



Noise Impact Assessment

Site Address: Ground Floor, 11 Dyche Street, Manchester, M4 4BQ

Client Name: John Flinn

Project Reference No: NP-009142



Authorisation and Version Control

Revision	Date	Reported By	Checked By	Approved By
001	10/03/2023	H Masters, BEng, AMIOA	T Watkin, MSc, AMIOA	A Martin, MSc, MIOA

Amendment History

Revision	Summary of Amendments
001	First Draft

Disclaimer

This document has been prepared for the Client only and solely for the purposes expressly defined herein. NOVA Acoustics Ltd owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by NOVA Acoustics Ltd in signed writing, NOVA Acoustics Ltd hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. This report has been solely on the specific design assumptions and criteria stated herein.

All works undertaken by NOVA Acoustics Ltd are carried out in accordance with NOVA Acoustics Ltd's terms and conditions found at www.novaacoustics.co.uk.

Contact Details

NOVA Acoustics Ltd,
Suite 13, Crown House,
94 Armley Road,
Leeds,
LS12 2EJ

0113 322 7977

www.novaacoustics.co.uk
technical@novaacoustics.co.uk

Contents

1.	INTRODUCTION	4
1.1	Legislation, Policy & Guidance.....	4
1.2	Proposal Brief	4
2.	ACOUSTIC DESIGN CRITERIA.....	5
3.	ENVIRONMENTAL NOISE SURVEY	6
3.1	Measurement Methodology	6
3.2	Subjective Impression & Context.....	6
3.3	Background Sound Level Results Summary – Noise Breakout	7
3.4	Background Sound Level Results Summary – BS4142 Plant Noise Limit level	7
4.	NOISE IMPACT ASSESSMENT	8
4.1	Required Mitigation Measures.....	8
4.2	Existing Construction of Building Fabric	8
4.3	Noise Breakout Assessment	9
5.	BS4142 EXTERNAL FIXED PLANT NOISE LIMIT LEVEL	10
6.	CONCLUSION & ACTION PLAN.....	11
	APPENDIX A – ACOUSTIC TERMINOLOGY	12
	APPENDIX B – STANDARDS, LEGISLATION, POLICY AND GUIDANCE	13
	B.1 – National Planning Policy Framework (2021)	13
	B.2 – Noise Policy Statement for England (2010).....	13
	B.3 – BS8233:2014 ‘Guidance on Sound insulation and noise reduction for buildings’	14
	B.4 – British Standard BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound	15
	APPENDIX C – ENVIRONMENTAL NOISE SURVEY	18
	C.1 – Time History / Measurements	18
	C.2 – Surveying Equipment	18
	C.3 – Meteorological Conditions	18

Tables

Table 1 – Environmental Noise Survey Details	6
Table 2 – Background Sound Level Summary	7
Table 3 – Maximum Amplified Music Limit Levels	8
Table 4 – Noise Breakout Assessment	9
Table 5 – External Plant Noise Limit Levels	10
Table 6 – BS8233:2014 Internal Ambient Noise Level Criteria.....	15
Table 7 – Measurement Equipment	18
Table 8 – Weather Conditions	19

Figures

Figure 1 – Indicative Site Layout	6
Figure 2 – MP1 Background Sound Level Analysis (07:00 – 23:00 hours)	7
Figure 3 – MP1 Background Sound Level Analysis (23:00 – 07:00 hours)	7
Figure 4 – Environmental Noise Survey Measurement Time History	18

1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment for a Café and Bar ('the Proposed Development') on the ground floor at 11 Dyche Street, Manchester, M4 4BQ ('the Site').

The applicant has submitted planning application No.'135803/FO/2022' ('the Application') to Manchester City Council, who have requested further documentation to approve the application. The following technical report has been compiled to support the application to Manchester City Council.

An environmental noise survey has been undertaken to establish the prevailing background noise levels in the area surrounding the site. The findings have been subsequently used to assess the suitability of the site. Measures required to mitigate noise impacts for the Proposed Development have been assessed in accordance with the relevant performance standards, legislation, policy and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 *Legislation, Policy & Guidance*

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The Local Planning Authorities ('LPA') guidance, specifically: 'Manchester City Council – Planning and Noise Technical Guidance (October 2022)' including Section 3.7.1.2 – *Entertainment Venues*.
- National Planning Policy Framework (2021)
- Noise Policy Statement for England (2010)
- British Standard BS4142:2014+A1:2019 – 'Methods for Rating and Assessing Industrial and Commercial Sound'
- British Standard BS8233:2014 – 'Guidance on sound insulation and noise reduction for buildings'

Further information on the above legislation can be found in Appendix B.

1.2 *Proposal Brief*

The proposed fit-out will provide a main bar area with associated seating, a storage area, and a WC. From the plans, it is also noted that there is not a dedicated external patron area. Furthermore, the client has stated that no external fixed plant is to be installed.

The proposed operational hours for the café/bar will be between:

- 07:30 to 17:00, all days of the week for the café.
- 17:00 to 22:30, all days of the week for the bar.

The client has stipulated that any amplified music will be played at a low level to create ambience and to allow for 'normal' conversation, e.g., not having to raise your voice.

2. Acoustic Design Criteria

Manchester City Council provides the following guidance in regard to noise from Entertainment Venues in the 'Planning and Noise Technical Guidance (2022)':

3.7.1.2 Entertainment Venues

...a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:

'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively'.

This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue.

A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

'Entertainment noise (LAeq,5min) should be controlled to 5dB below the typical background noise level (LA90) in each octave band at the nearest noise sensitive location'.

To achieve the requirements set out above, the following has been undertaken:

- Assessment of noise breakout associated with that of a typical café/bar from the proposed development. Where necessary, mitigation measures and/or limiting noise levels are provided to achieve the criteria.

3.1 Measurement Methodology

Table 1 – Environmental Noise Survey Details

This aerial map illustrates the proposed development site, highlighted by a red rectangle. The site is located at the intersection of Dwyer St and Rochdale Rd. Key features and labels include:

- MP1:** A yellow box with an arrow pointing to the site location.
- Site:** A red box with an arrow pointing to the red-outlined development area.
- Closest NSR1:** A green box with an arrow pointing to the nearest National Speed Review (NSR) 1 line.
- NSR2:** A green box with an arrow pointing to the nearest National Speed Review (NSR) 2 line.
- Windows of Proposed Development:** A yellow box with an arrow pointing to the specific windows of the proposed development.

Surrounding streets and landmarks visible on the map include Dwyer St, Rochdale Rd, and various local businesses and parking areas.

Figure 1 – Indicative Site Layout

NSR2 is the 'North Central Hotel' which includes bedroom windows on the first floor. The closest bedroom window of NSR2 is situated approximately 6m from the closest window of the Proposed Development, however, it is set back and fully shielded by the fabric of the hotel and the Proposed Development.

3.3 Background Sound Level Results Summary – Noise Breakout

The following table outlines the lowest L_{90} background sound levels measured during the most sensitive operational hours of 19:00 to 22:30, daily. The time history results can be found in Appendix C.

Location	Measurement Period ('T')	Octave Frequency Band (Hz, $L_{90,T}$ dB)							$L_{A90,T}$ (dB)
		63	125	250	500	1k	2k	4k	
MP1	Day 4: 19:00 – 22:30	51	47	45	45	45	41	28	48

Table 2 – Background Sound Level Summary

3.4 Background Sound Level Results Summary – BS4142 Plant Noise Limit level

The following table outlines the measured background sound levels that have been used as the baseline for the BS4142 external plant noise limit level assessment. The figures below show histogram graphs of the background sound levels measured during the day time and night time periods throughout the entire measurement period.

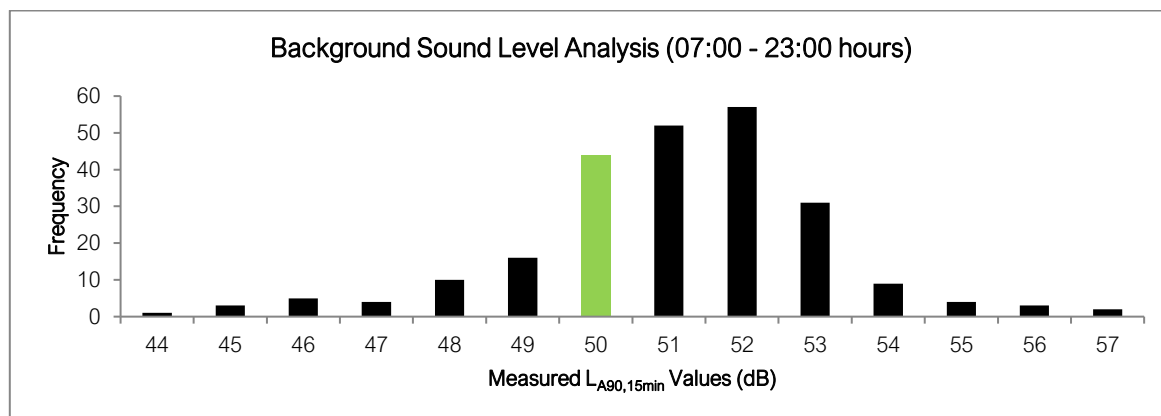


Figure 2 – MP1 Background Sound Level Analysis (07:00 – 23:00 hours)

As can be seen in the figure above, the $L_{A90,15min}$ value of 50 dB is considered to be the 'lowest typical' background sound level and has been used as the baseline in the subsequent BS4142 assessment.

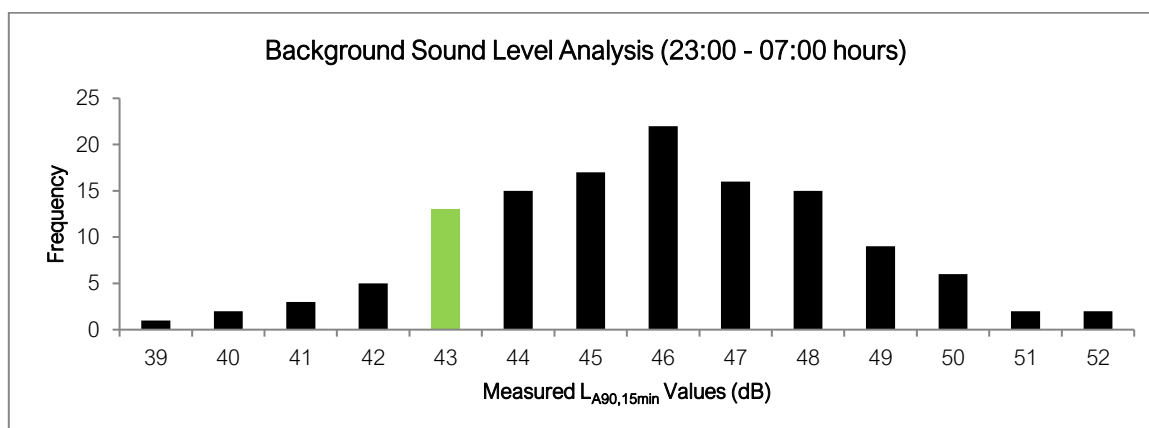


Figure 3 – MP1 Background Sound Level Analysis (23:00 – 07:00 hours)

As can be seen in the figure above, the $L_{A90,15min}$ value of 43 dB is considered to be the 'lowest typical' background sound level and has been used as the baseline in the subsequent BS4142 assessment.

4. Noise Impact Assessment

The following section analyses the impact from entertainment noise breaking out of the Proposed Development.

4.1 Required Mitigation Measures

To achieve the acoustic design criteria, the following mitigation measures should be implemented prior to the first operation and retained thereafter:

- Any amplified music limiting device capable of controlling music noise levels in specific octave frequency bands must be installed and the maximum amplified music limit levels presented in Table 3 should be adhered to.

Maximum Amplified Music Limit Levels								
Description	Octave Frequency Band (Hz, L _{eq} dB)							L _{Aeq} (dB)
	63	125	250	500	1k	2k	4k	
Maximum Amplified Music Limit Levels	71	72	75	78	80	75	67	83

Table 3 – Maximum Amplified Music Limit Levels

The maximum amplified music limit levels presented above are deemed appropriate for the Proposed Development. The client has stated that any amplified music will be played at a low level to create ambience and to allow for 'normal' conversation, e.g., not having to raise your voice. Furthermore, the above amplified music limit levels are akin to those for a 'bust restaurant' outlined in the ANC's 'Little Red Book of Acoustics'.

4.2 Existing Construction of Building Fabric

The current ground floor retail unit consists of a solid masonry wall assumed to be at least 200mm in depth and is assumed to provide sufficient sound reduction compared to the windows.

The three windows that face NSR1 are of a 4mm glass specification and approximately 1.5m tall by 1m wide.

4.3 Noise Breakout Assessment

The noise emissions breaking out of the Proposed Development have been assessed outside the closest window of the most affected NSR1. The calculations have been undertaken assuming the following:

- The amplified music limit levels presented in Table 3,
- The glazing is weakest element of the façade in terms of sound reduction,
- The sound reduction provide by the 4mm glazed elements is taken from the Pilkington catalogue except for the 63Hz octave frequency band which was ascertained form INSUL 9.0 Sound Insulation Software,
- The sound power levels of the glazed elements is calculated using the formula: $L_{W,rad} = L_{p,int} - R - Cd + 10 \cdot \log(S)$, where:
 - o $L_{p,int}$ is the internal noise levels presented in Table 3,
 - o R is the sound reduction provided by the element,
 - o Cd is the correction to account for the difference between reverberant internal non-reverberant external conditions (BS12354),
 - o S is the total surface area of the glazing.
- The distance correction to the NSR has been calculated assuming point source behaviour as the distance between the sources and the NSR is greater than the largest source dimension / π .

The table below presents the noise breakout assessment.

Noise Breakout Assessment at NSR1								
Description	Octave Frequency Band (Hz, dB)							Overall (dBA)
	63	125	250	500	1k	2k	4k	
Maximum Amp Music Limit Levels	71	72	75	78	80	75	67	83
Glazing SRI (R')	12	17	20	26	32	33	26	--
Cd Correction	-6							
L_w of Glazed Elements	60	56	56	53	49	43	42	54
Distance Correction to NSR1 (5m – Q4)	-19							
Total External Noise Level at NSR (L_{eq})	41	37	37	34	30	24	23	35
Background Sound Level (L_{90} : 19:00 – 22:30 hours)	51	47	45	45	45	41	28	48
Exceedance of Criteria	-10	-10	-8	-11	-15	-17	-5	-13

Table 4 – Noise Breakout Assessment

As can be seen in the assessment above, provide the mitigation measures specified within this report are adhere to and retained thereafter, the octave band breakout noise levels are predicted to be at least 5 dB below the background sound levels measured during the most sensitive operational period. This achieve the LPA criteria and would be classed as 'No Observed Effect level' ('NOEL') when assessed in accordance with the NPSE and NPPF.

5. BS4142 External Fixed Plant Noise Limit Level

Currently, no external fixed plant has been specified for the Proposed Development, however, it is thought that it is possible that plant may be required for ventilation and chilling purposes. For this reason, plant noise limit levels have been defined to ensure that the noise emissions do not exceed the background sound levels at the closest NSRs. The limit levels are inclusive of any rating penalties that should be applied to account for audible characteristics of the noise which could be deemed to cause increased annoyance, such as intermittency, impulsivity, or tonality. The limit levels have been calculated for the daytime and night-time periods, depending on when the plant will be operational.

The calculated plant noise limit levels are shown in the table below.

Description	Daytime Period (dB)	Night-time Period (dB)
Background Sound Level ($L_{A90,T}$)	50	43
Cumulative Plant Noise Limit Level at NSR ($L_{Aeq,T}$)	40	33

Table 5 – External Plant Noise Limit Levels

Discussion:

As can be seen in the assessment above, provided the plant limit levels are adhered to all noise emissions from the external plant units should not exceed the existing background sound levels. When assessed in accordance with BS4142:2014 this indicates 'Low Impact', and when assessed with the NPPF and NPSE this is classed as 'No Observed Effect Level' ('NOEL'). Once the plant units are specified the noise emissions should be calculated by an appropriately qualified person to ensure that the limit levels are achieved.

6. Conclusion & Action Plan

The proposed development has been assessed against the Local Authority's acoustic design criteria and a noise mitigation scheme has been provided to ensure the criteria has been achieved.

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are duly implemented:

- A limiting device must be installed which is capable of limiting noise levels in the specific octave band frequencies shown in Table 3.
- The plant noise limit levels presented in Table 5 should be adhered to.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Background Sound	Underlying level of sound over a period, T , which might in part be an indication of relative quietness at a given location
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
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
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
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
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
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
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 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), given by the formula: $L_p = 10 \log_{10} (p/p_0)^2$. Where: p is the root-mean-square sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2021)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2021. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 174e, it states:

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.

Paragraph 185 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 impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
- 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; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 185 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision 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.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS8233:2014 ‘Guidance on Sound insulation and noise reduction for buildings’

BS8233 provides guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, ‘WHO Guidelines on Community Noise, 1999’. The Guidelines on Community Noise (1999) document defines community noise to include noise from “industries” and “construction”. The desirable criteria levels of steady state, “anonymous” noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below.

BS8233:2014 Internal Ambient Noise Level Criteria			
Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
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 $L_{Aeq,8hour}$ 45 dB L_{AFmax}^*

Table 6 – BS8233:2014 Internal Ambient Noise Level Criteria

**ProPG:2017 states that's good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{AFmax} more than 10 time a night within noise sensitive rooms such as bedrooms. However, where it is not reasonably practicable to achieve the guideline then the judgment of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number distribution, predictability and regularity of noise events.*

It is noted, however, that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

For this assessment, the above criteria are considered to be the 'LOAEL' as defined in the NPSE in Appendix B.

B.4 – British Standard BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound

Overview

BS4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency, and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 states:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

- a) subjective method;*
- b) objective method for tonality;*
- c) reference method.”*

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

“Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources.”

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is “just perceptible”, +4 dB where a tone is “clearly perceptible”, and +6 dB where a tone is “highly perceptible”.

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is “just perceptible”, +6 dB where it is “clearly perceptible”, and +9 dB where it is “highly perceptible”.

c) Other Sound Characteristics

BS4142 states that where “the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied.”

d) Intermittency

BS4142 states that when the “specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.”

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142 states: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs"*. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."
- "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 negligible impact, depending on the context."

Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level.
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level.
- The lower the rating sound 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 sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact and would therefore be classified as No Observed Effect Level.
- During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Environmental Noise Survey

C.1 – Time History / Measurements

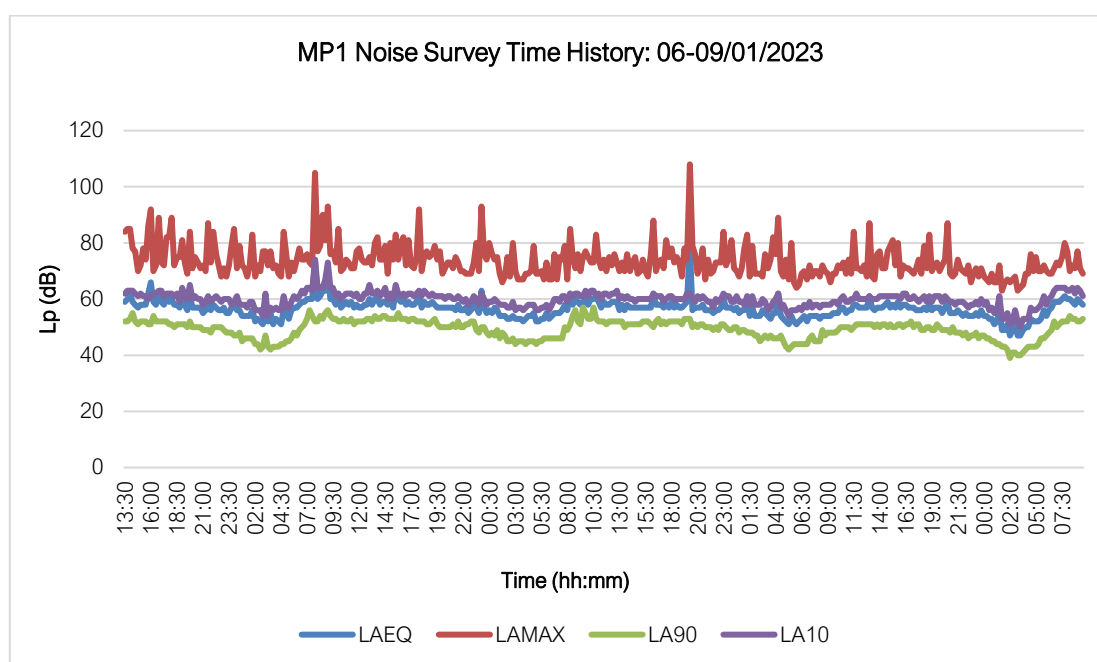


Figure 4 – Environmental Noise Survey Measurement Time History

C.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC250 Sound Level Meter	T252917	≤0.3dB
CESVA CB011 Calibrator	T253551	

Table 7 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

C.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445

Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Roe Green (Approx. 10.1km W of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
23/02/23: 00:00 – 23:59	2.8 – 8.8	0.0	SSW	0.0 – 3.6
24/02/23: 00:00 – 23:59	2.5 – 11.2	0.0 – 1.2	SE	0.0 – 4.4
25/02/23: 00:00 – 23:59	1.0 – 6.6	0.0	SE	0.0 – 4.0
26/02/23: 00:00 – 23:59	0.4 – 8.9	0.0	NE	0.0 – 4.0
27/02/23: 00:00 – 23:59	1.2 – 8.4	0.0	NE	0.0 – 2.8

Table 8 – Weather Conditions



NOVA
ACOUSTICS