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11th February 2011

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11 FEB 2011

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Dear Sir

**NOISE IMPACT ASSESSMENT FOR THE PROPOSED CHANGE OF USE FROM A SHOP TO A WINE BAR / BISTRO (SUI GENERIS) AT THE FIRST FLOOR OF NO. 7 THE QUADRANT, BUXTON**

Please find herewith the noise impact assessment for the proposed change of use from a shop to a wine bar / bistro at the first floor of No. 7 The Quadrant, Buxton.

## 1.00 INTRODUCTION

1.01 Planning permission for the proposed change of use was granted by High Peak Borough Council (Application No. HPK/2010/0617) in January 2011, subject to a number of conditions. Conditions 2 and 3 restrict the proposed change of use as follows:

*2. Notwithstanding the details shown on Drawing DR3 the first floor shall at no time be used by customers for the consumption of food or drink; it shall only be used for ancillary storage, administration accommodation, toilet facilities and for staff welfare purposes. Reason: In order that the amenities enjoyed by the occupants of the adjacent dwellings shall not be injured, in accordance with Policy GD5 of the High Peak Saved Local Plan Policies 2008.*

*3. The premises shall not be open for business outside the hours 0800 to 2300 on any day. Reason: In order to protect the amenities of the area, in accordance with Policy GD5 of the High Peak Saved Local Plan Policies 2008.*

1.02 Environmental Noise Solutions Limited has been commissioned by Mr Rod McKay of 'The Dressing Room' to establish the measures required to permit the first floor of the premises to be used by customers for the consumption of food or drink whilst ensuring that the amenities enjoyed by the occupants of the adjacent dwellings (principally the second floor dwelling flat, although it is understood that a planning application has been submitted to High Peak Borough Council for a House in Multiple Occupation at (the upper floors of) No. 6 The Quadrant) shall not be injured.

1.03 A glossary of acoustic terms is contained within Appendix 1 for reference.

## 2.00 AIRBORNE SOUND INSULATION OF THE EXISTING SEPARATING FLOOR TO THE SECOND FLOOR DWELLING FLAT

2.01 In order to establish the airborne sound insulation of the existing separating floor to the second floor dwelling flat, sound insulation testing was undertaken at the site on Tuesday 8th February 2011. The following sound insulation tests were undertaken:

- Between existing first floor retail space and second floor dwelling flat (living room to front)
- Between existing first floor retail space and second floor dwelling flat (bedroom to rear)
- Between existing ground floor retail space and second floor dwelling flat (bedroom to rear)

2.02 The airborne sound insulation testing was undertaken using a Bruel & Kjaer 2260 sound level meter and the Building Acoustic Kit. All the procedures in Annex B of the Approved Document E 'Resistance to the Passage of Sound', 2003 (ADE 2003) of the Building Regulations were followed.

2.03 Airborne testing was undertaken for all third octave frequency bands between 100–3150 Hertz. Two source positions were used. The spatial average sound pressure level was obtained for each source position in both source and receiving rooms using a swept microphone technique (continuously moving). An averaging time of 30 seconds was used for each microphone sweep. Reverberation time measurements were undertaken using one loudspeaker position and an interrupted source. The average of six decay measurements for each frequency band was determined from three fixed microphone positions with two readings in each case. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, with no drift in calibration level noted.

2.04 The airborne sound insulation of the existing separating floor is summarised in the following table, where $D_{nT,w}$ is a single-number quantity which characterizes the airborne sound insulation between rooms as defined in BS EN ISO 717-1 (note: $D_{nT,w}$ adopted in ADE 1992), whilst $C_{tr}$ is the spectrum adaptation term for low frequency noise (note: $D_{nT,w} + C_{tr}$ adopted in ADE 2003). It should be noted that, since a marginally higher degree of sound insulation may be expected when the source position is not directly beneath the receiver position, as a worst case scenario, the speaker position which gave rise to the lowest airborne sound insulation is reproduced in the table below rather than the average from both speaker positions.

**Table 1 – Sound Insulation Test Results of Separating Floor**

| Source Room | Receiving Room | $D_{nT,w}$ | $D_{nT,w} + C_{tr}$ |
|---|---|---|---|
| First floor retail space | Second floor dwelling flat (living room) | 49 | 41 |
| First floor retail space | Second floor dwelling flat (bedroom) | 49 | 41 |
| Ground floor retail space | Second floor dwelling flat (bedroom) | 61 | 55 |

2.05 The separating floor construction is understood to consist of a circa 5 mm thick acoustic rubber mat over (circa) 22 mm original t&g floor boarding, (circa) 175 x 50 mm softwood joists, (circa) 20 mm original lath and plaster ceiling under drawn with 12.5 mm fire line plasterboard.

2.06 The airborne sound insulation between the existing first floor retail space and the second floor dwelling flat is wholly consistent with the construction details and represents a moderate degree of sound insulation (i.e. slightly less than that required under ADE 1992[1] / ADE 2003[2]). It is noteworthy, however, that a relatively high degree of sound insulation was measured in the speech frequencies, for example 63 dB $D_{nT}$ at 1,000 hertz and 69 dB $D_{nT}$ at 2,000 hertz.

2.07 As expected (due to increased distance separation and an intermediate floor, albeit with an 'open' stairwell), the airborne sound insulation between the existing ground floor retail space and the second floor dwelling flat is notably higher than that between the existing first floor retail space and the second floor dwelling flat (61 dB $D_{nT,w}$ vs. 49 dB $D_{nT,w}$ (ADE 1992), or 55 dB $D_{nT,w} + C_{tr}$ vs. 41 dB $D_{nT,w} + C_{tr}$ (ADE 2003)) and represents a relatively high degree of sound insulation (i.e. significantly in excess of ADE 2003).

2.08 As stated, the airborne sound insulation between the existing ground floor retail space and the second floor dwelling flat is relatively high (61 dB $D_{nT,w}$). For reference, a number of local planning authorities require that the airborne sound insulation of separating elements between residential dwellings and adjacent places of entertainment with "non-discotheque" music should be a minimum of 60 dB $D_{nT,w}$.

2.09 For reference, ENS has recently designed and tested a separating floor between a sports bar and overlying dwelling flats in the outskirts of Sheffield. The airborne sound insulation of the separating floor was measured at 66 dB $D_{nT,w}$ and occupants of the dwellings flats have subsequently commented that both patron noise and music from the underlying sports bar (likely to be louder than that associated with a bistro / wine bar) was inaudible.

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1: ADE 1992 defined the minimum airborne sound insulation of separating floors as 49 dB $D_{nT,w}$.
2: ADE 2003 defined the minimum airborne sound insulation of separating floors as 43 dB $D_{nT,w} + C_{tr}$.

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2.10 It is therefore considered that in order for the first floor of the premises at Buxton to be used by customers for the consumption of food or drink whilst ensuring that the amenities enjoyed by the occupants of the adjacent dwellings (namely the second floor dwelling flat) shall not be injured, it is necessary to:

- Improve the airborne sound insulation of the separating floor between the existing first floor retail space and the second floor dwelling flat to at least 60 dB $D_{nT,w}$; and

- Subject to the requirements of the local planning authority, install a noise limiting device to ensure that music from the proposed bistro / wine bar is inaudible in the second floor dwelling flat (for reference, it is considered that at 60 dB $D_{nT,w}$ patron noise would be inaudible since speech occurs at mid to high frequencies; the sound insulation of the separating floor is already relatively high at such frequencies and would further increase with the proposed scheme of sound insulation works).

2.11 For reference, sound transmission via the building envelope (i.e. out via the first floor windows and back-in via the second floor windows) was not noted during the course of the testing. It is therefore considered that there is no justification for upgrading the glazing to the first or second floor windows).

2.12 As stated, it is understood that a planning application has been submitted to High Peak Borough Council for a House in Multiple Occupation at (the upper floors of) No. 6 The Quadrant. It is further understood that the existing separating wall between Nos. 6 and 7 The Quadrant is a circa 500 mm solid masonry construction (traditional stone). On this basis, it is considered that the existing separating wall should provide a relatively high degree of sound insulation (i.e. at least 60 dB $D_{nT,w}$).

## 3.00 PROPOSED SCHEME OF SOUND INSULATION WORKS

3.01 It order that the airborne sound insulation of the separating floor between the first floor retail space and the overlying dwelling flat is a minimum of 60 dB $D_{nT,w}$, it is necessary to under draw the existing ceiling (including that within the extended part of the building) with an independent ceiling as per the following specification.

- Install a metal frame ceiling (British Gypsum Casoline or equivalent) beneath the existing ceiling on resilient hangers (as the existing ceiling is to remain in place, it is likely that the acoustic hangers will need to be reversed, so that the hanger is attached to the underside of the joists through the existing ceiling board with the resilient mount before attaching the grid strap hanger).

- Under draw the metal frame ceiling with two layers of 12.5 mm sound bloc plasterboard (joints staggered) and insert 100 mm mineral wool insulation (density 45 kg/$m^3$) in the void.

- The minimum separation distance between the underside of the existing ceiling and the proposed metal frame ceiling board should be at least 250 mm.

3.02 The bulkhead (at first floor level) beneath the stairs to the second floor dwelling flat should also be upgraded as follows:

- Under draw the side and underside of the existing bulkhead with two layers of 12.5 mm sound bloc plasterboard (joints staggered).

- Attach 75 mm timber battens around the bulkhead and insert 50 mm mineral wool insulation (density 45 kg/$m^3$) between battens.

- Attach 16 mm metal resilient bars to the timber battens around the bulkhead.

- Fix two layers of 12.5 mm sound bloc plasterboard (joints staggered) to the metal resilient bars.

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3.03 To avoid any sound flanking via circa 100 mm 'spine' walls, both sides of the wall either side and above the opening between the front and back part of the existing first floor retail space (note: it is understood that this wall extends vertically to form the wall between the living room and bedroom of the second floor dwelling flat) should also be boxed out with timber battens, resilient bars, insulation and sound bloc plasterboard as per Section 3.02.

3.04 The wine bar / bistro may have music at ground and first floor levels. The music should be set such that it is inaudible in the second floor dwelling flat (and the adjacent HMO if planning permission is duly granted). It is considered that this requirement is amenable to planning condition and will be readily achieved since it is understood that the wine bar / bistro is to simply have background music to be compatible with a conversational noise level. For reference, any music system installed within the existing first floor retail space should consist of a series of small loud speakers (resiliently mounted to the walls rather than the ceiling) which distribute sound evenly throughout the premises.

I trust the foregoing is to your satisfaction. If you have any queries please do not hesitate to contact me.

Yours sincerely

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Development Director
Environmental Noise Solutions Limited

cc File