Domino’s, Mirfield

Floor Sound Insulation Review

Report 29AA.RP.2.1 // 7 February 2025

prepared for

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Contents

1.0 Introduction

1.1 It is proposed that a unit at 47 Huddersfield Road, Mirfield WF14 8AE, previously in use as a bank, be utilised as a hot food takeaway outlet.

1.2 As part of these works, Kirklees Council require that the sound insulation of the existing ceiling between the proposed store and the existing residence above be considered.

1.3 Sound insulation tests have been undertaken to determine the existing performance of the separating ceiling. The results have been calculated and outlined within this report, with any required remedial works also discussed.

2.0 Existing Floor Performance and Construction

2.1 Sound insulation testing of the existing floor was undertaken on 23rd January 2025. The testing was conducted in general accordance with the procedures described in BS EN ISO 140-4:1998 and Annex B of Approved Document E of the Building Regulations. The methodology is not replicated here but a summary can be provided on request.

2.2 Testing was undertaken from the ground floor to three spaces within the residence above.

2.3 The results of the sound insulation testing can be seen in **Table 1.**

Table 1 Sound insulation test results

Test No.	**Rooms**	**Measured Sound Insulation Performance R, dB** **at octave band centred frequency (Hz)**						
		125	**250**	**500**	**1k**	**2k**	**4k**	**$D_{nT,w} + C_{tr}$**
1	GF Main Space to Room 1	22	30	44	58	66	71	**35**
2	GF Main Space to Room 2	23	29	41	55	67	73	**35**
3	GF Front Left to Room 3	37	45	52	60	69	75	**49**

2.4 It had been noted that the ceiling in the front left room had been much lower than that in the main space, which may suggest an improved construction. This is the likely cause of the improvement in performance between tests.

2.5 Background noise levels were controlled by road traffic noise from Huddersfield Road.

2.6 The following is understood to be the approximate construction of the separating floor:

- Reclaimed wood floor finish;
- 25 mm Timber floorboards;
- 200 mm Timber joist;
- Lath and plaster ceiling approx. 40 mm thick fixed directly to the underside of the joist,
- Void (depth varies);

- Suspended lay in grid ceiling.

2.7 It was not possible to visually inspect the current floor build up whilst on site.

3.0 Assessment Criteria

Local Authority Guidance

3.1 The proposed store falls within the jurisdiction of Kirklees Council (KC). The council provide a 'Hot Food Takeaway' SPD that provides guidance on the criteria for any new hot food takeaway developments. Policy 'HFT 4 – Noise abatement and extraction of odours' outlines the requirements relevant to this assessment.

> *'Proposals for new hot food takeaways must demonstrate* effective kitchen odour control and extract systems and appropriate noise attenuation measures. Noise attenuation and odour control measures must:
>
> - Be acceptable in terms of visual amenity, including location and external finish;
> - Not adversely impact on neighbouring occupiers by virtue of noise, vibration or odour; and
> - Remain appropriate to the type of food being prepared and be routinely and properly maintained.
>
> Proposals must demonstrate appropriate sound proofing of party walls and ceilings where necessary.
>
> Where appropriate, restrictions on the hours of operation will be considered.
>
> All applications must be accompanied by an Odour and Noise Impact Assessment. This should include full details of the extraction system proposed including the internal layout and external appearance showing the location of all the main components of the system, together *with details of any necessary noise attenuation and odour abatement measures.'*

3.2 This report covers the party wall and ceilings concerns of the local authority. Plant noise has been dealt with in a further report.

Internal Assessment Criteria

Approved Document E (ADE)

3.3 The sound insulation standards within ADE for purpose-built dwelling-houses and flats are outlined below for context.

Table 1.1. Approved Document E sound insulation requirements

Building Element	**Required Airborne Sound Insulation Performance (dB $D_{nT,w} + C_{tr}$)**
Party walls and floors in dwellings-houses and flats formed by material change of use	≥ 43

3.4 Whilst the above performance requirement is intended for the performance of separating floors between residences, ADE states the following.

*"***0.8** The performance standards set out in Tables 1a and 1b 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 normal domestic purposes and communal or 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. Specialist advice may be needed to establish if a higher level of sound insulation is required *and, if so, to determine the appropriate level."*

3.5 Further assessment considerations are required to fully assess the effect of commercial noise into neighbouring residential units.

The World Health Organisation (WHO) Guidelines

3.6 Currently, there is no defined guidance or standard that considers noise from commercial to residential property through a party wall or floor. Therefore, to consider this in more detail, a reasonable assessment criterion must be derived from the available guidance around the matter.

3.7 The World Health Organisation (WHO) Guidelines for Community Noise 1999, lays focus on the health impacts of noise for human wellbeing, considering the adverse effects noise can have. In this instance the main points of focus would be the interference with speech communication and disturbance of rest and sleep.

3.8 The WHO Guidelines outline the following for internal noise criteria for dwellings from external noise sources.

Table 2 WHO Guidelines values for community noise in dwellings

Environment	**Period**	**dB, $L_{Aeq,T}$**	**dB, L_{Amax}**
Residential rooms above the commercial unit	Day (0700-2300)	35	-
	Night (2300-0700)	30	≥ 45[1]

Assessment Criteria

3.9 Whilst it is understood that the WHO guidelines are set with external noise sources in mind, it is considered that in lieu of any further noise assessment basis the noise levels outlined above are a reasonable starting point for internal noise limits.

3.10 To ensure a more robust assessment basis, a -5 dB penalty has been applied to the above noise limits to account for potential contributions from other noise sources that may be affecting the dwellings. In addition, the criteria have been expressed in terms of NR levels to ensure the spectral content of the affecting noise is better considered.

3.11 The following noise limits that apply to Dominos' typical operation, assessed within the residential spaces above are set out within the following table.

Table 3 Noise intrusion limits

Environment	**Period**	**NR L_{eq}**	**NR L_{max}**
Residential rooms above the commercial unit	Day (0700-2300)	20	-
	Night (2300-0700)	14	31

[1] Generally accepted as not normally being exceeded more than 10 times per night.

4.0 Separating Floor Assessment

4.1 Noise levels measured within a same brand hot food takeaway preparation area have been used to assess expected noise levels within the residence above. These noise levels can be seen in the table below**.** Further details on the source measurements can be provided on request.

Table 4 Measured noise levels within a hot food takeaway preparation area

Detail	**Sound Pressure Level, dB at octave band centred frequency, Hz**							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**dB(A)**
$L_{eq,5min}$	67	69	67	68	65	63	59	**70**
Maximum $L_{max,1min}$	82	88	87	91	91	88	83	**95**

4.2 The noise levels were measured on a busy evening between 1900 and 2100 hours. Maximum noise levels were caused by clattering in the preparation area.

4.3 During the measurement period the internal noise levels were dominated by plant, specifically from the oven extract, with contributions from other plant items throughout. Further contributions came from conversation between staff members, customers, phone calls and food preparation. It is noted that the noise does not have a tonal component.

4.4 The measured floor performance is first subtracted from the noise level within the hot food takeaway and are then converted to a reverberant level within the space before to obtain a resultant level within the residence above.

4.5 The resultant noise level is then compared to the proposed NR L_{eq} and NR L_{max} criteria as appropriate.

Results Without Floor Improvements

4.6 The following table outlines the results of the assessment with the existing floor in place.

Table 5 Resultant noise levels within residence above with existing floor in place

Environment	**Period**	**NR L_{eq} (Limit)**	**NR L_{max} (Limit)**
GF to Room 1	Day (0700-2300)	29 (20)	-
	Night (2300-0700)	29 (14)	50 (31)
GF to Room 2	Day (0700-2300)	29 (20)	-
	Night (2300-0700)	29 (14)	50 (31)
GF to Room 3	Day (0700-2300)	13 (20)	-
	Night (2300-0700)	13 (14)	35 (31)

4.7 Whilst the store is to be open during daytime hours only, the above is presented to outline how the existing floor performs against each criteria.

4.8 It can be seen from the results above that remedial works will be required to meet the criteria outlined herein.

Proposed Remedial Works

4.9 In order to achieve the criteria outlined in the sections above, the following remedial works will be required to the whole ceiling.

4.10 A layer of 19 mm British Gypsum Gyproc Plank (15 kg/m^2) should be fixed to the underside of the existing floorboards across the whole area of the floor(s).

4.11 The existing lathe and plaster ceiling should be removed and a new suspended MF grid ceiling system should be installed beneath the joists using Gypframe Acoustic Hangers forming a void of approximately 270 mm.

4.12 The suspended ceiling should be formed of two layers of 15 mm British Gypsum SoundBloc (13 kg/m^3) and 100 mm of mineral wool quilt should be laid on the ceiling boards across the whole area of the floor(s).

4.13 In summary, the construction of the separating floor is to be as follows:

- 25 mm timber floorboards,
- Single layer of Gyproc Plank (15 kg/m^2) fixed to underside of existing floorboards,
- 200mm Timber joist,
- MF Grid ceiling suspended by Gypframe Acoustic Hangers from existing joists,
- 100 mm mineral wool quilt (such as Isover Spacesaver Ready-Cut),
- Two layers 15 mm SoundBloc (13 kg/m^2).

4.14 The expected sound insulation performance of this proposed floor is detailed below. This is assuming that no element of the floor will create an acoustic weakness between the adjacent spaces.

Table 6 Expected sound insulation performance of proposed floor

	Sound Insulation Performance R, dB at octave band centred frequency (Hz)						
	125	**250**	**500**	**1k**	**2k**	**4k**	**$D_{nT,w} + C_{tr}$**
Proposed Floor	58	55	58	65	68	82	**52**

Results with Remedial Works in Place

4.15 Based on the remedial works outlined above and with the assumption that no other elements will create an acoustic weakness between the adjacent spaces, the proposed floor is expected to achieve the following against the outlined criteria.

Table 7 Resultant noise levels within residence above with remedial works undertaken

Environment	**Period**	**NR L_{eq} (Limit)**	**NR L_{max} (Limit)**
Living room above the commercial unit	Day (0700-2300)	5 (20)	-
	Night (2300-0700)	5 (14)	29 (31)
Kitchen above the commercial unit	Day (0700-2300)	5 (20)	-
	Night (2300-0700)	5 (14)	29 (31)
Bedroom above the commercial unit	Day (0700-2300)	5 (20)	-
	Night (2300-0700)	5 (14)	29 (31)

4.16 With the proposed construction in place, our calculations show that the internal activity noise levels from the hot food takeaway do not breach the criteria outlined herein within the residences above the unit.

4.17 Therefore, it has been determined that the proposed floor construction can be expected to reduce noise from the expected hot food takeaway operation to below acceptable levels. This is subject to the previous comments relating to flanking sound transmission.

5.0 Conclusions

5.1 It is proposed to convert am old bank building at 47 Huddersfield Road, Mirfield WF14 8AE for use as a Hot Food Takeaway outlet. As part of these works, Kirklees Council require that the sound insulation of the existing ceiling between the proposed store and the existing residence above be considered.

5.2 The necessary remedial works to achieve the separating floor performance requirements have also been outlined in this report. With this construction in place the requirements outlined within the noise intrusion assessment would be met.