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Theofanis Anastasiadis
Scenario Architecture
10A Branch Place
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Dear Theofanis,

17 – 27 QUEEN VICTORIA STREET, READING

This letter sets out the requirements for sound insulation between residential units formed by material change of use, and between commercial and residential units at the above address.

A summary of the various anticipated requirements of the development in terms of the Local Authority and Approved Document E (2003) of the Building Regulations (2010) is included as follows.

In addition, guidance constructions are detailed below for information at this stage of the design. Please note these may be altered during the design stage to suit other requirements, e.g. Listed status of the building, etc.

1.0 CRITERIA

Listed Status

The building has Grade 2 Listed Status. Approved Document E offers the following guidance with regards historic buildings:

"In the case of some historic buildings undergoing a material change of use, it may not be practical to improve the sound insulation to the standards set out [above]. The need to conserve the special characteristics of such historic buildings needs to be recognised, and in such work, the aim should be to improve the sound insulation to the extent that it is practically possible, always provided that the work does not prejudice the character of the building, or increase the risk of long-term deterioration to the building fabric or fittings."

Therefore although the various criteria described below constitute a design target it may not be possible to achieve all numerical criteria due to constraints around the listed elements of the building fabric.



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Sound Insulation between Apartments

Approved Document E of the Building Regulations provides the following advice regarding sound insulation standards between residential areas formed by material change of use:

Airborne (Walls & Floors)

A minimum weighted standardised level difference plus spectrum adaptation term ($D_{nT,w} + C_{tr}$) of 43dB.

Impact (Floors only)

A maximum weighted standardised impact sound pressure level ($L'_{nT,w}$) of 64dB.

Sound Insulation between Residential and Commercial Areas

In addition to the levels of sound insulation detailed above, the following additional advice from Approved Document E concerns sound insulation standards between residential and commercial areas:

"The performance standards set out [above] are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space."

Designing the floors between the commercial space and the residential units above to a 5-10dB uplift over the airborne sound insulation criterion detailed above should ensure that reasonable internal noise levels can be maintained in the residential units directly above the commercial units, assuming "normal" usage within the commercial areas.

The suggested criterion for the airborne sound insulation of the separating floor construction between commercial and residential areas is therefore as follows:

Airborne (Commercial-Residential Floors)

A minimum weighted standardised level difference plus spectrum adaptation term ($D_{nT,w} + C_{tr}$) of 48-53dB.

Assuming the above stated performance is achieved through the separating floor, this should allow noise levels within the A1/A3 Use spaces to be able to produce source (music/occupant) noise levels up to the following limits, which are likely to be acceptable to most end users.

Maximum assumed levels in the commercial unit:

L_{eq} levels:

Daytime: Overall level: 80dBA, and 75dB per octave from 63Hz-4000Hz

Night-time: Overall level: 75dBA, and 70dB per octave from 63Hz-4000Hz

Sound Insulation of Internal Walls

Newly created internal walls, which separate bathrooms/water closets and bedrooms from other parts of the flat, and internal floors should achieve a laboratory sound insulation rating value of R_w 40dB (this requirement specifically excludes walls which separate a bedroom from the associated en-suite bathroom and walls containing a door). Please note that there is no requirement for testing the sound insulation of internal walls on site.

2.0 GUIDANCE CONSTRUCTIONS

We would typically expect the following guidance constructions to be commensurate with achieving the project criteria.

Separating Wall – New Twin Frame

Where new separating walls are proposed to be formed, we suggest the following build-up:

- 2No. layers 15mm dense plasterboard (12.5kg/m² each)
- 50/60mm timber studs (depending on spans)
- 100mm mineral wool (10-40kg/m³)
- 50/60mm timber studs (depending on spans)
- 2No. layers 15mm dense plasterboard (12.5kg/m² each)

The above construction equates to an overall dimension of 250mm and assumes braced C-studs will be used. Use of acoustic/resilient bracing or I-studs may allow for a reduced overall dimension.

Separating Wall – Existing Masonry

Where separating walls are to be formed by existing masonry walls, we recommend the following upgrades to the build-up:

- 1No. layer 12.5mm standard plasterboard (8.5kg/m²) on dabs
- Existing masonry wall
- Minimum 25mm GypLyner system with 25mm mineral wool in the cavity
- 1No. layer 15mm dense plasterboard (12.5kg/m²)

The above represents an asymmetric solution, which works very well acoustically, but does mean setting-out on site is slightly more difficult. Alternative solutions are possible, but a simple plasterboard-on-dabs finish to both sides should not be utilised due to inherent resonance effects that deteriorate the overall performance of the wall.

Separating Floor – Flat to Flat

The existing floors are understood to be of timber construction with floorboards and either plasterboard or lath and plaster ceilings. The exact design of these separating floors needs to be finalised with other members of the design team and needs to take in to account the requirements of various other disciplines and consider the listed nature of the building. However, the following generic principles will be followed for the lightweight timber floor construction.

- Some form of floating floor incorporating resilience will be required to the upper-most surface of the floor.
- Mineral wool insulation should be introduced between the joists within the floor void.
- The specification of the ceiling will need to consider the listed nature and any decorative features that may be required to be retained, but typically some form of resilient/isolating fixing method would be required and the equivalent of two layers of plasterboard.

This will all be reviewed with the rest of the Design Team and finalised at the design stage.

Perimeter resilient isolation flanking strips should be used around the perimeter of the floating floor to prevent rigid contact between the floating floor and the walls. Skirting boards should be fixed such that they loosely sit on top of the flanking isolation strip with the strip cut back afterwards and the junction sealed with flexible sealant.

Separating Floor – Flat to Commercial

The commercial property at ground floor is currently occupied as a coffee shop. Therefore any upgrade measures to the separating floor structure will need to be applied to the upper surface of the floor structure.

A similar approach to that stated above for the flat-to-flat floors will be adopted with the addition of extra mass and isolation to the system. However, this all depends on the space available and lining up with the existing stairs, etc. A full specification and design will be developed with the Team through the design stage.

Flat Entrance Doors

Entrance doors to flats off common areas should be at least 25kg/m² or alternatively should be capable of achieving approximately R_w 30dB. We suggest the doors comprise 44mm thick solid core timber doors fitted within rebated frames with continuous neoprene compressible bulb type or batwing type acoustic seals to head and jambs. Gaps at the threshold should be minimised and ideally an automatic drop-down threshold seal installed.

Soil Vent Pipes

Where soil vent pipework and/or rain water pipework penetrate separating floors within habitable rooms in the flats, these pipes should be boxed-in using 2 layers of 15mm full density plasterboard (SoundBloc or similar) with a 50mm (un-faced) mineral wool quilt within the cavity in addition to a fire-stopping layer at floor level. Care should be taken to ensure the separating floor floating layer is not breached by this enclosure lining.

Where these penetrations are within bathrooms/WC's, the boxing-in may be reduced to 2 layers of 12.5mm standard plasterboard (WallBoard or similar) plus 25mm mineral wool quilt in addition to the fire stopping treatment.

Reverberation in Common Parts

Common parts, such as hallways, corridors, stairwells, entrance lobbies, etc. that give direct access to flat entrance doors should provide a certain level of absorption. The easiest method to achieve this requirement is to line the ceilings with a Class C Absorber. The communal circulation areas at each floor will require consideration.

We hope the above is clear and of use, however should you have any questions, please do not hesitate to contact the undersigned.

Yours sincerely,
For RBA Acoustics



David Johnston