Noise Breakthrough Assessment

Site Address:	34 Well Street, Cefn Mawr, Wrexham, LL14 3AE
Project Reference No:	NP-012073
Client:	Felicity Richards
Reported By:	M. Caley, MSc, MIOA
Date:	09/01/2025

Introduction

NOVA Acoustics Ltd has been commissioned to assess the level of noise transmission between a proposed ground floor laundrette and first-floor residential flats above.

A full planning application for the development (ref. P/2024/1558) has been submitted to the Local Planning Authority ('LPA') Wrexham County Borough Council. The application is titled as follows:

"Change of use of ground floor from Class A1 (hairdressers) to Sui Generis (Laundrette)."

A request has been received from the LPA for a noise assessment to be submitted for the development. This is reproduced below:

"Due to the presence of residential accommodation above the proposal (Public Protection) is unable to make a recommendation without a scheme of noise insulation and attenuation measures between the ground floor proposal and first floor accommodation, in compliance with the Building Regulation Guidance: Part E – Resistance to Passage of Sound, has been submitted to, and approved in writing by, the Local Planning Authority. The measures as are approved should be fully implemented in strict accordance with the scheme prior to the first occupation and shall thereafter be permanently retained.

If there is any plant associated with the proposal (i.e., air handling plant) a noise assessment will also be required so as to assess any impact on nearby (including first floor) residential receptors:

A noise survey shall be carried out, and a detailed report of the findings shall be submitted to, and approved in writing by, the Local Planning Authority. The noise survey shall determine noise levels for both day (07:00 – 23:00 hours) and if applicable night (23:00 – 07:00 hours), having regard to Planning Policy Wales (PPW) Guidance and Technical Advice Note (TAN) 11 – Noise. The report findings shall include:

a) *Noise levels arising from day / night-time activities in the vicinity of the proposed development site and the impact upon existing residential accommodation, and*
b) *A detailed scheme of noise insulation and/or attenuation measures so designed to safeguard the amenity of the residential accommodation hereby approved."*

It is thought that the following guidance from TAN 11 is applicable to the development:

"*8. Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.*

9. Noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development, for example, the character of the noise should be taken into account as well as its level. Sudden impulses, irregular noise or noise which contains a distinguishable continuous tone will require special consideration... Advice on assessing noise and on factors to consider in relation to the major noise sources including roads, railways, airports, industrial and recreational noise and their measurement is given in Annex B."

"Appendix B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24-hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g., day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233:1987."

The applicant has informed NOVA Acoustics there will be no externally ducting or externally mounted plant (extraction, air condition, etc.) installed as part of the development. Given this, it is thought that an assessment of noise in the external environment is not necessary, and the focus of the assessment is exclusively noise transference within the building itself.

Noise Breakthrough Assessment

Noise Breakthrough Criteria

It is stated in BS8233:2014 that the internal noise criteria within residential properties should be achieved considering the cumulative noise environment. This includes both noise ingress through the external building envelope, and noise transference within the building itself.

Guidance on sound insulation between adjoining domestic and non-domestic dwellings is discussed in Approved Document E ('ADE') of the Building Regulations. The following is stated in section 0.8 of Part E:

"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 standard of sound insulation is required and, if so, to determine the appropriate level."

The predicted internal noise level within the proposed laundrette has been taken from a previous assessment carried out by NOVA Acoustics for an industrial washing facility (report ref. 4795CL). This is thought to present a 'worst-case' scenario considering that internal noise levels within a commercial laundrette are likely to be lower than those found in an industrial setting.

To ensure that the risk of adverse impact is effectively reduced should the owners wish for the laundrette to operate during the early morning or night-time hours (23:00 – 07:00), the NR15 frequency curve is used as the criteria for the breakthrough calculations. This is 10dB below the standard BS8233 night-time criteria, which should ensure that noise from the laundrette will not constructively add to the internal noise levels within the 1st floor residential rooms. Further to this, the criteria in the 63Hz and 125Hz are equal to (or lower than) the Moorhouse Curve criteria, which should ensure that any adverse impact from low-frequency noise is fully considered.

The minimum levels of airborne sound insulation required to achieve the criteria are presented in the table below.

Description	Octave Frequency Band (Hz, dB)							Overall (dB)
	63	125	250	500	1k	2k	4k	
Internal Noise Level within Bar (L_{eq})	75	79	77	73	71	73	67	78 (A)
NR15 Curve (L_{eq})	47	35	26	19	15	12	9	20 (A)
Min. Required Sound Reduction (D_{nT})	28	44	51	54	56	61	58	58 ($D_{nT,w}$)

Table 1 – Minimum Required Airborne Sound Insulation Performance

Sound Insulation Testing Results

Sound insulation testing was conducted at the development site on 02/01/2025. Airborne sound insulation measurements were undertaken using a dodecahedral speaker and a type 1 sound level meter in accordance with BS140-4:1998. The equipment was calibrated to an accuracy showing negligible deviation using a field calibrator before and after the measurement periods.

The testing was undertaken in the following locations:

- Proposed ground floor development to Flat 1 lounge / bedroom above.
- Proposed ground floor development to Flat 1 kitchen above.

The results of the testing are compared with the minimum sound insulation requirements in the table below.

Description	Octave Frequency Band (Hz, dB)							Overall (dB)
	63	125	250	500	1k	2k	4k	
Ground Floor Commercial to Flat 1 Lounge / Bedroom	31	45	52	68	76	79	81	66 ($D_{nT,w}$)
Min. Required Sound Reduction (D_{nT})	28	44	51	54	56	61	58	58 ($D_{nT,w}$)
Exceedance of Criteria	+3	+1	+1	+14	+20	+18	+23	+8
Ground Floor Commercial to Flat 1 Kitchen	35	43	49	61	73	76	73	62 ($D_{nT,w}$)
Min. Required Sound Reduction (D_{nT})	28	44	51	54	56	61	58	58 ($D_{nT,w}$)
Exceedance of Criteria	+7	-1	-2	+7	+17	+15	+15	+4

Table 2 – Minimum Required Airborne Sound Insulation Performance

Conclusion

As can be seen in table 1, the criteria have been achieved in all frequency bands with the exception of two marginal shortfalls in the 125Hz and 250Hz octaves. Considering that the exceedances are no larger than 1 – 2dB, they are deemed to be negligible and inaudible. As such, it is thought that the existing floor construction is appropriate and there is a low risk of adverse impact in the residential rooms above.

No further upgrades of the partition are recommended, however, to further reduce the likelihood of adverse impact, it is recommended that all machines are installed on antivibration mounts or damping pads so that they are fully isolated from the building structure.

Sound insulation test certificates can be found in Appendix A overleaf.

Document End

Appendix A – Sound Insulation Test Certificates

Standardized Level Difference According to Resistance to the Passage of Sound Approved Document E

Field measurements of airborne sound insulation between rooms

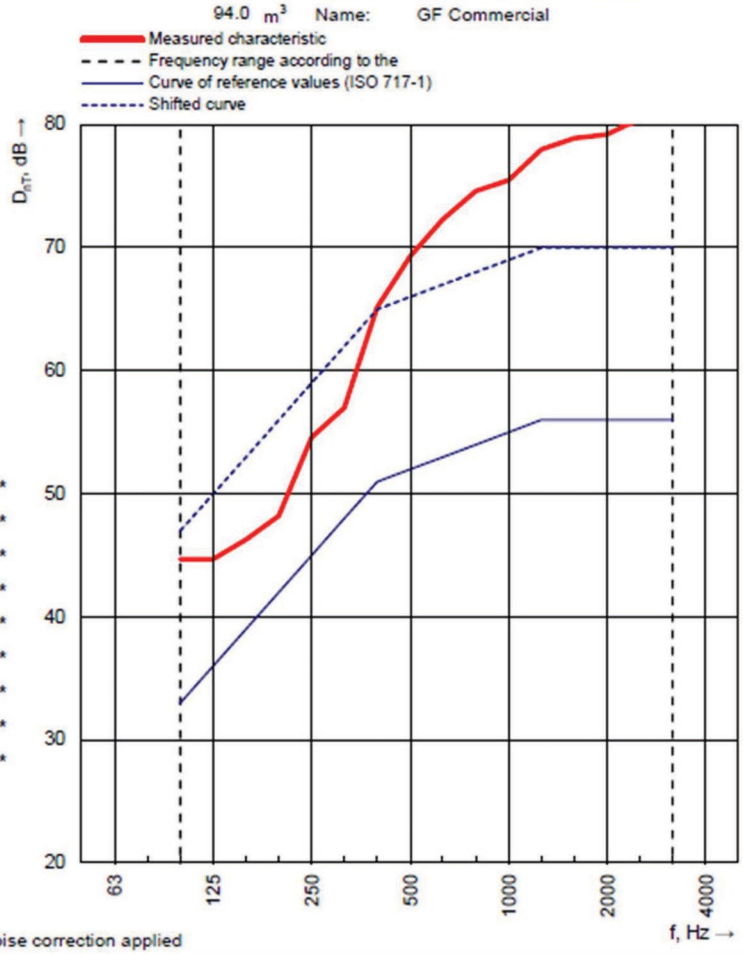
Date of test: 2025-01-02

Client:

Description: See Pages 1 & 2

Area of common partition: 12.0 m^2 Note:
Receiving room volume: 36.0 m^3 Name: Flat 1 - Lounge / Bedroom
Source room volume: 94.0 m^3 Name: GF Commercial

Frequency *f* Hz	D_{nT} (1/3 octave) dB	
50		
63		
80		
100	44.7	
125	44.7	
160	46.3	
200	48.2	
250	54.6	
315	57.0	
400	65.2	
500	69.3	*
630	72.3	*
800	74.6	*
1000	75.5	*
1250	78.0	*
1600	78.9	*
2000	79.2	*
2500	80.5	*
3150	80.5	*
4000		
5000		



* ISO 140 - 4 maximum background noise correction applied

Rating according to ISO 717-1

$D_{nT,w}(C; Ctr)$ = **66** (-3 ; -8) dB $C_{50-3150}$= -5 dB $C_{50-5000}$= -4 dB $C_{100-5000}$= -2 dB
$C_{tr,50-3150}$= -17 dB $C_{tr,50-5000}$= -17 dB $C_{tr,100-5000}$= -8 dB

Evaluation based on field measurement results obtained by an engineering method

No. of test report: NP-012073 - A Name of test institute: NOVA Acoustics Ltd

Date: 2025-01-02 Signature: T Bunting

Standardized Level Difference According to Resistance to the Passage of Sound Approved Document E

Field measurements of airborne sound insulation between rooms

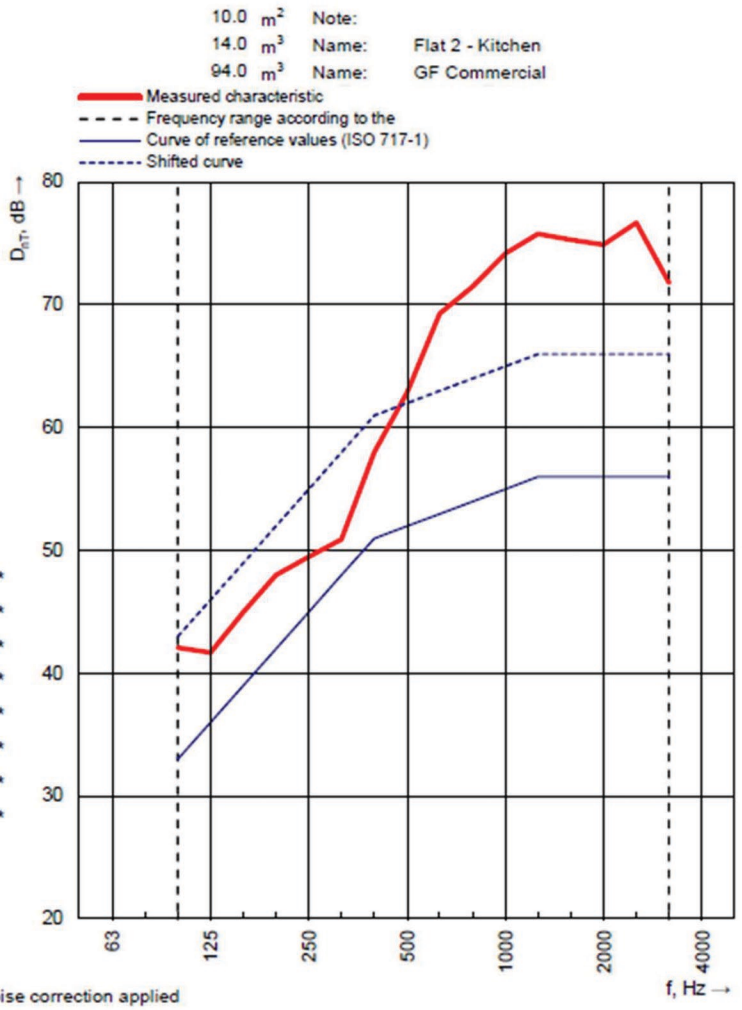
Date of test: 2025-01-02

Client:

Description: See Pages 1 & 2

Area of common partition: 10.0 m^2 Note:
Receiving room volume: 14.0 m^3 Name: Flat 2 - Kitchen
Source room volume: 94.0 m^3 Name: GF Commercial

Frequency *f* Hz	D_{nT} (1/3 octave) dB	
50		
63		
80		
100	42.1	
125	41.7	
160	45.0	
200	48.0	
250	49.5	
315	50.9	
400	58.0	
500	62.9	
630	69.3	*
800	71.5	*
1000	74.2	*
1250	75.8	*
1600	75.3	*
2000	74.9	*
2500	76.7	*
3150	76.7	*
4000		
5000		



* ISO 140 - 4 maximum background noise correction applied

Rating according to ISO 717-1

$D_{nT,w}(C; Ctr)$ = **62** (-2 ; -7) dB $C_{50\text{-}3150}$= -3 dB $C_{50\text{-}5000}$= -2 dB $C_{100\text{-}5000}$= -1 dB
$C_{tr,50\text{-}3150}$= -11 dB $C_{tr,50\text{-}5000}$= -11 dB $C_{tr,100\text{-}5000}$= -7 dB

Evaluation based on field measurement results obtained by an engineering method

No. of test report: NP-012073 - B Name of test institute: NOVA Acoustics Ltd

Date: 2025-01-02 Signature: T Bunting

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