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MR A HUSSAIN

NOISE IMPACT ASSESSMENT REPORT

4 SMITH STREET, ROCHDALE OL12 6HR

Client: Mr A Hussain

Report Ref: P7511-R1-V1

Issue Date: 2nd August 2024

Document Status: Version 1

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DATE ISSUED: 2nd AUGUST 2024

REPORT REFERENCE P7511-R1-V1

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REPORT VERSION CONTROL:

Document Reference	Date	Report Prepared by	Report Checked by	Report Authorised by
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		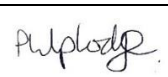		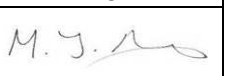

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1 INTRODUCTION

1.1 Overview

1.1.1 By instruction from Building Design & Planning Consultancy ('the agent') on behalf of Mr A Hussain (the client), NoiseAir was commissioned to conduct a noise impact assessment (NIA) for a proposed change of use from former offices (Planning Class E) to one residential apartment (Planning use class C). The location of the proposal is 4 Smith Street, Rochdale OL12 6HR, herein referred to as the 'development site'.

1.1.2 This noise report has been prepared with respect to an existing planning application (ref: 24/00403) and specifically the request from the local authority (LA) for a NIA. The report assesses the results of a noise survey conducted in accordance with current guidance and includes recommendations and mitigation, as appropriate.

1.1.3 General limitations with respect to this NIA are presented in **Appendix A**.

1.2 Site Description

1.2.1 The development site is located in an urban area of Rochdale town centre and the local area is a mix of commercial and residential properties.

1.2.2 The Metrolink tram services run to the north of the development site and the road network in the immediate vicinity accommodates various traffic types including busses.

1.2.3 To the south of the development site there is a car park which it is understood opens at 08:00 and closes at 18:00 on a Monday to Saturday and is closed on Sunday.

1.2.4 During the site survey it was observed that there were existing commercial condenser units to the west façade of the development building approximately 5m above local ground level.

1.2.5 There is an existing estate agent on the first floor which also directly adjoins the proposed flat on the ground floor to the west. Directly adjoining the other east side of the flat is a former taxi booking office.

1.2.6 **Figure 1** presents an aerial image of the development site with respect to the local area and its context.

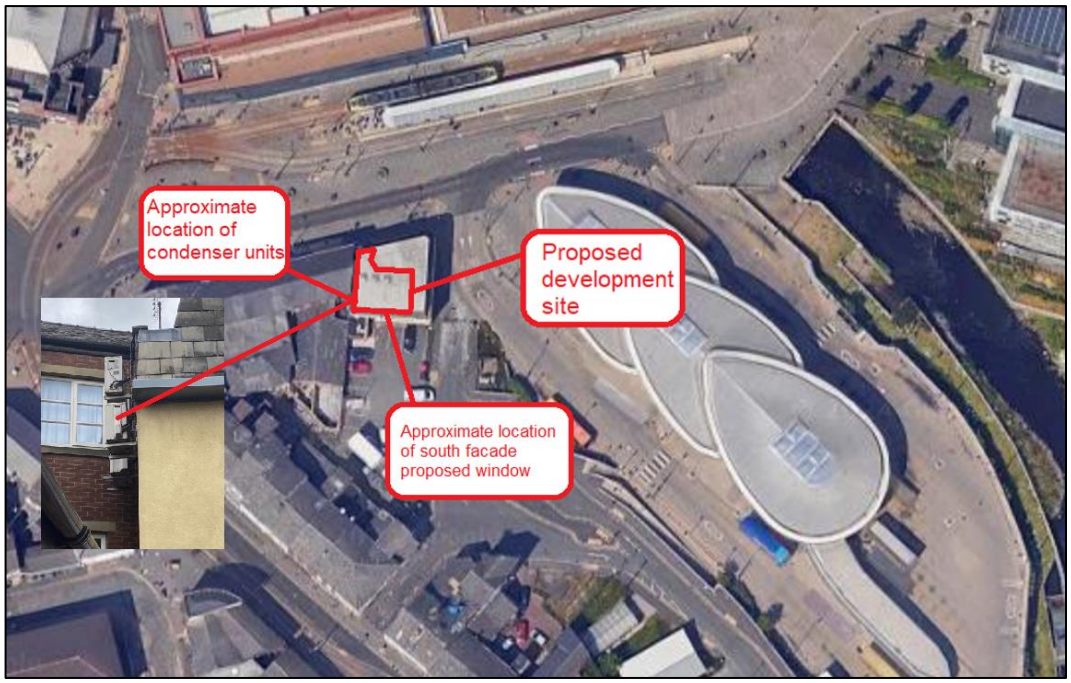

Figure 1: Site aerial image.

1.3 Development Proposals

1.3.1 At the time of writing, proposals provided to NoiseAir were for the renovation of an existing ground floor office to accommodate a single residential dwelling. **Figure 2** is available at the time of writing and presents the proposed layout of the development.

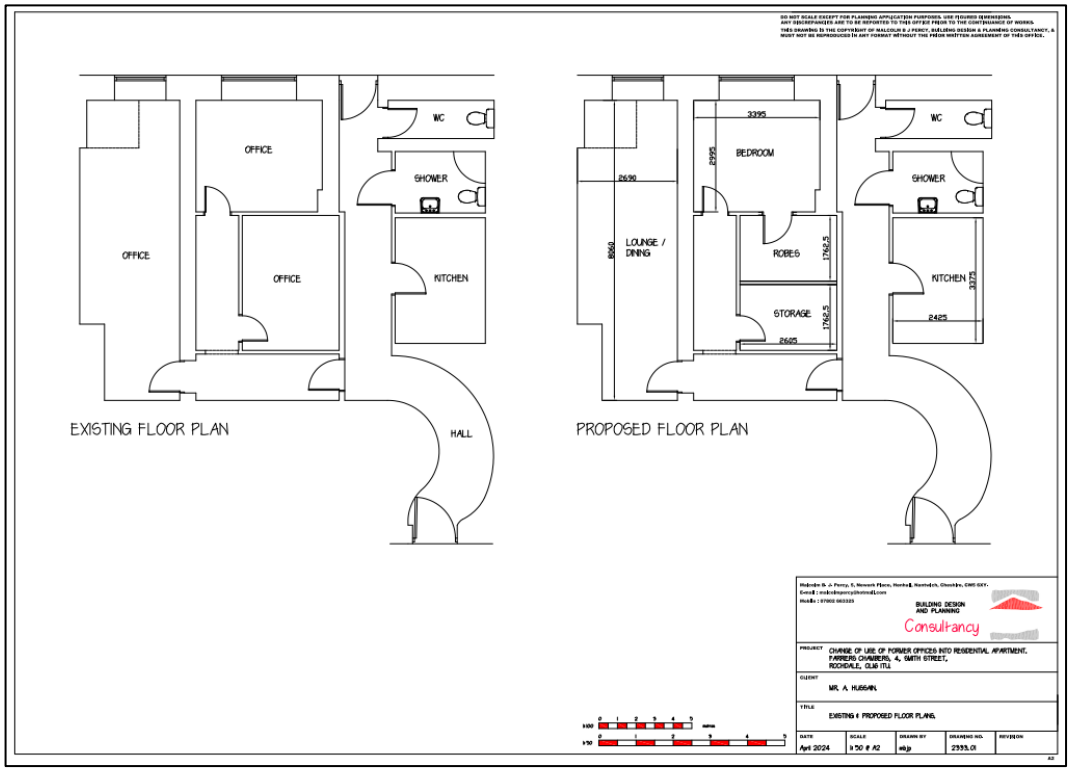

Figure 2: Proposed development layout.

1.3.2 All drawings received at the time of writing are presented in **Appendix B**.

1.3.3 It is understood that existing operational offices on the first floor of the building are to remain in operation.

2 ASSESSMENT METHODOLOGY AND SCOPE OF WORKS

2.1 Scope of Works

2.1.1 Following the site visit, it was observed that the following noise sources have the potential to impact the residents of the proposed development:

- General traffic in the local area including busses and trams;
- Local commercial plant; and,
- Potential noise impact via the party walls and floors.

2.2 Assessment Criteria

2.2.1 Given the noise from kitchen extract units is typically commercial in nature, a BS 4142:2014 assessment will be conducted to assess the impact. A brief summary of BS 4142:2014 is presented below.

2.2.2 To assess the noise impact from road traffic, the report makes reference to BS 8233:2014, a summary of which is also presented below.

British Standard 4142:2014 (BS 4142:2014)

2.2.3 British Standard 4142:2014 - Methods for rating and assessing industrial and commercial sound, sets the methodology for rating and assessing sound of an industrial and commercial nature, which includes sound from fixed installations such as mechanical and electrical plant and equipment.

2.2.4 In BS 4142:2014, a noise rating is determined and compared with the existing local background sound level based on several more cumulative acoustic feature corrections to apply where appropriate. For example, if the noise includes a distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristic, then additional cumulative penalties individually ranging from 0 to 9 dB may be applied depending on the type of noise.

2.2.5 BS 4142:2014 seeks to determine a “representative” background sound level, stating that “…the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.

2.2.6 The assessment of the impact depends upon the margin by which the rating level of the specific sound source exceeds the background sound level but also promotes a consideration of the context in which the sound occurs when making an assessment. BS 4142:2014 states that an initial estimate of the impact of the specific sound is made by

subtracting the measured background sound level from the rating level, while considering the following points:

- Typically, the greater this difference, the greater the magnitude of the impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.2.7 Therefore, a BS 4142:2014 assessment may deduce a low impact where the specific sound level is below the background sound level.

British Standard 8233:2014 (BS 8233:2014) – Guidance on Sound Insulation and Noise Reduction for Buildings

2.2.8 Internal noise level guidelines are set out in BS 8233:2014 which have been reproduced in **Table 1**.

Table 1: Summary of internal noise guidelines.

Activity	Location	07:00 – 23:00 hours	23:00 – 07:00 hours
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

2.2.9 BS 8233:2014 does not discuss internal noise guidelines with respect to L_{AFMax} criteria, therefore the assessment draws upon guidance in Pro-PG:2017 which states how individual noise events should not exceed 45 dB L_{AFMax} more than ten times a night.

2.2.10 BS 8233:2014 states that “the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB LAeq,16hr”. The standard continues… “These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.”

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

3.1.1 NoiseAir conducted unattended fixed position noise monitoring between 28th of June 2024 to the 1st of July 2024 (ML1)

3.1.2 The noise monitoring locations are presented in **Figure 3** and described in **Table 2**.

Figure 3: Noise monitoring locations.

Table 2: Summary of Noise Monitoring Locations

Monitor Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End / Duration	
ML1	Protruding from window approximately 1.5m from local ground level	10:30 28/06/24	09:15 01/07/24	Unattended

3.1.3 Monitoring location ML1 was considered to be representative of the ambient noise levels at the approximate location of the south façade of the development site. Audio recordings were also taken at ML1.

3.1.4 The noise measurement was conducted using a Class 1, integrating sound level meter (SLM).

3.1.5 The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003[1], before and after the noise monitoring periods.

3.1.6 Details of the SLMs and associated field calibration are presented in **Table 3.**

Table 3: Summary of SLM used for survey and associated field calibration

SLM (Serial Number)	Preamp (Serial Number)	Microphone (Serial Number)	Start Calibration	End Calibration	Drift
NOR140 (1405677)	NOR1209 (12308)	NOR1225 (33192)	-26.1	-25.9	0.2

3.1.7 The weather conditions were noted to be as outlined in **Table 4** during the site visits at the start and end of the monitoring period.

Table 4: Summary of weather conditions noted at the start and end of the monitoring duration.

Parameter	28th of June 2024	1st of July 2024
Roads (Wet / Dry)	Damp	Wet
Temperature (˚C)	13	13
Wind speed (ms^{-1})	< 5, gusts 5.8	4
Cloud Cover (Approx. %)	100	100
Humidity (%)	78	64

3.1.8 A-weighted[2] L_{eq}[3] and L_{AFMax}[4] noise levels were measured at ML1 to comply with the requirements of BS 8233:2014. A-weighted L_{90}[5] were also measured at ML1 to comply with the requirement of BS 4142:2014.

3.1.9 Attending the development site at the start and end of the survey monitoring period provided opportunity for observations and detailed notes to be made of the significant noise sources, which contribute to the measured level.

ML1

3.1.10 Dominant noise was general road traffic and bus noise. Secondary noise was occasional tram movement and pedestrian voices.

[1] BS7445-2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.
[2] An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.
[3] Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.
[4] The instantaneous maximum noise level recorded for a measurement period.
[5] The noise level which is exceeded for 90% of the measurement period.

3.2 Measured Sound Levels

3.2.1 Data is presented in **Figure 4** detailing a level vs time graph of the recorded L_{AFmax}, L_{Aeq} and L_{AF90} sound level over 15-minute time periods for ML1. Meteorological conditions likely to have influenced the measurement are highlighted yellow.

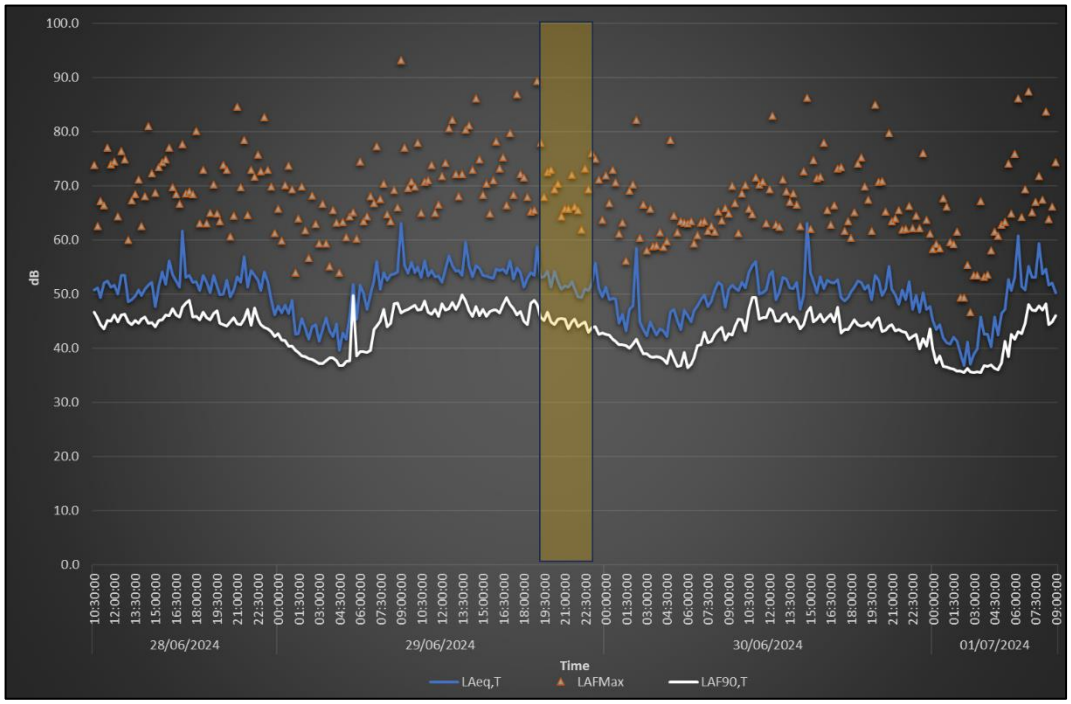

Figure 4: Level vs. time graph presenting L_{AFmax}, L_{Aeq} and L_{AF90} sound levels – ML1.

3.2.2 The location of ML1 was less than 1 m from the façade due to on-site constraints, in accordance with BS 8233:2014 clause 3.1.10 a correction of -2 dB has been applied to the ambient measured data to account for reflections off the facade. Given the condenser units are being assessed with respect to BS 4142:2014 and that they are located on a different façade and not perpendicular to ML1, a -1 dB correction is applied to the specific sound.

3.2.3 It is reasoned that the data highlighted yellow in **Figure 4** may have influenced the measurement and as such has been excluded from the dataset.

3.2.4 The results for the monitoring location ML1 during the daytime and night-time periods are presented in **Table 5** and are inclusive of the -2 dB aforementioned correction.

Table 5: Average Measured Daytime and Night-time Noise Levels				
Monitoring Location	Time	Measured Noise Level		
		dB $L_{Aeq,16hour}$ / dB $L_{Aeq,8hour}$	dB $L_{Aeq,1hour}$ / dB $L_{Aeq,15mins}$	dB $L_{A90,1hour}$ / dB $L_{A90,15mins}$
ML1	0700 - 2300 2300 - 0700	50.3 – 53.0 45.5 – 47.2	46.9 – 56.8 34.8 – 58.8	39.4 – 46.4 33.5 – 47.7

3.2.5 The maximum noise level exceeded more than 10 times recorded during a single night-time period, is presented in **Table 6** (inclusive of the -2 dB façade correction).

Table 6: Summary of the Maximum Night-time Noise Levels Exceeded More than 10 times in one Night-Time Period (Figures in dB L_{AFmax}).	
Monitoring Location	Measured Maximum Noise Level Exceeded More than 10 times in one night-time period (dB(A))
ML1	64

3.3 Typical Background Noise Levels

3.3.1 In accordance with BS 4142:2014 clause 6.2 (note), given the location of ML1 being within 1 m from the façade, corrections to the measured data are applicable in order to account for reflections.

3.3.2 Given the constraints of locating ML1 and also given the background noise level is likely to be driven from sources some of which are perpendicular to the façade at ML1 and some of which are not perpendicular, a correction of -2 dB is applied.

3.3.3 Typical Measured Background Sound Levels for the daytime are presented in **Figure 5.**

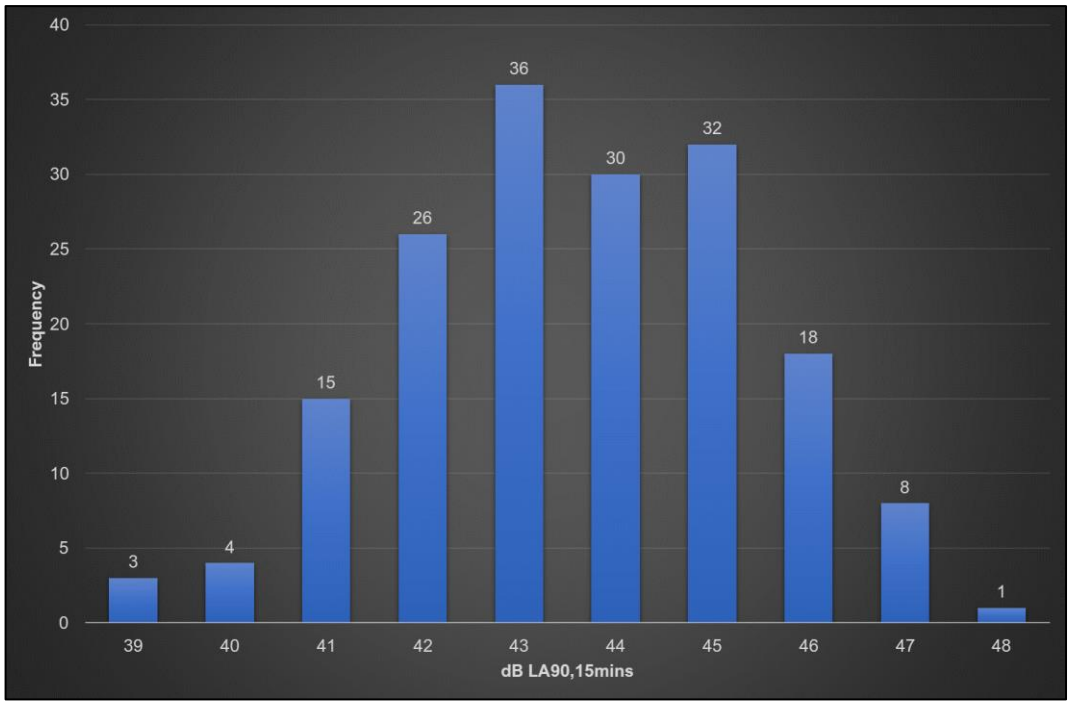

Figure 5: $L_{AF90,15mins}$ – Daytime

3.3.4 The background level selected for the BS 4142:2014 assessment is 41 dB(A).

3.3.5 Typical Measured Background Sound Levels for the night-time are presented in **Figure 6.**

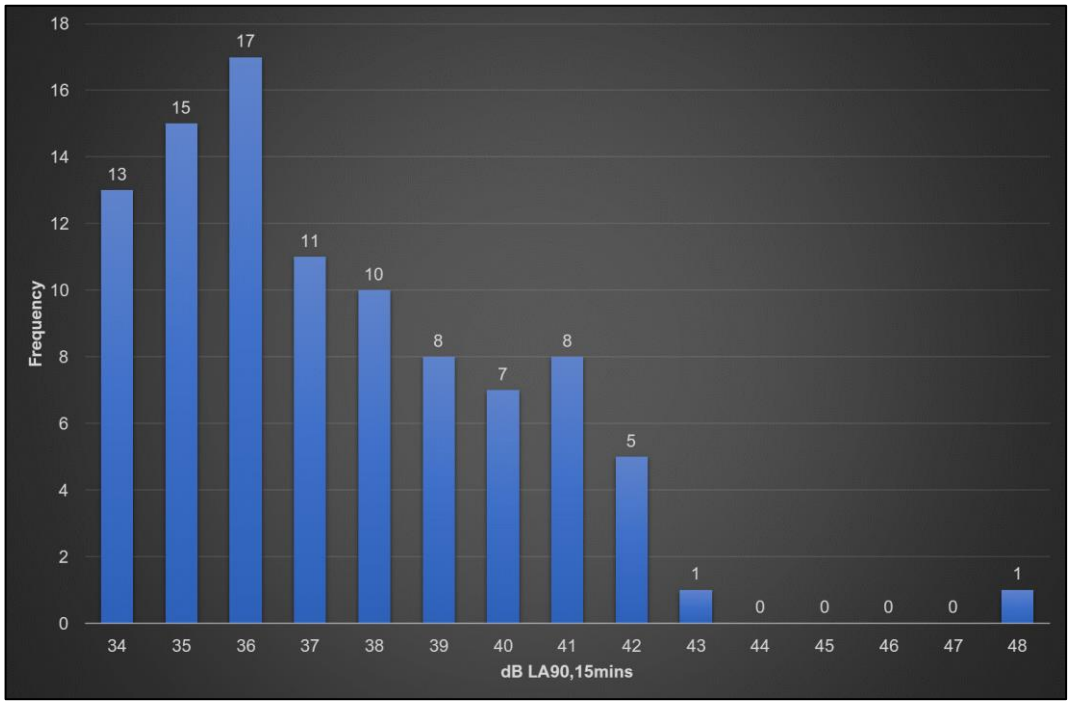

Figure 6: $L_{AF90,15mins}$ – Night-time

3.3.6 The background level selected for the BS 4142:2014 assessment is 34 dB(A).

4 NOISE IMPACT ASSESSMENT

4.1 BS 8233:2014 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

4.1.1 **Table 1** presents the BS8233:2014 recommended internal noise levels for residential properties.

4.1.2 The measured noise levels at the northeast façade of the proposed building structure (inclusive of the -2 dB façade correction), together with the level of attenuation required in accordance with BS 8233: 2014 and WHO:1999 are presented in **Table 7**.

Table 7: Level of Attenuation Required to Achieve the Internal Noise Guideline Levels.

Façade	Daytime ($L_{Aeq,16hours}$) / Night-Time ($L_{Aeq,8hours}$ / L_{AFmax})	Worst Case Noise Level at the Façade of the Property (dB)	Worst Case Level of Attenuation Required (dB)
S	Daytime $L_{Aeq,16hours}$	53	18
	Night-Time $L_{Aeq,8hours}$	47	17
	Night-Time L_{AFmax}	64	19*
*Indicates the worst case façade noise levels at each façade colour			

4.2 BS 4142:2014 Assessment – Existing Commercial Plant

4.2.1 Following a detailed review of the data in NorReview and the audio recordings at approximately 03:10 to 03:26 on the 1st of July 2024, it is reasoned that commercial noise is likely to be incident at ML1 as indicated in **Figure 7**.

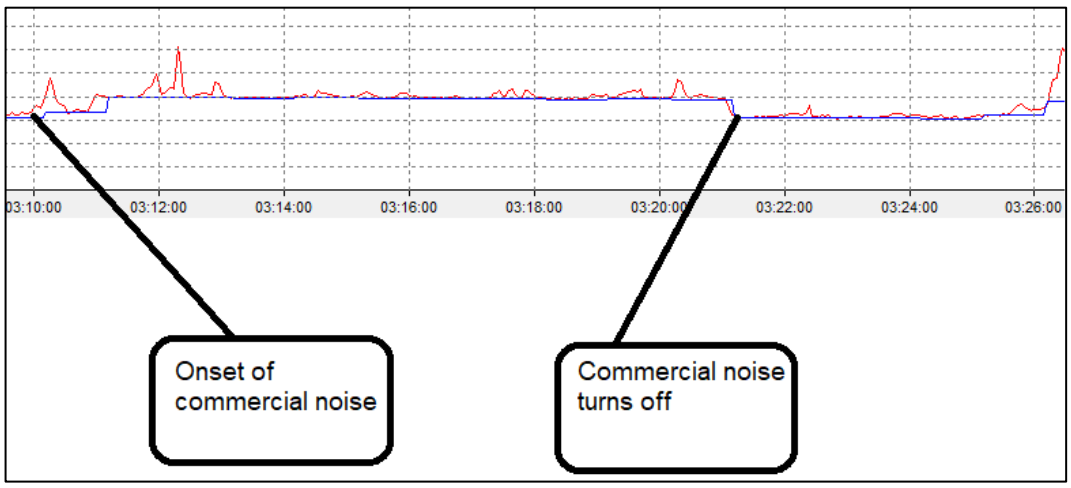

Figure 7: Indication of Commercial Noise Incident at ML1

4.2.2 Calculations from NorReview presented in **Figure 8** indicate an ambient noise level of 40.4 dB(A) and a residual level of 35.8 dB(A).

Source	Calculation interval (absolute time) 01/07/2024 03:10:03.000 - 01/07/2024 03:25:40.000	Effective duration (Profile)	Average: LAeq Profile, Ch1 [dB]
commercial	01/07/2024 03:10:03.000 - 01/07/2024 03:25:02.999	00:11:13.000 (1)	40.4 dB
	01/07/2024 03:25:03.000 - 01/07/2024 03:25:40.000	00:00:00.000 (0)	
residual	01/07/2024 03:10:03.000 - 01/07/2024 03:25:02.999	00:03:51.000 (1)	35.8 dB

Figure 8: NorReview Calculations

4.3 Specific Sound Level

4.3.1 Given the location of the condensers with respect to ML1, as previously discussed a correction of -1 dB should be applied for façade correction to give corrected ambient and residual levels of 39.4 dB(A) and 34.8 dB(A).

4.3.2 Given the ambient and residual noise level a logarithmic calculation predicts a specific sound at ML1 of 38 dB(A).

4.4 Specific Sound On-time Correction

4.4.1 The data indicates that the specific sound is typically on for approximately 10 minutes of the 15 minute reference period during the night-time, therefore an on-time calculation provides a noise level of 36 dB(A).

4.5 Background Sound Level

4.5.1 The typical background sound level adopted for this assessment during the daytime and night-time is 41 dB and 34 dB $L_{AF90,15mins}$, respectively.

4.6 BS 4142:2014 Assessment

Character Corrections

4.6.1 Given the specific sound has been measured, a subjective assessment of the character of the noise is provided as follows:

- **Tonality** – - the audio recording indicates that the tonal character at the receptor is clearly perceptible during the night-time and just perceptible during the daytime.
- **Impulsivity** – no impulsivity observed.
- **Intermittency –** commercial noise not considered intermittent.

Initial Assessment

4.6.2 The BS 4142:2014 initial assessment based on the calculated noise breakout levels with respect to the worst case NSR façade is presented in **Table 8.**

Table 8: BS 4142:2014 Initial Assessment		
Quantity	**Daytime dB**	**Night-time dB**
Typical Background Sound Level, $L_{A90,15mins}$	41	34
Specific sound level, $L_{Aeq,T}$	36	36
Acoustic feature correction	+2	+4
Rating Level	38	40
Excess of Rating Level over Background Sound Level	-3	+6
Initial Assessment impact	Low	Adverse

4.7 BS 4142:2014 Assessment Context and Outcome

4.7.1 While the impact during the night-time is adverse at the external façade the context in this case is to determine the likely impact internally.

4.7.2 While the mitigation of noise from commercial sources falls outside the scope of BS 8233:2014, it does discuss how lower targets may be more suitable when considering commercial source mitigation.

4.7.3 The sound insulation scheme presented further down the report recommends a sound insulation scheme that is predicted to reduce the noise levels with respect to the commercial noise to 17 dB(A) which is considered suitable for internal night-time levels in a bedroom.

4.7.4 Taking the context into consideration, it is reasoned that an adverse impact can be avoided.

4.8 Uncertainty

4.8.1 Uncertainty of measurements can have a significant effect on the outcome and findings of an assessment and therefore such constraints are documented and discussed below.

4.8.2 The SLM used was a Norsonic Class 1 SLM, it is generally recognised that Class 1 SLM's offer an uncertainty of ±1.0 dB(A). The instrumentation used for the survey has been calibrated by UKAS approved laboratories.

4.8.3 The sound levels measured (which include busier and quieter periods) are considered typical for urban areas.

4.8.4 Wind speeds during the measurement period adopted for the assessment were typically less than 5 ms-1 and the effect of wind generated noise is not considered to have a significant impact on this assessment.

4.8.5 Conservative background levels have been adopted from the measurements at ML1.

4.8.6 It is therefore considered that in this instance the uncertainty of the calculations may have minimal influence on the outcome of this assessment, however no further steps are required to increase confidence in the results.

5 SOUND INSULATION SCHEME

5.1 Building Envelope Requirements – Windows Closed

5.1.1 Proposals for the development site at the time of writing outline residential use. The proposed layout is presented in **Figure 2.**

5.1.2 Internal noise levels are required to not exceed 35 dB $L_{Aeq,16hours}$ during the daytime hours in all noise sensitive habitable rooms and 30 dB $L_{Aeq,8hours}$ and 45 dB L_{AFmax} during the night-time hours in bedrooms.

5.1.3 When assessing sound levels in habitable areas of the proposed development, the sound attenuation provided by the overall building facade should be considered. To mitigate sound levels, the composition of the building facade can be designed to provide the level of attenuation required.

5.1.4 Glazing is generally the building element which attenuates noise the least, so the proportion of glazing in a building facade is an important consideration when assessing overall sound attenuation. Additionally, any façade penetrations should also be considered such as for ventilation, i.e., trickle ventilation.

5.1.5 The documentation does not indicate the construction detail of the walls therefore, reasonable assumptions have been made in order to calculate the likely sound reduction of the building envelope.

5.1.6 Calculations indicate that to achieve a reasonable internal acoustic environment in habitable rooms as specified within BS 8233:2014, the building envelope constructions should be selected to meet the sound reduction index (SRI) values calculated as presented in **Figure 9** and **Figure 10** and summarised in **Table 9**.

Term	Description	Value
S_f	Total facade area (m^2)	4.75
S_{wi}	Window area (m^2)	2.00
S_{ew}	External wall area (Sf - Swi) (m^2)	2.75
S_{rr}	Area of the ceiling (m^2)	10.17
S	Total area exposed to noise ingress (Sf + Srr)	14.92
x	Room dimension x	3.40
y	Room dimension y	3.00
z	Room dimension z	2.40
V	Volume of receiving room (m^3)	24.40
K	Facade Measuremet Correction	0.00
A0	Ref. qbs area (m2)	10.00
k	k=3 in BS 8233:2014 + Tollerance	5.00
	No. of vents in external wall	2.00
r	Distance to window / vent (m)	0.00
d	Angle of incidence (deg)	180.00

Project:
Description:
by:
Date:
Room Assessed:
Night/Day:

Results: **30** dB L_{Aeq} NR **22**

45 dB LA_{max}

Term	Description	Description of noise level	Octave Band Centre Frequency (Hz) 63	125	250	500	1000	2000	4000	8000	Broadband dB(A) 63-8k	dB(A) 125-2k
$L_{eq,ff}$	Free-field **L_{eq}** outside room		53	54	49	43	39	39	34	25	47	47
L_{max}	Free-field **L_{max}** outside room		68	69	60	60	59	58	44	47	64	64

Term	Description	Specification									
$D_{n,e}$	$D_{n,e}$ of **each** venitlator:	29 dB Dne,w+Ctr Standard trickle vent in window	20	23	26	29	30	33	33	33	-	-
	Cumulative $D_{n,e}$ for all venitilators		17	20	23	26	27	30	30	30		
R_{wi}	SRI of glazing/window:	27 dB Rw+Ctr 4:12:4 mm	18	24	20	25	35	38	35	35	-	-
	SRI of external wall:	47 dB Rw+Ctr BS8233 Example - Brick and block external wall	34	40	44	45	51	56	56	56	-	-
R_{rr}	SRI of roof and ceiling:	Ignore roof	130	130	130	130	130	130	130	130	-	-

Term	Description	Type / Comment /Source								dB(A) 63-8k	dB(A) 125-2k
$L_{eq,2}$	Internal L_{eq}		42	41	34	24	18	15	10	1	30	29
$L_{max,2}$	Internal L_{max}		58	55	44	41	38	34	21	23	45	44

Figure 9: Sound Insulation Calculation – BS 8233:2014 Assessment Calculation

5.1.7 The calculation presented in **Figure 10** predicts that the sound insulation scheme recommended in **Figure 9** is sufficient to attenuate the commercial noise to a level of 17 dB(A) inside the bedroom.

Term	Description	Value
S_f	Total facade area (m^2)	4.75
S_{wi}	Window area (m^2)	2.00
S_{ew}	External wall area (Sf - Swi) (m^2)	2.75
S_{rr}	Area of the ceiling (m^2)	10.17
S	Total area exposed to noise ingress (Sf + Srr)	14.92
x	Room dimension x	3.40
y	Room dimension y	3.00
z	Room dimension z	2.40
V	Volume of receiving room (m^3)	24.40
K	Facade Measuremet Correction	0.00
A0	Ref. qbs area (m2)	10.00
k	k=3 in BS 8233:2014 + Tollerance	5.00
	No. of vents in external wall	2.00
r	Distance to window / vent (m)	0.00
d	Angle of incidence (deg)	180.00

Project:
Description:
by:
Date:
Room Assessed:
Night/Day:

Results: **17** dB L_{Aeq} NR **7**

-15 dB LA_{max}

Term	Description	Description of noise level	Octave Band Centre Frequency (Hz) 63	125	250	500	1000	2000	4000	8000	Broadband dB(A) 63-8k	dB(A) 125-2k
$L_{eq,ff}$	Free-field **L_{eq}** outside room		41	36	35	32	29	30	25	16	36	35
L_{max}	Free-field **L_{max}** outside room										7	5

Term	Description	Specification									
$D_{n,e}$	$D_{n,e}$ of **each** venitlator:	29 dB Dne,w+Ctr Standard trickle vent in window	20	23	26	29	30	33	33	33	-	-
	Cumulative $D_{n,e}$ for all venitilators		17	20	23	26	27	30	30	30		
R_{wi}	SRI of glazing/window:	27 dB Rw+Ctr 4:12:4 mm	18	24	20	25	35	38	35	35	-	-
	SRI of external wall:	47 dB Rw+Ctr BS8233 Example - Brick and block external wall	34	40	44	45	51	56	56	56	-	-
R_{rr}	SRI of roof and ceiling:	Ignore roof	130	130	130	130	130	130	130	130	-	-

Term	Description	Type / Comment /Source								dB(A) 63-8k	dB(A) 125-2k
$L_{eq,2}$	Internal L_{eq}		31	23	20	13	8	6	2	-7	17	16

Figure 10: Sound Insulation Calculation with Respect to Commercial Noise

Table 9: Summary of Building Envelope Performance Requirements		
Walls	47 R_w+C_{tr}	Example – BS 8233 example - Brick and block external wall
Glazing	27 R_w+C_{tr}	Example - 4-12-4 profile
Acoustically Treated Ventilators (assumed 2 per room)	29 $D_{ne,w}+C_{tr}$	Example: Standard trickle vent in window

5.2 Open Window Constraints

5.2.1 Given the proposal is to refurbish an existing building, Building Regulations Approved Document O Overheating: 2021 is not applicable in this scenario.

5.2.2 It is however considered appropriate to assess the attenuation across a facade with a partially open window for ventilation.

5.2.3 Noise attenuation through an open window is approximately 10-15 dB. The 2020 Acoustics, Ventilation and Overheating (AVO) Guidance published in 2020 suggests 13 dB as a suitable assumption for a typical window.

5.2.4 Assuming 13 dB of attenuation in line with the 2020 AVO guidance, daytime noise levels would need to be 48 dB $L_{Aeq,16hour}$ or below and night-time noise levels would need to be 43 dB $L_{Aeq,8hour}$ / 58 dB L_{AFmax} to achieve acceptable internal noise levels in typical circumstances.

5.2.5 The external noise levels predicted at this site are 53 dB $L_{Aeq,16hour}$, 47 dB dB $L_{Aeq,8hour}$ and 64 dB dB L_{AFmax}.

5.2.6 It would therefore be considered insufficient to adopt partially open windows as a means of ventilation and alternative forms of ventilation should be considered (e.g., trickle ventilators).

5.3 Acoustic Ventilation Requirements

5.3.1 Acoustic ventilation proposed at the site, is recommended that it should, as a minimum, comply with Building Regulations Approved Document F1 Means of Ventilation and British Standard BS 5925 1991: "Code of Practice for Ventilation Principles and Designing for Natural Ventilation". Acoustic ventilation is only recommended for noise sensitive rooms, which are bedrooms and living/dining rooms.

5.3.2 Where a passive ventilation system is incorporated into the design, ventilators should be acoustically treated for habitable rooms to all facades. Ventilation openings to these rooms should match or exceed the minimum values set out for the level of attenuation provided by the glazing.

5.3.3 The implementation of the recommended glazing together with appropriate acoustic ventilation predicts that the required internal daytime and night-time noise limits are achieved.

5.3.4 It is likely that noise levels in noise sensitive rooms within the proposed dwellings will rely on the windows being in the closed position (other than for purge ventilation) and therefore appropriate ventilation design should be completed.

5.3.5 From a technical perspective, it is likely that a passive ventilation system can be adopted at the development site and basic acoustic requirements for any passive ventilation which may be installed should match or exceed the level of attenuation provided by the glazing.

5.3.6 It should be noted that ventilation requirements for future occupants of the proposed development are outside the scope of this report.

5.3.7 Any mechanical ventilation adopted for the noise sensitive rooms should have a noise output which complies with NR25 L_{eq} noise rating curve.

5.4 Floor and Dividing Wall Sound Insulation Requirements

5.4.1 Given the existing businesses operating to the first floor and directly adjoining the proposed site, it is considered necessary to assess the sound insulation requirements of the party floor and walls such that the required internal noise levels are not exceeded.

5.4.2 The construction detail of the existing floors and walls are not known at the time of writing.

5.4.3 BS 8233:2014 states that the $L_{Aeq,16hours}$ and $L_{Aeq,8hours}$ shall not exceed 35 dB and 30 dB for daytime and night-time respectively. Given these requirement noise levels are with respect to non-commercial sources, it is reasoned that the target levels in this case are reduced by 5 dB to 30 dB and 25 dB for daytime and night-time, respectively.

5.4.4 Given the types of commercial businesses operating the noise levels inside the rooms where the businesses operate is not likely to exceed 70 dB(A)

5.4.5 Based on the layout provided at the time of writing (presented in **Figure 2**), the party walls and floors are required to achieve a sound reduction of 40 dB and 45 dB $D_{n,t,W} + C_{tr}$, respectively.

5.4.6 It is therefore recommended that a sound insulation test is conducted on the walls and floor to confirm their performance. This can be instigated via a suitably worded planning condition issued via the LA.

5.4.7 Subject to the discharge of the aforementioned condition, it is reasoned that planning permission should not be refused on the grounds of noise impact.

6 CONCLUSIONS

6.1.1 NoiseAir has conducted a noise impact assessment with respect to the proposed residential development to be located at 4 Smith Street, Rochdale OL12 6HR.

6.1.2 The main noise sources at the site are road traffic, external commercial noise and noise from commercial businesses above and directly adjoining the development site.

6.1.3 A BS 4142:2014 assessment has been conducted and based on the introduction of the recommended façade sound insulation; it is reasoned that an adverse impact can be avoided internally.

6.1.4 With windows partially open, the recommended internal noise limit is likely to be exceeded in some habitable rooms at the development site, therefore an alternative form of ventilation is recommended.

6.1.5 Given it is predicted that a partially open window would not suffice at the proposed development, the report has therefore provided recommendations with respect to the building envelope.

6.1.6 Building performance requirements with windows closed are as follows:

- glazing performance achieving 27 R_w+C_{tr} and associated trickle ventilation achieving 29 $D_{ne,w} + C_{tr}$; and,
- Walls to achieve no less than 47 dB R_w+C_{tr}.

6.1.7 Given the commercial businesses operating on the first floor and adjoining rooms, recommendations are provided with respect to the sound insulation performance requirements of the walls and floor.

6.1.8 On the basis that it is demonstrated that the party walls and floor perform to the requirements and recommended mitigation outlined in the report is introduced, it is reasoned that sufficient evidence has been provided such that planning permission should not be refused on the grounds of acoustic impact.

APPENDIX A - REPORT LIMITATIONS

This report is presented to Mr A Hussain and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

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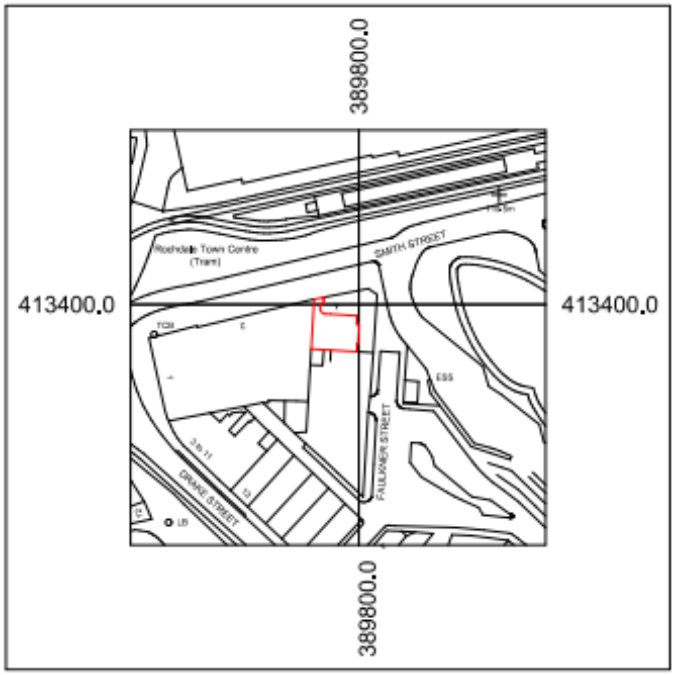
APPENDIX B – DRAWINGS

Stanfords Planning Map Data



Location Plan - 1:1250

20 0 20 40 60 80 100

Metres

N

Production Date: 30 April 2024

Top Left: 389745 413442 Bottom Right: 389845 413342

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APPENDIX C – GLOSSARY

A-weighted sound pressure, p_A	Value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network. *NOTE: The A-weighting network modifies the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system.*
A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure in decibels (dBA).
Acoustic environment	Sound from all sound sources as modified by the environment [BS ISO 12913-1:2013].
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. *NOTE: The ambient sound comprises the residual sound and the specific sound when present.*
Ambient sound level, $L_a = L_{Aeq,T}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T *NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.*
Background sound	Underlying level of sound over a period, *T*, which might in part be an indication of relative quietness at a given location.
Background sound level, $L_{A90,T}$ (BS4142:2014)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Break-in	Noise transmission into a structure from outside.
Break-out	Noise transmission from inside a structure to the outside.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
C_{tr}	Correction term applied against the sound insulation single-number values (R_w, D_w, and $D_{nT,w}$) to provide a weighting against low frequency performance. *NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.*
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time.
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ (BS4142:2014)	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time.
Equivalent sound absorption area of a room, A	Hypothetical area of a totally absorbing surface without diffraction effects, expressed in square metres (m2), which, if it were the only absorbing element in the room, would give the same reverberation time as the room under consideration
Facade level	Sound pressure level 1 m in front of the façade. *NOTE: Facade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.*
Free-field level	Sound pressure level away from reflecting surfaces. *NOTE: Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e., not 3.5 m from the reflecting surface in the direction of the source). Estimates of noise from aircraft overhead usually include a correction of 2 dB to allow for reflections from the ground.*

Impact sound pressure level, L_i	Average sound pressure level in a specific frequency band in a room below a floor when it is excited by a standard tapping machine or equivalent.
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants. *NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.*
Measurement time interval, T_m (BS4142:2014)	Total time over which measurements are taken. *NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.*
Noise criteria	Numerical indices used to define design goals in a given space.
Noise rating, NR	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves.
Normalised impact sound pressure level, L_n	Impact sound pressure level normalized for a standard absorption area in the receiving room. *NOTE: Normalised impact sound pressure level is usually used to characterize the insulation of a floor in a laboratory against impact sound in a stated frequency band.*
Octave band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Percentile level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for *N*% of a specified time interval.
Reference time interval, T_r (BS4142:2014)	Specified interval over which the specific sound level is determined. *NOTE: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.*
Residual sound (BS4142:2014)	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, $L_r = L_{Aeq,T}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Rating level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. *NOTE: This is used in BS 7445 and BS 4142 for rating industrial noise, where the noise is the specific noise from the source under investigation.*
Reverberation time, *T*	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped.
Sound exposure level, *L*AE	Level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Sound level difference, *D*	Difference between the sound pressure level in the source room and the sound pressure level in the receiving room.
Sound pressure, *p*	Root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound.
Sound pressure level, L_p	Quantity of sound pressure, in decibels (dB).
Sound reduction index, *R*	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
Specific sound source (BS4142:2014)	Sound source being assessed.
Standardised impact sound pressure level, L'_{nT}	Impact sound pressure level normalized to a reverberation time in the receiving room of 0.5 s.
Standardised level difference, D_{nT}	Difference in sound level between a pair of rooms, in a stated frequency band, normalized to a reference reverberation time of 0.5 s for dwellings.
Groundborne noise	Audible noise caused by the vibration of elements of a structure, for which the vibration propagation path from the source is partially or wholly through the ground. *NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.*
Structure-borne noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements. *NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.*
Third octave band	Band of frequencies in which the upper limit of the band is 2% times the frequency of the lower limit.
Weighted level difference, D_w	Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions. *NOTE Weighted level difference is used to characterize the insulation between rooms in a building as they are. Values cannot normally be compared with measurements made under other conditions (see BS EN ISO 717-1).*
Weighted normalised impact sound pressure level, $L'_{n,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or
Weighted standardised impact sound pressure level $L'_{nT,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted standardised level difference, $D_{nT,w}$	Single-number quantity that characterizes the airborne sound insulation between rooms.

Symbols

D_w	Weighted level difference (dB)
D_{nT}	Standardized level difference (dB)
$D_{nT,w}$	Weighted standardized level difference (dB)
L_{Amax}	Maximum noise level (dB)
$L_{Ar,Tr}$	Rating level (dB)
L_n	Normalised impact sound pressure level (dB)
L'_{nT}	Standardised impact sound pressure level (dB)
$L'_{nT,w}$	Weighted standardised impact sound pressure level (dB)
$L'_{n,w}$	Weighted normalised impact sound pressure level (dB)
L_p	Sound pressure level (dB)
L_{pA}	A-weighted sound pressure level (dB)
$L_{AN,T}$	Percentile level (dB)
L_{AE}	Sound exposure level (dB)
$LAeq,T$	Equivalent continuous A-weighted sound pressure level (dB)
p	Sound pressure (Pa)
p_A	A-weighted sound pressure (dB)
$p_{A(t)}$	Instantaneous A-weighted sound pressure (Pa)

R	Sound reduction index (dB)
R_w	Weighted sound reduction index (dB)
T	Time interval (also used for reverberation time) (s)
t_0	Reference time interval (s)

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