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Oaksey
Malmesbury
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Date: 26th November 2018

Our Reference: PC-17-0324-LT1

Your Reference: Magdala Pub

Magdala Pub Recommendations for Potential Airborne Sound Insulation between Pub and Residential Accommodation

Dear Martin,

Pace Consult has been asked to:

- Assess the airborne sound insulation performance of the existing separating floor structures between the 'Magdala Public House' commercial unit, and the proposed residential dwelling directly above.
- Propose an operational noise level for the trading pub.
- Propose a criteria for airborne noise break in to the proposed adjacent residential dwelling.
- To provide recommendations of any required uplift in airborne sound insulation performance necessary to achieve the proposed criteria.

This note has been compiled primarily to support the Full Application that proposes the creation of a new residential unit at first floor level above the Magdala Pub.

It is to be noted that this letter does not constitute a detailed acoustic design Brief, but is intended to demonstrate that compliance with the criteria could be achieved through reasonable acoustic measures.

The location of the 'Magdala Pub' and the proposed residential dwellings is shown in figure 1 & 2 below. The separating floor of concern is between the ground floor pub, and proposed 1st floor residential accommodation. It is assumed that the separating floor construction is the same across the whole separating floor.

Figure 1: Ground floor existing Magdala pub demise.

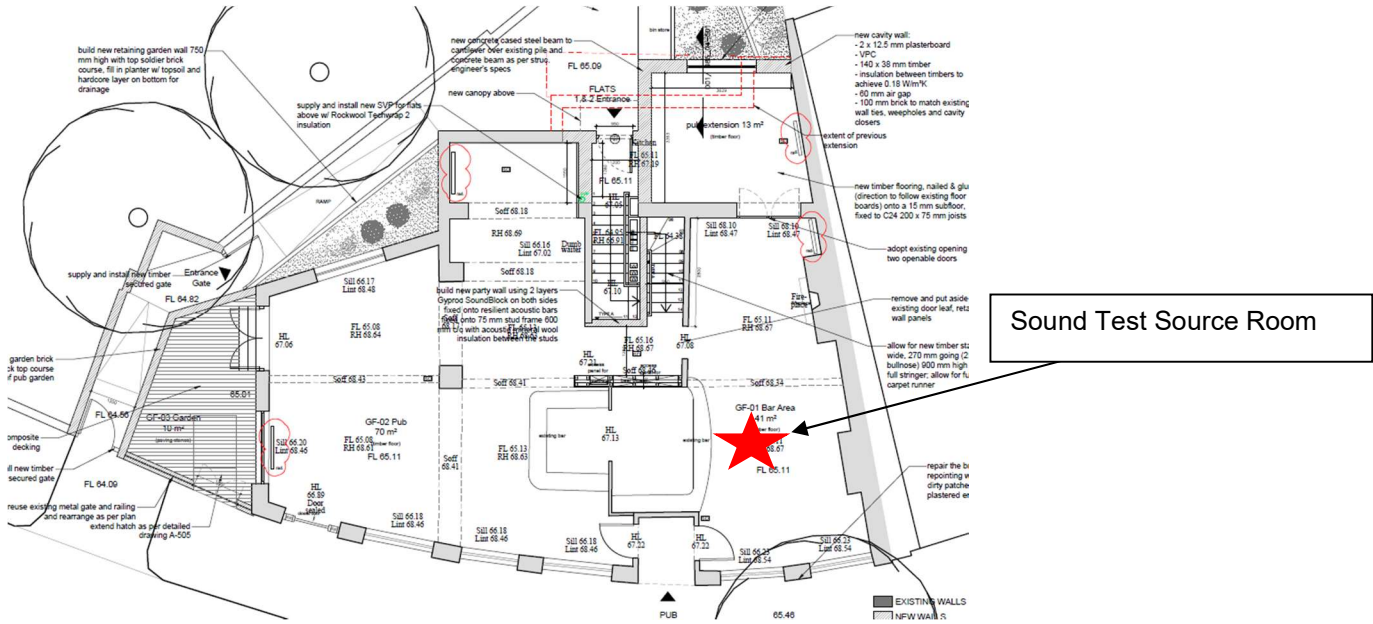


Figure 2: First floor existing function room.

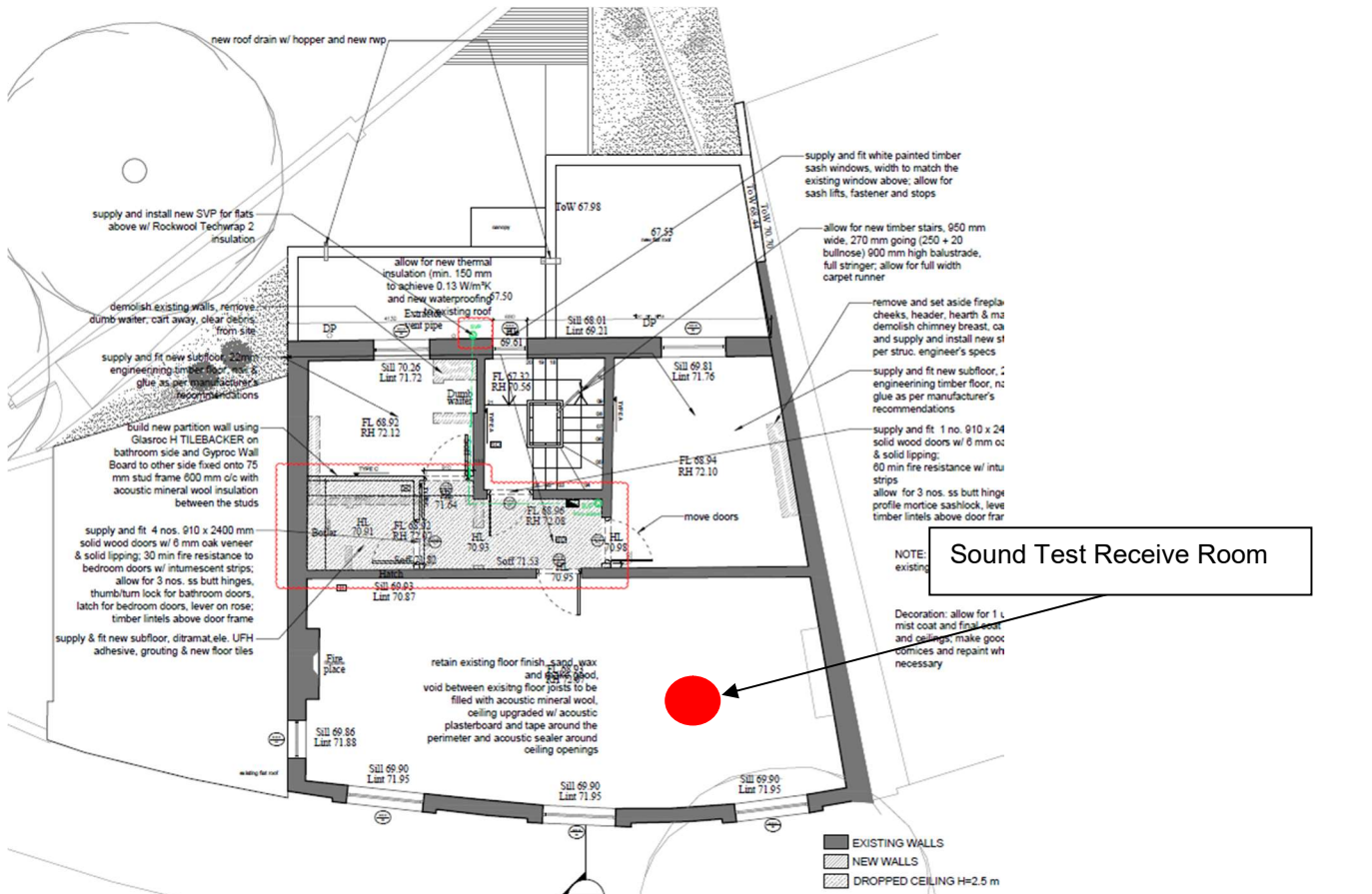


Figure 3: Proposed new first floor residential dwelling



Table 1 - Pace Consult proposed pub operational noise level. The noise levels were measured in a trading venue with 80-90 people present (no amplified music).

Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dB(A)
Pub Noise (L_{fmax})	79	83	86	95	93	89	82	97

Table 2 - Pace Consult proposed criteria for airborne noise break-in to the residential accommodation which is adjacent to the Magdala public house.

Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
NR20 (L_{fmax})	51	39	31	24	20	17	14

NR20 L_{fmax} Has been successfully used by Pace Consult to prevent loss on amenity in residential accommodation from noise break-in from neighbouring properties. It has often been considered as largely inaudible by local authorities.

Existing Floor between Pub & Proposed Residential Accommodation -

A sound level difference was measured across the floor that will separate the Magdala Public House and the proposed residential accommodation. Measurements were completed from the pub ground floor level into the existing first floor function room which is to be converted.

In table 3 overleaf, the measured level difference, has been subtracted from the expected maximum noise inside the pub to give the predicted airborne noise break-in to the residential accommodation. A further subtraction of the NR20 L_{Fmax} criteria indicates the additional sound insulation that is required. Where noise levels from the pub are predicted to exceed the proposed NR20 L_{Fmax} value in the residential accommodation, the values are indicated in red.

The current build up of the floor has been assumed by you as a timber floor construction consisting of 230 mm x 50 mm timber joists, with 18mm plywood boards either side. The measured sound level difference indicates that the actual build-up may differ from this assumption.

Table 3: Calculated noise break in from Magdala Tavern.

Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
Pub Noise (L_{fmax})	79	83	86	95	93	90	82
Measured Level Difference	27	33	43	51	60	64	74
Predicted Airborne Noise Break-In	52	50	43	44	33	26	8
NR20 (L_{fmax})	51	39	31	24	20	17	14
Additional Sound Reduction Necessary	1	11	12	20	13	9	-

The existing floor / ceiling structure is not capable of controlling noise from the public house to an acceptable level inside the proposed new accommodation. New floor / ceiling structures are required which will provide significantly improved levels of sound insulation.

To help check that the NR20 L_{Fmax} criteria is achievable I have modelled new floor and ceiling build-ups using Insul (version 9.0) which is a commercially available piece of software used to predict the airborne sound insulation values of multi layer constructions.

It will be necessary to install new high mass floor boards within the first floor to provide a new floor construction which helps to achieve the required airborne sound insulation performance. Along with this floor boarding you will need to install new independent ceiling joists within the public house which will support a high mass ceiling. A thick mineral wool quilt will be required in the void between the floor and ceiling surfaces. The public house to residential accommodation room calculation and Insul sound insulation prediction are included in Appendix A.

Our assessment includes for significant reductions in the on-site performance of the separating floor due to site flanking conditions and accuracy of the Insul prediction.

The calculations indicate that a floor/ceiling build up consisting of:

Upper floor surface consisting of 2 layers of 18mm plywood x 1 layer of 18mm cement particle board
New independent lower ceiling structure throughout the public house consisting of 3 layers of 15mm dense plasterboard (>800 kg/m³) supported on new independent joists with an overall cavity depth of 300 mm .A 150mm thick mineral wool acoustic absorption (48/kg/m³) should be positioned throughout the entire cavity

Please Note: It would be necessary to complete a full review of the flanking sound insulation provided by the building structure prior to developing the final plans, To do this we would need to know the full construction details of the existing building from the project architect.

Any building services which penetrate the party floor directly in the residential accommodation between the pub and the proposed dwellings above should be redirected such that they do not penetrate the party floor. If this is not possible then the services must be acoustically lagged and boxed in with multiple layers of 15mm dense plasterboard supported independently.

It was also noted on site that existing chimney flues exist between the ground and first floors. It will be necessary to seal these to provide suitable sound insulation via this path.

The measurements and calculations completed here demonstrate that with the appropriate acoustic measures it is possible to achieve the proposed criteria of NR20 L_{fmax}, for typical noise levels within a pub that does not contain amplified music

Kind regards,

A handwritten signature in black ink, appearing to read 'Peter Young', written in a cursive style.

Peter Young
Acoustic Consultant
PC-18-0324-LT1-RevA

Appendix A -

Sound Insulation Prediction (v9.0.1)

Program copyright Marshall Day Acoustics 2017

- Key No. 1558

Job Name:

Job No:

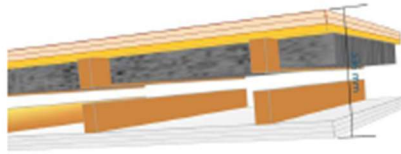
Date: 23/11/2018

File Name:

Initials: Peter Young



Notes:



Rw 84 dB
 C -4 dB
 Ctr -11 dB
 Dntw 86 dB
 [V:50m3] [A:11m2]

Mass-air mass resonant frequency = 90 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 77.4 kg/m²

System description

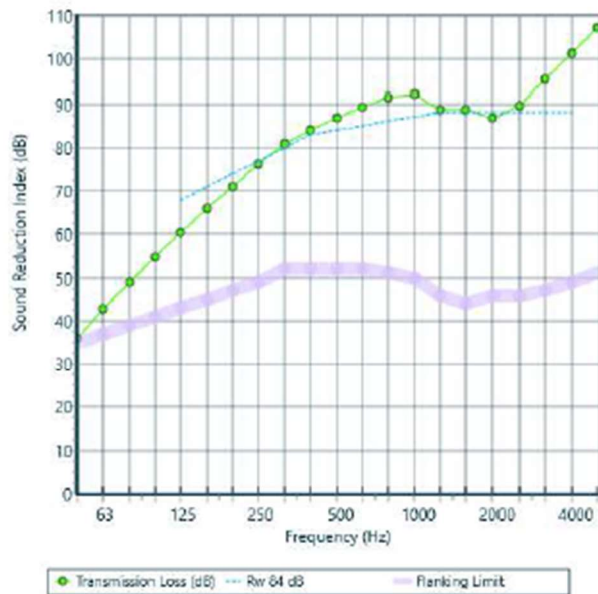
Panel 1 : 2 x 17.5 mm Plywood

+ 1 x 18.0 mm Flooring Particle Board

Frame: Separate Joists, Cavity Width 238 mm, Stud spacing 600 mm, 1 x Rockwool (48kg/m³) Thickness 150 mm (ρ:48 kg/m³, Rf:19400 Raylm)

Panel 2 : 3 x 15.0 mm Gyproc SoundBloc 15mm

freq.(Hz)	TL(dB)	TL(dB)
50	36	
63	43	40
80	49	
100	55	
125	61	58
160	66	
200	71	
250	76	74
315	81	
400	84	
500	87	86
630	89	
800	91	
1000	92	90
1250	89	
1600	89	
2000	87	88
2500	89	
3150	95	
4000	101	99
5000	107	



Room-Room Sound transmission by percentage view of different building elements							
Project/Location:	Magdala Tavern			Date:	23-Nov-18		
Surfaces				Total M²			
Seperating Floor	100	%	16.00				
	0	%					
	0	%					
	100		16.00				
Reverberation Time of receiving Room (s)				0.5			
Volume of receiving room m ³				45			
SxT/0.163V		0					
	63	125	250	500	1K	2K	4K
Insul Floor	28	46	62	74	78	76	87
1 (C: -1							
Composite (R)	28.0	46.0	62.0	74.0	78.0	76.0	87.0
	63	125	250	500	1K	2K	4K
Source Room SPL	79	83	86	95	93	90	82
96.8							
Correction Factor	0	0	0	0	0	0	0
Composite R	28.0	46.0	62.0	74.0	78.0	76.0	87.0
Resultant	51	37	25	21	15	14	-5
	51	39	31	24	20	17	14
Notes							
Constructions Used							
x2 18mm plywood boards + x1 18mm particle floorboard, independent 115mm timber floor joists (total cavity depth 240mm), 150mm (48kg/m ³) absorption in cavity, x3 layers of 15mm soundbloc dense plasterboard							