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Desktop Study

31st July 2024

Proposal Number:

22704-1-R2

Client:

HDS Architectural Services

Site Address:

33 High Street

Wrexham

LL13 8LD

noise.co.uk



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1. Quality Management

Report Number	22704-1
Issue	Revision 2
Prepared	31 st July 2024
Prepared By	[REDACTED] Jonathan Seiffert BSc, MIOA
Authorised By	[REDACTED] Bill Whitfield PhD, MSc, MIOA

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4. Introduction

noise.co.uk Ltd has been appointed by HDS Architectural Services to comment on the likely compliance of a proposed development at 33 High Street, Wrexham, LL13 8LD with the requirements from ADE2003.

The existing level of sound insulation has been assessed using objective sound insulation tests and a subjective evaluation of the building structure based on the plans that have been provided by the client. Proposals have been put forward for the construction of the separating walls and floors based on guidance from the Building Regulations, product manufacturers and previous experience of similar projects.

4.1. Building Regulations 2010

Requirement E1 of Schedule 1 of the Building Regulations 2010 requires that dwelling houses, flats and rooms for residential purposes be designed and constructed in such a way that they provide a reasonable resistance to the sound from other parts of the same building and from adjoining buildings.

Regulation 41 requires that the person carrying out the building works ensured that the appropriate sound insulation testing is carried out in accordance with a procedure approved by the Secretary of state and that a copy of these results be issued to the relevant building control body.

i. Sound Insulation of Separating Elements

In the Secretary of State's view, the normal way of satisfying Requirement E1 will be to build separating walls, separating floors and stairs that have a separating function, in a way such that they achieve the sound insulation values for dwelling houses and flats set out in table 0.1a and the values for rooms for residential purposes set out in table 0.1b of ADE2003.

The conversion of the existing building has been identified as rooms for residential purposes formed by a material change of use; therefore, the separating walls and floors should achieve the minimum performance standards in table 0.1b of Approved Document E 2003 ("ADE2003"). The performance standards have been reproduced in Table 1.

	Airborne sound insulation $\text{dB } D_{nT,w} + C_{tr}$ (Minimum values)	Impact sound insulation $\text{dB } L'_{nT,w}$ (Maximum values)
Rooms for residential purposes formed by by a material change of use		
Walls	43	-
Floors	43	64

Table 1 - Sound insulation performance standards that apply to dwellings formed by a material change-of-use.

The performance standards set out in table 0.1b from ADE2003 are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes.

ii. Historic Buildings

The client has informed us that the building is listed on site. Approved Document E paragraph 0.7 recognises 'Historic Buildings' which includes conservation areas undergoing a material change of use may need to conserve the special characteristics of the building; therefore, it may be reasonable to improve the sound insulation as much as is practical and affix a notice showing the sound insulation value(s) in a conspicuous place inside the building. This should be discussed and agreed between the Client, Building Inspector for the project and the Local Authority prior to attaching a 'Test and Declare' situation to this project.

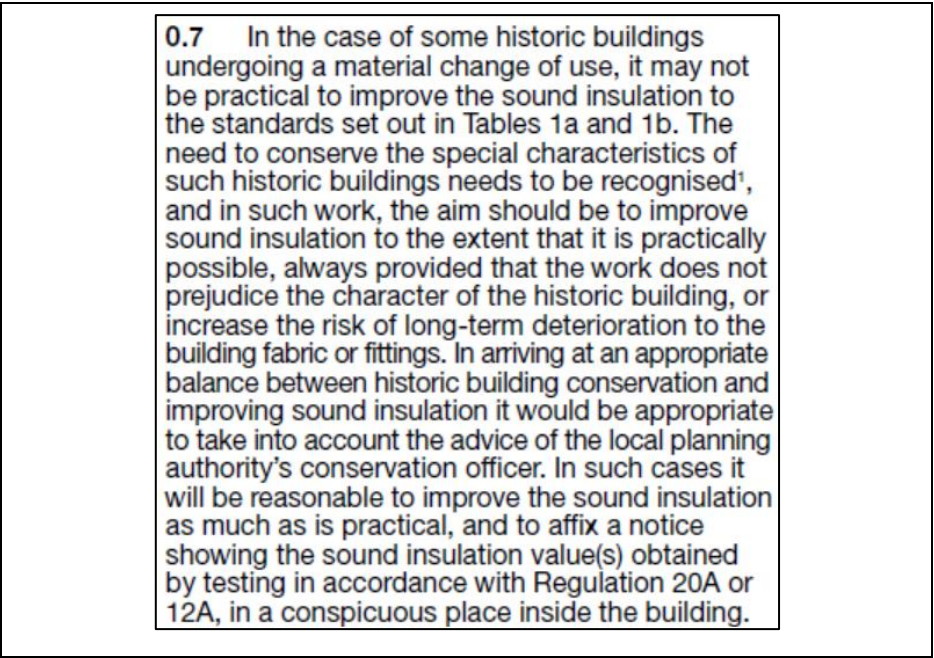


Figure 1 – Paragraph 0.7 from Approved Document E 'Historic Buildings'

It is important to note that, 'Test and declare' is not a license to have reduced sound insulation. It is required that everything that can be done has been done and the resulting sound insulation performance is tested, and the certificate kept as proof to any incoming residential occupant.

4.2. Separating Floor between Domestic and Non Domestic

BS8233:2014 provides a matrix for recommending sound insulation between domestic and non-domestic spaces based on the noise generation of the source room and the noise sensitivity of the receiving room. This has been recreated below:

Privacy requirement	Activity noise of source room	Noise sensitivity of receiving rooms		
		Low sensitivity	Medium Sensitivity	Sensitive
Confidential	Very high	47dB D _{nT,w}	52dB D _{nT,w}	57dB D _{nT,w} ^{A)}
	High	47dB D _{nT,w}	47dB D _{nT,w}	52dB D _{nT,w}
	Typical	47dB D _{nT,w}	47dB D _{nT,w}	47dB D _{nT,w}
	Low	42dB D _{nT,w}	42dB D _{nT,w}	47dB D _{nT,w}
Moderate	Very high	47dB D _{nT,w}	52dB D _{nT,w}	57dB D _{nT,w} ^{A)}
	High	37dB D _{nT,w}	42dB D _{nT,w}	47dB D _{nT,w}
	Typical	37dB D _{nT,w}	37dB D _{nT,w}	42dB D _{nT,w}
	Low	No rating	No rating	37dB D _{nT,w}
Not Private	Very high	47dB D _{nT,w}	52dB D _{nT,w}	57dB D _{nT,w} ^{A)}
	High	37dB D _{nT,w}	42dB D _{nT,w}	47dB D _{nT,w}
	Typical	No rating	37dB D _{nT,w}	42dB D _{nT,w}
	Low	No rating	No rating	37dB D _{nT,w}

^{A)} D_{nT,w} 55dB or greater is difficult to obtain on site and room adjacencies requiring these levels should be avoided wherever practical.

In this case, as the use case for the ground floor is a bar (potentially 'Very high' source noise¹), and the space above is proposed for residential use ('Sensitive'), 57dB $D_{nT,w}$ should be the target sound insulation for this separating element.

i. Sound Insulation of Internal Elements

To comply with the internal sound insulation requirements of ADE2003, constructions used within a dwelling-house or flat should achieve the minimum laboratory sound insulation performance requirements from Table 2 of ADE2003. This table has been reproduced in Table 2.

Airborne sound insulation, R_w dB (Minimum values)	
Walls	40
Floors	40

Table 2 – Minimum sound insulation performance for internal walls and floors from ADE2003

ADE2003 provides a series of example constructions that would satisfy the requirements of Table 2; however, the suggested constructions are not exhaustive and it is open to the developer to use alternative details provided the laboratory performance has been demonstrated in an appropriately accredited laboratory.

It should be noted that the performance standards only apply to internal walls that do not contain a door. Where an internal wall separates a bedroom from ensuite, the performance standards do not apply.

ii. Reverberation Control in Common Areas

ADE2003 requires that reverberation should be controlled in common areas, such as stairwells and corridors. ADE2003 prescribes two methods for demonstrating this:

Method A: Cover a specified area with an absorber of an appropriate class that has been rated according to BS EN ISO 11654:1997.²

Method B: Determine the minimum amount of absorptive material using a calculation procedure in octave bands. Method B is indented only for use in corridors, hallways and entrance halls as it is not well suited to stairwells.

¹ Note: This does not include for amplified music

² BS EN ISO 11654:1997 "Acoustics: Sound absorbers for use in buildings. Rating of sound absorption"

5. Audit

5.1. Building Construction

The general construction of the building was noted. The relevant building constructions have been summarised in Table 3.

Element	Description
Floors	26mm Oak/Hardwood Plank, 9' joists, lathe and plaster ceilings
External walls	Standard lined plaster & brick

Table 3 – General building construction witnessed during survey visit

5.2. Test Areas

The following room pairs were included in the sound insulation audit survey.

	Source room		Receive room	Test type
FA01	2 nd Floor Lounge	–	3 rd Floor Lounge	Airborne
FA02	1 st Floor Lounge	–	2 nd Floor Lounge	Airborne
FA03	Ground Floor Bar	–	1 st Floor Lounge	Airborne
FI01	3 rd Floor Lounge	–	2 nd Floor Lounge	Impact
FI02	2 nd Floor Lounge	–	1 st Floor Lounge	Impact

Table 4 – Test areas included in the sound insulation audit survey

5.3. Airborne Sound Insulation Test Method

The airborne sound insulation measurements were taken using the prescribed procedure in BS EN ISO 140-4: 1998³. The measurements were taken with a steady source generating sound pressure levels in the 16 third-octave bands between 100Hz–3150Hz. The fixed position microphone method was used to obtain the spatial average in the source and receive room.

A correction for the receiver room affect is made by measuring the reverberation time in each third octave band across the frequency range following the procedures in BS EN ISO354:2003.⁴ T = average reverberation time in the receive room. The standardised level difference D_{nT} is given in decibels using the equation:

$$D_{nT} = D + 10 \log \left(\frac{T}{T_0} \right)$$

Where:

T_0 = reference reverberation time 0.5 seconds

D = the level difference; $L_1 - L_2$

L_1 = average sound pressure level in the Source Room

L_2 = average sound pressure level in the Receive Room

The single figure descriptor of sound insulation D_{nTw} (Weighted Standardized Level Difference) and the Spectrum Adaptation Term C_{tr} measured in decibels (dB) are calculated in the procedure given in BS EN ISO 717-1: 1997 using the relevant reference curves. Unfavourable deviations (D_{nT}) from the reference curve are mentioned if they exceed 8.0dB.

³ BS EN ISO 717-1:1997 "Acoustics - Rating of sound insulation in buildings and of building elements. Airborne sound insulation"

⁴ BS EN ISO 354:2003 "Acoustics - Measurement of sound absorption in a reverberation room"

5.4. Impact Sound Insulation Test Method

The impact sound insulation measurements were made using a calibrated tapping source and the prescribed procedure in BS EN ISO 140-7: 1998.⁵ The fixed position microphone method was used to obtain a spatial average in the 16 third-octave bands between 100Hz and 3.15 kHz in the receive room.

A correction for the receive room effect was made by measuring the reverberation time in each third octave band across the frequency range following the procedures in BS EN ISO354: 2003. The standardised impact sound level, L'_{nT} , has been calculated in decibels using the equation:

$$L'_{nT} = L_i - 10 \log \left(\frac{T}{T_0} \right) \text{ dB}$$

Where: T_0 = reference reverberation time 0.5 seconds

T = reverberation time in receive room

T = average reverberation time in the receive room.

L_i = average impact sound pressure level in the receive room

The single figure descriptor of impact sound insulation L'_{nTw} (weighted standardized impact sound pressure level) measured in dB (decibels) has been calculated using the procedure given in BS EN ISO 717-2: 1997 using the relevant reference curves. Unfavourable deviations (L'_{nT}) from the reference curve have been stated if they exceed 8.0dB.

5.5. Test Results

The results of the sound insulation survey have been summarised in Table 5.

	Source room		Receive room	Result
FA01	2 nd Floor Lounge	–	3 rd Floor Lounge	36 dB $D_{nT,w} + C_{tr}$
FA02	1 st Floor Lounge		2 nd Floor Lounge	41 dB $D_{nT,w} + C_{tr}$
FA03	Ground Floor Bar		1 st Floor Lounge	38 dB $D_{nT,w} + C_{tr}$
FI01	3 rd Floor Lounge	–	2 nd Floor Lounge	70 dB $L'_{nT,w}$
FI02	2 nd Floor Lounge		1 st Floor Lounge	64 dB $L'_{nT,w}$

Table 5 – Summary of the airborne and impact sound insulation test results

All of the floor airborne and impact tests fail to meet the minimum performance standards from ADE2003, except the impact sound insulation test for 2nd floor lounge to first floor lounge (FI02).

⁵ BS EN ISO 717-2:1997 "Acoustics. Rating of sound insulation in buildings and of building elements. Impact sound insulation"

6. Separating Elements

6.1. Separating Walls

i. Lightweight Framed Walls

It is recommended that the design for new separating walls be based on Wall Type 4 from ADE2003.⁶ The resistance to the airborne sound depends on the mass per unit area of the leaves, the isolation of the frames, and the absorption in the cavity between the frames. The construction consists of timber or metal frames, with plasterboard linings on the room surfaces with absorbent material between the frames. A detail illustrating the preferred wall construction has been given in Figure 2.

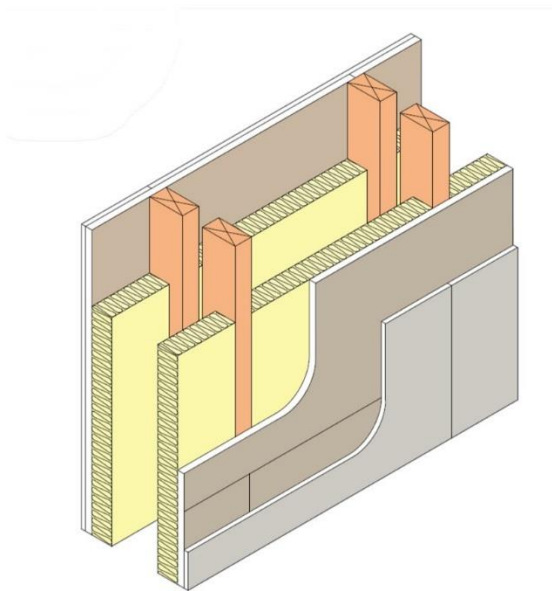


Figure 2 – Recommended new separating wall construction.

With reference to Figure 2, the separating wall should consist of:

- minimum distance between inside lining faces of 200mm;
- plywood sheathing may be used in the cavity as necessary for structural reasons;
- each lining to be two or more layers of plasterboard, each sheet of minimum mass per unit area 10kg/m^2 , with staggered joints;
- absorbent material to be unfaced mineral wool batts or quilt (which may be wire reinforced), minimum density 10kg/m^3 ;
- minimum thickness of absorbent material:
 - 25mm if suspended in the cavity between frames;
 - 50mm if fixed to one frame;
 - 25mm per batt if one is fixed to each frame.

Junctions between lightweight walls and the timber floors should be sealed with acoustic (non-hardening) mastic and the floor void beneath the wall should be filled with full height timber blocking.⁷ The floor deck should not be continuous from one side of the separating wall to other.

Suggested Materials List:

2x layers of 12.5mm Gyproc SoundBloc both sides

Timber studs to structural requirements

50mm Isover APR 1200



⁶ Approved Document E 2003 (2015 Amendments) "Resistance to the passage of sound", paragraphs 2.147

⁷ Approved Document E 2003 (2015 Amendments), Paragraph 2.156

ii. Separating wall between bar and stairwell

There is a separating wall between the ground floor bar and the stairwell leading to the first floor apartment. In this case, the stairwell is considered part of the upstairs dwelling and so it is recommended that the separating wall highlighted in Figure 3 below should achieve 57dB D_{nTw} criteria from BS8233:2014 as stated in Section 4.2 of this report.

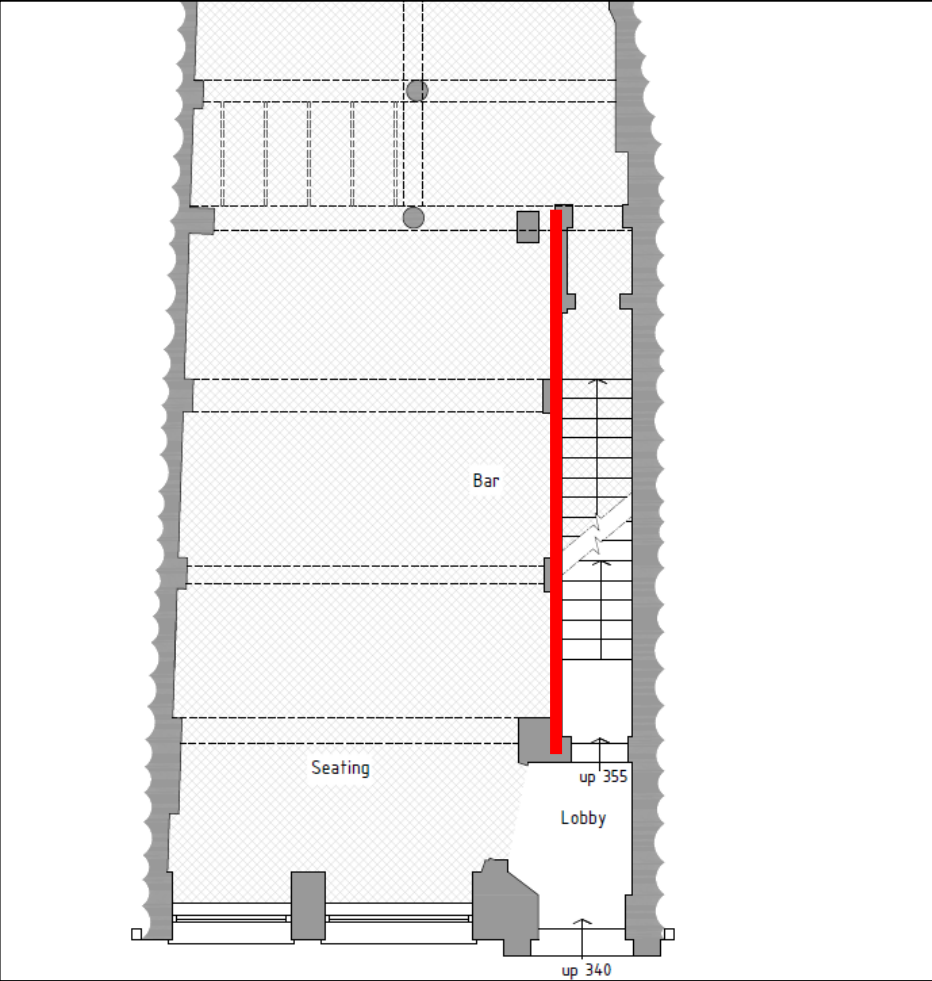


Figure 3 - Separating wall between domestic and non-domestic spaces

It is understood from conversations with the client that the proposed construction of this wall is to be plastered 9 inch brickwork. A model has been created in INSUL to predict the performance of this construction.

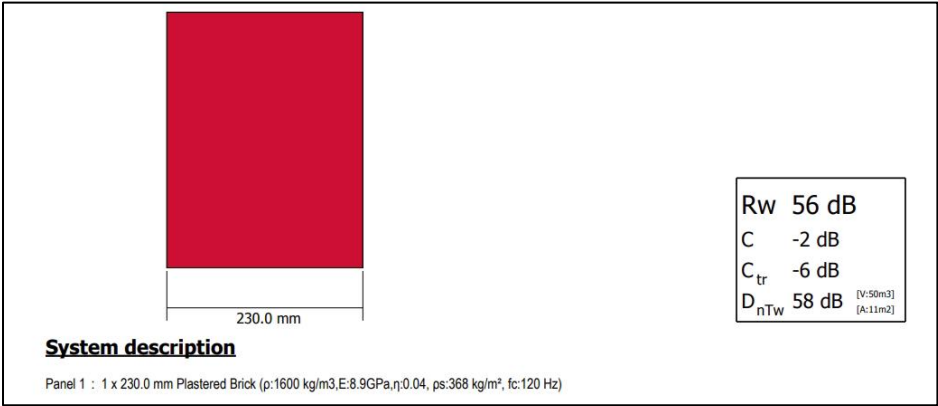


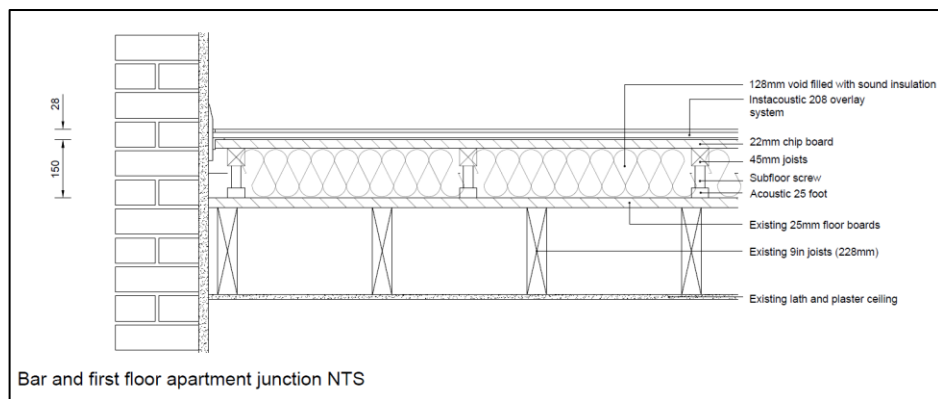
Figure 4 - INSUL prediction of sound insulation of proposed separating wall construction

The predictions indicate that the wall construction is likely to meet the recommended 57dB D_{nTw} performance.

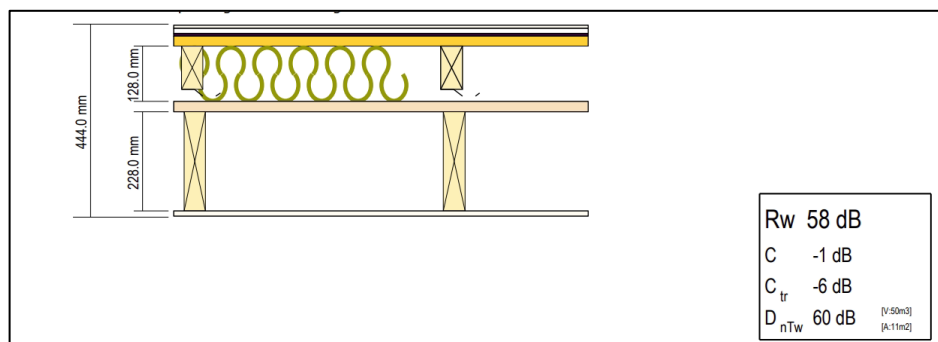
6.2. Separating Floor

Floor Treatment – Non Domestic to Domestic

The client has provided details of the proposed floor construction between the ground floor bar and the first floor residential properties. It is understood that treatment is limited due to the building being listed i.e. treatment can only be carried out above the bar. The floor construction details are given below:



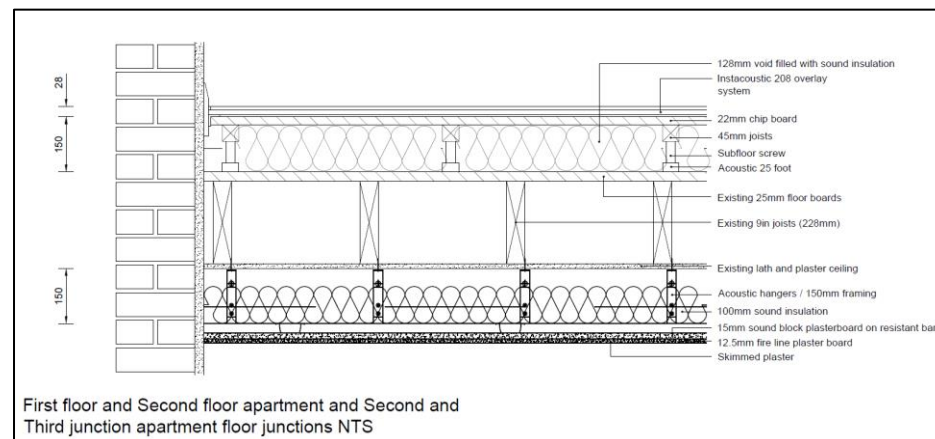
An INSUL model has been created of the proposed floor construction. Due to the limitations of the software, the nearest equivalent to the materials used have been selected.



The predictions indicate that the proposed floor construction will achieve the recommended 57dB D_{nTw} sound insulation performance.

Floor Treatment – Domestic to Domestic

The client has also provided details for the proposed floor construction used between domestic dwellings above first floor. The floor construction details are given below:



In this case, the limitations of the INSUL modelling software prevent a model with three cavities. However, given the predicted performance of the floor construction without the additional suspended ceiling, it is expected that the above floor construction will have an increased performance over what has been predicted for the ground-first floor construction and so the above floor construction is expected to have a high likelihood of achieving the sound insulation requirements between domestic properties given in Approved Document E.

7. Flanking Transmission

Sound can travel not only through the partition that separates two rooms but also via other elements in the building. When sound travels through these other building elements it is referred to as flanking transmission. Figure 5 illustrates how flanking sound can detract from the level of sound insulation between spaces.

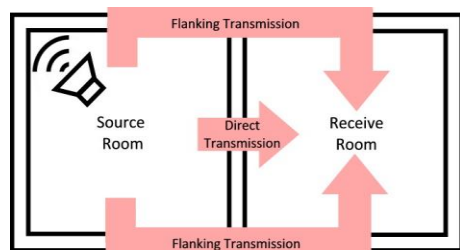


Figure 5 - Illustrating the difference between sound transmitted directly through a common area and flanking transmission

Flanking transmission allows sound to enter the adjacent room even if the separating surface itself is heavily engineered.

7.1. Structural Masonry Walls

Where structural masonry wall elements have a mass per unit area less than 375kg/m^2 and are common either side of a separating element, the room facing wall should be lined with an independent plasterboard panel based on the construction from ADE2003.⁸ This is designed to a) prevent noise entering the wall from the source room and being transmitted up the supporting element and b) prevent any noise in the wall element being emitted into the receiver room thereby bypassing the separating floor.⁹

In this situation, we would assume 1840kg/m^3 density for the external brick wall, which would be expected to satisfy this requirement once rendered and plastered. This would need to be verified by a qualified surveyor.

7.2. Junction Between Separating Wall and Separating Floor

Junction between lightweight walls and the timber floors should be sealed with acoustic (non-hardening) mastic and the floor void beneath wall should be filled with full height timber blocking.¹⁰ It is important that the floating floor treatment be isolated from the perimeter of the room in order to be effective. Proprietary systems will come with perimeter strips to achieve this.

A recommended junction arrangement has been illustrated in Figure 6.

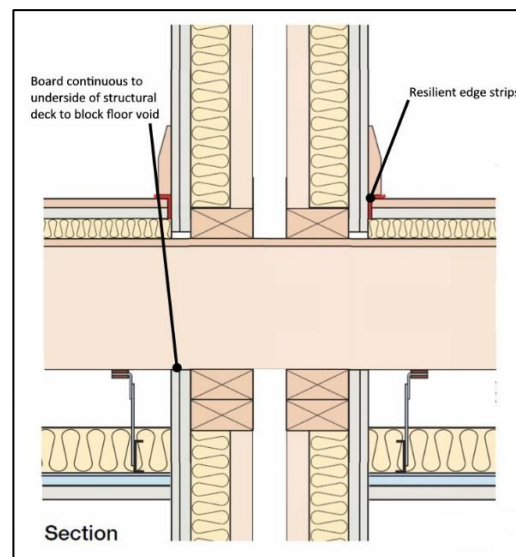


Figure 6 – Section detail illustrating how the separating floor should be junctioned with the separating walls

⁸ Approved Document E 2003 (2015 Amendments), Paragraph 4.43-4.44

⁹ Approved Document E 2003 (2015 Amendments), Paragraph 4.43-4.44

¹⁰ Approved Document E 2003 (2015 Amendments), Paragraph 2.156

7.3. Service Penetrations

It is expected that service penetrations will be required throughout the building. Horizontal penetrations should be restricted to above the ceiling line, where penetrations should be sealed with acoustic (non-hardening) sealant. Vertical surface penetrations should be enclosed.

Pipes and ducts that penetrate a floor separating two habitable rooms in different flats should be enclosed to their full height in each flat. The enclosure should be constructed of a material having a mass per unit area of at least 15kg/m^2 . Either line the enclosure, or wrap the duct/pipe within the enclosure, with 25mm of unfaced mineral wool.¹¹

7.4. Doors to Common Areas

Whilst designing corridor walls to a high standard is required, it is likely that the sound insulation will be reduced by the presence of the door.¹² In order to mitigate this, any door to the stairwell should have good perimeter sealing (including the threshold where practicable) and a minimum mass per unit area of 25kg/m^2 or a minimum sound reduction index of $29\text{dB } R_w$ (measured according to BS EN ISO 140-3:1995 and rated according to BS EN ISO 717-1:1997)¹³.

8. Internal Elements

8.1. Lightweight Internal Walls

The following construction is recommended where the client wishes to build lightweight internal walls.¹⁴

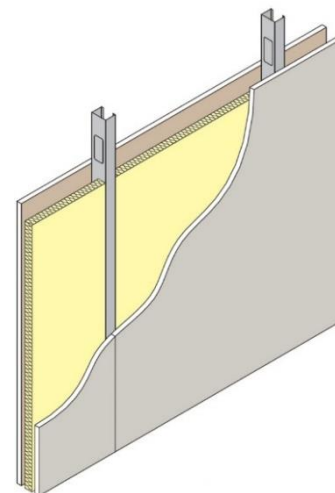


Figure 7 - Recommended internal wall constructions

With reference to Figure 7, Internal wall type B is recommended, which consists of timber or metal frames with plasterboard linings on each side of frame and absorbent material.

On each side of the partition should be a single layer of plasterboard of minimum mass per unit area 10kg/m^2 . The linings should be fixed to a timber frame with a minimum distance between linings of 75mm, or metal frame with a minimum distance between linings of 45mm. An absorbent layer of unfaced mineral wool batts or quilt (minimum thickness 25mm, minimum density 10kg/m^3) should be suspended in the cavity. Where there is a door in the partition, the mineral wool may be omitted.

¹¹ Approved Document E 2003 (2015 Amendments), Paragraph 4.45 – 4.50

¹² Approved Document E 2003 (2015 Amendments), Paragraph 1.8

¹³ Approved Document E 2003 (2015 Amendments), Paragraph 2.26

¹⁴ Approved Document E 2003 (2015 Amendments), Paragraph 5.18

9. Reverberation Time Requirements

The reverberation in common areas, such as the stairwell, should be controlled. This will help reduce the noise at source in the stairwell, reducing the likelihood that it will cause disturbance to the proposed flats.

9.1. Method A

For entrance halls, corridors and hallways, an area equal to the floor area should be fitted with a class C absorber or better.

For stairwells, the combined area of the stair treads, the upper surface of the intermediate landings, the upper surface of the landings (excluding ground floor) and the ceiling area on the top floor should be calculated. An area equal to at least 50% of this calculated area should be fitted with a Class C absorber or better or 100% with a Class D absorber.¹⁵

The absorptive material should be equally distributed between all floor levels. It will normally be convenient to cover the underside of intermediate landings, the underside of the other landings, and the ceiling area on the top floor.

10. Testing Requirements

One set of tests is conducted for every ten properties in a group or sub-group. A group is defined by the type of property and a sub-group is defined by the construction methods that have been used. Normally, one set of tests in a group of flats should comprise six individual sound insulation tests (two airborne wall tests, two airborne floor tests and two floor impact tests). The number of required tests is summarised in Figure 4.

Diagram 0.1 Requirement E1

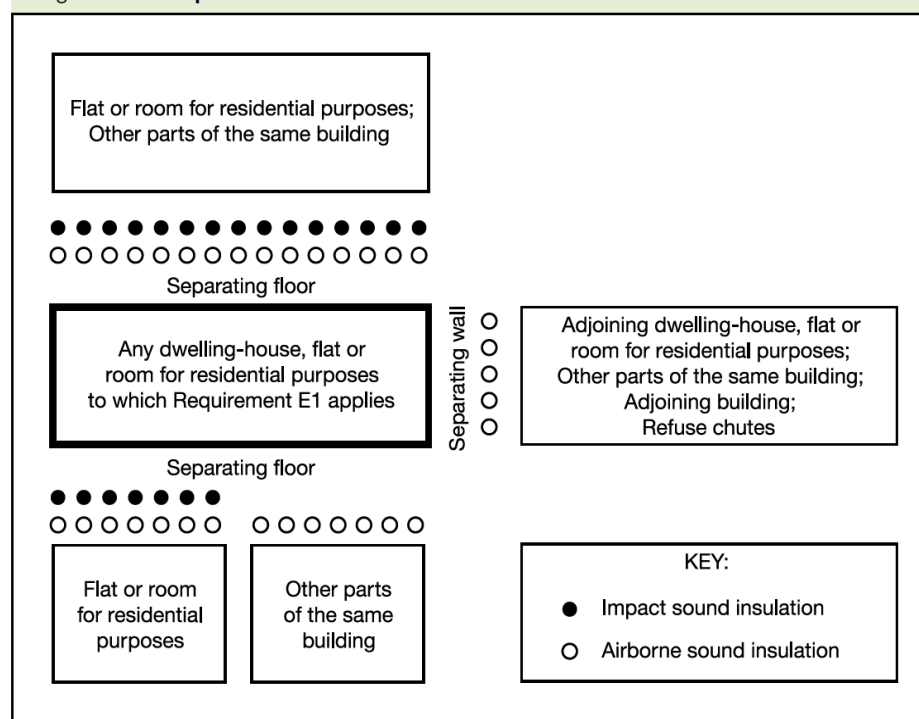


Figure 4 – Diagram 0.1 from ADE2003 illustrating where sound insulation testing should be carried out in a residential development.

¹⁵ Approved Document E 2003 (2015 Amendments), Paragraph 7.10

In this situation there will be three flats formed by a material change of use; therefore, a two sets of sound insulation tests would be required. This would be a total of two airborne wall tests, two airborne floor tests and two impact floor tests, as well as two airborne sound insulation tests between the ground floor bar area and the flat above.

It recommended that testing be carried out at the earliest available opportunity, which would be possible once the doors and windows have been fitted and the boarding-out has been completed.

11. Conclusions

noise.co.uk Ltd has been commissioned by HDS Architectural Services to comment on the likely compliance of a proposed development at 33 High Street, Wrexham, LL13 8LD with the requirements from ADE2003.

The proposed floor constructions provided by the client have been assessed and are predicted to achieve the required sound insulation in line with Approved Document E and BS8233:2014.

It should be noted that masonry flanking elements with a mass per unit area of less than 375kg/m^2 would need to be lined with independent plasterboard panels to prevent critical flanking transmission.

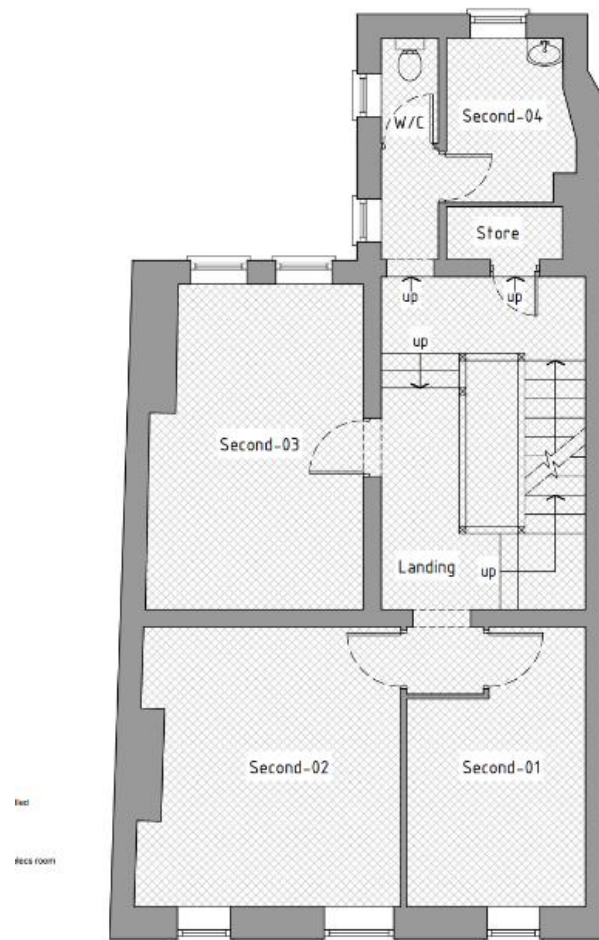
Care should be taken to observe the additional flanking details that have been provided.

APPENDIX

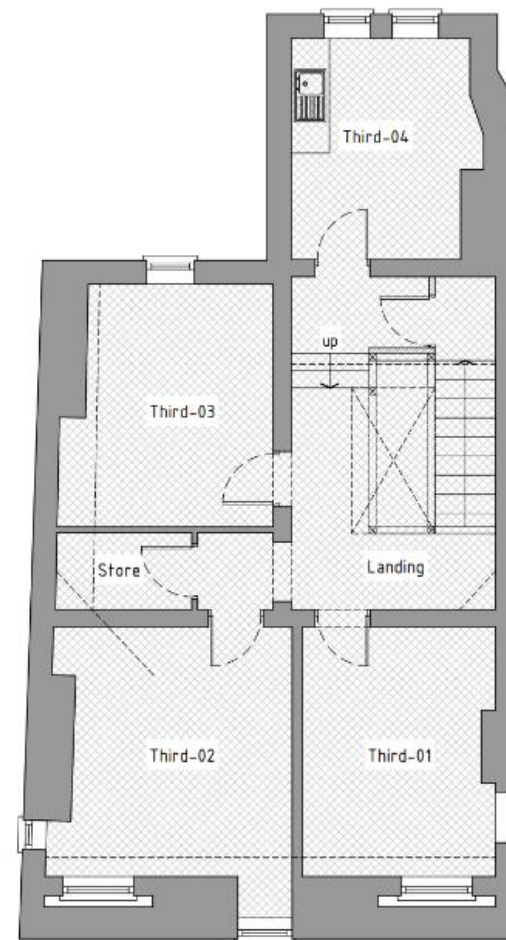
Client Drawings



Ground floor plan 1:50



Second floor plan 1:50



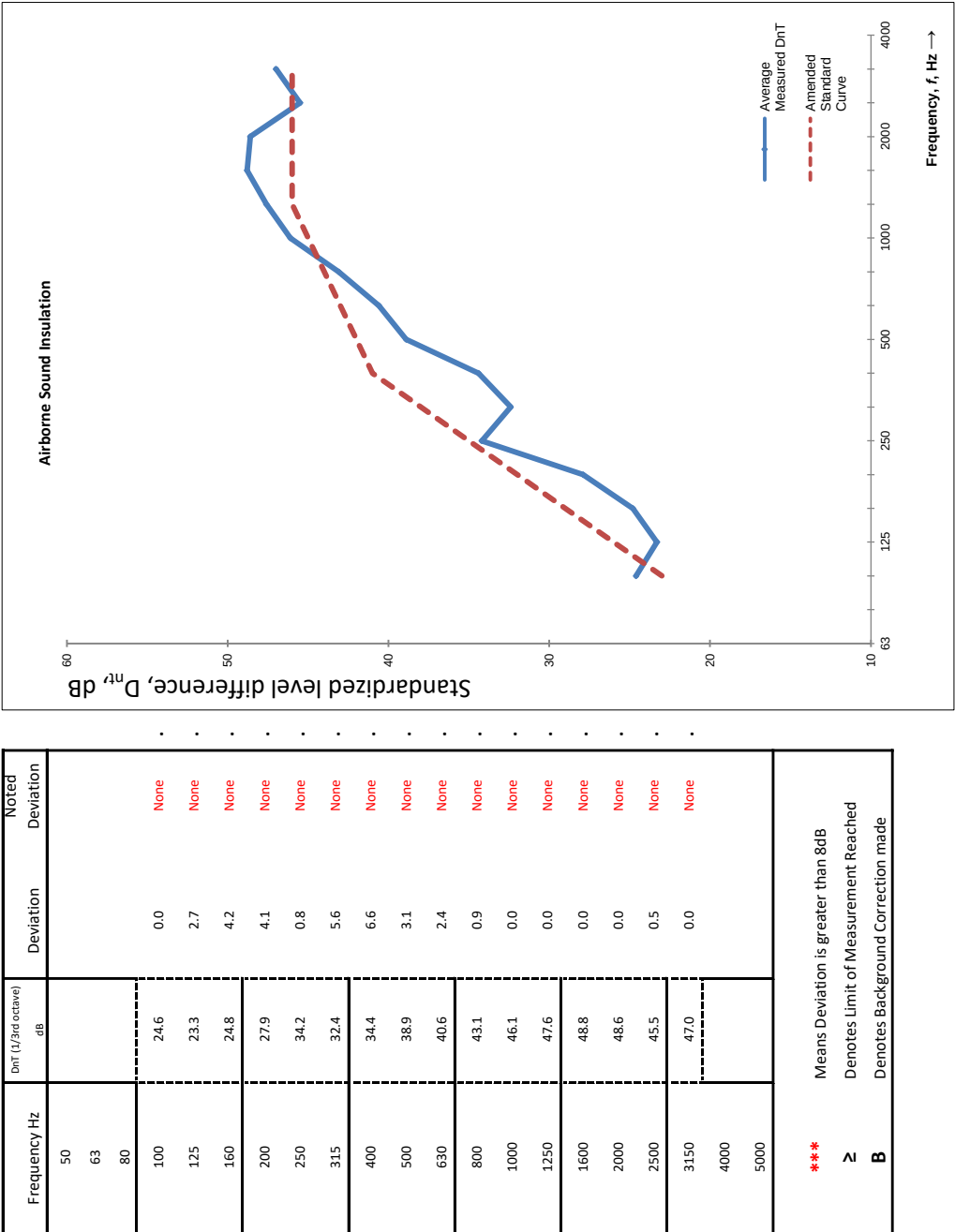
Third floor plan 1:50

Standardized level difference according to ISO 140-4:
Field measurements of airborne sound insulation between rooms

Client: HDS Architectural Services
Site Address: 33 High Street, Wrexham, LL13 8LD
Date of Test: 01/11/2023

Description and identification of the building construction and test arrangement, direction of measurement:
Construction: Construction details were not provided by client
CID:

Source Room Volume: 50m³
Source Room: 2F Lounge
Receive Room Volume: 40m³
Receive Room: 3F Lounge



Sound Insulation Results: EN ISO 717-1
 $D_{nT,w}(C_{tr}) = 42 \text{ (-2; -6) dB}$
 $D_{nT,w} + C_{tr} = 36 \text{ dB}$
 $C_{(100-3150)} = -2 \text{ dB}$
 $C_{tr(100-3150)} = -6 \text{ dB}$
Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No: 22704-1-FA01
Sound Level Meter Serial No: 1405560
Amplifier Serial No: 0
Loudspeaker Serial No: 0
Name of test institute: noise.co.uk Ltd
Address: The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Person in Charge of Test: Dan Willett
UKAS No: 2694
Date of Certificate: 01/11/2023
Signature:

Standardized level difference according to ISO 140-4:
Field measurements of airborne sound insulation between rooms

Client: HDS Architectural Services
Site Address: 33 High Street, Wrexham, LL13 8LD

Date of Test: 01/11/2023

Description and identification of the building construction and test arrangement, direction of measurement:

Construction: Construction details were not provided by client

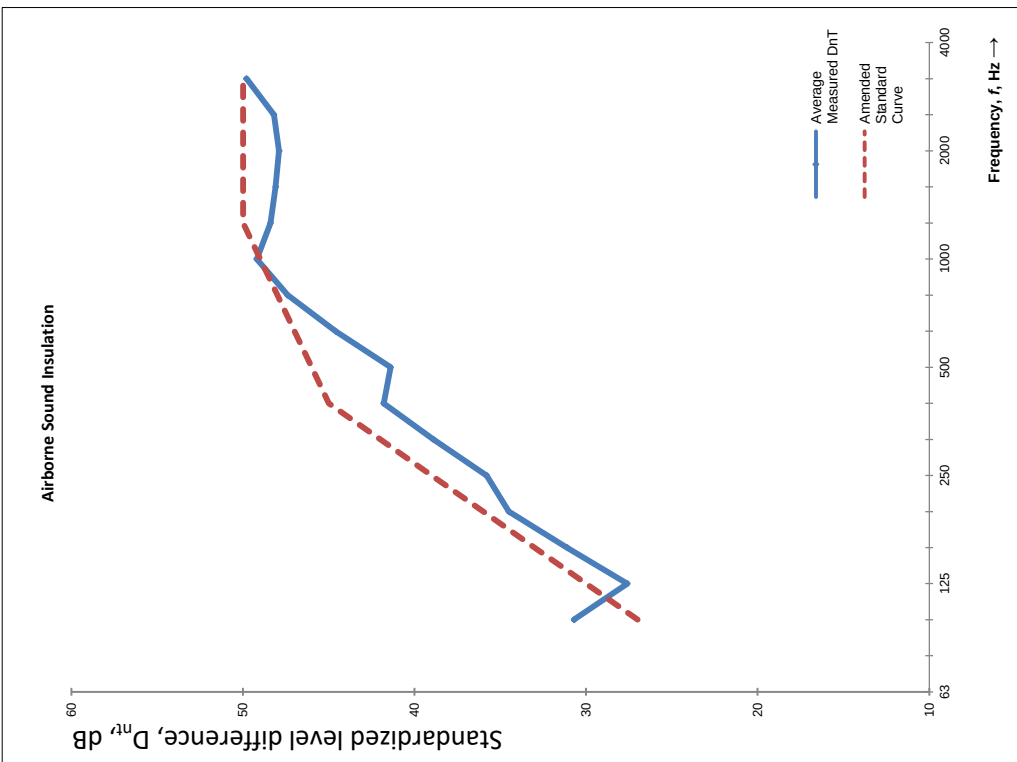
CID:



Source Room Volume: 69m³
Source Room: 1F Lounge
Receive Room Volume: 50m³
Receive Room: 2F Lounge

Frequency Hz	DnT (1/3rd octave) dB	Deviation	Noted Deviation
50			
63			
80			
100	30.7	0.0	None
125	27.6	2.4	None
160	31.1	1.9	None
200	34.5	1.5	None
250	35.8	3.2	None
315	38.9	3.1	None
400	41.8	3.2	None
500	41.4	4.6	None
630	44.6	2.4	None
800	47.4	0.6	None
1000	49.2	0.0	None
1250	48.4	1.6	None
1600	48.1	1.9	None
2000	47.9	2.1	None
2500	48.2	1.8	None
3150	49.8	0.2	None
4000			
5000			

*** Means Deviation is greater than 8dB
≥ Denotes Limit of Measurement Reached
B Denotes Background Correction made



Sound Insulation Results: EN ISO 717-1

$D_{nT,w}(C_{tr}) = 46 \text{ (-2; -5) dB}$
 $D_{nT,w} + C_{tr} = 41 \text{ dB}$

$C_{(100-3150)} = -2 \text{ dB}$
 $C_{tr(100-3150)} = -5 \text{ dB}$

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No:	22704-1-FA02	Name of test institute:	noise.co.uk Ltd
Sound Level Meter Serial No:	1405560	Address:	The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Amplifier Serial No:	0	Person in Charge of Test:	Dan Willett
Loudspeaker Serial No:	0	UKAS No:	2694
Date of Certificate:	01/11/2023	Signature:	

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Standardized level difference according to ISO 140-4:
Field measurements of airborne sound insulation between rooms

Client: HDS Architectural Services
Site Address: 33 High Street, Wrexham, LL13 8LD
Date of Test: 01/11/2023

Description and identification of the building construction and test arrangement, direction of measurement:
Construction: Construction details were not provided by client
CID:

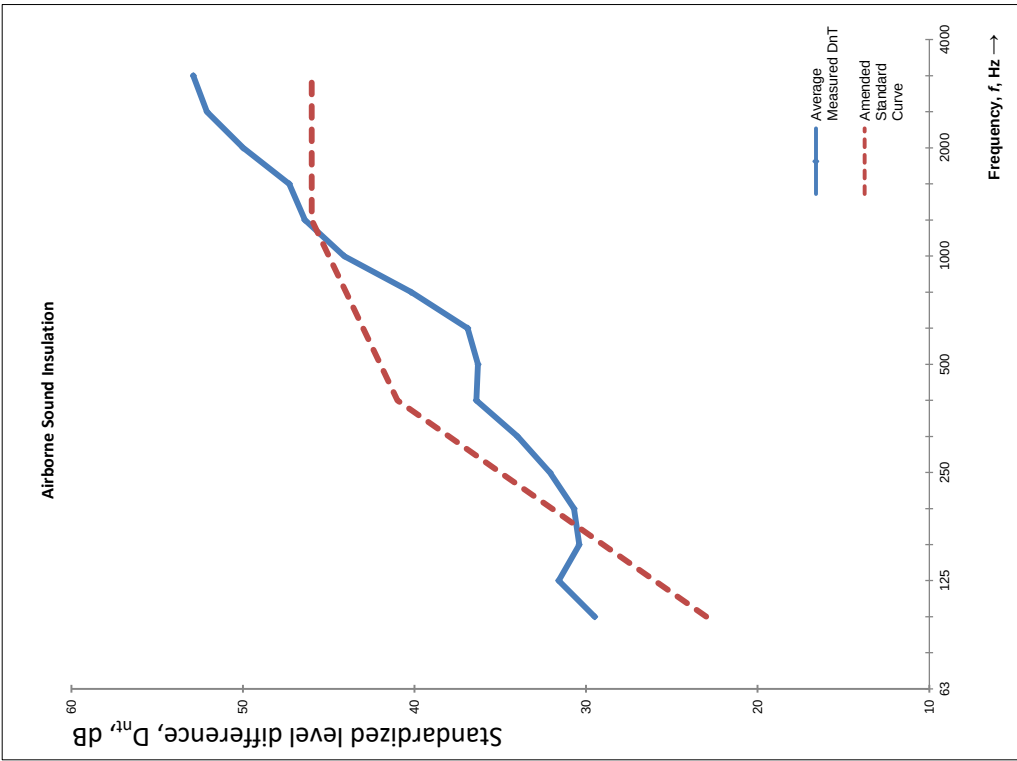
Source Room Volume: 436m³
Receive Room Volume: 69m³

Source Room: GF Bar
Receive Room: 1F Lounge



Frequency Hz	DnT (1/3rd octave) dB	Deviation	Noted Deviation
50			
63			
80			
100	29.5	0.0	None
125	31.6	0.0	None
160	30.4	0.0	None
200	30.7	1.3	None
250	32.1	2.9	None
315	34.0	4.0	None
400	36.4	4.6	None
500	36.3	5.7	None
630	36.9	6.1	None
800	40.2	3.8	None
1000	44.1	0.9	None
1250	46.4	0.0	None
1600	47.3	0.0	None
2000	50.0	0.0	None
2500	52.1	0.0	None
3150	52.9	0.0	None
4000			
5000			

*** Means Deviation is greater than 8dB
≥ Denotes Limit of Measurement Reached
B Denotes Background Correction made



Sound Insulation Results: EN ISO 717-1

$$D_{nT,w}(C_{tr}) = 42 \text{ (-1; -4) dB}$$
$$D_{nT,w} + C_{tr} = 38 \text{ dB}$$

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No: 22704-1-FA03
Sound Level Meter Serial No: 1405560
Amplifier Serial No: 0
Loudspeaker Serial No: 0
Name of test institute: noise.co.uk Ltd
Address: The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Person in Charge of Test: Dan Willett
UKAS No: 2694
Signature: [Redacted]

Standardized impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Client: HDS Architectural Services
Site Address: 33 High Street , Wrexham, LL13 8LD

Date of Test: 01/11/2023

Description and identification of the building construction and test arrangement, direction of measurement:

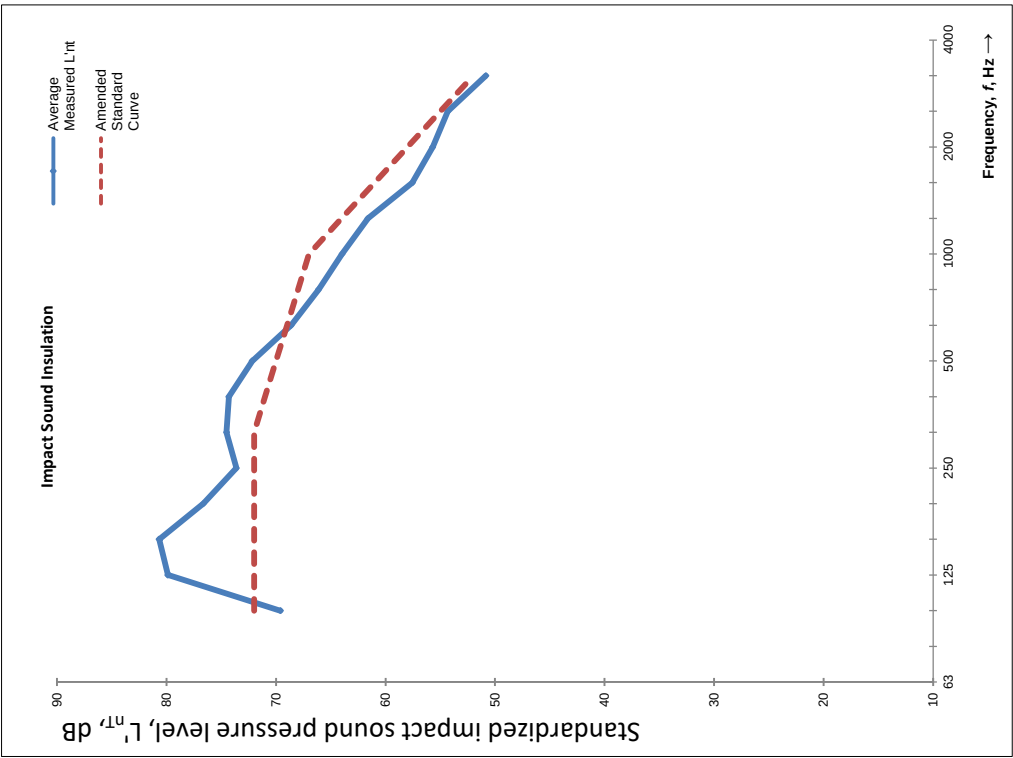
Construction: Construction details were not provided by client
CID:

Source Room Volume: 40m³
Receive Room Volume: 50m³

Source Room: 3F Lounge
Receive Room: 2F Lounge



Frequency Hz	L _{NT,w} (3rd octave) dB	Deviation	Noted Deviation
50			
63			
80			
100	69.6	0.0	None
125	79.9	7.9	None
160	80.7	8.7	***
200	76.6	4.6	None
250	73.6	1.6	None
315	74.5	2.5	None
400	74.3	3.3	None
500	72.2	2.2	None
630	68.6	0.0	None
800	66.1	0.0	None
1000	64.0	0.0	None
1250	61.6	0.0	None
1600	57.6	0.0	None
2000	55.7	0.0	None
2500	54.3	0.0	None
3150	50.8	0.0	None
4000			
5000			
***	Means Deviation is greater than 8dB		
≥	Denotes Limit of Measurement Reached		
B	Denotes Background Correction made		



Sound Insulation Results: EN ISO 717-2

$L_{nt,w} = 70dB$

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No: 22704-1-F101
Sound Level Meter Serial No: 1405560
Tapping Machine Serial No: 14130
Date of Certificate: 01/11/2023

Name of test institute: noise.co.uk Ltd
Address: The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Person in Charge of Test: Dan Willett
UKAS No: 2694
Signature: [Redacted]

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Standardized impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Client: HDS Architectural Services
Site Address: 33 High Street , Wrexham, LL13 8LD

Date of Test: 01/11/2023

Description and identification of the building construction and test arrangement, direction of measurement:

Construction: Construction details were not provided by client
CID:

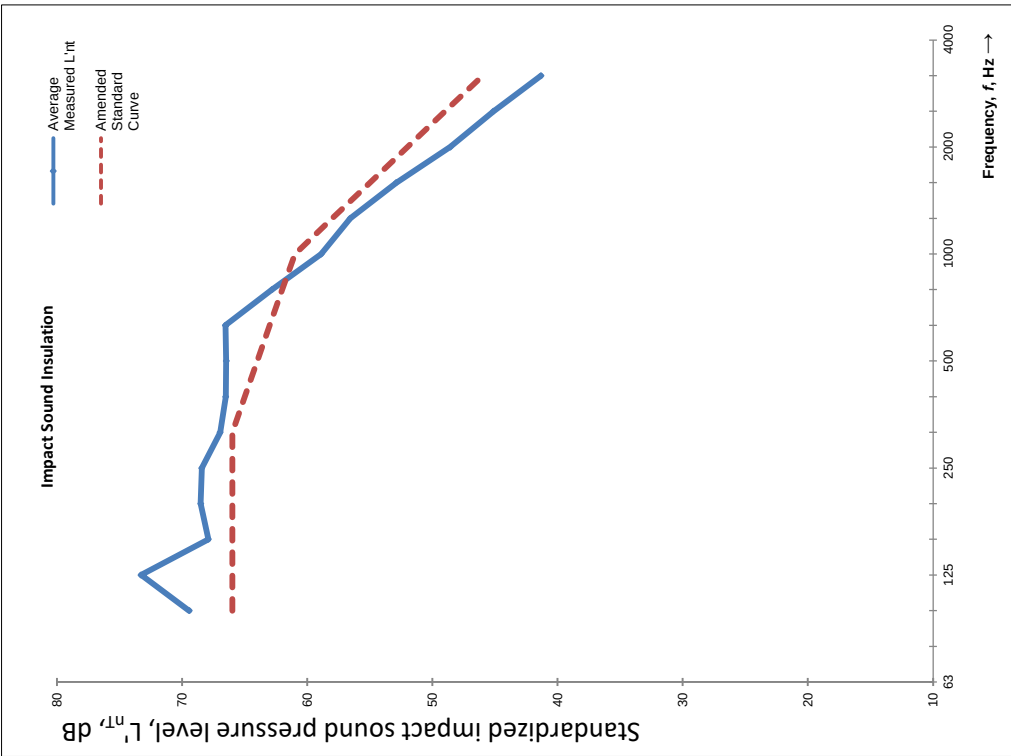
Source Room Volume: 50m³
Receive Room Volume: 69m³

Source Room: 2F Lounge
Receive Room: 1F Lounge



Frequency Hz	L _{NT,w} (1/3rd octave) dB	Deviation	Noted Deviation
50			
63			
80			
100	69.4	3.4	None
125	73.3	7.3	None
160	67.9	1.9	None
200	68.5	2.5	None
250	68.4	2.4	None
315	67.0	1.0	None
400	66.5	1.5	None
500	66.5	2.5	None
630	66.5	3.5	None
800	62.8	0.8	None
1000	58.9	0.0	None
1250	56.6	0.0	None
1600	52.9	0.0	None
2000	48.6	0.0	None
2500	45.1	0.0	None
3150	41.3	0.0	None
4000			
5000			

*** Means Deviation is greater than 8dB
≥ Denotes Limit of Measurement Reached
B Denotes Background Correction made



Sound Insulation Results: EN ISO 717-2

L_{NT,w} = 64dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No: 22704-1-F102
Sound Level Meter Serial No: 1405560
Tapping Machine Serial No: 14130
Date of Certificate: 01/11/2023

Name of test institute: noise.co.uk Ltd
Address: The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Person in Charge of Test: Dan Willett
UKAS No: 2694
Signature: [Redacted]

QF18-1.2 I25