ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3851

07 August 2025

Barnsley MBC
Finance and Property Directorate
Commercial Services Payments Team
PO BOX 522
BARNSLEY

PENISTONE TOWN HALL REMODELLING

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 3851/ENIA

Revision	Date	Prepared by	Issued by	Revision Notes
-	22 May 2025	Joe Mosley	Chris Middleton	first issue
A	07 August 2025	Bidrohi Sheikh	Chris Middleton	revised to include preliminary plant selections

ACOUSTIC DESIGN TECHNOLOGY LIMITED
7 ROYAL COURT, BASIL CLOSE, CHESTERFIELD S41 7SL
Telephone: 01246 554841 Facsimile: 01246 550141 Website: www.acousticdesign.co.uk E-mail: mail@acousticdesign.co.uk
Company Registered in England No. 4528227
V.A.T. Registration No. 593 7456 92

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1.0 SUMMARY

The proposal is to redevelop the building to create a second screen for the cinema, adjoining the existing auditorium, along with general alterations to the rest of the building including a bar and an open plan activity space. The intention is that the new cinema room would also be used to host live music.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the currently prevailing noise levels representative of surrounding noise sensitive areas.

BS 4142:2014+A1:2019 rating level limits have been proposed for the new fixed plant installations, set equivalent to the otherwise prevailing background noise levels, defined as a 'low impact' in BS 4142, and equating to 'no observed effect' using the Planning Practice Guidance. Noise emissions from the preliminary plant selections have been assessed and comply with those limits.

Noise breakout from the new cinema room to the noise sensitive masonic lodge has been assessed, with the conclusion that the sound insulation performance of the separating floor should be improved to ensure that the noise levels in the lodge are reasonable. Some degree of low frequency noise transmission is unavoidable in the context of this existing historic building, and the intention is therefore to avoid using the cinema room when meetings are scheduled for the lodge.

Environmental noise breakout from the room has been considered, and the proposed sound insulation measures include solid masonry infill of the existing windows, a lobbied set of acoustic doors to the fire exit, and mechanical ventilation. With these measures in place, the resultant noise levels at the nearest residential properties should be negligible, and inaudible inside dwellings.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The building is located on Shrewsbury Road in Penistone town centre. There is the existing Penistone Paramount Cinema, council meeting rooms and a physiotherapist's practice, along with a masonic lodge immediately above the proposed second screen room.

The nearest noise sensitive properties are the houses on Vicarage Walk, immediately to the west of the site, with more to the south and on Shrewsbury Close to the south-east. On the opposite side of Shrewsbury Road are more houses, a dance school and the church of St. John the Baptist.

The closest main road is the A628 Barnsley Road, located approximately 525 metres away to the north west.

2.2 Proposed Development

The proposal is to redevelop the building to create a second screen for the cinema, adjoining the existing auditorium, along with general alterations to the rest of the building including a bar and an open plan activity space. The intention is that the new cinema room would also be used to host live music.

The masonic lodge on the first floor is to remain, and will be situated above the new cinema screen. No changes are proposed for the physiotherapist's section of the building.

2.3 Planning Policy

The National Planning Policy Framework (NPPF) sets out the general terms of reference for sustainable development, including noise. Section 187 of the December 2024 edition states that:

> *Planning policies and decisions should contribute to and enhance the natural and local environment by…e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans…*

Section 198 of the same document states:

> *Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life72;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;*

The Noise Policy Statement for England (NPSE) published in March 2010 establishes the No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL), although these are not linked to objective criteria, as Section 2.22 of the NPSE states:

> *It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.*

For this development the key principles to be applied from the NPPF are to protect existing noise sensitive properties from noise generated by the development.

The Noise Policy Statement for England (NPSE) published in March 2010 establishes the No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL), although these are not linked to objective criteria, as Section 2.22 of the NPSE states:

> *It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.*

The Ministry of Housing, Communities and Local Government guidance on planning and noise as of July 2019 includes a noise exposure hierarchy table to help determine the NOEL, NOAEL and SOAEL. This is provided in Appendix A.

2.4 Assessment Criteria

The main noise sources to consider are noise emissions from new mechanical plant, noise transfer through the separating floor to the masonic lodge above, and environmental noise breakout from the cinema. Noise levels in the bar and the small meeting room are not expected to be significant, with no more than quiet background music to be played.

The appropriate assessment method for plant noise is BS 4142:2014+A1:2019 (hereafter referred to in the short form BS 4142), as it is specifically mentioned in the scope of the standard. Key terminology from BS 4142 is provided in Appendix D.

The BS 4142 assessment method is based on the determination of a 'rating level' for the items of plant being assessed, expressed as $L_{Ar,Tr}$, which is compared with the pre-existing 'background level' for the period of interest.

In relation to the other noise sources which do not fall within the scope of BS 4142, the most relevant acoustic design guide is BS 8233:2014, which provides environmental noise criteria for dwellings and outdoor living spaces.

2.5 Nearest Noise Sensitive Properties

The noise sensitive properties in the surrounding area have been grouped into several noise sensitive properties as described below and as indicated on the attached site plan 3851/SP1.

NSA	Location	Direction	Approximate distance from site
1	Houses on Vicarage Walk	west	< 5
2	Houses on Shrewsbury Road	north	30
3	Houses between Vicarage Walk and Shrewsbury Close	south east	25
4	Houses east of Shrewsbury Close	east	60

The above noise sensitive areas represent the closest noise sensitive properties, with others located further from the site and in some cases screened by the intervening buildings. A satisfactory noise impact at the defined noise sensitive areas should therefore ensure a satisfactory noise impact at other noise sensitive areas.

2.6 Strategy for Noise Impact Assessment

Based on the information in Sections 2.1 to 2.5 above, the strategy for the noise impact assessment has been broken down into the following stages:

i. undertake an environmental noise survey to obtain baseline noise data, as described in Section 3.0 below.

ii. set noise limits for new fixed plant installations as described in Section 4.0 below.

iii. assess the impact of noise breakout to the masonic lodge above, as described in Section 5.0 below.

iv. assess the impact of environmental noise breakout from the cinema, as described in Section 6.0 below.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Purpose

The purpose of the survey was to determine the existing ambient noise levels at locations representative of the surrounding noise sensitive areas during the daytime and night time periods.

3.2 Scope of Survey

A programme of automatic noise monitoring was undertaken between 16:00 hours on Wednesday 2 April and 08:45 hours on Monday 7 April 2025. Sound insulation tests on the internal structures were undertaken during the collection visit.

3.3 Instrumentation

The instrumentation used for the automatic noise monitoring, and the field calibration values before and after the survey are detailed in Appendix B of this report.

3.4 Procedure

A single measurement position was selected on the flat roof area of the building as indicated on the attached site plan 3851/SP1 in order to obtain representative background levels for the surrounding houses.

The microphone was mounted on a tripod approximately 1.2 metres above the flat roof and least 3.5 metres from any other acoustically reflective surface.

The noise levels were logged continuously for the duration of the survey period, using the 01dB Fusion sound level meter set to store the octave band and 'A' weighted 100ms short-term L_{eq} for subsequent post processing.

3.5 Results

The logged data has been post processed to determine $L_{Aeq,T}$ $L_{A90,T}$ and L_{Amax} levels for each 15 minute period, and these have been plotted on the attached time history graph 3851/TH1.

As the background levels varied significantly over the course of the day, the daytime period has been split into daytime (07:00-19:00) and evening (19:00-23:00). Typical background noise levels at position 1 have been processed as follows, based on statistical analysis of the measured levels according to the method described in Section 8.1.4 of BS 4142:

Measurement Position	Typical $L_{A90,T}$ by period dB		
	Day time 07:00 – 19:00 $L_{A90,\ 1\ hour}$	Evening 19:00 – 23:00 $L_{A90,\ 1\ hour}$	Night time 23:00 – 07:00 $L_{A90,\ 15\ mins}$
Position 1	43	36	26

Please refer to Appendix C for explanation of the noise units and the A-weighting term used in this report.

3.6 Weather Conditions

As the survey was primarily unattended, it is not possible to provide a detailed description of the weather conditions throughout the entire survey period. However, at the start and end of the survey the weather was fine and dry with wind speeds of no more than 5m/s and the ground was not frozen or wet. Reference to published weather data reveals that similar conditions were forecast and locally observed for the intervening period.

3.7 Description of Existing Acoustic Environment

As the survey was primarily unattended, it is not possible to provide a detailed description of the acoustic environment throughout the entire survey period. However, on the setup and collection visits, the background levels were controlled by distant traffic noise from Barnsley Road with occasional local traffic noise from Shrewsbury Road and birdsong controlling causing peaks in the data.

The shape of the time history graph and reference to periodic audio samples reveals that the noise levels generally followed a diurnal pattern typical of an environment controlled primarily by traffic noise, with the exception of the occasional daytime period affected by the sound of church bells.

4.0 NOISE IMPACT ASSESSMENT (NEW FIXED PLANT)

4.1 Basis of Assessment

At this stage, the plant selections are preliminary and not fully designed. Environmental noise limits have therefore been proposed, which can then be used in the future selection of plant and any associated attenuation.

4.2 Noise Limits

As described in Section 2.4 above, it is proposed that plant noise is assessed using the BS 4142 method, and a rating level on a par with the typically prevailing background level is defined as a 'low impact'. Please refer to Appendix C for definitions of the relevant terms from BS 4142.

As background levels measured at position 1 are deemed to be representative of the background levels at all the nearby houses, proposed noise limits for fixed plant are as follows:

Recommended BS 4142:2014+A1:2019 rating level limits for fixed plant			
Noise Sensitive Area	Day time 07:00 – 19:00 $L_{Ar,\ 1\ hour}$ dB	Evening 19:00 – 23:00 $L_{Ar,\ 1\ hour}$ dB	Night time 23:00 – 07:00 $L_{Ar,\ 15\ mins}$ dB
All dwellings	43	36	26

4.3 Assessment of Noise from Preliminary Plant Selections

Manufacturers' noise data for the proposed plant is set out in the attached plant noise schedule 3851/PNS, with the recommended atmospheric silencers provided in the attached silencer schedule 3851/SSA. The plant locations are shown on the separately issued BMBC External Plant Locations drawing SK101.

The air conditioning units would need acoustic screening of 1800mm height, to reduce the noise transmission to the houses south-west of the site (NSA1).

This assessment is based on the assumption that the air conditioning plant would operate 24 hours a day, while the ventilation plant normally operates during opening hours i.e. day time and evening periods.

The scheduled plant noise levels and insertion losses have been input into the Cadna/A computer model, and the predicted rating levels at the identified noise sensitive areas are as follows, including a + 3 dB correction to allow for possible intermittent operation:-

NSA	Location	Daytime $L_{Ar,\ 1\ hour}$ dB	Night time $L_{Ar,\ 15\ mins}$ dB
1	Houses on Vicarage Walk	30	25
2	Houses on Shrewsbury Road	16	14
3	Houses between Vicarage Walk and Shrewsbury Close	24	15
4	Houses east of Shrewsbury Close	11	11

The above levels are well within the limits recommended in Section 4.2 above, and would therefore fall within the BS 4142 definition of 'low impact'.

5.0 NOISE BREAKOUT FROM CINEMA ROOM TO MASONIC LODGE ABOVE

5.1 Sound Levels Inside New Screen

Typical worst case cinema noise levels are set out in the following table:-

	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
$L_{eq,\ 5\ mins}$ dB	98	95	90	88	86	86	81	76	92
L_{max} dB	108	105	100	98	96	96	91	86	102

Substantially lower levels have been measured during a screening at the existing cinema on the site (around 75 dB $L_{Aeq,5\ mins}$) although the above levels have been used in order to consider the worst case. Also, a live band playing in a venue of this size and type can be expected to generate similar levels to those tabulated above.

5.2 Sound Transfer to Masonic Lodge

Sound insulation tests were carried out on the separating floor between the proposed second cinema screen room and the masonic lodge above, with the results plotted on the attached graph in Appendix D.

On the basis of these test results, and the source levels tabulated in the previous section, the predicted worst-case levels inside the masonic lodge with the existing structure unimproved are shown below:

	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
$L_{eq,\ 5\ mins}$ dB	77	71	59	50	42	35	24	8	58
L_{max} dB	87	81	69	60	52	45	34	18	68

The noise levels in the above table would be unacceptably high. To provide some mitigation the proposal is to underdraw the existing ceiling with a new acoustic ceiling, for example, 2 layers of 15mm acoustic plasterboard on MF grid supported by acoustic hangers with a 100mm mineral wool quilt. With that in place, the predicted levels in the masonic hall above are as follows:-

	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
$L_{eq,\ 5\ mins}$ dB	70	58	30	28	21	16	11	1	46
L_{max} dB	80	68	40	38	31	26	21	11	56

Those levels would be acceptable for less sensitive activities such as cleaning or maintenance, but not for any kind of meeting, and further noise reduction is not realistic in the context of this development. It would therefore be necessary to schedule the use of the new cinema room so as not to coincide with meetings in the masonic lodge, and this is understood to be the strategy.

6.0 ENVIRONMENTAL NOISE BREAKOUT FROM CINEMA

The only route for environmental noise breakout is the south wall of the cinema room, which is understood to be 315mm solid brickwork. The existing windows are to be infilled with medium density blockwork (i.e. of similar density to the bricks), and the whole wall will be drylined internally. This form of construction provides sound insulation of at least R_w 60.

The fire exit doors are in a lobby arrangement, and are each to be specified at minimum R_w 35 dB. This would mean a solid steel external door and a solid core timber internal door, both with acoustic seals to the entire perimeter. The combined sound insulation of the arrangement of two lobbied acoustic doors should be equivalent to that of the external wall.

With those measures in place, environmental noise breakout from the south wall has been calculated using Cadna/A 2024 environmental noise mapping software, with ground absorption pessimistically set to zero, and two orders of reflections used.

The results are shown on the attached noise map in Appendix E, and the worst case noise levels outside the houses on Vicarage Walk to the south are just 17 dB $L_{Aeq,\ 5\ mins}$ / 27 dB L_{Amax}, which would be virtually inaudible even outside, and would certainly be inaudible inside the dwellings.

On that basis it is reasonable to conclude that environmental noise breakout should be acceptable with the proposed package of sound insulation measures.

Notes

Description

Site plan showing noise monitoring locations and noise sensitive areas

Project

Penistone Town Hall Remodelling

Date

07 August 2025

Drawing No.

3851/SP1

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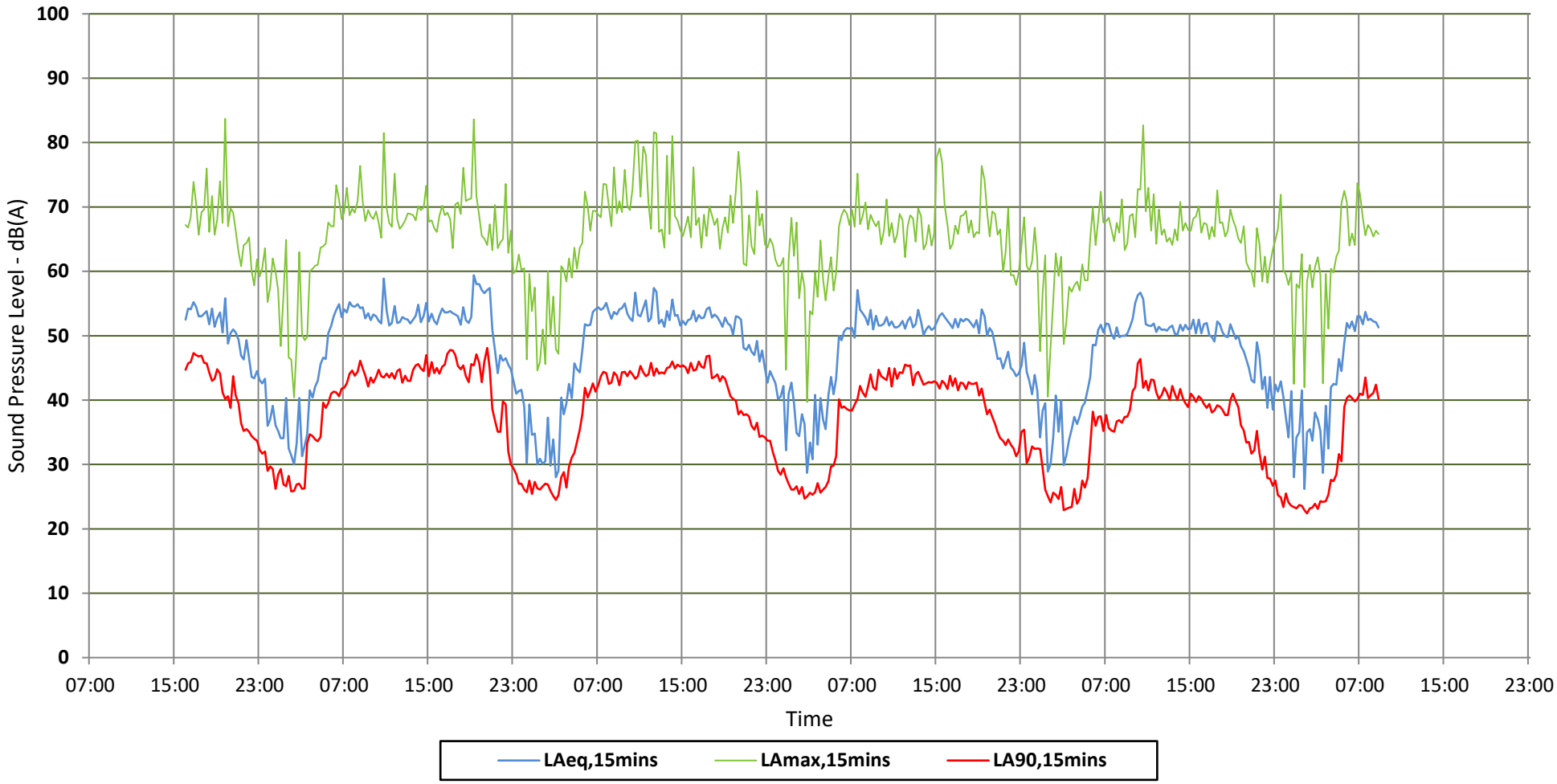

Notes	Description	
	Time History Graph - Measurement Position	
	Project	
	Penistone Town Hall Remodelling	
	Survey Date	**Drawing No.**
	02 - 07 April 2025	3851/TH1

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APPENDIX A

NOISE EXPOSURE HIERARCHY TABLE

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
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; where there is no alternative ventilation, having to close windows for some of the time because of the noise. 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; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. 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 Adverse 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, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

APPENDIX B - INSTRUMENTATION

Manufacturer	Type and / or Model	Serial Number	Last Laboratory Calibration at the time of the survey	Calibrator Output (dB)	Free Field Correction (dB)	Initial reading (dB)	Final reading (dB)
01dB	Fusion 2 Class 1 Sound Level Meter (SLM12)	15130	Jan 2025		-0.20	113.8	113.9
01dB	Fusion MCE3 Microphone	14050	Jan 2025				
Norsonic	Nor1251 Calibrator (Cal 4)	33453	March 2025	113.96			

APPENDIX C

Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

A-weighting The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} L_{10}, being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

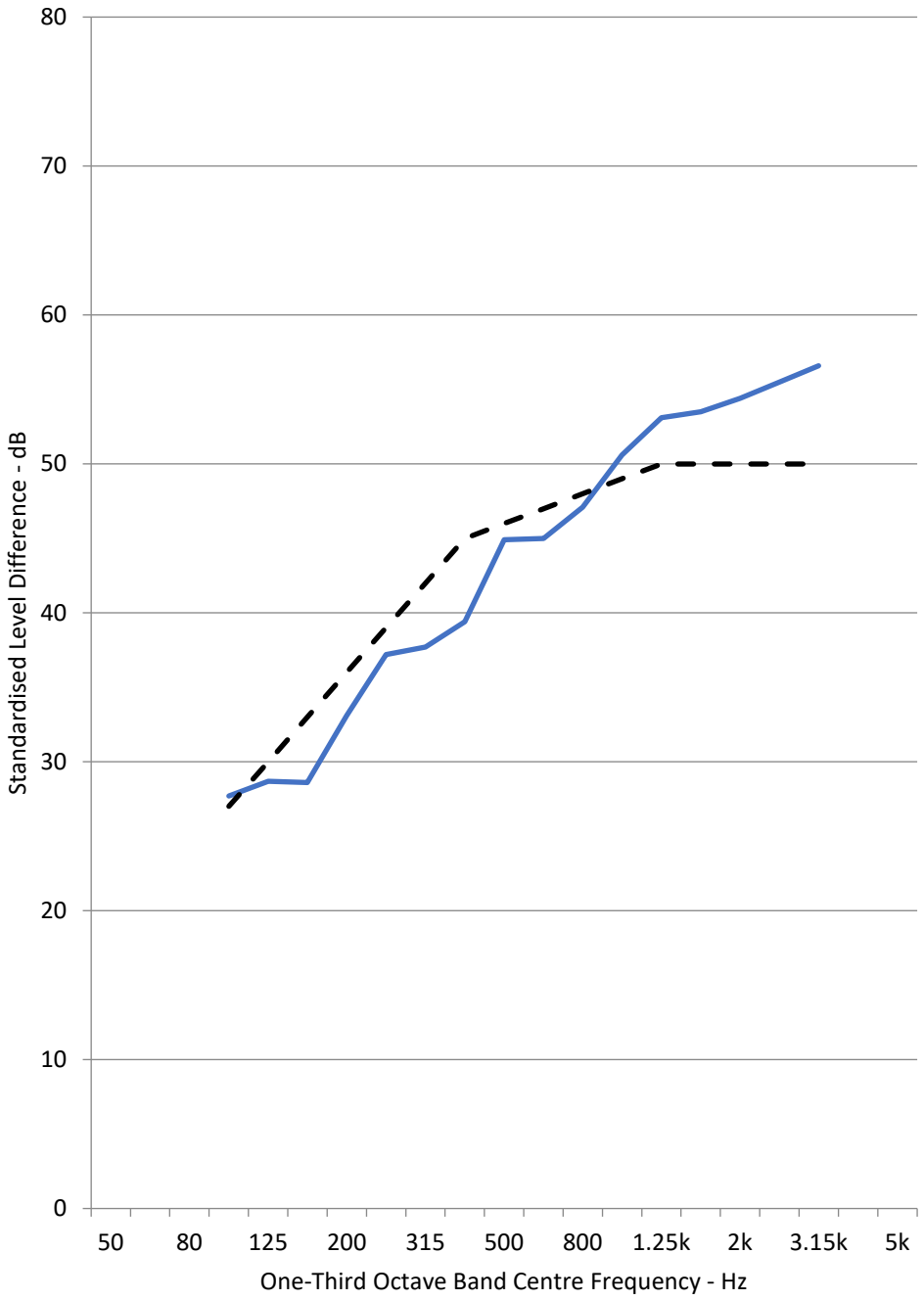
In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

L_{max} L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period

Standardized level difference according to BS EN ISO 140-4 and Annex B to Approved Document E 2003
Field measurements of airborne sound insulation between rooms

Frequency (Hz)	D_{nT} (dB)
50	
63	
80	
100	27.7
125	28.7
160	28.6
200	33.1
250	37.2
315	37.7
400	39.4
500	44.9
630	45.0
800	47.10
1k	50.6
1.25k	53.1
1.6k	53.5
2k	54.4
2.5k	55.5
3.15k	56.6
4k	
5k	



Rating according to BS EN ISO 717-1

$D_{nT,w}$ (C ; C_{tr}) = 46 (-1 ; -6) dB $D_{nT,w} + C_{tr}$ = 40 dB

Evaluation based on field measurement results obtained by an engineering method

Source Room	Ground floor area	Receiver Room	Masonic Lodge
Test Element	Floor	Test Date	7 April 2025

Description
Airborne Sound Insulation Test - Floor

Project
Penistone Town Hall Remodelling

Drawing No.
Appendix D

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	Description Environmental noise breakout from cinema $L_{Aeq,\ 5\ mins}$ dB
	Project Penistone Town Hall Remodelling
	Drawing No. Appendix E

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PENISTONE TOWN HALL REMODELLING

PLANT NOISE SCHEDULE ADT 3851/PNS

FIRST ISSUE

07 August 2025

Ref.	Plant Description	Location	Duty m^3/s : Pa	Data L_w / L_p dB	Octave Band Centre Frequency - Hz							
					63	125	250	500	1k	2k	4k	8k
HEU1	Air Handling Unit, BPS B807V	External Wall	TBC	L_w Open Intake	65	64	73	72	70	72	70	68
			TBC	L_w Open Extract	65	64	73	72	70	72	70	68
			TBC	L_w Breakout	68	57	63	56	53	45	39	28
AC1	Air Conditioning Unit, Mitsubishi PUMY-P200YKM2	External Wall	TBC	L_p at 1m[1]	63	61	61	58	57	52	49	41
AC2	Air Conditioning Unit, Mitsubishi PUMY-P200YKM2	External Wall	TBC	L_p at 1m [1]	63	61	61	58	57	52	49	41
HRU1	Heat Recovery Unit, Mitsubishi LGH-100RVX-E	Roof	TBC	L_w	72	72	68	69	67	67	62	52
HRU2	Heat Recovery Unit, Mitsubishi LGH-100RVX-E	Roof	TBC	L_w	72	72	68	69	67	67	62	52

Notes:-

1) Sound pressure level in ‘standard heating mode’ at 1m distance

PENISTONE TOWN HALL REMODELLING

ATMOSPHERIC SILENCER SCHEDULE ADT 3851/SSA

FIRST ISSUE

07 August 2025

ACOUSTIC DESIGN TECHNOLOGY
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Ref	Description	Length (mm)	Width (mm)	Height (mm)	No. Off	Vol (m^3/s)	Max. (Pa)	Insertion Loss (dB) at Centre Frequency (Hz)							
								63	125	250	500	1k	2k	4k	8k
ATT/01	HEU1 intake	900	to suit		1	TBC	TBC	2	4	9	15	17	14	10	8
ATT/02	HEU1 exhaust	900	to suit		1	TBC	TBC	2	4	9	15	17	14	10	8
ATT/03	HRU1 intake	600	to suit		1	TBC	TBC	1	2	7	10	11	9	8	7
ATT/04	HRU1 exhaust	600	to suit		1	TBC	TBC	1	2	7	10	11	9	8	7