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Acoustic Survey and Assessment for Proposed conversion of the first floors to create an additional floor and four Flats at 41-43 Wellgate, Clitheroe, BB7 1LU.

Prepared for:

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Contents

1. Introduction

1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic survey and assessment to support a planning application for the change of use to the first floor and creation of a second floor to create four flats at 41-43 Wellgate, Clitheroe, BB7 1LU.

Site Location and Context

1.2. The development site is situated to the north of Wellgate in the centre of Clitheroe. The ground floor of the site is commercial as is the rest of the terrace block which stretches along the road to the west . additional commercial units are located on the far side of the road to the south. To the east a cut through runs along the side of the building accessing a unit to the rear, north and allowing pedestrians access to the supermarket to the northeast. Adjacent to the east is the Dog and Partridge public house.

1.3. An aerial Photograph is enclosed in Figure 1, together with a proposed layout drawing in Figure 2.

1.4. The report has been produced to clarify the potential impact on the proposed development and to identify mitigation measures if required to ensure the development is appropriate in terms of noise impact.

2. Policy and Guidance

2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals, or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).

2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in December 2024, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution, paragraph 187.

2.3. The document goes further in paragraph 198 by stating planning policies and decisions should ensure that new development is appropriate for its location … in doing so they should "*mitigate and reduce to a minimum potential adverse impacts from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*". The NPPF makes direct reference to the Government published Noise Policy Statement for England (NPSE).

2.4. The NPSE sets out the long-term vision of the government's policy on noise, which is to "*promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*."

2.5. Its guiding principles include "Using Sound Science Responsibly – Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the precautionary principle) as well as public attitudes and values."

2.6. The NPSE's long-term vision is supported by three aims:

- Avoid significant adverse impacts on health and quality of life,
- Mitigate and minimise adverse impacts on health and quality of life; and,

- Where possible, contribute to the improvements of health and quality of life.

2.7. The NPSE provides further guidance on "significant adverse effects" and adverse effects" and introduces the following terms, which have been used within toxicological studies for years.

NOEL – No Observed Effect Level; this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

LOAEL – Lowest Observed Adverse Effect Level. this is the level of noise exposure above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level. This is the level of noise exposure above which significant adverse effects on health and quality of life occur.

2.8. The use of the words Observed is important, a change in behaviour, e.g. closing windows, turning up TV's or physical change, e.g. being woken up must be observed, and not simply being able hearing a sound.

2.9. The NPSE recognises that it is not possible to have single objective noise-based measures which define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

2.10. The Planning Practice Guidance on Noise, July 2019 (PPG – N) provides further guidance on the consideration of noise as part of the planning process and highlights that plan-making and decision making need to take account of the acoustic environment and consider;

- Whether or not a significant adverse effect is occurring or likely to occur
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether a good standard of amenity can be achieved.

The guidance used the same concepts of adverse effect level, used within the NPSE.

2.11. The PPG -N document provides the following noise exposure hierarchy;

TABLE 2.1 NOISE EXPOSURE HIERARCHY

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVEL	ACTION
Not Noticeable	No effect.	No observed effect	No specific measures required
Noticeable and Not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television, speaking more loudly, or having to close windows for some of the time because of the noise where there is no alternative ventilation. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant/medically definable harm (auditory and non-auditory).	Unacceptable adverse effect	Prevent

2.12. One therefore needs to determine what level represents SOAEL in a given situation, so that it can be avoided and mitigated against. While the NPSE and PPG-N identify that no single level of sound can be provided which determines an adverse impact from noise many Local Authorities have identified sound level criteria in accordance with the World Health Organisation's recommended levels, mirrored in BS8233:2014.

2.13. The World Health Organisation (WHO) "Guidelines for the prevention of Community Noise Annoyance" provides guidance on internal and external sound levels that are likely to result in community annoyance. These are mirrored within BS8233:2014. 'Guidance on sound insulation and noise reduction for buildings – Code of Practice'

2.14. The WHO recommended noise levels are based on sound scientific research principles on when observed effects are reached as required by the NPPF.

2.15. The WHO guidance identifies that for outdoor amenity areas (gardens) sound levels that should not exceeded 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For internal levels the WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ in bedrooms at night to prevent sleep disturbance.

2.16. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night-time period.

2.17. The hours of 07:00 – 23:00 representing day-time and 23:00 -07:00 night-time periods.

2.18. BS 8233:2014 also specifies desirable noise levels to be achieved inside dwellings. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night-time a level of 30dB $L_{Aeq,8hr}$ is recommended. Slightly higher levels are recommended for dining room areas at 40dB $L_{Aeq,16hr.}$ The for Criteria for external areas mirrors that within the WHO guidance.

2.19. The WHO/BS8233 guidelines therefore suggest sound levels above 55dB(A) externally would result in a significant adverse impact (SOAEL), between 50-55dB(A) as a moderate annoyance or LOAEL and therefore below 50dB(A) as NOEL.

2.20. Internally the guidance recommended levels of 35dB(A) during the daytime to avoid moderate annoyance and 30dB(A) at night-time to prevent sleep disturbance (LOAEL). Thus, levels below these would equate to NOEL.

2.21. Based on the 15dB reduction for an open window sited within both the WHO and BS8233 guidance documents and the sited external and internal recommended sound levels, LOAEL would be observed between 35-40dB $L_{Aeq,16hr}$ day and 30-35dB $L_{Aeq,8hr}$ night. While SOAEL levels would be above these values.

2.22. Councils typically use the 35dB day/30dB night as internal criteria when assessing the impact on and from developments as part of the planning process, along with the night-time maximum 45dB L_{Amax} level within bedrooms.

BS4142:2014+A1:2019

2.23. Another commonly used standard is British Standard 4142:2014+A1:2019 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels. This standard aims at addressing the impact from industrial and commercial activities, taking into account the subjective nature of sound and potential short term activities.

2.24. The methodology requires the "residual sound", the ambient sound level when the specific sound source is suppressed or absent expressed as an $L_{Aeq,t}$ measurement to be then subtracted from the "ambient sound level", the overall sound level present including the specific source sound, measured as L_{Aeq} measurement resulting a in value for the specific or "problem" sound alone.

2.25. If the "specific" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is intermittent or irregular enough to attract attention a correction is added to the "specific level" to produce a "rating level". The "rating level" is then compared to the measured "background" L_{A90} sound level.

2.26. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact.

ProPG : Planning & Noise : 2017

2.27. The primary goal of this guidance is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise.

2.28. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. It is applicable to noise from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise).

2.29. The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is "not dominant".

2.30. This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

2.31. The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- Element 1 – demonstrating a "Good Acoustic Design Process";
- Element 2 – observing internal "Noise Level Guidelines";
- Element 3 – undertaking an "External Amenity Area Noise Assessment"; and
- Element 4 – consideration of "Other Relevant Issues".

The ProPG considers suitable guidance on internal noise levels found in "BS8233:2014: Guidance on sound insulation and noise reduction for buildings".

2.32. The above being measured prior to the any equipment being turned on, e.g. the engine or bridge simulation equipment for this development.

2.33. Based on the above guidance and given the development being considered the following criterion have been identified:

Location	07:00 to 23:00	23:00 to 07:00
Living rooms (e.g. Lounges)	35 dB $L_{Aeq,16hr}$	-
Bedrooms	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$
Dining rooms	40 dB $L_{Aeq,16hr}$	-
BS4142:2014 Rating Level		
Living rooms	35 dB $L_{Aeq,16hr}$	-
Bedrooms	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

3. The Assessment

The development

3.1 The proposed development consists change to the first floor and an extension to create a second floor to the property resulting in four flats.

3.2 In addition, the ground floor has permission to operate as a commercial kitchen and as such an extraction system is located to the rear elevation.

3.3 Figure 2 below provides an overview of the proposed development.

Existing Situation.

3.4 In order to obtain representative background sound levels for the area on site monitoring was undertaken over the 20th-22nd November 2025.

3.5 Two Cirrus Optimus Green sound level meters were utilised for the monitoring. The first meter was placed over 1m from the second-floor façade overlooking the road to the south. The second meter was placed over 1m from the second-floor façade overlooking the rear alleyway and side of the public house. The second floor was used due to the lack of floorboards to the first floor.

3.6 The meters were field calibrated at the start and end of the monitoring period with no significant variation and full laboratory calibration certificates are available on request.

3.7 The weather during the monitoring was generally dry with short shower on the second evening and little wind <5m/s.

3.8 The full results are shown in Appendix A, with a summary in the tables below.

Front

Start Time	End Time	Duration	L_{Aeq}	L_{A90}	L_{AMax}
20/11/2025 15:00	20/11/2025 23:00	07:59:59	59.8	44.2	90.9
20/11/2025 23:00	21/11/2025 07:00	08:00:00	52.3	35.1	86.3
21/11/2025 07:00	21/11/2025 23:00	16:00:00	60.9	50.2	91.1
21/11/2025 23:00	22/11/2025 07:00	08:00:00	56.5	41.3	96.5
22/11/2025 07:00	22/11/2025 11:00	04:00:01	62.2	47.4	82.0

Rear

Start Time	End Time	Duration	L_{Aeq}	L_{A90}	L_{AMax}
20/11/2025 15:00	20/11/2025 23:00	07:59:59	53.7	48.8	82.0
20/11/2025 23:00	21/11/2025 07:00	08:00:00	51.7	44.2	83.3

21/11/2025 07:00	21/11/2025 23:00	16:00:00	55.5	50.0	88.3
21/11/2025 23:00	22/11/2025 07:00	08:00:00	51.4	41.8	84.5
22/11/2025 07:00	22/11/2025 10:56	03:56:51	55.5	47.7	90.0

3.9 Background sound levels were dominated by passing traffic on the road and people in the alleyway. Plant noise was also identified to the rear during the night-time period, i.e. when the daytime traffic had subsided. Night-time maximum sound levels not regularly exceeded, due predominantly to passing vehicles at the front and people talking outside of the property to the rear were identified at 77.5dB(A) to the front and 78.0dB(A) to the rear.

3.10 Given a 15dB attenuation[1] for an open window the sound levels to be experienced by the future occupants are above those identified within the guidance documents detailed in section 2 of the report. Therefore, further mitigation measures are required.

3.11 A standard 6/12/6 double glazing unit will, when closed, provide a sound reduction, $R_w(C;C_{tr})$, of 36(-2;-5). Therefore, based on the simple calculation detailed in Annex G.1 of BS8233:2014, which considers the reduction provided by only the glazing element, typically the weakness point of any façade, the standard 6/12/6 glazing unit is adequate to protect the future occupants of the accommodation from the prevailing environmental sound levels for the average day and night-time periods.

3.12 Insulation values for materials are largely governed by their mass, with greater mass providing greater attenuation. A standard brick/block solid or cavity wall will generally provide much higher levels of attenuation than a standard window unit of the same size due to the greater mass involved. Thus, when carrying out a simple calculation assuming the reduction of the full façade of the building is equivalent to the window unit adds in a very conservative precautionary approach to the assessment.

3.13 For the night-time regularly exceeded maximum sound levels observed the above glazing specification, when considered in conjunction with the entire façade is adequate to the protect the internal environment. Appendix C contains calculations for the first and second floor bedrooms against the identified night-time maximum. Each

[1] BS8233: 2014; Guidance on sound insulation and noise reduction for buildings

is below the recommended 45dB(A) identified in Section 2 as generating an adverse impact.

3.14 Therefore, to ensure that suitable internal sound levels are maintained it is recommended that all habitable rooms are fitted with the 6/12/6 standard double glazing units.

3.15 Care must be taken to ensure that windows are well fitted and gaps between the window frame and the brick work are minimised. Where gaps do occur, these should be filled with a suitable acoustic material, not expandable foam. The window frame should be sealed across the full depth of the frame and not just around the edges. This will ensure that sound does not 'leak' around the edge of the frame.

Ventilation

3.16 To ensure a suitable internal sound levels is maintained windows will need to be kept closed. Building Regulations Approved Documents F (ADF) – Ventilation and O (ADO) – Overheating provide a requirement for adequate ventilation of buildings.

3.17 ADF identifies three types of ventilation which must be present in a dwelling,

Background **whole dwelling** ventilation – continuous ventilation at a low rate to dilute and remove pollutants, water vapour and stale air,

Extraction ventilation from rooms where water vapour or pollutants are likely to be released (e.g. bathrooms and kitchens), to minimise their spread to the rest of the building

Purge ventilation – short duration relatively high rates to rapidly remove/dilute pollutants and/or water vapour.

3.18 As windows must remain closed additional provision for whole dwelling ventilation is required. This is likely to be consist of some form of mechanical ventilation. Where this includes direct openings between habitable rooms and the external environment, e.g. wall fans, the chosen system must ensure a suitable level of attenuation is provided equal to or greater than the glazing specification (Note vents are described in terms of dB $D_{ne.w}+C_{Tr}$[2]).

[2] See Appendix G – Definitions

3.19 Extract Ventilation is typically provided with kitchen and bathroom areas and the above recommendation s would not impact on the standard provision of extract ventilation.

3.20 Purge Ventilation is only required for short periods and the above recommendations do not prohibit the short opening of windows for purge ventilation of the property, but would still ensure adequate internal sound levels are achieved.

3.21 ADO requires adequate means to remove heat from the indoor environment. In standard properties where windows can be left open and cross ventilation of the whole dwelling is possible this is usually sufficient, however where restrictions are present on the opening of windows e.g. high crime areas or for acoustic reasons alternative provision must be made. This is likely to be consist of some form of mechanical ventilation.

Internal transfer of Sound

3.22 It is also important to ensure that the internal transfer of sound between the flats does not result in an adverse impact on the future occupants of the development.

3.23 It has not been possible to undertaken an assessment of the current separating construction elements due to limited access, and lack of any floor ceiling at the site. The transmission of sound between the floors can be calculated in accordance to the principes contained within BS12354-1 and the use of the following equation.

$$L_2 = L_1 - R + 10log(S) - 10log(A)$$

Where L_1 is the source room sound level (dB), R is the sound reduction index of the separating floor/wall (dB), S is the surface area of the separating element (m^2), and A is the equivalent absorption are within the receiving room (m^2).

3.24 Values for R for the separating elements have been obtained through the use of the Insul sound insulation modelling software, and are shown in Appendix D. The proposed details include upgrading any single brick walls with a 100mm stud with , any stud walls to be constructed from a 15mm layer of acoustic board and 15m layer of fire board overlapped on each side of a 100mm stud frame with 60mm insulation and a resilient bar on one side.

3.25 The floor/ceiling between the ground floor and first floor to be constructed from the 150mm joist with particle floorboarding above, a Gyproc acoustic hanger system below the joists with 60mm acoustic insulation laid between the joists. To the underside overlapping layers of 15mm soundboard and 15mm fireboard.

3.26 Between the first and second floors particle floorboarding over a 150mm joist, 60m insulation between the joists. Resilient bars below and overlapping 15mm sound board and 15mm fireboard to the underside.

3.27 The source noise used within the calculations has been assumed at 80dB(A), with a sound spectrum taken from the "Little Red Book of Acoustic" for a 'busy restaurant', given the size of the ground floor this is considered to be overly cautious, with a lower sound level expected. A level of 70dB(A) has been used for the source noise between the apartments, based on the same sound spectrum.

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4K	dB(A)
Ground floor	60	70	75	75	75	75	70	80
Residential	50	60	65	65	65	65	60	70

3.28 The results of the sound transfer calculations are shown in Appendix D, with all rooms and separating structures ensuring the resulting sound levels are below the criteria levels identified in Section 2. As a result, no adverse impact will be experienced between the different uses/apartment's.

Impact from External Extraction System

3.29 Details of the current extraction system have bene obtained, the system utilises a Flaktwood JM Aerofoil 31JM/216/4/5/34, with a 2D silencer to each side of the fan. Manufacturers details are attached in Appendix E.

3.30 It is typical to consider extraction systems utilising the methodology contained with BS4142:2014, however this standard provides a rating level for the external environment. The extraction system is an existing system and it has already been identified that the property will have closed windows due to the prevailing environmental sound.

3.31 As such a consideration of the internal sound level has been undertaken for the nearest apartment window. A simple calculation has been undertaken considering the glazing attenuation only, a more detailed assessment, considering the full façade would result in lower internal sound levels than those discussed below.

3.32 The nearest window, a stairwell window will be at least 1.45m away from the extraction fan, given the above information this will result in a façade sound level of 52.0dB(A) and an internal sound level of 28.0dB(A). The nearest habitable room window, the kitchen /dining area of Flat 1 is over 3m away, with resulting internal sound levels being 45.1dB(A) faced and 21.2dB(A) internally.

3.33 In line with BS4142, a correction to these values can be made to account for the characteristics (+3dB) of the extract fan noise and any tonality (+2dB). This results in a rating level of 26.2dB(A) within the nearest habitable room.

3.34 The extraction system will not result in any adverse impact on the proposed development.

4 Conclusion

4.1 On-site monitoring has identified existing background sound levels will result in an adverse impact on the proposed development. As such additional mitigation measures are required.

4.2 These have been identified as standard double-glazing units with alternative ventilation provision to ensure a suitable level of ventilation is achieved.

4.3 A consideration of sound transfer between different uses along with break-in from the existing extraction has also been undertaken with suitable construction specifications provided to minimise internal sound transfer.

4.4 The inclusion of the above mitigation measures to all habitable rooms will ensure that the internal and external sound levels are acceptable and will result in a No Observe Effect on the future residents in line with the Noise Policy Statement for England.

4.5 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Figure 1 – Aerial Photograph

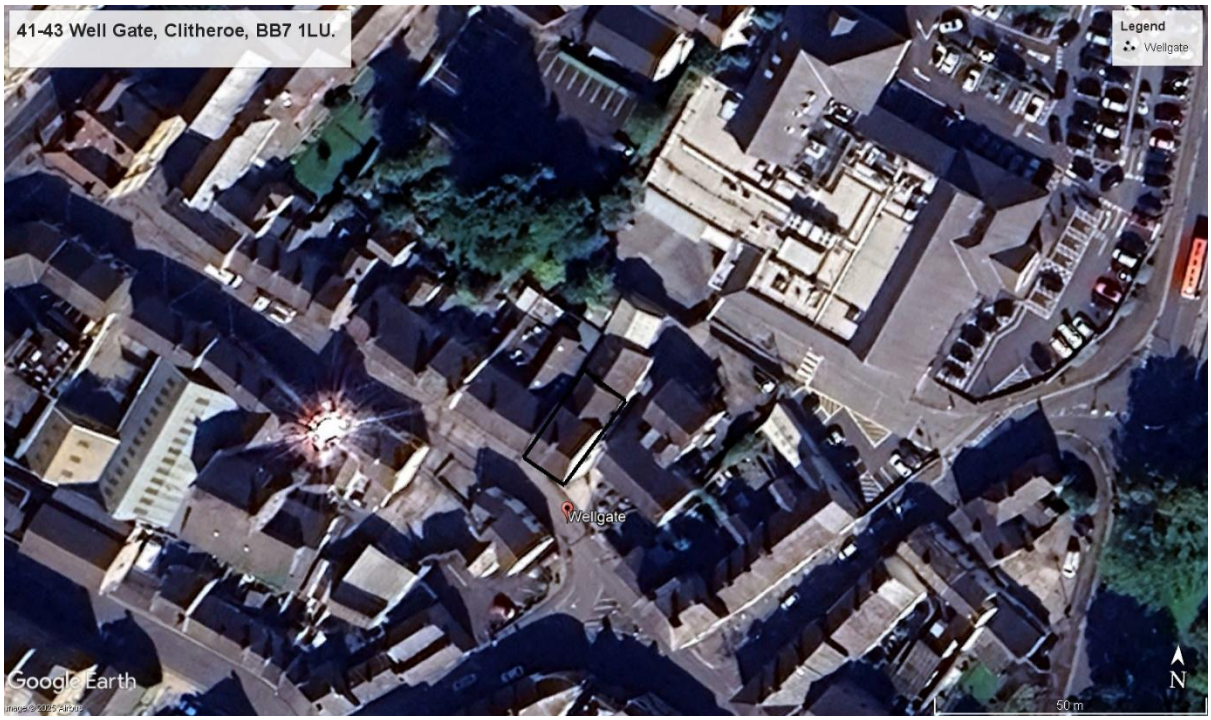


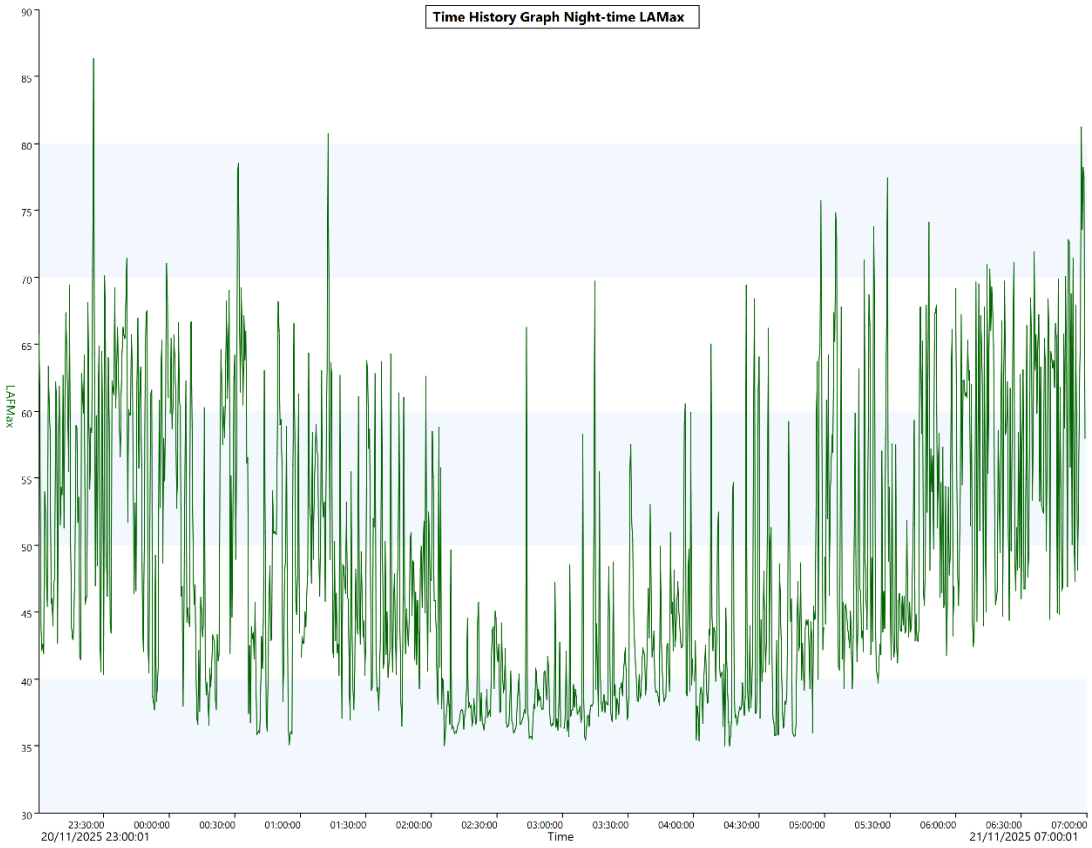
Figure 2 – Proposed Layout Plan

Appendix A – Full Monitoring Results

Front

Time	L_{Aeq} (dB)	L_{AMax} (dB)	L_{A90} (dB)
20/11/2025 15:00	61.9	90.9	54.0
20/11/2025 16:00	61.4	84.0	53.9
20/11/2025 17:00	61.2	84.2	52.9
20/11/2025 18:00	59.9	88.8	48.2
20/11/2025 19:00	59.7	82.5	47.7
20/11/2025 20:00	57.7	75.5	43.7
20/11/2025 21:00	56.3	71.7	41.2
20/11/2025 22:00	55.6	75.9	40.4
20/11/2025 23:00	56.8	86.3	37.2
21/11/2025 00:00	50.5	78.5	35.1
21/11/2025 01:00	48.1	80.7	34.9
21/11/2025 02:00	39.6	66.2	34.6
21/11/2025 03:00	42.8	69.7	35.1
21/11/2025 04:00	46.8	75.7	34.2
21/11/2025 05:00	54.1	77.4	37.8
21/11/2025 06:00	55.8	81.2	40.9
21/11/2025 07:00	59.7	82.0	46.8
21/11/2025 08:00	61.9	81.3	52.6
21/11/2025 09:00	60.9	77.5	53.1
21/11/2025 10:00	61.0	79.6	52.6
21/11/2025 11:00	61.2	79.5	54.5
21/11/2025 12:00	61.9	78.4	53.6
21/11/2025 13:00	60.7	82.9	52.4
21/11/2025 14:00	61.9	88.2	55.7
21/11/2025 15:00	63.0	86.9	55.2
21/11/2025 16:00	61.7	89.6	54.8
21/11/2025 17:00	61.5	75.9	54.1
21/11/2025 18:00	60.1	78.7	50.8
21/11/2025 19:00	59.9	88.2	48.2
21/11/2025 20:00	59.5	91.1	46.6
21/11/2025 21:00	58.2	83.1	47.2
21/11/2025 22:00	58.2	81.4	45.4
21/11/2025 23:00	60.1	96.5	44.5
22/11/2025 00:00	59.5	88.4	44.1
22/11/2025 01:00	55.2	75.6	40.7
22/11/2025 02:00	54.5	80.5	43.3
22/11/2025 03:00	54.2	78.0	45.3
22/11/2025 04:00	51.0	75.3	38.3
22/11/2025 05:00	51.4	73.9	39.2

22/11/2025 06:00	57.3	82.3	41.9
22/11/2025 07:00	58.8	81.5	44.6
22/11/2025 08:00	62.3	76.4	49.4
22/11/2025 09:00	63.1	82.0	54.8
22/11/2025 10:00	63.4	80.4	56.4


Time History Graph Night-time LAMax
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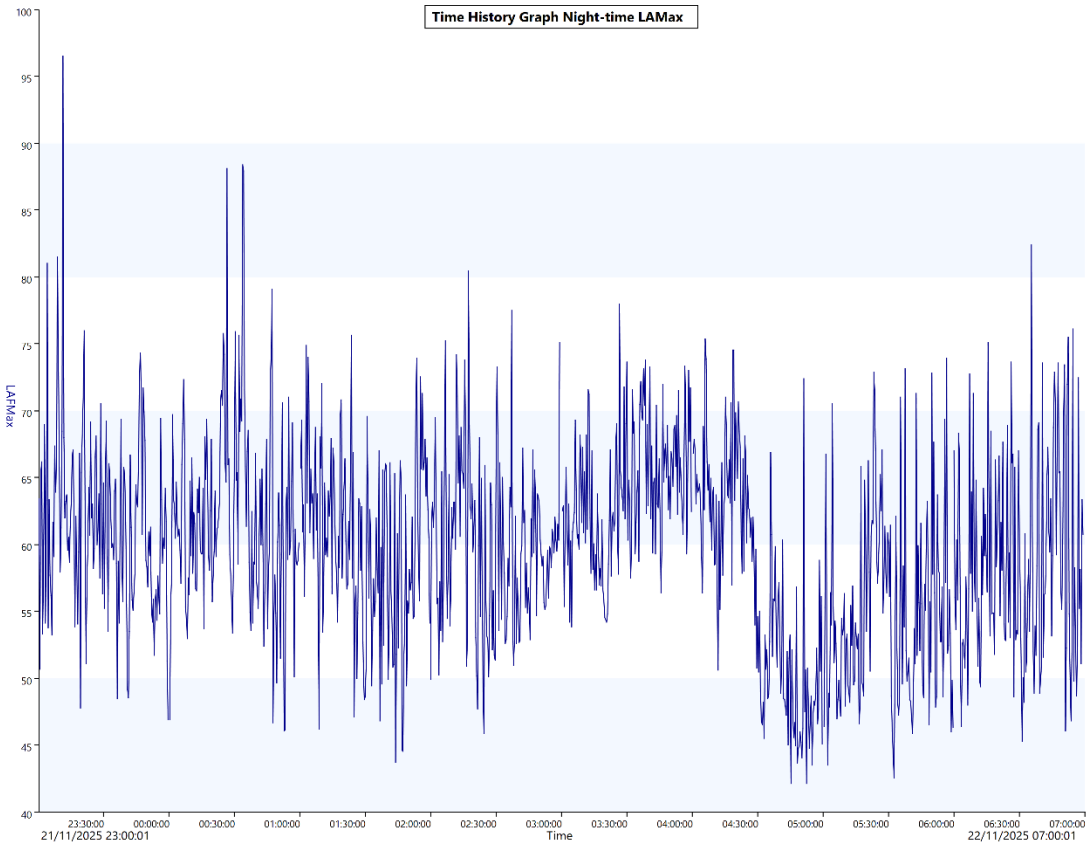
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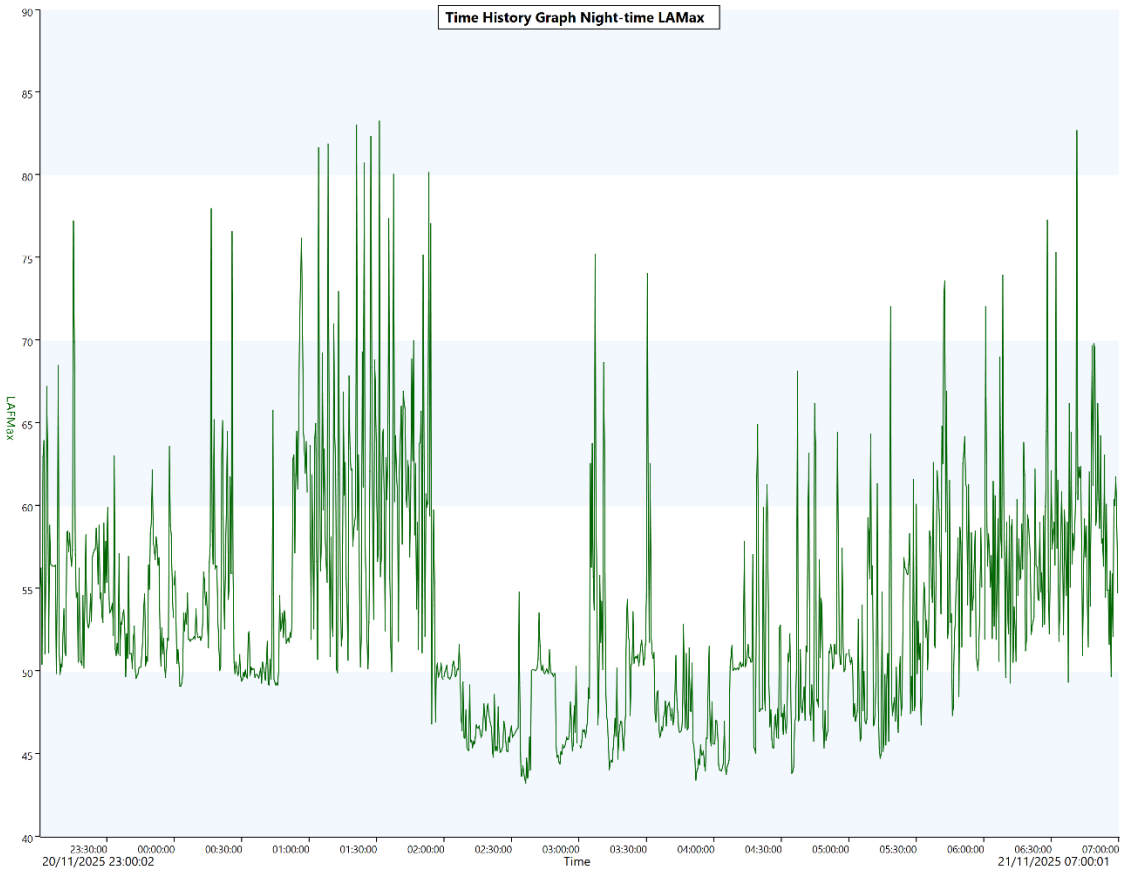
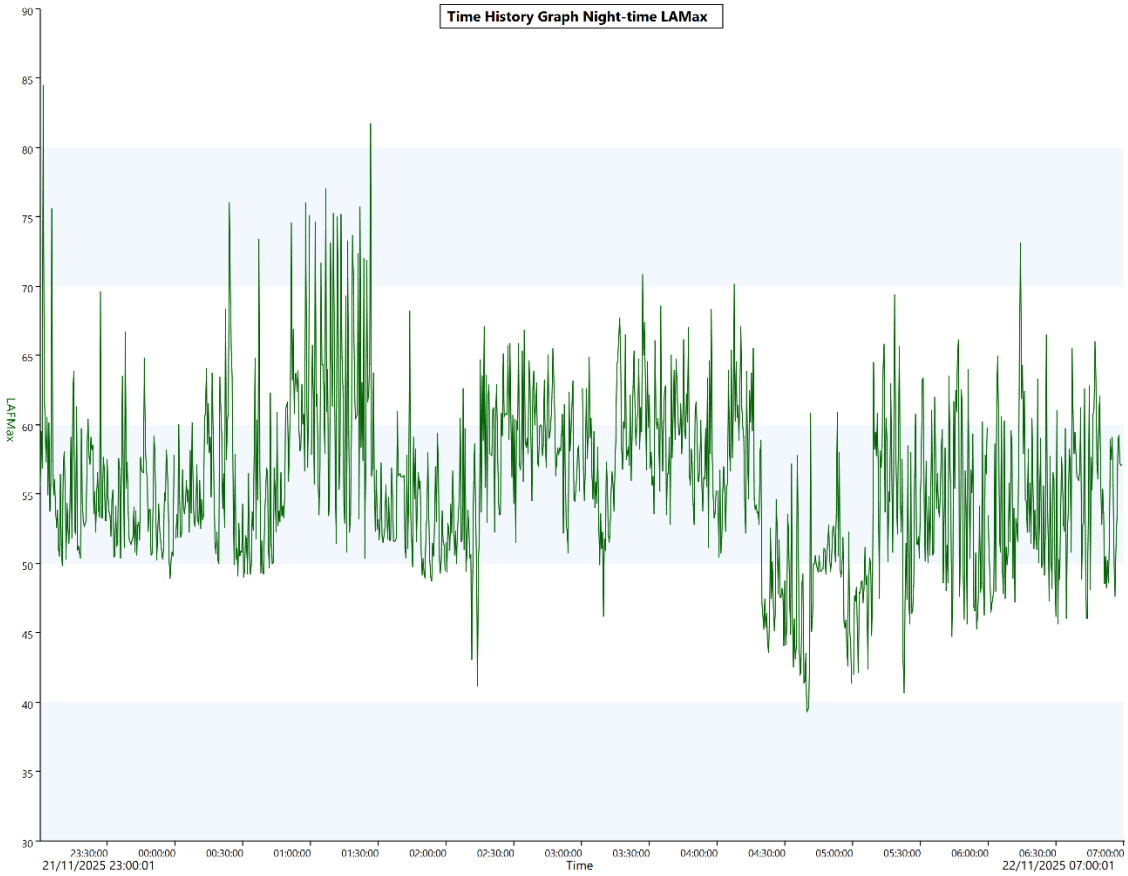
Time

Rear

Time	L_{Aeq} (dB)	L_{AMax} (dB)	L_{A90} (dB)
20/11/2025 15:00	54.4	77.8	48.8
20/11/2025 16:00	53.3	72.4	48.7
20/11/2025 17:00	53.2	78.9	48.4
20/11/2025 18:00	52.0	73.8	47.3
20/11/2025 19:00	53.3	73.7	47.6
20/11/2025 20:00	55.4	82.0	49.6
20/11/2025 21:00	54.0	80.1	49.4
20/11/2025 22:00	52.8	71.8	49.2
20/11/2025 23:00	52.9	77.2	48.9
21/11/2025 00:00	53.0	77.9	48.4
21/11/2025 01:00	54.7	83.3	48.3
21/11/2025 02:00	46.5	54.8	43.5
21/11/2025 03:00	48.0	75.2	43.2
21/11/2025 04:00	48.9	68.1	43.2
21/11/2025 05:00	50.7	73.6	44.3
21/11/2025 06:00	52.7	82.7	46.5
21/11/2025 07:00	55.6	80.5	49.3
21/11/2025 08:00	58.6	87.8	51.4
21/11/2025 09:00	57.8	88.3	49.8
21/11/2025 10:00	54.7	81.8	48.2
21/11/2025 11:00	54.9	81.9	49.1
21/11/2025 12:00	54.7	75.9	50.0
21/11/2025 13:00	53.9	80.2	50.0
21/11/2025 14:00	55.7	78.8	50.9
21/11/2025 15:00	56.4	83.5	51.3
21/11/2025 16:00	54.5	82.8	50.9
21/11/2025 17:00	55.1	80.8	51.3
21/11/2025 18:00	54.7	76.2	50.6
21/11/2025 19:00	54.2	73.7	50.1
21/11/2025 20:00	53.5	78.2	49.3
21/11/2025 21:00	55.8	79.7	49.6
21/11/2025 22:00	54.7	79.7	49.0
21/11/2025 23:00	53.0	84.5	48.6
22/11/2025 00:00	53.3	76.0	48.1
22/11/2025 01:00	54.8	81.7	48.0
22/11/2025 02:00	48.9	67.0	42.1
22/11/2025 03:00	48.8	70.8	42.8
22/11/2025 04:00	47.2	70.1	39.0
22/11/2025 05:00	47.5	69.4	39.8
22/11/2025 06:00	51.0	73.1	43.2
22/11/2025 07:00	53.1	70.8	45.6

22/11/2025 08:00	55.0	73.8	47.4
22/11/2025 09:00	56.8	90.0	49.5
22/11/2025 10:00	56.3	87.3	49.7


Time History Graph Night-time LAMax
LAFMax
90
85
80
75
70
65
60
55
50
45
40
23:30:00
00:00:00
00:30:00
01:00:00
01:30:00
02:00:00
02:30:00
03:00:00
03:30:00
04:00:00
04:30:00
05:00:00
05:30:00
06:00:00
06:30:00
07:00:00
20/11/2025 23:00:02
Time
21/11/2025 07:00:01


Time History Graph Night-time LAMax
LAFMax
90
85
80
75
70
65
60
55
50
45
40
35
30
23:30:00
00:00:00
00:30:00
01:00:00
01:30:00
02:00:00
02:30:00
03:00:00
03:30:00
04:00:00
04:30:00
05:00:00
05:30:00
06:00:00
06:30:00
07:00:00
21/11/2025 23:00:01
Time
22/11/2025 07:00:01

Appendix B – Standard Glazing Attenuation

Sound Insulation Prediction (v10.0.6)

Date: 14/09/2025

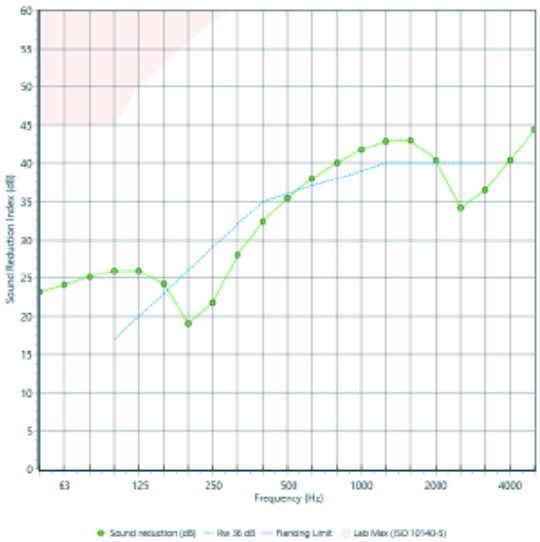
Job Name:

Rw 36 dB
C -2 dB
Ctr -5 dB

System description

Pane 1	1 x 6 mm Glass
Cavity	: 12 mm
Pane 2	1 x 6 mm Glass
Details	Energy-based model, Panel Size 1.3 m x 1.5 m, Partition surface mass = 29.2 kg/m², Mass-air-mass resonant frequency = : 200 Hz

freq. (Hz)	R (dB)	Roct (dB)
50	23	
63	24	24
80	25	
100	26	
125	26	25
160	24	
200	19	
250	22	22
315	28	
400	32	
500	35	35
630	38	
800	40	
1000	42	41
1250	43	
1600	43	
2000	40	38
2500	34	
3150	36	
4000	40	39
5000	44	



Appendix C – Break-in Calculations (Night-time L_{AMax})

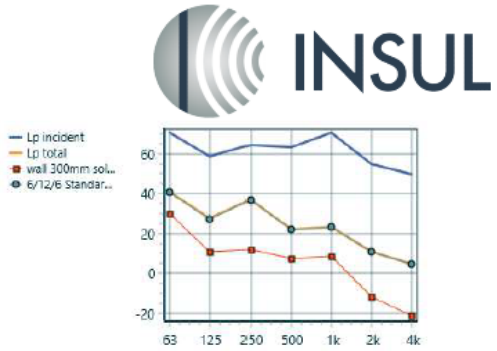
Summary

Room	Night-time L_{AMax} (dB)(A))
Flat 1 – Bedroom	26.3
Flat 3 – Bedroom	29.1
Flat 4 – Bedroom	28.4

Flat 1 – Bedroom Night-time L_{AMax}

Outdoor To Indoor Sound Transmission (v10.0.6)

Program copyright Marshall Day Acoustics
Margin of error is generally within ±3 dB
- Key No. 2594
Job Name:
Job No.: Initials:info
Date:13/12/2025
File Name:



	Octave Band Centre Frequency (Hz)							
Source	63	125	250	500	1k	2k	4k	NR
Incident sound level (freefield)	70.5	58.4	64.5	63.0	70.3	54.8	49.4	70.3
Path								
Element 1 , STL	-41	-48	-53	-56	-62	-67	-71	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area (+10LogA), 6 m²	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
Element sound level contribution	30	11	12	7	9	-12	-21	8.5
Element 2 , STL	-24	-25	-22	-35	-41	-38	-39	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area (+10LogA), 1 m²	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
Element sound level contribution	40	27	36	22	23	11	4	26.2
Receiver								
Room volume (-10LogV), 32.80 m³	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2	
Reverberation time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
RT (+10LogT)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	41	27	36	22	23	11	4	26.3
Level difference								LpAinc - LpARev,T0
D2m,nT	32.9	34.2	31.2	44.1	50.1	47.2	48.2	70.3

** Element descriptions:

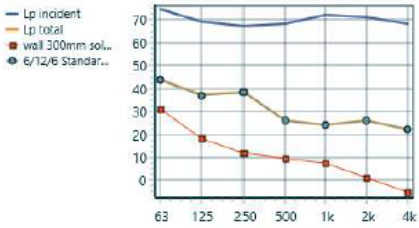
#1: wall 300mm solid
Wall (Single):
• Panel 1: 1 x 300 mm Brick
• Details: Panel Size 2.7 m x 4.0 m, Partition surface mass = 480 kg/m²

#2: 6/12/6 Standard glazing
Glazing (Double):
• Pane 1: 1 x 6 mm Glass
• Cavity: : 12 mm
• Pane 2: 1 x 6 mm Glass
• Details: Energy-based model, Panel Size 1.3 m x 1.5 m, Partition surface mass = 29.2 kg/m², Mass-air-mass resonant frequency = : 200 Hz

Flat 3 – Bedroom – Night-time L_{AMAx}

Outdoor To Indoor Sound Transmission (v10.0.6)

Program copyright Marshall Day Acoustics
Margin of error is generally within ±3 dB
- Key No. 2594
Job Name:
Job No.: Initials:info
Date:13/12/2025
File Name:



Source	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	NR
Incident sound level (freefield)	74.6	69.1	67.5	68.1	72.1	71.0	68.4	73.4
Path								
Element 1 , STL	-41	-48	-53	-56	-62	-67	-71	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area (+10LogA), 3 m²	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Element sound level contribution	31	19	12	10	8	1	-5	7.6
Element 2 , STL	-24	-25	-22	-35	-41	-38	-39	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area (+10LogA), 1 m²	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Element sound level contribution	44	37	39	26	24	26	22	29.1
Receiver								
Room volume (-10LogV), 35.44 m³	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5	
Reverberation time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
RT (+10LogT)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	44	37	39	26	24	26	22	29.1
Level difference								LpAinc - LpARev,T0
D2m,nT	33.6	35.0	32.1	45.0	51.0	48.1	49.1	73.4

** Element descriptions:

#1: wall 300mm solid
Wall (Single):
• Panel 1: 1 x 300 mm Brick
• Details: Panel Size 2.7 m x 4.0 m, Partition surface mass = 480 kg/m²

#2: 6/12/6 Standard glazing
Glazing (Double):
• Pane 1: 1 x 6 mm Glass
• Cavity: : 12 mm
• Pane 2: 1 x 6 mm Glass
• Details: Energy-based model, Panel Size 1.3 m x 1.5 m, Partition surface mass = 29.2 kg/m², Mass-air-mass resonant frequency = : 200 Hz

Flat 4 – Bedroom – Night-time L_{AMAx}

Outdoor To Indoor Sound Transmission (v10.0.6)

Program copyright Marshall Day Acoustics
Margin of error is generally within ±3 dB
- Key No. 2594
Job Name:
Job No.: Initials:info
Date:13/12/2025
File Name:

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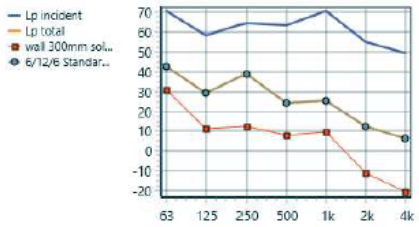


Octave Band Centre Frequency (Hz)								
Source	63	125	250	500	1k	2k	4k	NR
Incident sound level (freefield)	70.5	58.4	64.5	63.0	70.3	54.8	49.4	70.3
Path								
Element 1 , STL	-41	-48	-53	-56	-62	-67	-71	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area (+10LogA), 4 m²	5.9	5.9	5.9	5.9	5.9	5.9	5.9	
Element sound level contribution	31	12	13	8	9	-11	-20	9.5
Element 2 , STL	-24	-25	-22	-35	-41	-38	-39	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area (+10LogA), 1 m²	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Element sound level contribution	42	29	38	24	25	13	6	28.4
Receiver								
Room volume (-10LogV), 18.32 m³	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	
Reverberation time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
RT (+10LogT)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	43	29	38	24	25	13	6	28.4
Level difference								LpAinc - LpARev,T0
D2m,nT	30.9	32.1	29.2	42.1	48.1	45.2	46.2	70.3

** Element descriptions:

#1: wall 300mm solid
Wall (Single):
• Panel 1: 1 x 300 mm Brick
• Details: Panel Size 2.7 m x 4.0 m, Partition surface mass = 480 kg/m²

#2: 6/12/6 Standard glazing
Glazing (Double):
• Pane 1: 1 x 6 mm Glass
• Cavity: : 12 mm
• Pane 2: 1 x 6 mm Glass
• Details: Energy-based model, Panel Size 1.3 m x 1.5 m, Partition surface mass = 29.2 kg/m², Mass-air-mass resonant frequency = : 200 Hz

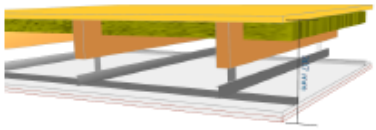
Appendix D – Proposed Internal Separating Structures

Separating Floors/ceiling - Ground

Sound Insulation Prediction (v10.0.6)

Date: 12/05/2026

Job Name:

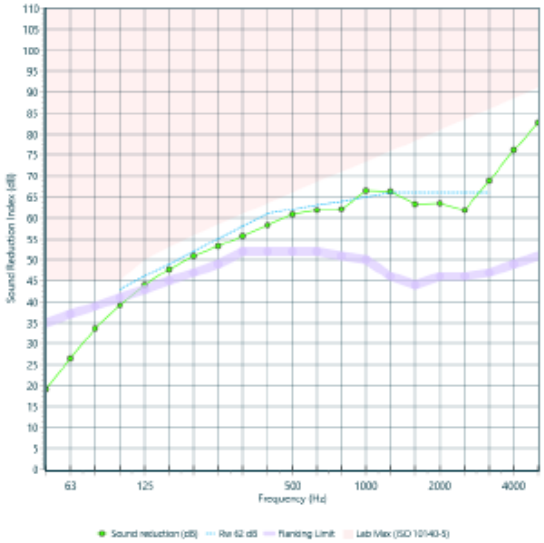


Rw 62 dB
C -2 dB
Ctr -6 dB

System description

Panel 1	1 x 20 mm Flooring Particle Board
Frame	Solid Joist with Gyproc acoustic hanger (144 mm x 47 mm), Stud spacing 600 mm , Cavity Width 257 mm + 60 mm Fibreglass (10kg/m3) 60mm
Panel 2	1 x 15 mm Gyproc SoundBloc 15mm + 1 x 15 mm Gyproc Fireline 15mm
Details	Panel Size 2.7 m x 4.0 m, Partition surface mass = 39.1 kg/m², Mass-air-mass resonant frequency = : 39 Hz

freq. (Hz)	R (dB)	Roct (dB)
50	19	
63	26	23
80	34	
100	39	
125	44	42
160	48	
200	51	
250	53	53
315	56	
400	58	
500	61	60
630	62	
800	62	
1000	66	64
1250	66	
1600	63	
2000	63	63
2500	62	
3150	69	
4000	76	73
5000	83	



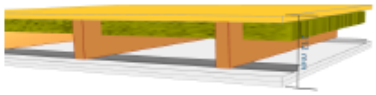
Separating Floors/ceiling – 1st-2nd floors

Sound Insulation Prediction (v10.0.6)

Program copyright Marshall Day Acoustics 2023 | Margin of error is generally within Rw ±3 dB

Date: 12/05/2026

Job Name:

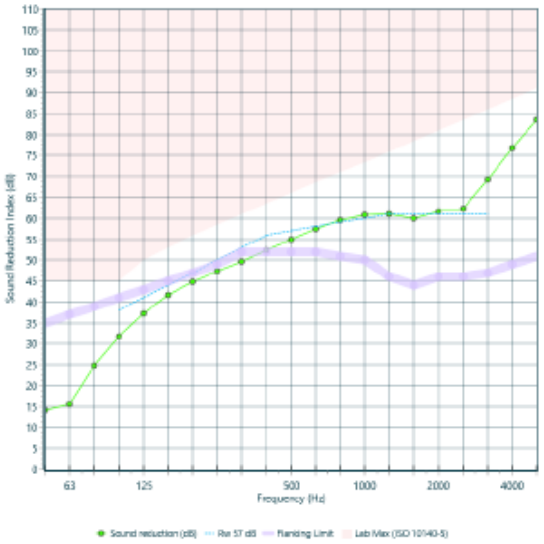


Rw 57 dB
C -2 dB
Ctr -8 dB

System description

Panel 1	1 x 20 mm Flooring Particle Board
Frame	Solid Joist with resilient rail (144 mm x 47 mm), Stud spacing 600 mm , Cavity Width 162 mm + 60 mm Fibreglass (10kg/m3) 60mm
Panel 2	1 x 15 mm Gyproc SoundBloc 15mm + 1 x 15 mm Gyproc Fireline 15mm
Details	Panel Size 2.7 m x 4.0 m, Partition surface mass = 39.1 kg/m², Mass-air-mass resonant frequency = : 49 Hz

freq. (Hz)	R (dB)	Roct (dB)
50	14	
63	16	16
80	25	
100	32	
125	37	35
160	42	
200	45	
250	47	47
315	50	
400	52	
500	55	54
630	57	
800	60	
1000	61	60
1250	61	
1600	60	
2000	62	61
2500	62	
3150	69	
4000	77	73
5000	83	



Brick Walls

Sound Insulation Prediction (v10.0.6)

Program copyright Marshall Day Acoustics 2023 | Margin of error is generally within Rw ±3 dB

Date: 12/05/2026

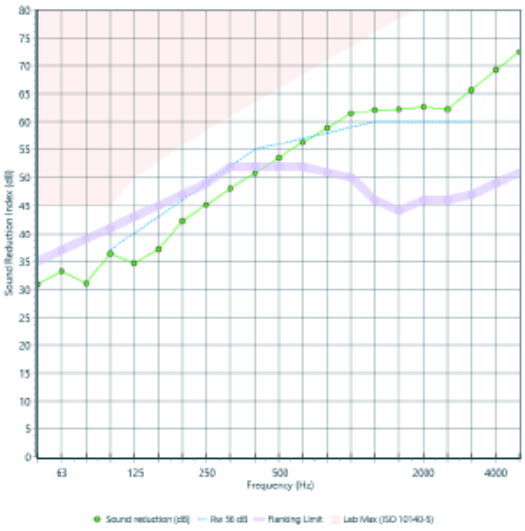
Job Name:

Rw 56 dB
C -2 dB
Ctr -7 dB

System description

Panel 1	1 x 15 mm Gyproc SoundBloc 15mm + 1 x 15 mm Gyproc Fireline 15mm
Frame	Timber stud (90 mm x 45 mm), Stud spacing 600 mm , Cavity Width 90 mm + 60 mm Fibreglass (10kg/m3) 60mm
Panel 2	1 x 122 mm Plastered Brick
Details	Panel Size 2.7 m x 4.0 m, Partition surface mass = 220 kg/m², Mass-air-mass resonant frequency = 42 Hz

freq. (Hz)	R (dB)	Rocf (dB)
50	31	
63	33	32
80	31	
100	36	
125	35	36
160	37	
200	42	
250	45	44
315	48	
400	51	
500	54	53
630	56	
800	59	
1000	61	61
1250	62	
1600	62	
2000	63	62
2500	62	
3150	66	
4000	69	68
5000	73	



Sound Insulation Prediction (v10.0.6)

Program copyright Marshall Day Acoustics 2023 | Margin of error is generally within Rw ±3 dB

Date: 12/05/2026

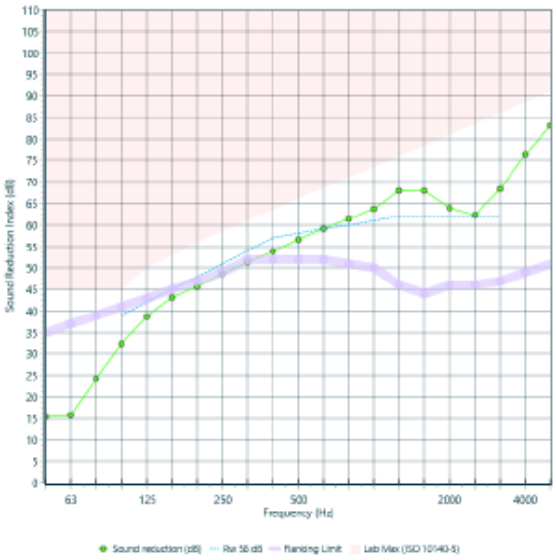
Job Name:

Rw 58 dB
C -2 dB
Ctr -8 dB

System description

Panel 1	1 x 15 mm Gyproc SoundBloc 15mm + 1 x 15 mm Gyproc Fireline 15mm
Frame	Timber stud + Resilient rail/bar (94 mm x 47 mm), Stud spacing 600 mm , Cavity Width 106 mm + 60 mm Fibreglass (10kg/m3) 60mm
Panel 2	1 x 15 mm Gyproc SoundBloc 15mm + 1 x 15 mm Gyproc Fireline 15mm
Details	Panel Size 2.7 m x 4.0 m, Partition surface mass = 49.2 kg/m², Mass-air-mass resonant frequency = 51 Hz

freq. (Hz)	R (dB)	Roct (dB)
50	15	
63	16	17
80	24	
100	32	
125	39	36
160	43	
200	46	
250	49	48
315	51	
400	54	
500	56	56
630	59	
800	61	
1000	64	64
1250	68	
1600	68	
2000	64	64
2500	62	
3150	68	
4000	76	72
5000	83	



Example Calculation

Sound Transfer											
	L2 = L1 – R + 10 Log10(S) - 10 Log10(A)										
			Rw	63	125	250	500	1K	2K	4K	
Construction detail of partition				17	36	48	56	63	64	72	
Surface area		9.64	m2		10log(S)	9.84077					
Volume of room		32.8	m3								
Absorption		10.5616	m2		10log(A)	10.2373					

L1	50	60	65	65	65	65	60	
R	17	36	48	56	63	64	72	
10+Log(s)	9.8	9.8	9.8	9.8	9.8	9.8	9.8	
10+log(A)	10.2	10.2	10.2	10.2	10.2	10.2	10.2	
L2	32.6	23.6	16.6	8.6	1.6	0.6	-12.4	
a-weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	
L2(A)	6.4	7.5	8.0	5.4	1.6	1.8	-11.4	
10^(L2(A)/10)	4.4	5.6	6.3	3.5	1.4	1.5	0.1	22.8
dB(A)								**13.6**

Summary of Results

Separating Structure	**Receiver room sound level (dB(A))**
Flat 1 to Flat 2	13.6
Flat 3 tot Flat 2	12.7
Flat 3 to Flat 4	13.3

Appendix E – Extraction System

Northern Fan Supplies Ltd
Technical Data Sheet
JM Aerofoil

Quotation Number	:	F
Project Name	:	C
Item Reference:	:	E

Fan Code	31JM/16/4/5/34
Fan Diameter / Size	315 Size / mm
Blades	5
Fan Speed	1420 rpm
Velocity	4.2 m/s
Blade Angle	34°
Installation Type / Form of Running	D / B
Fan Casing	Long
Requested Duty	0.33m³/s @ 94 Pa (static)
Outlet Dynamic Pressure	11 Pa
Duty Shaft Power	0.069 kW
Max Shaft Power	0.070 kW
Total Efficiency	50.3 %
Pitch Angle Range	28° - 34°
Motor Frame	BT5 (Sized at 1.2kg/m3 Air Density)
Motor Grade	IE1
Motor Rating	0.075 kW
Full Load Current	0.53 A
Starting Current	1.45 A
Motor Mounting	Pad
Electrical Supply	220-240 Volts 50 Hz 1 Phase
Start Type	DOL
Motor Winding	Standard
Enclosure	Standard All
ErP [FMEG] Rating	Not in Scope
SFP value	0.34 W/(l/s)
Energy Consumption	226 kWh (2000 h/year)
Running Cost / Year	£20
Air Density	1.2 kg/m³ / 20 °C / 0 m / 50% RH
Smoke Venting	Non Smoke Venting
Product Number	EJ321460

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	90	87	84	82	77	73	68	64	93	63
Outlet*	91	89	84	82	78	75	70	66	94	63
Breakout*	81	75	64	62	54	46	44	42	82	43

* Lw dB re 10^{-12} W ** dBA re 2x10^{-5} Pa

Performance data has been derived from tests carried out in a Flakt Woods laboratory, in accordance with ISO 5801 and is specifically applicable for Ducted installations. When an electronic controller is incorporated, enhanced motor noise can occur - particularly when the operating speed is well below maximum. FWL therefore recommend using an auto transformer speed controller for noise sensitive applications.

Acoustic data has been derived from tests carried out in a Flakt Woods laboratory, in accordance with BS 848 Pt 2, 1985 / BS EN ISO 5136 under Ducted conditions. The single figure provided is the overall inlet sound pressure level at the specified distance, under spherical, free field conditions. Breakout levels stated are estimated from induct sound power levels and are provided for guidance.

https://asset.eezybridge.com/nc/ba7b9546-29dd-40c4-87a7-

885627281b87/VA_Sonex_Attenuator_Catalogue.pdf

	Dimensions (mm)				Attenuation dB mid Frequency Hz							
Stock Ref	AØ	BØ	C	kg.	63	125	250	500	1K	2K	4K	8k
83010030	100	200	300	2.4	3	3	9	17	23	26	25	13
83010060	100	200	600	4.1	6	9	15	34	40	40	37	18
83010090	100	200	900	6.6	10	13	21	40	45	39	36	16
83012030	125	225	300	2.6	3	3	7	16	20	24	22	17
83012060	125	225	600	4.5	5	8	13	29	35	35	32	22
83012090	125	225	900	7.6	10	12	19	37	40	38	34	32
83015030	150	260	300	2.9	3	3	6	13	19	23	22	16
83015060	150	260	600	5.8	5	7	12	24	30	35	31	20
83015090	150	260	900	9	8	10	15	32	38	37	34	29
83016030	160	260	300	2.9	3	3	6	13	19	23	22	16
83016060	160	260	600	5.8	5	7	12	24	30	35	31	20
83016090	160	260	900	9	8	10	15	32	38	37	34	29
83020060	200	300	600	7	4	6	10	20	27	33	19	17
83020090	200	300	900	10	8	9	14	28	32	35	28	25
83020120	200	300	1200	14	10	12	17	36	41	43	28	26
83025060	250	355	600	8.6	4	5	10	19	25	29	18	17
83025090	250	355	900	12.2	6	7	12	23	30	30	22	19
83025120	250	355	1200	18	8	10	15	32	37	38	26	20
83031060	315	400	600	9.8	4	5	8	15	20	22	17	15
83031090	315	400	900	15	5	7	10	20	30	29	18	16
83031120	315	400	1200	21	7	9	13	22	32	33	19	18
83040090	400	606	900	21	3	5	9	19	26	20	13	11
83040120	400	606	1200	27	6	8	14	24	30	28	17	9
83050090	500	711	900	29	3	4	9	15	23	17	12	11
83050120	500	711	1200	38	5	7	13	18	26	23	15	9

	63	125	250	500	1000	2000	4000	Lw	Lp@3.2m
31JM/16/4/5/34	91	89	84	82	78	75	70	94	
Directivity	1	1	1	2	3	4	7		
silencer - 2D vent axia 315	7	9	13	22	32	33	19		
a-weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1		
resulting sound level	56.8	62.9	61.4	54.8	43	39.2	45	66.2	45.1
6/12/6 double glazed win	24	25	22	35	41	38	39		
Internal	32.8	37.9	39.4	19.8	2	1.2	6	42.3	**21.2**

Appendix F - Report Author Details

This report has been produced by Neil Martin, BSc (Hons), PGDip, CEnvH MCIEH, MIOA.

Neil is the principal acoustic consultant at Martin Environmental Solutions Ltd, a consultancy company specialising in Environmental Health disciplines including environmental noise assessment and control. He holds a Bachler's degree in Environmental Health and Diploma in Acoustics. He is a Chartered Member of the Chartered Institute of Environmental Health and a Full member of the Institute of Acoustics.

Neil has over 20year's experience working within a Local Authority Environmental Health setting, principally in the Environmental Protection and Public Health areas and has been working as an acoustic consultant since 2011.

Since its formation, Martin Environmental Solutions has advised and assisted many groups including residents, developers and local authorities about the problems of noise and vibration in the environment and the possible solutions. Neil also acts as an expert witness in the area of acoustics.

Appendix G – Acoustic Terminology and Definitions

Descriptor	Explanation
dB (decibel)	The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2 x 10-5 Pascals) and the threshold of pain is around 120 dB.
dB(A) – A-weighting	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L_{Amax}	A noise level index defined as the maximum noise level. L_{Max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{A10} and L_{90}	A noise level index. The noise level exceeded for percentage of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
R +R_w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz. The higher the value, the greater the sound insulation, and the more onerous the requirement.
D_{nTw}	Weighted standardized level difference. Single-number quantity that characterizes the airborne sound insulation between rooms. Specified in Building Regulations and measured on site.
C or C_{Tr}	These are spectrum adaptation terms for taking into account the effect of different sound spectra. C and Ctr are corrections for pink noise and traffic noise respectively and are added to single figure quantities, e.g. Rw + Ctr
Reverberation Time	The time required for the steady sound pressure level un an enclosed space to decay by 60dB, measured from the moment the sound source is switched off.

Free-field	Far from the presence of sound reflecting objects (except the ground),
Fast/slow time weighting	An averaging time used in sound level meters. Defined in BS 5969.
$D_{n,e,w}$	A weighted normalised sound level difference as measured in laboratory conditions for small building components like ventilators. The higher the figure the greater the level of attenuation is achieved.
SEL	Single Event Level – A 1 second figure which contains the same energy as the whole event.
Frequency	the pitch of a sound in Hz or kHz.
Octave Bands or 1/3 Octave Bands	Whilst single figure values are useful, often spectral data is required for analysis and/or acoustic specification. To represent the frequency content, sound level or acoustic properties are presented in specific frequency bands, also known as octave bands. The frequencies of octave bands have been internationally standardised. For example, the 500 Hz octave band (500 Hz being the centre frequency) has a range from 354 Hz to 707 Hz. Where finer spectral detail is required, 1/3-octave band data can be used. Each octave band is divided into three 1/3-octave bands.
Sound Pressure Level, L_P	a measure of the sound pressure at a point, in decibels.
Sound Power Level, $_w$	sound power level. It is a measure of the total sound energy radiated by a sound source and is used to calculate sound levels at a distant location. The LWA is the A-weighted sound power level.