



PEAK acoustics

Noise Assessment Report

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Environmental Noise Assessment

Report Ref: NM1906209NR

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Site: 4 The Horsefair, Hinckley, Leicestershire, LE10 0AN

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1. Summary

1.1. Proposal

Conversion, extension, and alterations, including part demolition, of buildings to form 44 apartments, associated parking and access is proposed at 4 The Horsefair, Hinkley, LE10 0AN.

1.2. Reason for Assessment

A noise assessment is to be submitted as part of the planning application due to the site's location within a dense urban area amongst numerous noise sources. The assessment is to provide a sound insulation scheme for the proposed dwellings to ensure desirable internal noise levels are met within habitable rooms.

1.3. Planning Conditions & Criteria

Pre application advice has been provided; however, no specific criteria has been stipulated by the local authority. The following assessment standards have been selected:

Desirable internal noise levels are to be maintained as given in BS8233:2014:

- *30dB $L_{Aeq, 8hr}$ within bedrooms at night (23:00 – 07:00).*
- *45dB L_{Amax} should not be regularly exceeded within bedrooms at night (23:00 – 07:00).*
- *35dB $L_{Aeq, 16hr}$ within living areas during the day (07:00 – 23:00)*

WHO Guidelines help to define the L_{Amax} parameter requirements:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times a night (Vallet & Vernet 1991)”.

1.4. Assessment Standards & Justification

‘BS8233:2014 – Guidance on sound insulation and noise reduction for buildings’ is a recognised standard for assessing and mitigating environmental noise levels upon a proposed noise sensitive development. The standard gives a rigorous calculation method for determining interior noise levels based on measured environmental noise levels.

‘World Health Organisation Guidelines for Community Noise (1999)’ details suitable noise levels for various activities within residential and commercial buildings

1.5. Environmental Noise Measurements

To assess environmental noise levels, a noise survey was undertaken at the site from Thursday 9th – Friday 10th July 2020.

The results from these measurements are tabulated below. A comparative measurement was taken on ‘The Horsefair’ to indicate the noise level difference between the two façades. Confirmation was made that no correction is applicable; further details are provided in Section 3.4.

Table 1. – Environmental Measurement Summary

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical L _{AFmax} (dB)
M1	9 th & 10 th July 2020	Day (16hr Aggregate Periods)	52.6	-
	9 th - 10 th July 2020	Night (8hr)	52.4	73.4

The full measured sound levels are shown graphically in **Appendix E**.

1.6. Noise Assessment Outcome

It is determined that by using mitigation as specified in section 1.7 for the building façades, the outcome summarised in the following table is achieved.

Table 2. – Noise Assessment Outcome

Internal Space	Noise Parameter	Internal Noise Level (dB)	Within Desirable Limit (BS8233)
Living Rooms	Daytime L _{Aeq} , 16hr	30	Yes
Bedrooms	Night-time L _{Aeq} , 8hr	25	Yes
Bedrooms	Night-time L _{AFmax}	44	Yes

1.7. Mitigation Recommendations

1.7.1. Glazing & Ventilation Scheme

Table 3. – Glazing and Ventilation Scheme

Internal Space	Glazing		Ventilation*	
	Minimum Performance R _w (+C _{tr})	Example Specification	Minimum Performance D _{nw,w,+C_{tr}} (Open)	Example Specification
Living Rooms	30 (26)	4 / 16 / 4mm	32	Titon Trimvent XS13 4400EA
Bedrooms	30 (26)	4 / 16 / 4mm	32	Titon Trimvent XS13 4400EA

N.B: The sound insulation value of the glazing should take into account the glass as well as the frame and perimeter seal.

*Further guidance on ventilation strategy is given in Section 4.4.

1.8. Site & Measurement Location

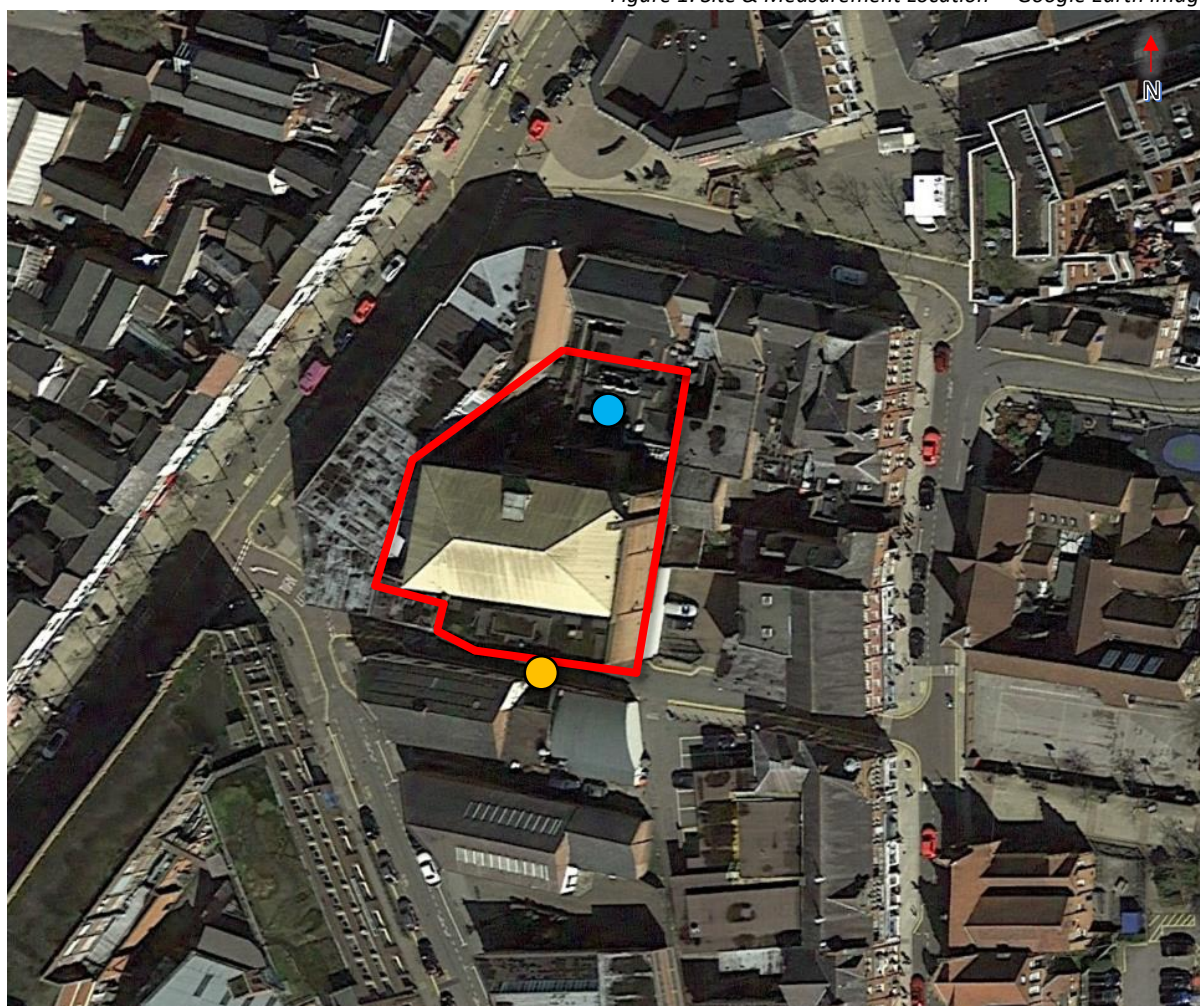
The site is situated within Hinckley Town Centre between The Horsefair and Market Place. The site comprises of a former dance hall/theatre/concert hall building which was most recently used as a nightclub before its closure in 2012. An under-croft vehicle parking area to the rear and a single storey flat roof building are attached to the rear of The Bounty Public House (to be demolished).

The site is surrounded by buildings of different scales, used for a variety of commercial purposes including retail, public house, café, offices, and residential apartments. The surrounding structures shield the site from much of the surrounding road network and streets.

A number of plant units are located on the flat roof. It is understood that all plant is to be removed as part of the demolition phase of the development. Further information is provided in Section 3.

The site and measurement locations are shown on Figure 1 below.

Figure 1: Site & Measurement Location — Google Earth Image



 Environmental Monitoring Location (M1)

 Site Boundary (Approx.)

 Environmental Comparative measurement - Street Level (C1)

2. Environmental Noise Survey

2.1. Sources Under Investigation

The primary noise source identified on site was conversing patrons at ground floor level on Market Place. Passing traffic on Regent Street and Station Road was also audible during periods of low activity on Market Place.

Commercial activity was noted as a secondary source from nearby takeaways which are open during the evening and into the night.

3. Survey Measurements

Day and night-time environmental noise measurements have been carried out over a 24-hour period from Thursday 9th – Friday 10th July 2020.

Environmental measurements of L_{Aeq} and L_{AFmax} were logged using 5-minute intervals with 1/1 octave resolution.

Event recording was utilised to identify the main source of noise. It was verified that patron noise was the main contribution of the noise climate.

It was communicated to Peak Acoustics during the noise survey that plant on the flat roof was non-operational. However, from the measurement graph (**Appendix E**) it can be seen that plant noise emissions influenced the measurement during 17:00 – 01:00. The use of event recording identified that the type of plant produces intermittent noise characteristics. The development seeks to demolish the flat roof and all plant is to be removed as part of the alterations. The noise levels can therefore be considered a worst-case scenario because, without the influence of plant, noise levels would likely be partially lower.

3.1. Measurement Location

At position M1, the microphone was placed at first floor flat roof level above The Bounty Public House which overlooked the main entrance to the public house and exposed to other commercial activity, approximately 1.5m from local ground level and away from reflective surfaces.

It is understood that the plant on the flat roof was non-operational. However, the measurement graph (**Appendix E**) indicated the plant did operate during the survey.

Due to the measurement position being shielded from The Horsefair, a comparative measurement was undertaken at street level to assess the level difference. It was confirmed that no significant difference in noise levels is present between two locations, further information is given in Section 3.4.

3.2. Weather Conditions

Weather conditions were deemed satisfactory for environmental noise measurements; detailed weather conditions are given in **Appendix C**.

3.3. Measurement Equipment

Measurement equipment complies with accuracy requirements for common environmental noise measurement standards. A detailed equipment list is given in **Appendix B** with calibration information in **Appendix D**.

3.4. External Noise Levels

The measurement intervals from measurement M1 are summarised in the table below.

The measured sound levels are shown graphically in **Appendix E**.

Table 4. – Selected Measurement Results

Measurement	Date(s)	Period	L_{Aeq} (dB)	Typical L_{AFmax} (dB)
M1	9 th & 10 th July 2020	Day (16hr Aggregate Periods)	52.6	-
	9 th - 10 th July 2020	Night (8hr)	52.4	73.4*

*The selected L_{AFmax} corrected noise level spectra, is an average of the spectra of the noisiest 10 events of the night-time period; the maxima levels selected would not ordinarily be exceeded more than 10 times within the night-time, in accordance with the guidance.

Commercial activity and road noise from The Horsefield are shielded by the surrounding buildings. To account for this, a 15-minute comparative measurement was undertaken at street level. It was noted that no difference in noise levels occurred from the comparison measurement and therefore no correction has been applied to measured levels of M1.

4. BS8233:2014 Environmental Noise Assessment

4.1. Criteria

Pre application advice has been provided; however, no specific criteria has been stipulated by the local authority. Therefore, the following assessment standards have been selected:

Desirable internal noise levels are to be maintained as given in BS8233:2014:

- 30dB $L_{Aeq, 8hr}$ within bedrooms at night (23:00 – 07:00).
- 45dB L_{AFmax} should not be regularly exceeded within bedrooms at night (23:00 – 07:00).
- 35dB $L_{Aeq, 16hr}$ within living areas during the day (07:00 – 23:00)

WHO Guidelines help to define the L_{AFmax} parameter requirements:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times a night (Vallet & Vernet 1991)”.

4.2. Internal Noise Levels – Proposed Insulation

Internal noise levels have been calculated to demonstrate that the proposed apartments can achieve suitable internal noise levels when appropriate glazing and ventilation systems are utilised.

Room dimensions and glazed areas have been approximated based on the drawings supplied to Peak Acoustics and drawn by ‘Hickman & Smith Architects’ and dated 25/02/2019. Note that assessment is not required for each individual room. The selection of habitable rooms has been chosen as representative of the most noise sensitive areas, which have been selected on account of room and windows sizes. Construction details and calculations are provided within **Appendix F**.

4.3. Assessment Outcome – Internal Noise Levels

Internal noise levels have been calculated to demonstrate that the proposed residential apartments can achieve suitable noise levels inside habitable rooms when appropriate glazing and ventilation systems are used. The recommended mitigation and corresponding internal noise levels are summarised in table 7 below.

Table 5. – Assessment Outcome

Internal Space	Glazing Minimum Performance $R_w (+C_{tr})$	Ventilation Minimum Performance $D_{nw,w,+C_{tr}} (Open)$	Internal Noise Level, dB
Living Rooms	30 (26)	32	30 $L_{Aeq, 16hr}$
Bedrooms	30 (26)	32	25 $L_{Aeq, 8hr}$ 44 L_{AFmax}

N.B: The sound insulation value of the glazing should consider the glass as well as the frame and perimeter seal.

For the daytime assessment for living areas, the desirable limit of BS8233:2014 suggests a guideline of 35 dB $L_{Aeq, 16hr}$ for resting conditions, and up to 40 dB is considered acceptable for necessary developments.

All results, with the proposed construction, would place the internal levels in kitchen/living areas as below 35 dB, therefore within the desirable category.

For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 30 dB $L_{Aeq, 8hr}$ for sleeping conditions, with an acceptable limit of 35 dB $L_{Aeq, 8hr}$. Individual noise events (Measured with fast time-weighted Maximum) should not normally exceed 45 dB L_{AFmax} (as in BS8233:1999).

The proposed construction would place the internal continuous levels in bedrooms as below 30 dB and the maximum noise events as typically below 45 dB L_{AFmax} , therefore within the desirable category.

4.4. Ventilation Strategy

The predicted internal noise levels detailed in section 4.3 rely on windows being kept closed with ventilation provided by passive methods. Should it be determined within the Energy Assessment for the apartments that overheating is likely to occur using this method, it is recommended that a Mechanically Assisted ventilation system is incorporated.

Should this be required, the following guidance should be followed to control self-generated noise from the system:

- Noise from the mechanical ventilation system, inclusive of fan case breakout and internal grilles should not exceed 35 dB L_{Aeq} / NR35 and 30 dB L_{Aeq} / NR25 within living rooms and bedrooms respectively.
- Where required, silencers should be installed at the fan inlet and / or outlet.
- Rooms which share supply and / or extract terminations from the same main duct should have cross talk attenuators implemented within at least one of the corresponding branch ducts to minimise cross talk between the rooms.
- Ventilation fans should be located within non-habitable rooms or within built-in cupboards. If located in a built-in cupboard, ensure that the access door provides a tight seal to prevent flanking transmission to habitable rooms.
- Fans and ductwork should be fitted using resilient mountings to mitigate vibration and re-radiated structural noise.
- All windows should not include trickle ventilators and walls should not contain passive through-wall vents. As ventilation is to be provided via mechanical means, the passive ventilators will introduce an unnecessary weakness to the building envelope.
- Façade penetrations for inlets / outlets should be routed to the rear façade as to benefit from the quieter noise climate and reduce noise transfer through the ductwork.

APPENDIX A – Measurement Details

Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	A4	09/07/2020	12:35	10/07/2020	14:00
C1	STK5	09/07/2020	12:55	09/07/2020	13:10

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A4	Sound Meter	Svantek	971	1	60688
A4	Pre-Amp	Svantek	SV18	1	62781
A4	Microphone	ACO	7052E	1	66703
STK 5	Sound Meter	Svantek	977A	1	69273
STK 5	Pre-Amp	Svantek	SV12L	1	71601
STK 5	Microphone	ACO	7052E	1	68217
Cal	Calibrator	Svantek	SV33B	1	83715

APPENDIX C - Meteorology Details

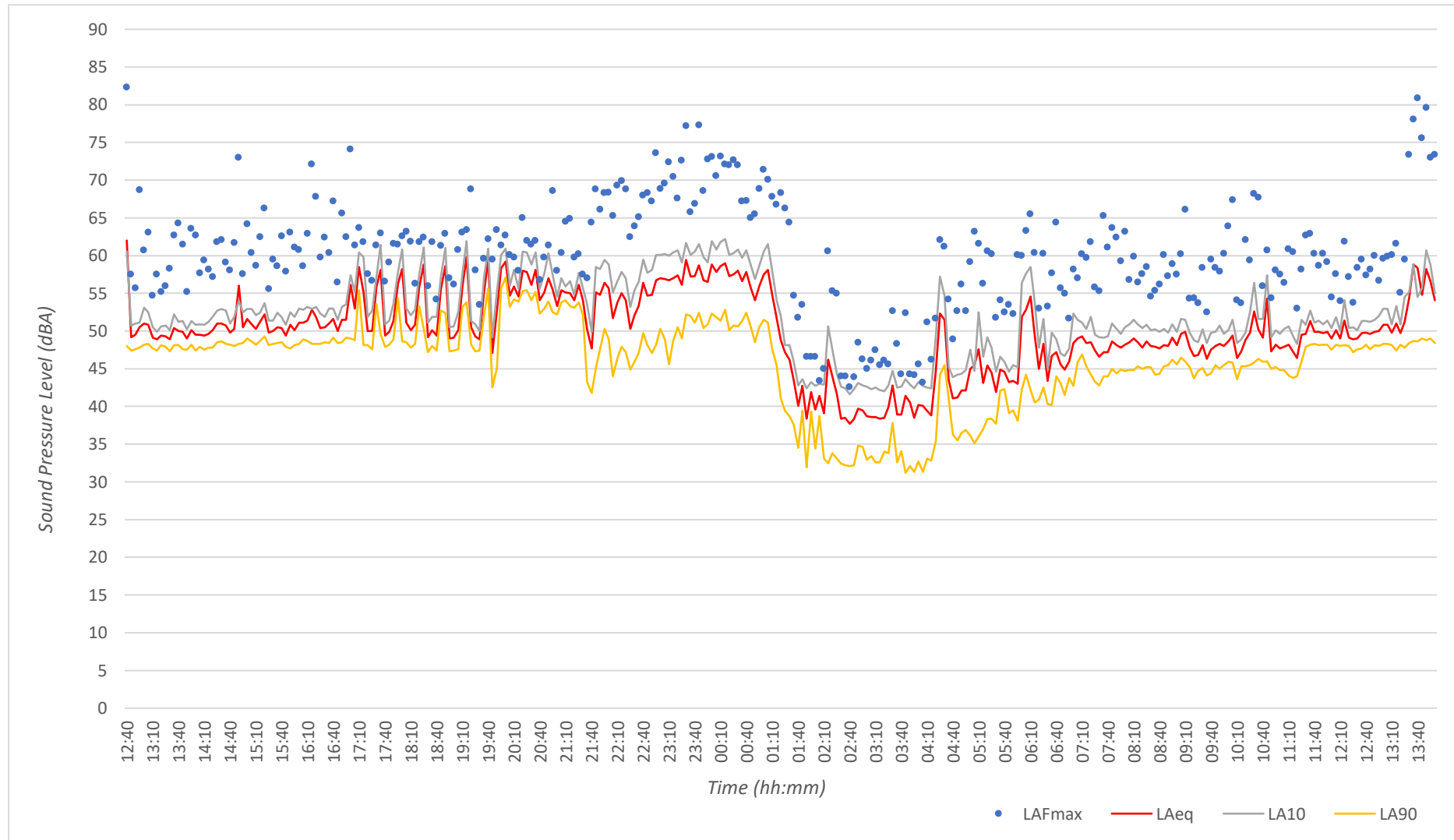
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
09/07/20 (Start of Survey)	15	3	WSW	87	0.5	8/8
10/07/20 (End of Survey)	26	4 - 5	NW	61	0.0	7/8

APPENDIX D - Calibration Details

Measurement	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
M1	113.9	-0.6	-0.8
C1	113.9	0.7	0.7

APPENDIX E – Noise Survey Results

Environmental Noise Measurement (M1), 09th – 10th July 2020

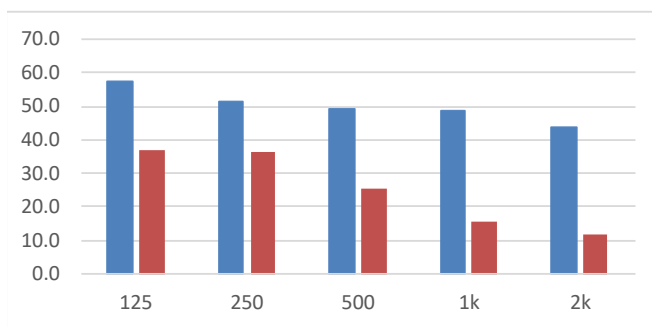


APPENDIX F – BS8233 Rigorous Design Calculation

Living - Daytime LAeq (07:00 - 23:00)

Room Properties		Sound Insulation Properties					
Room Width (m)	7.6	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	11.1	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.4	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	11.8	Glazing, dB R _{w+Ctr}	24	18	26	40	45
Is dwelling within roof	☒	Vents, D _{n,e,w+Ctr}	34	27	37	35	34

Noise Levels, dB



External Level	52.6 dB LAeq
Internal Level	29.7 dB LAeq
Insertion Loss	22.9 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	26	dB R _{w+Ctr}	Double Glazing <i>4/16/4mm</i>
Ventilation	32	D _{n,e,w+Ctr}	Hit & miss trickle vent <i>Titon Trimvent XS13 4400EA</i>

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	0.000218	0.0011	0.00011	0.0002	0.00022
Term 2	0.002575	0.0103	0.00163	6E-05	2E-05
Term 3	2.8E-05	1E-05	1.1E-05	1E-06	5.6E-07
Term 4	0	0	0	0	0
Internal, dB L _{eq}	36.9	36.3	25.4	15.8	11.6
Internal, dB LAeq	20.8	27.7	22.2	15.8	12.8

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Hit & miss trickle vent

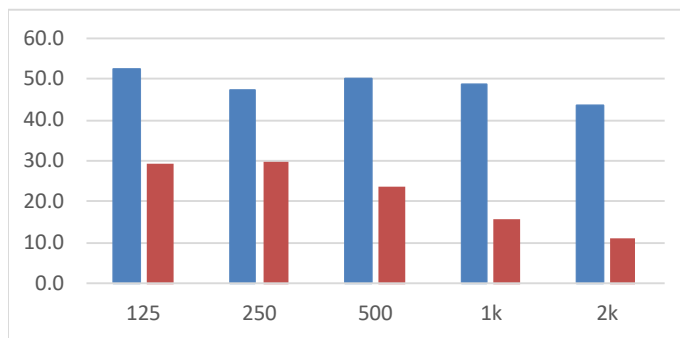
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,1} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{01}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Bedroom - Night-time LAeq (23:00 - 07:00)

Room Properties			Sound Insulation Properties					
Room Width (m)	2.7		Freq. Hz	125	250	500	1k	2k
Room Depth (m)	3.5		Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.4		Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	6.0		Glazing, dB R _{w+Ctr}	24	18	26	40	45
Is dwelling within roof	☒		Vents, D _{n,e,w+Ctr}	34	27	37	35	34

Noise Levels, dB



External Level	52.4 dB LAeq
Internal Level	24.9 dB LAeq
Insertion Loss	27.5 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	26	dB R _{w+Ctr}	Double Glazing 4 / 16 / 4mm
Ventilation	32	D _{n,e,w+Ctr}	Hit & miss trickle vent Titon Trimvent XS13 4400EA

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	0.000626	0.0031	0.00031	0.0005	0.00063
Term 2	0.003756	0.015	0.00237	9E-05	3E-05
Term 3	4.5E-06	2E-06	1.8E-06	2E-07	9E-08
Term 4	0	0	0	0	0
Internal, dB L _{eq}	29.4	29.6	23.6	15.6	10.9
Internal, dB LAeq	13.3	21.0	20.4	15.6	12.1

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Hit & miss trickle vent

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{-\frac{D_{0a}}{10}} + \frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}} + \frac{S_{it}}{S} 10^{-\frac{R_{it}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Bedroom - L_{Amax}

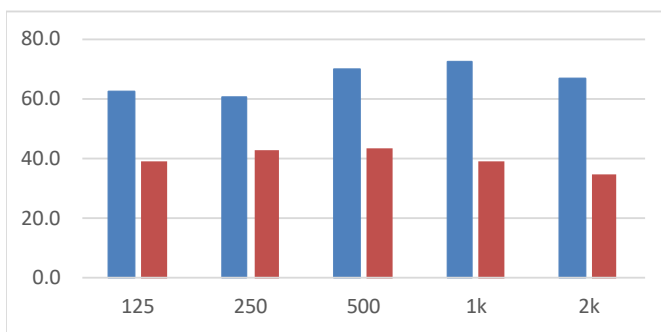
Room Properties

Room Width (m)	2.7
Room Depth (m)	3.5
Room Height (m)	2.4
Glazed Area (m ²)	6.0
Is dwelling within roof	☒

Sound Insulation Properties

Freq. Hz	125	250	500	1k	2k
Wall, dB R _{w+Ctr}	41	45	45	54	58
Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazing, dB R _{w+Ctr}	24	18	26	40	45
Vents, D _{n,e,w+Ctr}	34	27	37	35	34

Noise Levels, dB



External Level 73.4 dB L_{Amax}

Internal Level 43.9 dB L_{Amax}

Insertion Loss 29.5 dB L_{Amax}

Sound Insulation Requirement

Minimum Sound Insulation Requirement

Glazing	26	dB R _{w+Ctr}
Ventilation	32	D _{n,e,w+Ctr}

Suitable Systems

Double Glazing
4 / 16 / 4mm
Hit & miss trickle vent
Titon Trimvent XS13 4400EA

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	0.000626	0.0031	0.00031	0.0005	0.00063
Term 2	0.003756	0.015	0.00237	9E-05	3E-05
Term 3	4.5E-06	2E-06	1.8E-06	2E-07	9E-08
Term 4	0	0	0	0	0
Internal, dB L _{eq}	39.3	42.9	43.2	38.9	34.5
Internal, dB L _{Aeq}	23.2	34.3	40.0	38.9	35.7

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Hit & miss trickle vent

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{-\frac{D_{e,2}}{10}} + \frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}} + \frac{S_{n}}{S} 10^{-\frac{R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$



Let us introduce ourselves

Peak Acoustics formed in 2011, we are a fully accredited specialist consultancy and testing organisation.

We are a diverse team of Acoustic Consultants, Specialist Engineers and Building Compliance Technicians, with a network spanning the UK. We are proud to offer our services nationally, with no job too big or small.

We provide Acoustic Consultancy, Building Compliance Testing and Energy Services.

Additional Services

We offer an extensive range of services in the sectors of Acoustic Consultancy, Building Compliance & Energy Efficiency. We are able to put together custom packages combining multiple services which saves both time and money for you.

Building Compliance

- Sound Insulation Testing
- Air Tightness Testing
- Ventilation Testing
- Water Efficiency Calculations
- Sound Insulation Specification

Energy Efficiency

- SAP Calculations
- EPC's
- SBEM Calculations
- Energy Statements
- Sustainability Statements
- MEES Regulations
- Commercial EPC's

Acoustic Consultancy

- Noise Assessment for planning conditions
- Construction site noise monitoring
- Noise at work assessments
- Noise & Vibration Impact Assessments

Peace of mind

We are accredited and registered by all the relevant major UK authorities to provide the services we offer. Peak Acoustics is UKAS accredited for sound insulation testing, ATTMA registered for Air Leakage Testing. and our Energy team are all Domestic On-Completion Energy Assessors.

Our Added Value

We combine our detailed knowledge of building regulations with our technical understanding of building physics, acoustics and environmental sciences to maximise development quality. Our work ensures appropriate strategies and studies are prepared to demonstrate to local authorities how proposed developments will be of high quality and generate acceptable impact on the surrounding environment.

Contact Us

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