



Band on the Wall- Extension

Plant Noise Assessment

For Inner City Music LTD.

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1. INTRODUCTION

Hydrock have been appointed to carry out a plant noise assessment of a proposed plant units on the new extension of Band on the Wall in Manchester. This assessment demonstrates compliance with Condition 10 attached to the planning permission issued by Manchester City Council. Band on the Wall is an existing music venue and café/bar located on Swan Street in north-east Manchester which has recently been extended at the rear of the venue.

The site is located in north-east Manchester on Swan Street. To the north east, the site is bordered by Swan Street, which serves as a busy through road connecting Oldham Road and Rochdale Road, two major routes in and out of Manchester City Centre. To the north, east and west of the site are a mixture of commercial properties, including bars and restaurants along with residential and other entertainment venues. To the south of the site there are residential properties on Foundry Lane approximately 10m from the boundary of the extension.

This assessment evaluates the potential noise rating level of plant associated with the extension to Band on the Wall and outlines if any mitigation is needed to reduce the impact on the surrounding residential properties, and satisfy Condition 10.

This report is technical in nature and therefore technical terminology is provided in **Appendix A**.

2. ASSESSMENT METHODOLOGY

The purpose of this assessment is to discharge Condition 10 of the outline planning permission (application number: 127401/JO/2020) for the extension of the entertainment venue. Condition 10 states:

Condition 10: Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location. The scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to policies SP1 and DM1 of the Core Strategy.

2.1 Policy and Guidance

The assessment methodology is based on the following current policy and guidance documents:

- National Planning Policy Framework, 2021 (NPPF);
- Noise Policy Statement for England, 2010 (NPSE);
- Planning Practice Guidance, Live Document (PPG);
- World Health Organisation (WHO) 1999: Guidelines for Community Noise; and,
- BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound (BS4142).

A review of the relevant planning policies and acoustics guidance is found in **Appendix B**.

3. NOISE SURVEY

An acoustic noise survey has been carried out by Braiden Acoustics Ltd in April 2017 to support the planning application for the extension of the current entertainment venue. This assessment is based upon the results from the aforementioned survey, further information can be found on the Manchester City Council Planning Portal (ref: 116643/LO/2017) with the following document title: *116642_FO_2017-NOISE_IMPACT-ASSESSMENT-747998.PDF*.

3.1 Overview

A noise survey to measure existing background noise levels was carried out by Braiden Acoustics Ltd on 19th April 2017 over a 24-hour period. Monitoring was unattended and was carried out during the working week with a view to capturing robust background noise levels in the vicinity of nearby residents.

Weather conditions were reported to be conducive with temperatures of 12-18 degrees, 60 - 80% cloud cover, <5m/s wind speeds and light precipitation.

3.2 Existing Noise Environment

The acoustic report outlines that the dominant noise source was the surrounding local road network, notably Swan Street and Great Ancoats Street. In addition, noise from passing pedestrians was also reported to be audible throughout the survey.

Braiden Acoustics state that the background noise levels in the area were typical of a city centre location - between 50 and 60 $L_{A90,T}$ dB during the daytime and 40 $L_{A90,T}$ dB during the night-time. The lowest background noise level recorded was 39 $L_{A90,T}$ dB whilst the venue was operating at approximately 00:40hrs.

4. PLANT NOISE ASSESSMENT

4.1 Plant Noise Limits

No plant noise limits were set in the report by Braiden Acoustics, however based upon the measured background noise levels and the requirements of Condition, appropriate limits are set out below.

With reference to BS4142, the atmospheric noise emissions limits have been determined for any proposed fixed building services plant (with the exception of emergency plant i.e. back-up generators).

Noise associated with the development shall be controlled to the guideline levels outlined in Table 1, where possible, when assessed in accordance with BS4142, at the nearest noise sensitive receptor. The limits correspond to the 5 dB below the background noise levels outlined in Braiden Acoustics report, in order to comply with Condition 10.

Table 1: Guideline Atmospheric Plant Noise Emission Limit

Period	Atmospheric Plant Noise Emission Limit (dB, L _{Ar,T})
Daytime (07:00 to 23:00 hrs)	45
Night-time (23:00 to 07:00 hrs)	34

4.2 Proposed Plant

The proposed ancillary equipment associated with the extension at Band on the Wall has been outlined in Table 2. The levels outlined are the levels provided by the manufacturers data and do not include any attenuators in order to provide a robust assessment.

Table 2: Manufacturer Noise Levels of Proposed Unit

Unit	No.	Location	Sound Pressure Level at 1m (dBA)
Air handling unit	1	2 nd floor roof	50
Heat recovery unit	1	2 nd floor roof	34
Extract fan	1	2 nd floor roof	53

4.3 Specific Noise Levels at Existing Sensitive Receptors

The approximate location of the plant is measured at a distance of 23m to the nearest residential receptor. It has been assumed that the plant is located approximately where the AHU riser ductwork is on drawings provided by OMI Architects (dated August 2020). The specific levels of each unit have been logarithmically added together and a distance attenuation carried out to obtain the cumulative specific noise level at the façade of the ESRs.

For the purposes of this assessment, it is assumed that all proposed plant will be running simultaneously in order to provide a robust assessment of potential impact.

Table 3: Cumulative Specific Noise Level at the Nearest ESR

Existing Sensitive Receptors (ESRs)	Cumulative Specific Noise Level at Façade, L _{Aeq} dB(A)
Residential Properties on Foundry Lane	28

4.4 BS4142 Comparison of Rating and Background Noise Levels

Identification of Specific Noise Level

The specific noise level is the level of industrial noise under scrutiny when unaffected by noise from other sources. The cumulative specific noise level has been calculated at the nearest ESR by applying a point source distance attenuation correction, as presented in Table 3.

Identification of Background Noise Levels

In the acoustic survey carried out by Braiden Acoustics, $L_{A90,T}$ noise levels have been measured at Band on the Wall and have been divided into daytime (07:00-23:00hrs) and night-time (23:00-07:00hrs). The report outlines the lowest recorded daytime level as 50 $L_{A90,T}$ dB and the lowest recorded night-time level as 39 $L_{A90,T}$ dB.

These levels are considered to provide a robust representation of residential properties on Foundry Lane and have therefore been selected to represent the background noise levels for the purposes of this assessment.

Application of Acoustic Feature Correction

The proposed plant at Band on the Wall is associated with a heating and cooling system for the development. These systems are generally not found to be tonal or intermittent in character, however has the potential to operate intermittently. Therefore, an acoustic correction of +3dB has been applied in this assessment accordingly.

Barrier Attenuation

Based on a review of the proposed Site layout, drawings provided by OMI Architects and aerial imagery, the proposed plant will be partially screened from existing residents by the Band on The Wall building itself. Therefore, a partial screening correction of 5dB is has been applied.

BS4142 Assessment of Noise Impact During the Day and Night-time

Table 4: Assessment at ESRs on Foundry Lane

BS 4142:2014 reference	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Specific sound level at ESR, dB(A)	28	28
Acoustic feature correction*, dB	+3	+3
Barrier Attenuation, dB	-5	-5
Rating level, dB	26	26
Background sound level, $L_{A90,T}$ dB	50	39
Exceedance of Rating over Background level, dB	-24	-13
Impact (context dependent)	Low	Low

Table 4 indicates that during the daytime, noise rating levels will be below the typical background level by -24dB. During the night time, the noise rating will be below the typical background level by -13dB. This indicates a low impact during both the daytime and night time period in accordance to BS4142, depending on context.

This assessment demonstrates that proposed ancillary equipment achieves a noise rating level at least 5dB below the existing daytime and background level in accordance with Condition 10.

4.5 BS4142 Context Assessment

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 sources exceeds the background sound level and the context in which the sound occurs'

The first requirement of this statement has been determined within the preceding section. To determine the context in which the industrial sound resides, three factors must be considered, these are:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sounds; and,
- The sensitivity of the receptor.

4.5.1 Absolute Level of Sound

According to BS4142, the impact for a given difference between the rating level and the background sound level, the overall impact may be considered greater for an acoustic environment where the residual sound level is high, than for where a residual sound level is low.

Daytime

The specific level of sound from the plant units at the ESRs on Foundry Lane, during the daytime period, when taking in to account distance attenuation, is 28dB. The average daytime residual sound level is 50dB.

For the ESRs, the specific and residual sound level is considered to be low, and significantly lower than thresholds of health impacts, as per BS82233 and WHO guidance. The specific levels are significantly lower than the lower 'desirable' guideline level of 50dB $L_{Aeq,T}$ for outdoor living areas recommended by BS8233 and WHO, health-based guidance.

Therefore, when considering the absolute level of sound during the daytime, the magnitude of overall impact of the noise is reduced.

Night-time

The specific level of sound from the plant units at the ESRs during the night time period, when taking in to account distance attenuation is 28dB. The average night time (04:00 – 07:00) residual sound level is 39dB.

The specific and residual sound levels are considered to be standard for city centre living, and are both significantly below the recommended internal noise level of 30dB L_{Aeq} within bedrooms, when assuming attenuation through an open window of 15dB, outlined by BS8233 and WHO health-based guidance.

Therefore, when considering the absolute level of sound during the night time, the magnitude of overall impact of the noise is reduced.

4.5.2 Character and Level

This section of the context assessment considers whether the specific sound is likely to be distinguishable, and will represent an incongruous sound in comparison to the residual acoustic environment.

At the ESRs, the level of specific sound, is predicted to be approximately 24dB lower than the residual sound during the daytime, and 13dB lower during the night-time. Specific sound from the plant units is considered to have perceptible intermittency characteristics, however the overall sound spectrum is considered to be relatively evenly distributed. The residual acoustic environment in the vicinity of ESRs predominantly comprises of road traffic from the local and distant network along with commercial noise from local bars and restaurants.

Therefore, the broadband nature of residual and specific sources is considered similar across the majority of the audible spectrum, however some impulsivity associated with the plant units may be perceptible.

4.5.3 Sensitivity of Receptors

The ESRs are considered to have a moderate to high sensitivity given the residential nature. However, BS4142 states that the initial estimate of the impact needs to be modified where:

'dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal/or outdoor acoustic conditions, such as:

- » Façade insulation treatment;
- » Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and,
- » Acoustic screening'

Due to the city centre location of the residential properties on Foundry Lane, it is presumed that there is significant and appropriate façade insulation and ventilation strategies that allow for windows to be closed. The city centre location and existing noise levels would suggest that there are some forms of acoustic screening between the plant noise and ESRs.

Therefore, the sensitivity of the receptor is considered to be less during both the daytime and night-time.

The impact of the plant at the ESRs is considered to be low as outlined in the assessment and levels are not expected to exceed guideline levels during the daytime and night-time.

4.6 Summary of Industrial Noise Impacts

The residential receptors on Foundry Lane are the only sensitive properties in the nearby vicinity of Band on the Wall and the BS4142 assessment indicates a low impact is predicted to occur during the daytime and night-time.

The absolute level of residual and specific sound is considered to be low, when compared to relevant health-based impact thresholds, outlined by BS8233 and WHO. Therefore, the magnitude of overall impact is reduced further.

When considering the character and level of residual sound compared to specific sound, the specific sources are likely to be noticeable due to the difference in character, however the specific sound is less than the residual sound.

When considering the Site in context, in accordance with BS4142, the potential impact of noise associated with the proposed plant locations at the ESR is considered to be low. With respect to PPG and NPSE, noise is considered to be present but not intrusive and therefore below the LOAEL. No additional specific mitigation is therefore considered to be required.

This assessment demonstrates that proposed ancillary equipment achieves a noise rating level at least 5dB below the existing daytime and background level in accordance with Condition 10.

5. CONCLUSION

Hydrock have been appointed by Inner City Music Ltd to provide a plant noise assessment of the proposed plant associated with the extension of Band on the Wall, Manchester.

This assessment evaluates the like impacts associated with the proposed plant units at nearby existing sensitive receptors on Foundry Lane, based on manufacturer noise levels and baseline noise levels gathered on site by Braiden Acoustics.

Braiden Acoustics carried out a noise survey in order to establish the existing noise environment in the vicinity of the existing sensitive receptors (ESRs) during the daytime and night-time periods, in accordance with current guidance.

The existing noise climate is dominated by the local road network in Manchester City Centre and noise from bars and restaurants surrounding Band on the Wall.

A BS4142 assessment of noise emitted from the proposed plant units indicates that a low impact is likely to occur and the majority of the noise sensitive receptors, depending on context.

When considering the proposed development in context, in accordance with BS4142, the predicted noise impact is considered to be low to negligible.

With respect to PPG and NPSE, noise from the proposed development is considered to be present but not intrusive and therefore below the LOAEL, therefore no additional specific mitigation is considered to be required.

This assessment demonstrates that proposed ancillary equipment achieves a noise rating level at least 5dB below the existing daytime and background level in accordance with Condition 10.

Appendix A Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2 \times 10^{-5} \text{Pa}$).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
R_w	R_w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	$D_{n,e,w}$ is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C_{tr} is a correction term applied to single-number sound insulation values (R_w , $D_{n,e,w}$ etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3m from buildings.

Appendix B Policy and Guidance

National Planning Policy Framework (NPPF)

Published in February 2021, this document sets out the Government's planning policies for England and supersedes the previous version of the NPPF published in 2019. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

*"170. 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."

It also makes the following references to noise in the Section entitled Ground conditions and pollution:

"180. 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 life⁶⁰;

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.

60 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

And

"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Noise Policy Statement for England (NPSE)

Published in March 2010, the Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as follows:

"Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development."

The NPSE identifies three observed effect levels, names "No Observed Effect Level" (NOEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "Significant Observed Adverse Effect Level" (SOAEL).

The NPSE contains little detail on assessment methodologies and specific parameters at which the varying observed effect levels would occur in the context of a residential development.

BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings

As discussed above, there is no specific guidance contained within the Planning Condition and the NPSE. In lieu of this, the approach that is generally adopted when assessing environmental noise sources on residential developments is to undertake an assessment in accordance with BS 8233: 2014.

BS 8233 provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building. The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the following criteria set out in the table below:

Activity	Location	Period	
		Daytime (07:00 to 23:00 hrs)	Night-time (23:00 to 07:00 hrs)
Resting	Living room	$L_{Aeq,16hrs}$ 35 dB	-
Dining	Dining room/area	$L_{Aeq,16hrs}$ 40 dB	-
Sleeping (daytime resting)	Bedroom	$L_{Aeq,16hrs}$ 35 dB	$L_{Aeq,8hrs}$ 30 dB

Whilst BS 8233:2014 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise below.

With respect to external amenity space such as gardens and patios it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

As with the 'good' and 'reasonable' criteria in BS 8233, the L_{AFmax} criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance 1999: Guidelines for community noise. This document draws upon guidance from Vallet and Vernay, which states:

"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"

BS 4142:2014 - Methods for rating and assessing commercial and industrial sound

BS 4142 describes methods for rating and assessing sound from industrial and manufacturing processes, fixed installations which comprise mechanical and electrical plant and equipment, the loading and unloading of goods and materials at industrial and/or commercial premises and mobile plant and vehicles that are an intrinsic part of the overall sound emanating from premises or processes.

The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the sound and the prevailing background sound level ($L_{A90,T}$). Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of 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.

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."