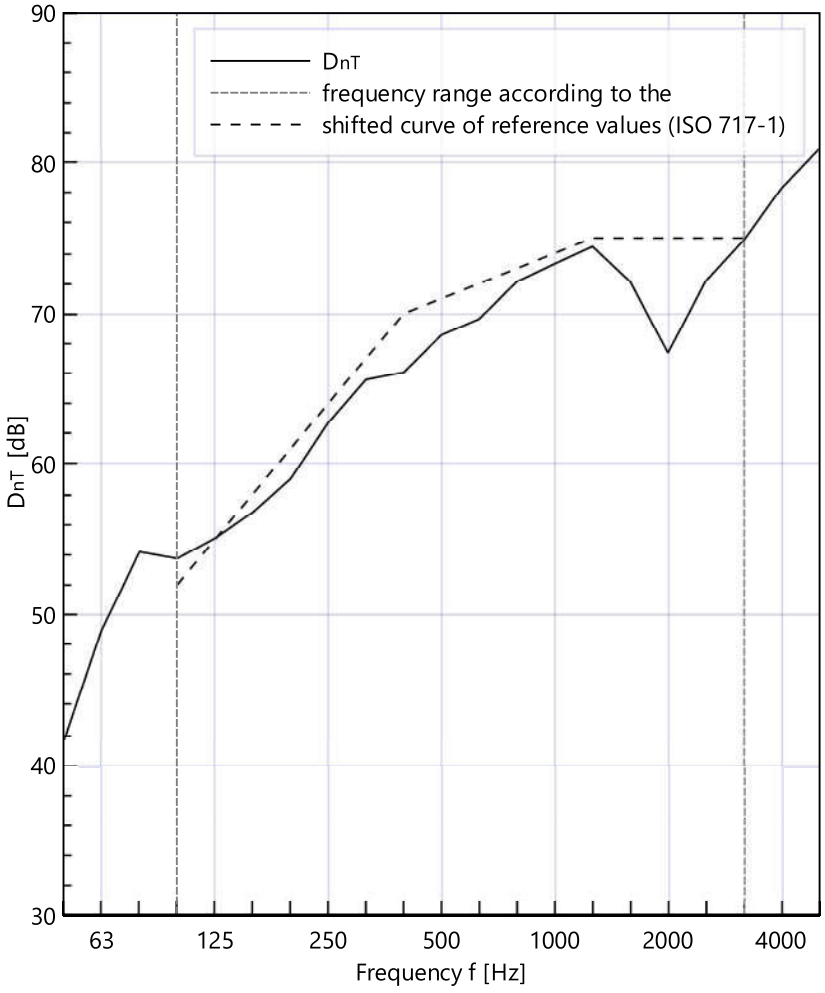
Location: 20 Queens Street, Huddersfield

Airborne test between the Ground Floor Bar area and the adjacent Office

Sound Level Meter: A3A-01427-F0 (M2340: 1887)
Area of common partition: 19.00 m²
Source room volume: 58.00 m³ (Bar)
Receiving room volume: 35.00 m³ (Office)

| Frequency f Hz | $D_{nT}$ 1/3 octave dB |
|---|---|
| 50 | ≥ 41.6 |
| 63 | 49.0 |
| 80 | 54.2 |
| 100 | 53.7 |
| 125 | 55.1 |
| 160 | 56.8 |
| 200 | 59.0 |
| 250 | 62.7 |
| 315 | 65.6 |
| 400 | 66.1 |
| 500 | 68.6 |
| 630 | ≥ 69.7 |
| 800 | 72.1 |
| 1000 | ≥ 73.3 |
| 1250 | ≥ 74.4 |
| 1600 | ≥ 72.1 |
| 2000 | ≥ 67.4 |
| 2500 | ≥ 72.2 |
| 3150 | ≥ 74.8 |
| 4000 | ≥ 78.3 |
| 5000 | ≥ 80.9 |

≥: 1.3 dB correction applied,
value at the limit of measurement




Rating in accordance with ISO 717-1:

$D_{nT,w}(C;C_{tr})$ = 71 (-2; -5) dB

$C_{50\text{-}3150}$ = -2 dB; $C_{50\text{-}5000}$ = -1 dB; $C_{100\text{-}5000}$ = -1 dB

$C_{tr,50\text{-}3150}$ = -8 dB; $C_{tr,50\text{-}5000}$ = -8 dB; $C_{tr,100\text{-}5000}$ = -5 dB

Evaluation based on field measurement using results obtained by an engineering method.

Report No.: 22722/AW1 Name: Matt Jones

Date: 09/07/2026 Signature:

**Apparent sound reduction index in accordance with Approved Document E (2003)**
**Field measurements of airborne sound insulation between rooms**

Client: Chloe James Date of test: 03/07/2026

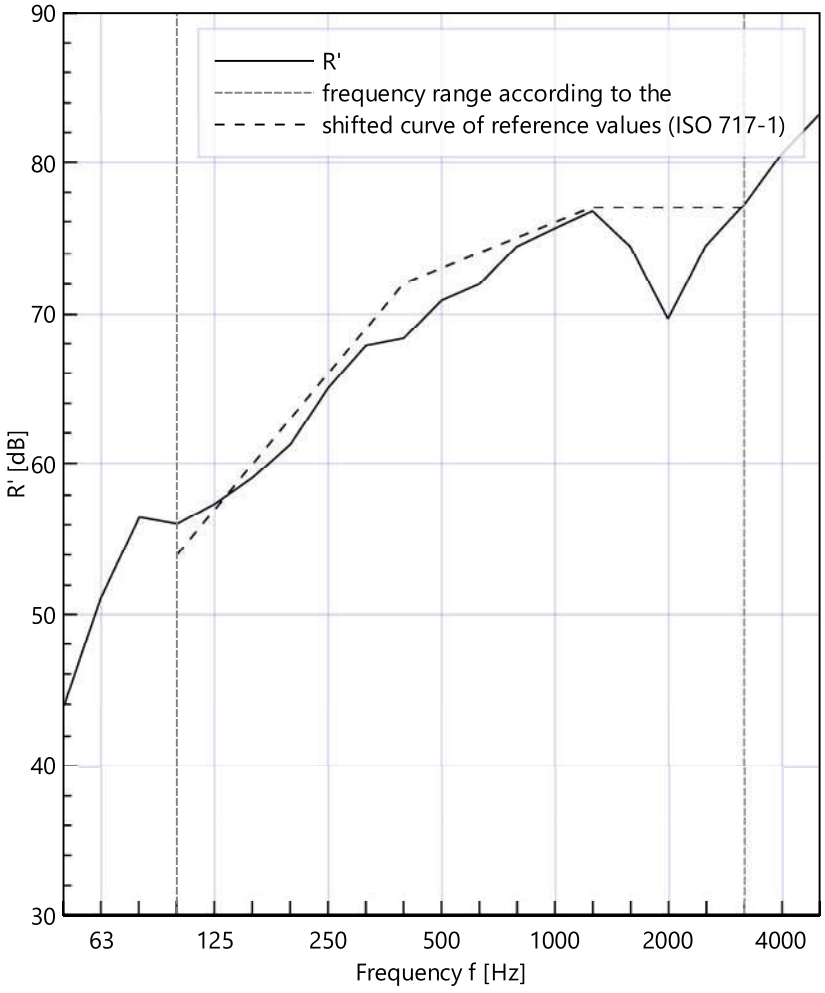
Location: 20 Queens Street, Huddersfield

Airborne test between the Ground Floor Bar area and the adjacent Office

Sound Level Meter: A3A-01427-F0 (M2340: 1887)
Area of common partition: 19.00 m²
Source room volume: 58.00 m³ (Bar)
Receiving room volume: 35.00 m³ (Office)

| Frequency f Hz | R' 1/3 octave dB |
|---|---|
| 50 | ≥ 43.9 |
| 63 | 51.3 |
| 80 | 56.5 |
| 100 | 56.0 |
| 125 | 57.4 |
| 160 | 59.1 |
| 200 | 61.3 |
| 250 | 65.0 |
| 315 | 67.9 |
| 400 | 68.4 |
| 500 | 70.9 |
| 630 | ≥ 71.9 |
| 800 | 74.4 |
| 1000 | ≥ 75.6 |
| 1250 | ≥ 76.7 |
| 1600 | ≥ 74.4 |
| 2000 | ≥ 69.7 |
| 2500 | ≥ 74.5 |
| 3150 | ≥ 77.1 |
| 4000 | ≥ 80.6 |
| 5000 | ≥ 83.2 |

≥: 1.3 dB correction applied,
value at the limit of measurement




Rating in accordance with ISO 717-1:

$R'_w(C;C_{tr})$ = 73 (-2; -5) dB

$C_{50\text{-}3150}$ = -2 dB; $C_{50\text{-}5000}$ = -1 dB; $C_{100\text{-}5000}$ = -1 dB

$C_{tr,50\text{-}3150}$ = -8 dB; $C_{tr,50\text{-}5000}$ = -8 dB; $C_{tr,100\text{-}5000}$ = -5 dB

Evaluation based on field measurement using results obtained by an engineering method.

Report No.: 22722/AW1 Name: Matt Jones

Date: 09/07/2026 Signature:

# APPENDIX F1

## NOISE TRANSFER CALCULATIONS TO RESIDENTIAL RECEIVER

es acoustics

The **reverberant sound pressure level** ($L_r$) in the receiver room is based on the following equation:

$$L_r = L_p - R + 10\log(S) + 10\log\left(\frac{T_r}{0.161 * V_r}\right)$$

where

$L_p$ is the reverberant sound pressure level within the source room, dB

$R$ is the octave band sound reduction Index of the party floor, dB

$S$ is the common area of the separating floor between the source and receiver room

$T_r$ is the reverberation time in the receiver room

$V_r$ is the volume of the receiver room

**Calculation of noise via direct transfer $L_{Aeq}$ to Residential Dwelling**

**Internal Building Fabric Details:**

| | | | |
|---|---|---|---|
| **Receiver:** | Bedroom above Bar | | |
| **Element:** | Existing Separating Floor | **Description:** | Unknown material build-up - assumed timber joist construction |
| **Area, m²:** | 12 | | |
| **Receiver Room Volume, m³:** | 28 | | |

| **Receiver Room Reverberation ($T$) at octave band (Hz):** | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
|---|---|---|---|---|---|---|---|---|
| | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 |

**Assessment:**

| | **Octave Band Centre Frequency** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| $L_p$ - reverberant sound pressure level within existing resturaunt ($L_{Aeq}$) | 97 | 99 | 99 | 100 | 95 | 90 | 90 | 90 |
| $R$ - predicted octave band sound reduction Index of the party floor, dB | -28 | -35 | -39 | -42 | -46 | -48 | -44 | -36 |
| S - common area of the separating floor between the source and receiver room | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| Correction for room volume and reverberation time | -5 | -6 | -6 | -6 | -6 | -6 | -6 | -6 |

**Calculated Internal Sound Pressure Level in Residential Dwelling:**

| **Worst-case Level $L_{Aeq(T)}$** | **Overall dB(A)** | **Linear dB at Octave Band Centre Frequency** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| $L_{eq}$ | 64.3 | 75 | 69 | 65 | 63 | 54 | 47 | 50 | 59 |

# APPENDIX F2

## NOISE TRANSFER CALCULATIONS TO OFFICE RECEIVER

es acoustics

The **reverberant sound pressure level** ($L_r$) in the receiver room is based on the following equation:

$$L_r = L_p - R + 10\log(S) + 10\log\left(\frac{T_r}{0.161 * V_r}\right)$$

where

$L_p$ is the reverberant sound pressure level within the source room, dB

$R$ is the octave band sound reduction Index of the party floor, dB

$S$ is the common area of the separating floor between the source and receiver room

$T_r$ is the reverberation time in the receiver room

$V_r$ is the volume of the receiver room

| **Calculation of noise via direct transfer $L_{Aeq}$ to Residential Dwelling** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Internal Building Fabric Details:** | | | | | | | | | |
| **Receiver:** | Office adjacent to Bar | | | | | | | | |
| **Element:** | Existing Separating Wall | **Description:** | Unknown material build-up - assumed timber joist construction | | | | | | |
| **Area, m²:** | 12 | | | | | | | | |
| **Receiver Room Volume, m³:** | 28 | | | | | | | | |
| **Receiver Room Reverberation ($T$) at octave band (Hz):** | | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| | | 0.7 | 0.6 | 0.6 | 0.7 | 0.7 | 0.6 | 0.5 | 0.5 |
| **Assessment:** | | | | | | | | | |
| | | **Octave Band Centre Frequency** | | | | | | | |
| | | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| $L_p$ - reverberant sound pressure level within existing resturaunt ($L_{Aeq}$) | | 97 | 99 | 99 | 100 | 95 | 90 | 90 | 90 |
| $R$ - predicted octave band sound reduction Index of the party floor, dB | | -58 | -62 | -70 | -75 | -80 | -78 | -86 | -91 |
| S - common area of the separating floor between the source and receiver room | | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| Correction for room volume and reverberation time | | -8 | -9 | -9 | -8 | -8 | -9 | -9 | -9 |
| **Calculated Internal Sound Pressure Level in Residential Dwelling:** | | | | | | | | | |
| **Worst-case Level $L_{Aeq(T)}$** | **Overall dB(A)** | **Linear dB at Octave Band Centre Frequency** | | | | | | | |
| | | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| $L_{eq}$ | **29.0** | 42 | 39 | 31 | 28 | 18 | 14 | 5 | 0 |

# APPENDIX F3
## NOISE BREAKOUT CALCULATIONS
## BAR

es acoustics

| Calculation of noise breakout via hairdresser side to receiver | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **External Building Fabric Details:** | | | | | | | | | |
| **Element:** | Existing bar wall | **Description:** | Assumed cavity brick construction with glazed panel and lobbied door to bar | | | | | | |
| **Area, m²:** | 19 | | | | | | | | |
| **Assessment:** | | | | | | | | | |
| | | **Octave Band Centre Frequency** | | | | | | | |
| | | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| **Reverberant Sound Pressure Level in Bar - Leq:T** | | 100 | 100 | 100 | 100 | 95 | 90 | 90 | 90 |
| **Measured Level Difference, D** | | -28 | -35 | -39 | -42 | -46 | -48 | -44 | -36 |
| **Radiating sound pressure level** | | 72 | 65 | 61 | 58 | 49 | 42 | 46 | 54 |
| **Minimum attenuation provided by distance (15m), dB** | | -12 | -12 | -12 | -12 | -12 | -12 | -12 | -12 |
| **Calculated Sound Pressure Level Outside Window:** | | | | | | | | | |
| **Worst-case Level $L_{Aeq(T)}$** | **Overall dB(A)** | **Linear dB at Octave Band Centre Frequency** | | | | | | | |
| | | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| LAeq,5min | 48 | 60 | 53 | 49 | 46 | 37 | 31 | 34 | 42 |
| LA90 - Day | 50 | 58 | 52 | 49 | 46 | 45 | n/a | n/a | n/a |
| LA90 - Evening | 49 | 51 | 49 | 47 | 47 | 44 | n/a | n/a | n/a |
| LA90 - Night | 43 | 52 | 48 | 43 | 41 | 38 | n/a | n/a | n/a |