

PEAK acoustics

Noise Assessment Report

Email: sales@acousticsurveys.co.uk | **Office:** 0330 043 1764
Web: www.acousticsurveys.co.uk
Peak Acoustics Ltd, Fernbank House, Springwood Way, Macclesfield, SK10 2XA

Rev. 0.0

Environmental Noise Assessment

Report Ref: NM2411208NR

Issue Date: Wednesday 14th April 2021

Site: 2 Thornwood Avenue, Manchester, M18 7HW

Project Consultant
N. Mitchell BSc (Hons)
Acoustic Consultant
nick@acousticsurveys.co.uk

Proofing Consultant
K. Donald BSc (Hons) AMIOA
Acoustic Consultant
kyle@acousticsurveys.co.uk



Contents

1. Summary 4
1.1. Proposal 4
1.2. Reason for Assessment 4
1.3. Planning Conditions & Criteria 4
1.4. Assessment Standards & Justification 4
1.5. Environmental Noise Measurements 5
1.6. Noise Assessment Outcome 5
1.7. Mitigation Recommendations 5
1.7.1. Glazing & Ventilation Scheme 5
1.8. Zone Designation 6
1.9. Site & Measurement Location 7
2. Environmental Noise Survey 8
2.1. Sources Under Investigation 8
3. Survey Measurements 8
3.1. Measurement Location 8
3.2. Weather Conditions 8
3.3. Measurement Equipment 8
3.4. External Noise Levels 9
4. BS8233:2014 Environmental Noise Assessment 10
4.1. Criteria 10
4.2. Internal Noise Levels – Proposed Insulation 10
4.3. Assessment Outcome – Internal Noise Levels 10
4.4. Assessment Outcome – External Noise Levels 11
APPENDIX A – Measurement Details 12
APPENDIX B - Equipment Details 12
APPENDIX C - Meteorology Details 12
APPENDIX D - Calibration Details 12
APPENDIX E – Noise Survey Results 13
APPENDIX F – BS8233 Rigorous Design Calculations 14
APPENDIX G – Acoustic Terminology 20

1. Summary

1.1. Proposal

A change of use from an existing working men's club to provide three dwelling houses with associated external alterations is proposed at 2 Thornwood Avenue, Manchester, M18 7HW.

1.2. Reason for Assessment

The Local Authority has conditioned the requirement of a noise assessment to provide a scheme of sound insulation for the residential accommodation to control noise from Hyde Road, and ensure desirable internal noise levels are met within habitable rooms of the proposed development.

1.3. Planning Conditions & Criteria

Manchester City Council issued the following planning condition:

> *"13) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Hyde Road shall be submitted to and approved in writing by the City Council as local planning authority."*

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

- *<35dB $L_{Aeq,\ 16hr}$ within living areas during the day (07:00 – 23:00)*
- *<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).*

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)".*

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

In order to assess environmental noise levels, a noise survey was undertaken at the site from Monday 12th – Tuesday 13th April 2021. The results from these measurements are tabulated below.

Table 1. – Environmental Measurement Summary

Measurement	Date(s)	Period	L_{Aeq} (dB)	Typical L_{AFmax} (dB)
M1 *(Front – Overlooking Thornwood Avenue)*	12th & 13th April 2021	Day *(16hr Aggregate Periods)*	62.1	-
	12th – 13th April 2021	Night *(8hr)*	56.9	74.1

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 facades, 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)
	Rooms to the Front		
Front Living/Kitchens	Daytime $L_{Aeq, 16hr}$	32.8	Yes
Front Bedrooms	Night-time $L_{Aeq, 8hr}$	24.8	Yes
Front Bedrooms	Night-time L_{AFmax}	43.8	Yes
	Rooms to the rear		
Rear Living/Kitchens	Daytime $L_{Aeq, 16hr}$	20.8	Yes
Rear Bedrooms	Night-time $L_{Aeq, 8hr}$	14.1	Yes
Rear Bedrooms	Night-time L_{AFmax}	33.7	Yes

1.7. Mitigation Recommendations

1.7.1. Glazing & Ventilation Scheme

The recommended glazing and ventilation scheme for respective façades are given below.

Table 3. – Glazing and Ventilation Scheme

Internal Space	Glazing		Ventilation*	
	Minimum Performance R_w *(+C_{tr})*	*Example Specification*	*Minimum Performance* $D_{ne,w}$,+C_{tr} (Open)	*Example Specification*
	Front Façade			
Living / Kitchens	30 *(26)*	*4 / 16 / 4mm*	32	*Titon Trimvent XS13 4400EA*
Bedrooms	37 *(31)*	*4 / 16 / 10mm*	32	*Titon Trimvent XS13 4400EA*

		Rear Façade		
Living / Kitchens	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.

The specific designation of façade areas is indicated below in Figure 1 and has been determined based on the measured noise exposure in these areas.

1.8. Zone Designation

N.B: The indicated façade Zones apply to all floors.

Figure 1. – Façade Zone Designation



1.9. Site & Measurement Location

The site is situated on Thornwood avenue near Hyde Road, a main access route through the Greater Manchester and network connection to the M60. Observations on site saw high levels of continuous road traffic throughout the consultant's attendance on site. The surrounding properties are predominantly residential with a few retail units on Hyde Road. Ryder Brow train station is approximately 11-minute walk south west of site. To the north lies a mix of commercial retail and hotel blocks, with Gorton Reservoir just beyond.

The site and measurement locations are shown on Figure 2 below.

Figure 2: Site & Measurement Locations – earth.google.com



Unattended Environmental Monitoring Location (M1)

Comparative Monitoring Location (C1)

Site Boundary (Approx.)

2. Environmental Noise Survey

2.1. Sources Under Investigation

The primary noise source identified on site was passing traffic on High Road, whereby vehicle noise was most dominant, inclusive of buses and HGVs. Passing conversing pedestrians was noted as a secondary source.

The prevailing noise climate is typical of areas dominated by road traffic, characterised by a decrease in noise levels during the night, when use of the nearby road network is reduced.

3. Survey Measurements

Day and night-time environmental noise measurements have been carried out over a 24-hour period from Monday 12th – Tuesday 13th April 2021.

Measurements of $L_{Aeq,T,}$ L_{AFmax} L_{10} & L_{90} were logged in 5-minute intervals using 1/1 octave resolution in accordance with the provisions of BS7445 - *'Description and Measurement of Environmental Noise'*.

3.1. Measurement Location

At position M1, the microphone was positioned through an open window on the front facing façade, directly overlooking Thornwood Avenue, and fully exposed to passing traffic on Hyde Road.

To provide a further indication of noise levels at the rear of the property, a comparative measurement was conducted free field at ground floor level in the rear garden area. Further description of this measurement is given in Section 3.4.

3.2. Weather Conditions

No precipitation occurred and wind speeds remained low with speeds of 2 – 5 m/s throughout; deemed suitable for conducting environmental noise measurements. Detailed meteorological information can be found 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 measurements M1 are summarised in the table below. M1 measurement data is subject to a -3 dB façade correction due to the microphone being within 1m of a reflective surface, namely, the building façade.

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

Table 4. – Measurement Results

Measurement	Date(s)	Period	L_{Aeq} (dB)	Typical L_{AFmax} (dB)
M1 *(Front – Overlooking Thornwood Avenue)*	12th & 13th April 2021	Day *(16hr Aggregate Periods)*	62.1	-
	12th – 13th April 2021	Night *(8hr)*	56.9	74.1*

**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.*

To determine the difference in environmental noise levels between the front and rear façade, comparative measurements were undertaken on Tuesday 13th April 2021. Measurement data from C1 has been utilised to represent conditions at the rear. The exact same measurement intervals from measurement M1 and measurement C1 have been compared below.

Table 5. – Comparative Measurement Results

Period	Measurement	Location	$L_{Aeq,T=5min}$ (dB)	Difference, dB
09:50 – 10:20	M1	Front *(Overlooking Hyde Road)*	61.2	12.2
09:50 – 10:20	C1	Rear	49.0	

The comparative measurement intervals shown in Table 5 demonstrate that there is an approximate 12 dB difference in noise levels between the front and rear of site. Therefore, a 12 dB correction will be applied to M1 noise data to represent noise levels at the rear of the property.

The resultant external noise levels for each area are summarised in the table below.

Table 6. – Zone Noise Levels

Zone(s)	Period	$L_{Aeq,T}$ (dB)	Typical L_{AFmax} (dB)
Front	Daytime *(16hr)*	62.1	-
	Night *(8hr)*	56.9	74.1
Rear	Daytime *(16hr)*	50.1	-
	Night *(8hr)*	44.9	62.1

4. BS8233:2014 Environmental Noise Assessment

4.1. Criteria

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

- *<35dB $L_{Aeq,\ 16hr}$ within living areas during the day (07:00 – 23:00)*
- *<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).*

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

Room dimensions and glazed areas have been approximated based on the drawings supplied to Peak Acoustics and drawn by '*Acremoss Designs Ltd*. 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 dwellings 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 7. – Assessment Outcome

Internal Space	Glazing Minimum Performance R_w *(+C_{tr})*	Ventilation	Internal Noise Level, dB
	Front Façade		
Living / Kitchens	30 *(26)*	32	33 $L_{Aeq,\ 16hr}$
Bedrooms	37 *(31)*	32	25 $L_{Aeq,\ 8hr}$ 44 L_{AFmax}
	Rear Façade		
Living / Kitchens	30 *(26)*	*32*	21 $L_{Aeq,\ 16hr}$
Bedrooms	30 *(26)*	*32*	14 $L_{Aeq,\ 8hr}$ 34 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.

It is noted that BS8233 section 7.2.2 states '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'. This statement implies that the use of closed windows and an alternative means of ventilation is acceptable. The development will be required to achieve the minimum ventilation rates indicated in the Building Regulations Approved Document F (AD-F).
Habitable rooms should therefore be provided with passive wall or window ventilators that meet or exceed the acoustic performance given in Table 3 whilst providing an open area equivalent to an open window in order to negate the need for open windows for the purposes of ventilation.

4.4. Assessment Outcome – External Noise Levels

BS8233:2014 provides a desirable guideline of 50 dB $L_{Aeq, 16hr}$ for external amenity spaces and an acceptable guideline of 55 dB $L_{Aeq, 16hr}$ for noisier environments. It is proposed to include one private and also a communal enclosed external amenity space.

External daytime noise levels were measured at the rear during the comparison measurement. A corrected external noise level at the rear was calculated at 50.1 dB $L_{Aeq,16hr}$ and within the desirable category for external amenity areas. No mitigation is deemed necessary.

APPENDIX A – Measurement Details

Measurement(s)	Kit	Start Date	Start Time	End Date	End Time
M1	A4	12/04/21	10:30	13/04/21	10:40
C1	STK5	13/04/21	09:50	13/04/21	10:20

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
A4/STK3	Calibrator	Svantek	SV33A	1	83715

APPENDIX C - Meteorology Details

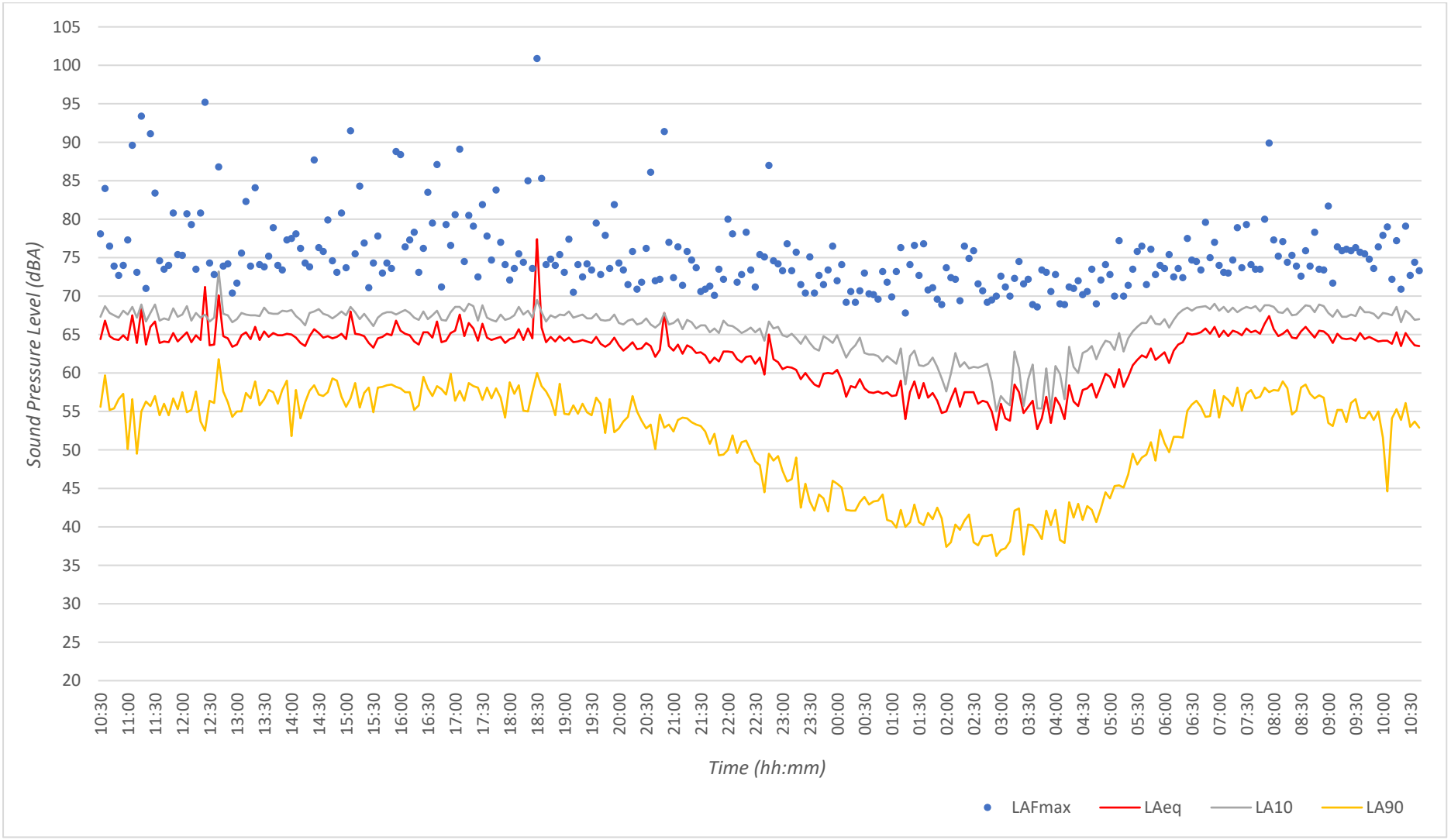
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
12/04/20 *(Start of Survey)*	4	3	NW	64	0	0/8
13/04/20 *(End of Survey)*	4	1 – 2	NNW	62	0	1/8

APPENDIX D - Calibration Details

Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
A4	113.9	-1.21	-0.82
STK3	113.8	+0.30	+0.40

APPENDIX E – Noise Survey Results

Environmental Noise Measurement (M1), 12th – 13th April 2021



APPENDIX F – BS8233 Rigorous Design Calculations

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

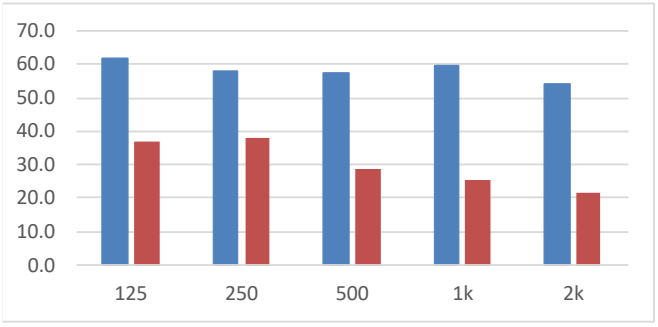
Room Properties

Room Width (m)	3.4
Room Depth (m)	3.8
Room Height (m)	2.4
Glazed Area (m^2)	3.4
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	62.1 dB LAeq
Internal Level	32.8 dB LAeq
Insertion Loss	29.3 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**30(26)**	dB $R_{W(+Ctr)}$	Double Glazing *4 / 16 / 4*
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	0.000488	0.0024	0.00024	0.0004	0.00049
Term 2	0.001659	0.0066	0.00105	4E-05	1.3E-05
Term 3	4.63E-05	2E-05	1.8E-05	2E-06	9.2E-07
Term 4	0	0	0	0	0
Internal, dB L_{eq}	37.1	38.0	28.7	25.7	21.6
Internal, dB LAeq	21.0	29.4	25.5	25.7	22.8

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

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

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

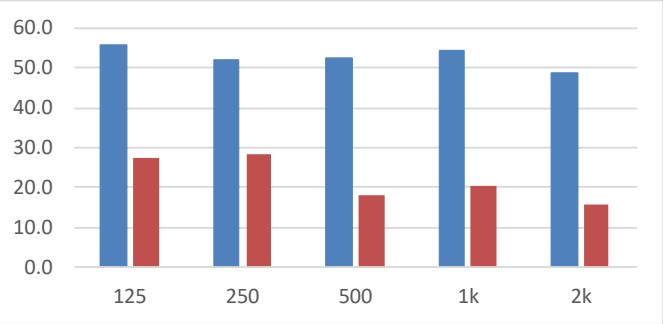
Room Properties

Room Width (m)	2.5
Room Depth (m)	2.0
Room Height (m)	2.4
Glazed Area (m^2)	1.8
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}	27	23	33	41	48
Vents, $D_{n,e,w+Ctr}$	34	27	37	35	34

Noise Levels, dB



External Level	56.9 dB LAeq
Internal Level	24.8 dB LAeq
Insertion Loss	32.1 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**37(31)**	dB $R_{W(+Ctr)}$	Double Glazing *4 / 16 / 10*
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	0.000677	0.0034	0.00034	0.0005	0.00068
Term 2	0.000611	0.0015	0.00015	2E-05	4.9E-06
Term 3	5.51E-05	2E-05	2.2E-05	3E-06	1.1E-06
Term 4	0	0	0	0	0
Internal, dB L_{eq}	27.4	28.3	18.2	20.5	15.9
Internal, dB LAeq	11.3	19.7	15.0	20.5	17.1

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

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

Front - LAFmax Night-time (23:00 - 07 :00)

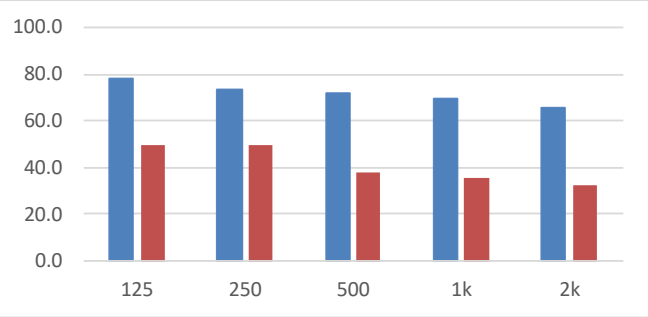
Room Properties

Room Width (m)	2.5
Room Depth (m)	2.0
Room Height (m)	2.4
Glazed Area (m^2)	1.8
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}	27	23	33	41	48
Vents, $D_{n,e,w+Ctr}$	34	27	37	35	34

Noise Levels, dB



External Level	74.1 dB LAmax
Internal Level	43.8 dB LAmax
Insertion Loss	30.3 dB LAmax

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**37(31)**	dB $R_{W(+Ctr)}$	Double Glazing *4 / 16 / 10*
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	0.000677	0.0034	0.00034	0.0005	0.00068
Term 2	0.000611	0.0015	0.00015	2E-05	4.9E-06
Term 3	5.51E-05	2E-05	2.2E-05	3E-06	1.1E-06
Term 4	0	0	0	0	0
Internal, dB L_{eq}	49.8	49.6	37.6	35.9	32.6
Internal, dB LAeq	33.7	41.0	34.4	35.9	33.8

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

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

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

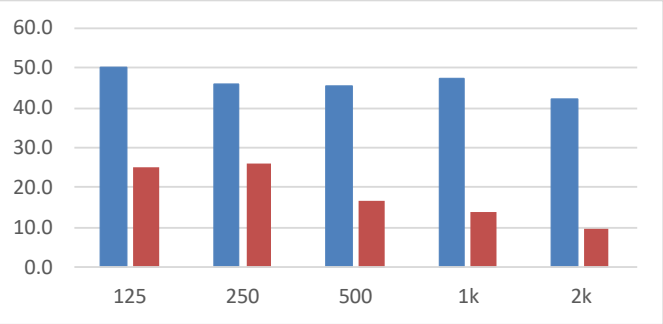
Room Properties

Room Width (m)	3.4
Room Depth (m)	3.8
Room Height (m)	2.4
Glazed Area (m^2)	3.4
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	50.1 dB LAeq
Internal Level	20.8 dB LAeq
Insertion Loss	29.3 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**30(26)**	dB $R_{W(+Ctr)}$	Double Glazing *4 / 16 / 4*
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	0.000488	0.0024	0.00024	0.0004	0.00049
Term 2	0.001659	0.0066	0.00105	4E-05	1.3E-05
Term 3	4.63E-05	2E-05	1.8E-05	2E-06	9.2E-07
Term 4	0	0	0	0	0
Internal, dB L_{eq}	25.1	26.0	16.7	13.7	9.6
Internal, dB LAeq	9.0	17.4	13.5	13.7	10.8

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

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

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

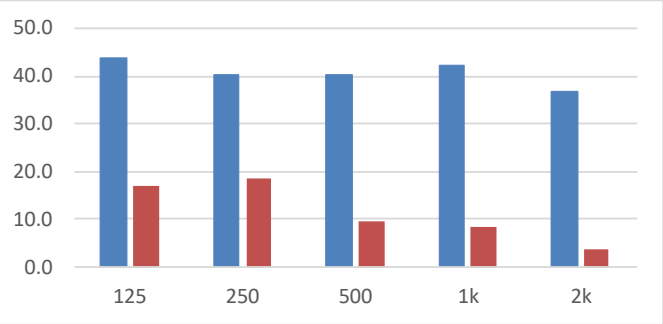
Room Properties

Room Width (m)	2.5
Room Depth (m)	2.0
Room Height (m)	2.4
Glazed Area (m^2)	1.8
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	44.9 dB LAeq
Internal Level	14.1 dB LAeq
Insertion Loss	30.8 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**30(26)**	dB $R_{W(+Ctr)}$	Double Glazing *4 / 16 / 4*
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	0.000677	0.0034	0.00034	0.0005	0.00068
Term 2	0.001219	0.0049	0.00077	3E-05	9.7E-06
Term 3	5.51E-05	2E-05	2.2E-05	3E-06	1.1E-06
Term 4	0	0	0	0	0
Internal, dB L_{eq}	17.0	18.5	9.6	8.5	3.9
Internal, dB LAeq	0.9	9.9	6.4	8.5	5.1

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

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

Rear - LAFmax Night-time (23:00 - 07 :00)

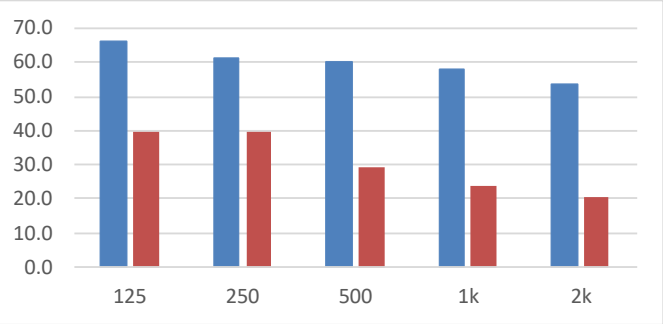
Room Properties

Room Width (m)	2.5
Room Depth (m)	2.0
Room Height (m)	2.4
Glazed Area (m^2)	1.8
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	62.1 dB LAmax
Internal Level	33.7 dB LAmax
Insertion Loss	28.4 dB LAmax

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**30(26)**	dB $R_{W(+Ctr)}$	Double Glazing *4 / 16 / 4*
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	0.000677	0.0034	0.00034	0.0005	0.00068
Term 2	0.001219	0.0049	0.00077	3E-05	9.7E-06
Term 3	5.51E-05	2E-05	2.2E-05	3E-06	1.1E-06
Term 4	0	0	0	0	0
Internal, dB L_{eq}	39.5	39.8	29.0	24.0	20.7
Internal, dB LAeq	23.4	31.2	25.8	24.0	21.9

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

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

APPENDIX G – Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples common environments and their typical noise levels.

Noise Level	Environment
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a moving car
60 to 70 dB(A)	Typical high street
100 to 110 dB(A)	Fire alarm at 1 metre away
140 dB(A)	Threshold of pain

Terminology

dB (decibel) – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level ($2x10^{-5}$ Pa – threshold of hearing).

$L_{Aeq,\,T}$ – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level in which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

L_{Amax} – the maximum RMS A-weighted sound pressure level occurring within a specified time period; the time weighting is typically either Fast or Slow.

R_w – The Weighted Sound Reduction Index (R_w) is a number used to rate the effectiveness of a soundproofing system or material.

$D_{n,e,W}$ – The Weighted Sound Reduction Index specifically for ventilators.

C_{tr} – C_{tr} is a spectrum adaptation term which method is defined in BS EN ISO 717. The standard uses a reference curve to determine the weighted value of airborne sound insulation. The spectrum adaptation terms C and C_{tr} may are used to take into account different source spectra. 'C_{tr}' is the A-weighted urban traffic noise spectrum.

PEAK acoustics



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

Head Office:
Peak Acoustics
Fernbank House
Springwood Way, Macclesfield, SK10 2XA

Tel: 0330 043 1764
Email: sales@acousticsurveys.co.uk
Website: acousticsurveys.co.uk

Opening hours
Mon - Fri: 8:30 - 17:00