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10 August 2016

Ref: 11384-ADR-01

H Company 2 Ltd
32-38 Scrutton Street
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Dear Sirs,

11384: 40-42 MILL LANE, LONDON

Further to your recent enquiry, we are pleased to present you with a summary of our recommendations for the acoustic treatment of the floor between the existing commercial unit and proposed residential apartments at the above project.

Although no planning conditions are currently known, we would recommend achieving a particularly high level of airborne sound insulation based on the use of the commercial unit as a Public House. In order to ensure a high level of airborne sound insulation is achieved, we would recommend the typical airborne sound insulation criteria stipulated in Approved Document E of the Building Regulations should be improved upon by at least 10dB.

The following sections describe our review and any necessary amendments to the proposed constructions in order to meet the above criterion.

1.0 SOUND INSULATION DESIGN CRITERIA

1.1 Standard Building Regulations

In order to satisfy the requirements for Approved Document E of the building regulations, the minimum sound insulation performance criteria, as shown in Table 1, should be met by all floor and wall constructions (i.e. separating elements between different residential dwellings). For this development, the less stringent requirements for change of use developments apply.

	Design Criteria	
Element	**Airborne**	**Impact**
Floor	$D_{nT,w} + C_{tr} \geq 45$ dB for new build $D_{nT,w} + C_{tr} \geq 43$ dB for conversions	$L'_{nT,w} \leq 62$ dB for new build $L'_{nT,w} \leq 64$ dB conversions
Wall	$D_{nT,w} + C_{tr} \geq 45$ dB for new build $D_{nT,w} + C_{tr} \geq 43$ dB for conversions	-

Table 1 Approved Document E design criteria for party elements

1.2 Recommended Target

In order to comply with the guidance suggested above, the criteria highlighted in Table 1 should be improved upon by at least 10dB.

This equates to an airborne sound insulation performance of at least $D_{nTw} + C_{tr}$ 53 dB, which would be comparable with an uncorrected performance in the region D_{nTw} 60-65 dB.

2.0 PROPOSED FLOOR SYSTEM

The proposed floor build-up between the ground floor Public House and proposed first floor residential units will be based on the existing timber joists. It is not currently known is access to upgrade the ceiling of the ground floor will be possible, two options have therefore been proposed as shown below.

2.1 Option 1: Upgraded Ceiling

In order to achieve the high level of airborne sound insulation required, we would recommend the use of an independent ceiling framework, below a plasterboard ceiling fixed to the existing joists.

We would first recommend filling the void between the joists with mineral wool, thickness 100mm, density 45kg/m3. A ceiling should then be formed on the joists from 2 layers of 15mm British Gypsum SoundBloc or similarly dense plasterboard.

We would then recommend installing an independent timber or metal framework system a minimum of 150mm below the newly formed ceiling, with support provided by the surrounding walls. Acoustic hangers can be used to provide support from the joists where necessary for larger ceiling spans. The 150mm void should also be filled with mineral wool, thickness 50mm, density 45kg/m3.

A further layer of 15mm plasterboard (British Gypsum SoundBloc or similar) should then be fixed to the independent support system.

Above the joists, a timber deck should be installed on the joists to provide a continuous layer, with gaps between boards sealed using flexible setting mastic. Retained floorboards can form this decking layer, provided all gaps are sealed and any missing or damaged boards replaced.

We would then recommend use of a product such as Cellecta Deckfon ScreedBoard 28, installed on timber decking. ScreedBoard 28 comprises 28mm thick interlocking panels, to introduce mass to the floor without the need for wet cement or screed.

The final floor system should therefore be formed of the following:

- Floor finish,
- 28mm ScreedBoard 28 layer,
- Timber decking installed on joists,
- 200mm timber joists, with 100mm mineral wool in void,
- 2 layers of 15mm SoundBloc or similar,
- Minimum 150mm void, with 50mm mineral wool infill,
- Independent ceiling framework,
- 1 layer of 15mm SoundBloc or similar.

The above construction would be considered an improvement on Robust Details construction E-FT-5, which comprises a similar above-joist construction, but only a resilient bar and fixed suspended ceiling. The proposed independent ceiling has significantly improved isolation, and would therefore be expected to outperform the Robust Details construction.

Modelling the system is proprietary sound insulation software INSUL suggests an airborne sound insulation performance of R_w 74 dB, $R_w + C_{tr}$ 62 dB. Applying an onerous correction to translate this into an onsite performance results in a predicted airborne sound insulation performance of D_{nTw} 66 dB, $D_{nTw} + C_{tr}$ 54 dB.

2.2 Option 2: Retained Ceiling

If access to upgrade the existing ceiling is not possible, works must be undertaken from above. It is assumed the existing ceiling is either lathe and plaster or plasterboard, fixed direct to the joists.

We would first recommend filling the void between the joists with mineral wool, thickness 100mm, density 45kg/m3. The floor may need to be lifted in order to do this.

A timber deck should be installed on the joists to provide a continuous layer, with gaps between boards sealed using flexible setting mastic. Retained floorboards can form this decking layer, provided all gaps are sealed and any missing or damaged boards replaced.

In order to introduce mass and isolation above the joists, we would recommend the use of a mass barrier floor on an isolated mount system.

We would recommend the use of mounts such as Mason EAFM 50mm Mounts, installed at distributed points based on load requirements. A manufacturer such as Mason Industries UK should be contacted in order to ensure the correct placement of mounts. The 50mm void formed by the mounts should be half filled with mineral wool, density 45kg/m3.

We would then recommend forming a floor on the mounts, consisting of 18mm cement particle board on the mounts, 19mm Gyproc Planks on top and finally 18mm plywood to take the final floor finish.

All floor layers above the mounts should be isolated from the surrounding walls using a flanking strip.

The final floor system should therefore be formed of the following:

- Floor finish,
- 18mm plywood
- 19mm Gyproc Plank,
- 18mm cement particle board,
- 50mm resilient mounts, with 25mm mineral wool in void,
- Timber decking
- 200mm timber joists, with 100mm mineral wool in void,
- Existing ceiling.

The above construction would be expected to perform in excess of the recommended airborne sound insulation criteria.

3.0 PROPOSED CLADDING SYSTEMS

Another element to consider is the potential for noise from the Public House to transmit through flanking paths including continuous external walls and any continuous structural columns.

In these instances, we would recommend forming an isolated cladding formed of an isolating mounting clip, such as the Mason WIC Wall Tie. This is a 38mm clip, used to fix a supporting stud to a structural element whilst maintaining a degree of isolation.

The WIC Wall Ties should be used to support minimum 48mm studs, with the total 78mm void filled with 25mm mineral wool, density 45kg/m3. An inner wall lining should then be formed from two layers of 12.5mm British Gypsum SoundBloc or similar.

4.0 JUNCTION DETAILING

At the perimeter of plasterboard layers, a small gap (up to 5mm) should be left, sealed using non-hardening silicone mastic

5.0 DUCTS AND PIPEWORK

Where pipes and ducts pass through adjacent dwellings, there is a possibility for flanking noise through the pipework itself.

In order to minimise the effects of this, we would recommend following the below advice:

- Where pipework runs through stacked bathrooms, we would recommend first lagging the pipework in mineral wool (25mm thick, minimum density 25Kg/m^3), before boxing in with a single layer of SoundBloc plasterboard or similar,
- Where pipework will penetrate through living spaces (eg combined Lounge/Kitchen), we would recommend lagging as above, but boxing in with a double layer of SoundBloc plasterboard or similar.

Where pipework penetrates through a separating wall or floor, it should be ensured that there is no rigid contact, but an airtight seal should be achieved using non-hardening mastic. Any fire stopping should also allow for a flexible, rather than rigid contact.

For ductwork that is within a single flat (eg kitchen extract fan running to the rear elevation of the same flat), no acoustic criteria need to be met. However, we would recommend boxing in ductwork with a single layer of 12.5mm SoundBloc plasterboard in order to allow amenable operation.

6.0 COMMUNAL DOORS

For doorsets within communal areas (eg from stairwell to corridor), no particular acoustic performance is deemed necessary.

Where doors are specified between communal areas and residential rooms, the following guidance is given in Approved Document E of the Building Regulations:

> *Ensure that any door has good perimeter sealing (including the threshold where practical) and a minimum mass per unit area of 25 kg/m^2 or a minimum sound reduction index of 29 dB R_w*

7.0 REVERBERATION IN COMMON PARTS

The simplest way to treat common parts for reverberation is by following Method A, as defined in Approved Document E of the Building Regulations.

Method A recommends that surface area of ceilings in common parts should be treated with a Class C (or better) absorber. For stairwells, this applies to the underside of landings, rather than the underside of stairs

8.0 GENERAL

It should be noted that where junctions are sealed with mastic, the mastic does not need to be specifically 'acoustic'. Provided the mastic is silicone-based and remains flexible when set (i.e. does not crack) it is acceptable for use.

The sound insulation performance predictions and advice provided in this document are based on the assumption that there will be no major mistakes in workmanship regarding the acoustic detailing and finishing of the party elements proposed in this development.

We trust that the above information is sufficient to your requirements and remain available should you have any further questions.

Yours Sincerely,

Duncan Martin MIOA

Clement Acoustics Ltd