



PEAK acoustics

Noise Assessment Report

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Sound Insulation Assessment

Report Reference Number: KD2804208NR

Client: Al Majid Welfare Trust

Site: 581 Basingstoke Road, Reading, RG2 0SJ

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Contents

Assessment Summary	4
1. Proposal	5
2. Criteria	5
3. Assessment Standards & Justification	5
4. Site Description	6
5. Assumed Internal Noise Levels	6
6. Existing Construction	6
7. Internal Sound Transmission	7
8. Further Recommendations	8
9. Conclusion	9
APPENDIX A – Calculations	10
APPENDIX B – Sound Insulation Models	12

Assessment Summary

A sound insulation assessment has been conducted for a D1 (Non-residential institution) at 581 Basingstoke Road, Reading, RG2 0SJ. The proposed D1 use is for religious activities with expected maximum attendance of 15 people. The assessment relates to internal sound transmission from the space into the residential apartment above, and the adjoining ground floor commercial unit. Internal noise levels within these adjoining units are to be within the desirable limits of BS8233:2014.

Assumed worst-case noise levels for the use were determined considering group speech as the likely primary noise source.

Sound insulation performance of the existing separating partitions was predicted using sound insulation modelling software, *Insul (Marshall Day Acoustics)*, based on construction details supplied by the applicant.

Calculations of internal sound transmission indicated that noise levels within first floor habitable rooms will exceed the desirable limits of BS8233:2014. Levels within the adjoining ground floor commercial space are predicted to be compliant with the criteria.

Enhancements to the floor system have been recommended that serve to reduce internal sound transmission to within desirable limits in first-floor bedrooms.

Further recommendations have been given to ensure external noise related to the proposal is controlled and potential adverse noise impacts minimised.

1. Proposal

- 1.1 A change of use from Class A1 (Retail) to D1 (Non-residential institution) is proposed for a ground floor space at 581 Basingstoke Road, Reading, RG2 0SJ.
- 1.2 The site is to be used for religious activities for groups up to 15 people maximum, this is typically for prayers in which one person leads the prayer through spoken voice. The timing and durations of activities is understood to vary throughout the year but will generally take place between 06:00 – 22:00.
- 1.3 No amplified music or speech is to be played any time and no external plant equipment is to be installed as part of the proposal.
- 1.4 Residential and commercial units that are directly adjacent and above are to be considered noise sensitive for the assessment.

2. Criteria

- 2.1 The Local Authority has stipulated that internal noise levels within the adjoining noise sensitive properties are to be maintained to criteria given in BS8233:2014. These specific criteria are given below.
 - 2.1.1 *Internal sound transmission into the adjoining ground floor commercial unit will not exceed the design range guidance of BS8233:2014 (40 dB L_{Aeq}).*
 - 2.1.2 *Internal sound transmission into first-floor bedrooms directly above will not exceed the desirable night-time limits of BS8233:2014 (30 dB L_{Aeq}).*

3. Assessment Standards & Justification

- 3.1 **'BS8233:2014 – Guidance on sound insulation and noise reduction for buildings'** is a recognised standard that indicates suitable internal noise levels for various activities within residential and commercial buildings.

4. Site Description

- 4.1 581 Basingstoke Road is a semi-detached property in a mixed area in Reading. Directly adjoining site is a commercial (Class A3) unit with residential units above. A busy roundabout is situated directly out the front of site with numerous commercial premises in the surrounding area.
- 4.2 Plans supplied by the applicant show the arrangement of the proposal with a main meeting space, office, kitchen and storeroom. It is understood that much of the activities will take place within the meeting room and will therefore be the focus of the assessment.

5. Assumed Internal Noise Levels

- 5.1 During activities within the proposal, the primary noise source is likely to be spoken voice from the attendees or prayer leader. Library data for spoken voice has been used to calculate a worst-case internal noise level for multiple attendees speaking simultaneously within the meeting room. The resultant noise levels are tabulated below:

Table 1: Worst-Case Internal Noise Levels

Source	63	125	250	500	1k	2k	4k	dBA
Meeting Room (Group Speech)	33	49	62	72	71	67	61	75

- 5.2 It is important to note that the noise levels given in table 1 are considered worst-case for nature of the activities et to take place within the proposal, noise levels for the majority of the time are likely to be lower.

6. Existing Construction

- 6.1 Details on the existing constructions for the separating party floor and wall have been supplied by the applicant. The existing constructions have been modelled in sound insulation modelling software, *Insul (Marshall Day Acoustics)*, to predict their sound insulation performance. A summary of the proposed constructions is given below:

Existing Separating Floor

- 20mm Timber Floorboards
- 200mm Timber Joists at 350mm Centre Spacing
- Approx. 30mm Lath and Plaster Ceiling

Existing Separating Wall

- 102mm Brick

6.2 The predicted sound insulation performance for each partition is given below.

Table 2: Existing Sound Insulation

Separating Partition	Sound Reduction Index (SRI)							R _w dB	R _w +C _{tr} dB
	63	125	250	500	1k	2k	4k		
Existing Separating Floor	35	38	35	38	46	54	59	44	41
Existing Separating Wall	22	11	15	36	41	52	65	34	22

6.3 Detailed sound insulation models are given in **Appendix B**.

7. Internal Sound Transmission

7.1 Sound transmission from ground to first floor has been calculated using the assumed worst-case noise levels given in Table 1 and the predicted sound insulation performance given in Table 2. Surface areas and room dimensions have been approximated and assumed from current proposals. The resultant internal sound transmission is tabulated below.

Table 3: Internal Sound Transmission

Assessment Location	Source Room Noise level, dBA	Criteria, dB	Receiving Room Noise Level, dBA
Adjoining Commercial Unit	75	40	32
First-floor Bedroom	75	30	42

7.2 Table 3 demonstrates that internal noise levels within the first-floor bedroom are predicted to exceed the criteria given in paragraph 2.1.2. Enhancements to the floor system are required to reduce sound transmission. Recommended enhancements are discussed in paragraph 7.4.

7.3 Internal levels within the adjoining commercial unit are within the criteria stated in paragraph 2.1.1, no enhancements to the separating wall are deemed applicable.

7.4 The following enhancements to the separating floor system are recommended to reduce internal sound transmission. Additional components are shown in ***Bold Italics***:

Enhanced Separating Floor

- 20mm Timber Floorboards
- 200mm Timber Joists at 350mm Centre Spacing
 - ***100mm mineral wool Insulation between the joists (Min. Density = 10kg/m³)***
- ~~Approx. 30mm Lath and Plaster Ceiling~~ ***Remove***
- ***Resilient Bars installed perpendicular to the ceiling joists (installation must adhere to the manufacturer's instructions)***
- ***2x No. 15mm Gyproc Soundbloc (or equivalent acoustic plasterboard)***

Predicted sound insulation of the enhanced floor system is shown below.

Table 4: Sound Insulation – Enhanced Floor

Separating Partition	Sound Reduction Index (SRI)							R _w	R _w +C _{tr}
	63	125	250	500	1k	2k	4k	dB	dB
Enhanced Floor	23	36	43	48	53	56	65	52	47

- 7.5 Internal sound transmission has been recalculated considering the assumed worst-case noise levels given in Table 1 and the enhanced floor system given above in Table 4. The resultant internal sound transmission is tabulated below.

Table 5: Internal Sound Transmission – Enhanced Floor

Assessment Location	Source Room Noise level, dBA	Criteria, dB	Receiving Room Noise Level, dBA
First-floor Bedroom	75	30	23

- 7.6 Table 5 demonstrates that the recommended enhancements to the floor system serve to sufficiently reduce internal sound transmission; ensuring the criteria stated in paragraph 2.1.2 is met within first-floor bedrooms.
- 7.7 Full calculations are given in **Appendix A**.
- 7.8 Further recommendations are given in **Section 8**.

8. Further Recommendations

- 8.1 No amplified music or voice should be played at any time within the proposal.
- 8.2 The front window of the meeting room should be minimum **30 dB R_w**. A suitable glazing specification is '4/16/4mm' which should serve no control noise breakout via the front façade.
- 8.3 The main front door should achieve minimum **30 dB R_w**, including perimeter acoustic seals to ensure noise breakout is controlled.
- 8.4 Signage should be utilised outside the premises to encourage attendees to be mindful of nearby residents and keep noise levels down when congregating outside.

9. Conclusion

- 9.1 A sound insulation assessment has been conducted for a proposed D1 (Non-residential institution) change of use at 581 Basingstoke Road, Reading, RG2 0SJ. Concerns were raised over internal sound transmission into the adjoining commercial and residential units.
- 9.2 The proposal is to be used for religious activities such as prayer. Worst-case noise levels for such a use were determined considering a primary source of group speech.
- 9.3 Details of the separating partitions were provided by the applicant and were modelled in sound insulation modelling software, *Insul (Marshall Day Acoustics)*
- 9.4 Internal sound transmission has been calculated considering the existing sound insulation which indicated noise levels within first floor habitable rooms to be above the desirable limits of BS8233:2014. Desirable noise levels are predicted to be met within the adjoining ground floor commercial unit.
- 9.5 Recommended enhancements to the floor system have been provided which would serve to reduce internal sound transmission to within desirable limits, ensuring the criteria given in paragraphs 2.1.1 and 2.1.2 are met.
- 9.6 Further recommendations were given to ensure external noise arising from the proposal is sufficiently controlled.

APPENDIX A – Calculations

Existing Wall – Commercial Unit

Room to Room Sound Transmission Calculation									
Description:									
Calculation of sound trasmission from meeting room to neighbouring commercial unit									
1/1 Octave Centre-Freq. Band	Hz	63	125	250	500	1k	2k	4k	dBA
Source Noise Level, dB	dB	33	49	62	72	71	67	61	75
R1 Existing Wall	R, dB	35	38	35	38	46	54	59	
R2	R, dB	0	0	0	0	0	0	0	
R3	R, dB	0	0	0	0	0	0	0	
Comp R	Rcomp, dB	-35	-38	-35	-38	-46	-54	-59	
Receiver Room Level	dB	-2	11	27	34	25	13	2	32
Partition & Receiver Room Details									
S1 Separating Wall	m2	19.0							
S2	m2	0.0							
S3	m2	0.0							
S Total	m2	19.0							
S Shared Area	m2	19.0							
Receiver Room Volume (Assumed)	m3	70.0							
RT60	s	0.6							
Absorptive Area	A, m2	18.8							
Source Room Level	dBA	75							
Receiver Room Level	dBA	32.0							

Octave Centre-Freq. Band (Hz)	NR30 (dB)	Receiver Room Level (dB)
63	65	0
125	52	11
250	45	27
500	40	34
1k	35	25
2k	32	13
4k	30	2

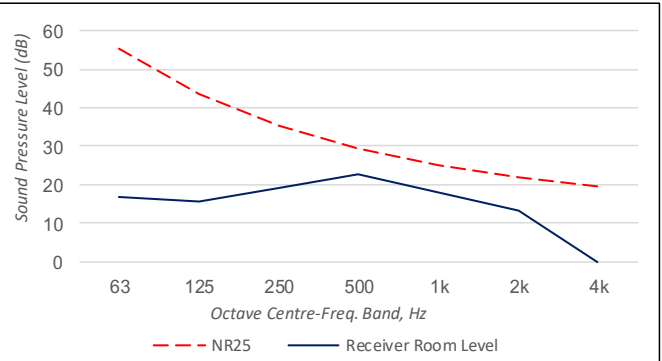
Existing Floor – First-floor Bedroom

Room to Room Sound Transmission Calculation									
Description: Calculation of sound trasmission from meeting room to apartment bedroom directly above									
1/1 Octave Centre-Freq. Band	Hz	63	125	250	500	1k	2k	4k	dBA
Source Noise Level, dB	dB	33	49	62	72	71	67	61	75
R1 Existing Floor	R, dB	22	11	15	36	41	52	65	
R2	R, dB	0	0	0	0	0	0	0	
R3	R, dB	0	0	0	0	0	0	0	
Comp R	Rcomp, dB	-22	-11	-15	-36	-41	-52	-65	
Receiver Room Level	dB	13	40	49	38	32	17	-2	42
Partition & Receiver Room Details									
S1 Separating Floor	m2	15.0							
S2	m2	0.0							
S3	m2	0.0							
S Total	m2	15.0							
S Shared Area	m2	15.0							
Receiver Room Volume (Assumed)	m3	36.0							
RT60	s	0.6							
Absorptive Area	A, m2	9.7							
Source Room Level	dBA	75							
Receiver Room Level	dBA	42.2							

Octave Centre-Freq. Band (Hz)	NR25 (dB)	Receiver Room Level (dB)
63	55	13
125	45	40
250	38	49
500	32	38
1k	28	32
2k	24	17
4k	20	-2

Enhanced Floor – First-floor Bedroom

Room to Room Sound Transmission Calculation									
Description: Calculation of sound transmission from meeting room to apartment bedroom directly above									
1/1 Octave Centre-Freq. Band	Hz	63	125	250	500	1k	2k	4k	dBA
Source Noise Level, dB	dB	33	49	62	72	71	67	61	75
R1 Proposed Floor (Resi Bars)	R, dB	18	35	45	51	55	56	65	
R2	R, dB	0	0	0	0	0	0	0	
R3	R, dB	0	0	0	0	0	0	0	
Comp R	Rcomp, dB	-18	-35	-45	-51	-55	-56	-65	
Receiver Room Level	dB	17	16	19	23	18	13	-2	23
Partition & Receiver Room Details									
S1 Separating Floor	m2	15.0							
S2	m2	0.0							
S3	m2	0.0							
S Total	m2	15.0							
S Shared Area	m2	15.0							
Receiver Room Volume (Assumed)	m3	36.0							
RT60	s	0.6							
Absorptive Area	A, m2	9.7							
Source Room Level	dBA	75							
Receiver Room Level	dBA	22.8							



APPENDIX B – Sound Insulation Models

Existing Wall

Sound Insulation Prediction (v9.0.22)

Program copyright Marshall Day Acoustics 2017

Margin of error is generally within $R_w \pm 3$ dB

Peak Acoustics - Key No. 5524

Job Name:

Job No.:

Date: 21/05/2020

File Name:

Initials: kyle



Notes:



R_w 44 dB
 C -1 dB
 Ctr -3 dB

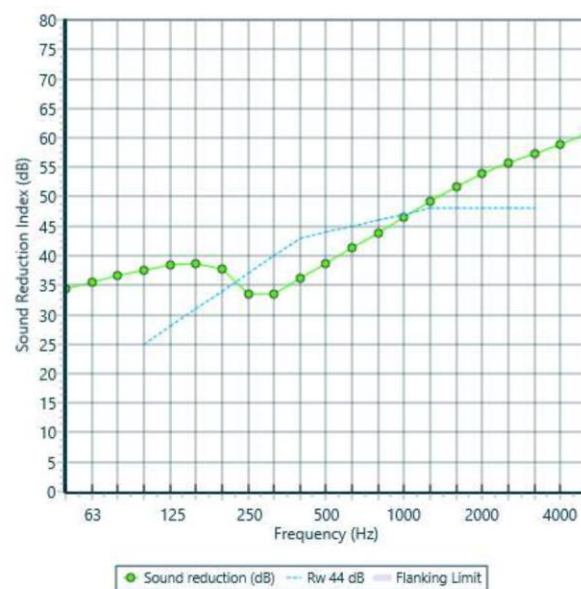
Panel Size = 2.7 m x 4.0 m

Partition surface mass = 163 kg/m²

System description

Panel 1 : 1 x 102 mm Brick

freq.(Hz)	R(dB)	R(dB)
50	34	
63	35	35
80	37	
100	38	
125	38	38
160	39	
200	38	
250	33	35
315	34	
400	36	
500	39	38
630	41	
800	44	
1000	47	46
1250	49	
1600	52	
2000	54	54
2500	56	
3150	57	
4000	59	59
5000	61	



Existing Floor

Sound Insulation Prediction (v9.0.22)

Program copyright Marshall Day Acoustics 2017

Margin of error is generally within ± 3 dB

Peak Acoustics - Key No. 5524

Job Name:

Job No.:

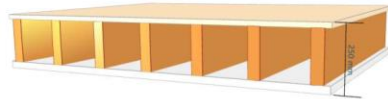
Date: 21/05/2020

File Name:

Initials: kyle



Notes:



Rw 34 dB
C -7 dB
Ctr -12 dB

Mass-air-mass resonant frequency = 41 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 61.6 kg/m²

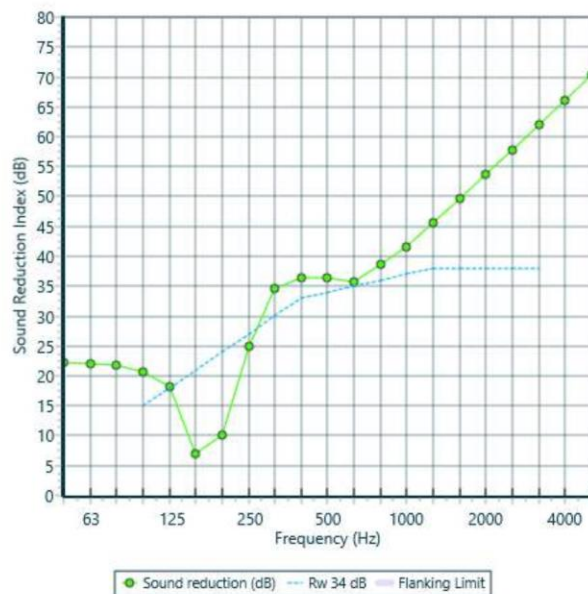
System description

Panel 1 : 1 x 20 mm Oak (Red or White)

Frame: Timber stud (2E2 mm x 50 mm), Stud spacing 250 mm; Cavity Width 200 mm

Panel 2 : 1 x 30 mm Gypsum plaster on lath

freq.(Hz)	R(dB)	R(dB)
50	22	
63	22	22
80	22	
100	21	
125	18	11
160	7	
200	10	
250	25	15
315	35	
400	36	
500	37	36
630	36	
800	39	
1000	42	41
1250	46	
1600	50	
2000	54	52
2500	58	
3150	62	
4000	66	65
5000	70	



Enhanced Floor

Sound Insulation Prediction (v9.0.22)

Program copyright Marshall Day Acoustics 2017

Margin of error is generally within $R_w \pm 3$ dB

Peak Acoustics - Key No. 5524

Job Name:

Initials:kyle

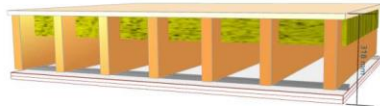
Job No.:

Date:21/05/2020

File Name:Proposed Floor - Resi Bars.ixl



Notes:



R_w 52 dB
 C -1 dB
 C_{tr} -5 dB

Mass-air-mass resonant frequency = ≈ 34 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 39 kg/m²

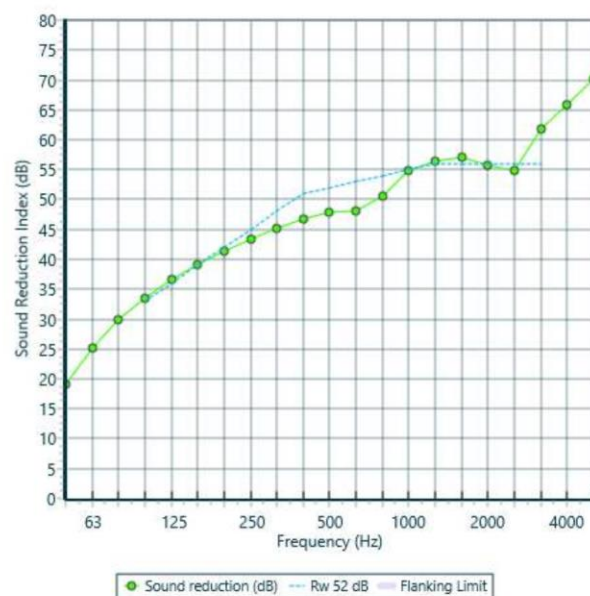
System description

Panel 1 : 1 x 20 mm Oak (Red or White)

Frame: Solid Joist with resilient rail (2.5E2 mm x 45 mm), Stud spacing 250 mm; Cavity Width 268 mm, 1 x Fibreglass (10kg/m³) Thickness 100 mm

Panel 2 : 2 x 15 mm Gyproc SoundBloc 15mm

freq.(Hz)	R(dB)	R(dB)
50	19	
63	25	23
80	30	
100	34	
125	37	36
160	39	
200	41	
250	43	43
315	45	
400	47	
500	48	48
630	48	
800	51	
1000	55	53
1250	56	
1600	57	
2000	56	56
2500	55	
3150	62	
4000	66	65
5000	70	





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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