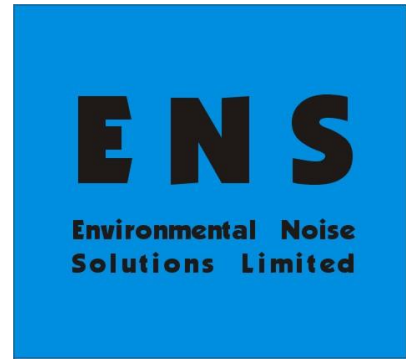




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Consented Restaurant 7 Noble Way, Manchester, M1 7FU

Breakout Noise Assessment

**For:
Mr Su**

3rd August 2023

Ref: NIA-10966-23-11237-v1 Mr Su, Manchester

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1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Mr Su to undertake a noise survey and assessment for a consented hot pot restaurant (Mr Su) at 7 Noble Way, Manchester, M1 7FU (hereafter referred to as 'the site').

Planning permission (ref: 110055/FO/2015/C1) for Phase 1A of the wider mixed-use residential/commercial development (Circle Square) was granted by Manchester City Council (MCC) in January 2016, subject to conditions. Condition 16 relates to the control of breakout noise as follows:

'16. *Before any use hereby approved commences within the ground floor units for a Class A3 or Class A4 use, final details of how the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment (including where appropriate acoustic lobbies) shall be submitted to and approved in writing by the City Council as local planning authority. The development shall thereafter be fully implemented in accordance with these details.'*

The objectives of the noise impact assessment were therefore to:

- Determine the levels of break out noise associated with the restaurant
- Assess the potential impact of noise break out from the restaurant on the nearest receptors
- Provide recommendations for a scheme of sound attenuation works, as necessary

This report details the methodology and results of the assessment and provides recommendations as necessary. It has been prepared to accompany Planning Application ref: CDN/23/0228 submitted to MCC for the discharge of Condition 16 of Planning Permission ref: 110055/FO/2015/C1.

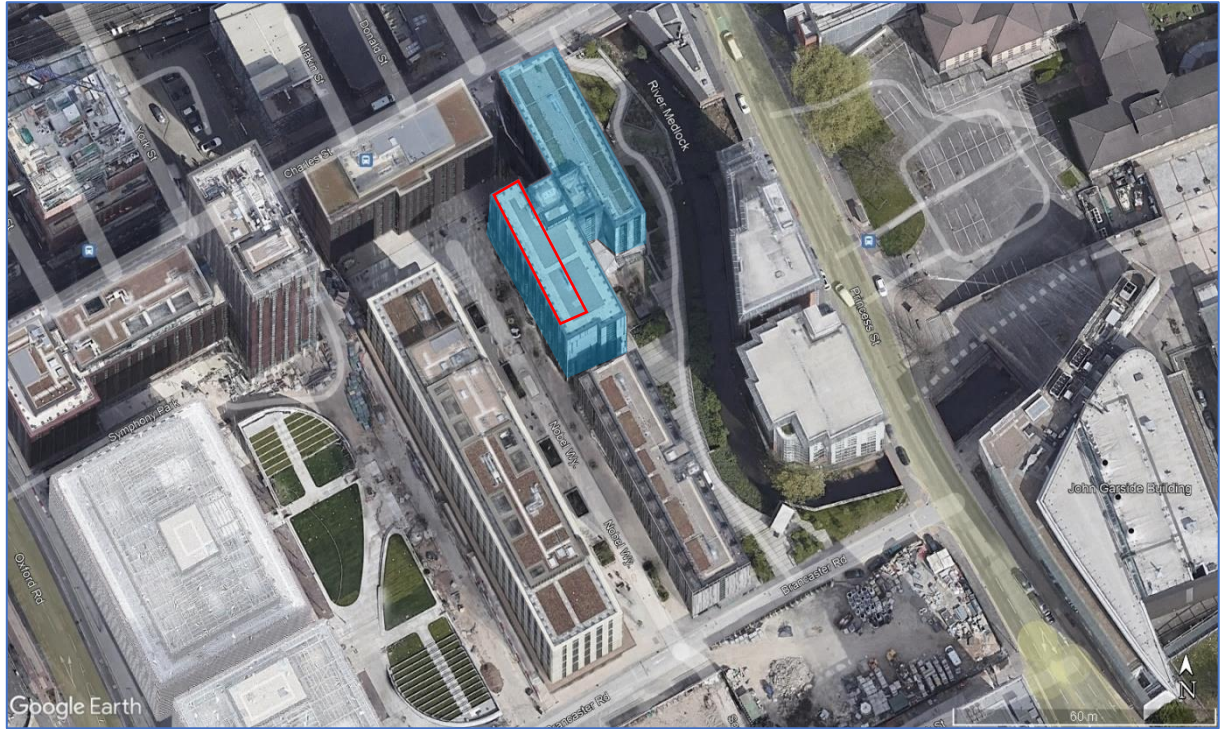
The report has been prepared for Mr Su for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Mr Su and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description

The restaurant occupies a portion of the ground floor of Block 10 of the Circle Square development. The overlying mezzanine floor is used as a store room for the restaurant. Block 10 is shown highlighted in blue in Figure 1.1 below, with the approximate footprint of the site shown outlined in red.

Figure 1.1: Location of Development



At both ground floor and mezzanine level, the restaurant/store room adjoins communal/ancillary areas of the wider building (e.g. lift lobbies, stair cores, refuse store and plant rooms), and does not share a party wall with any residential unit. However, there are existing first floor apartments overlying the mezzanine level store room.

The restaurant operates from 1100 to 2100 hours.

2 Policy Context and Assessment Guidance

2.1 Planning Practice Guidance on Noise

Planning Practice Guidance¹ (PPG) is an online resource providing additional guidance and elaboration on the National Planning Policy Framework (NPPF)². It advises that the Local Planning Authority should consider the acoustic environment in relation to:

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

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that: ‘...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation’.

Table 2.1 summarises the PPG noise exposure hierarchy.

Table 2.1: PPG Noise Exposure Hierarchy

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

1 Planning Practice Guidance on Noise: <http://planningguidance.planningportal.gov.uk/blog/guidance/noise/>

2 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2021)

2.2 British Standard 8233:2014

British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (BS 8233)³ sets indoor ambient noise levels for residential dwellings, as summarised in Table 2.2.

Table 2.2: Indoor Ambient Noise Levels in Dwellings

Activity	Location	Daytime Indoor Ambient Noise Levels
Resting	Living Room	35 dB L _{Aeq} (0700-2300)
Dining	Dining Room/Area	40 dB L _{Aeq} (0700-2300)
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} (0700-2300)

2.3 Manchester City Council Planning and Noise Technical Guidance

Planning and Noise Technical Guidance⁴ produced by Manchester City Council provides supplementary planning guidance and criteria relating to noise for proposed developments.

Section 3.7.1.1 of the guidance (Residential Developments) reflects the guidance contained in BS 8233.

For developments containing both commercial and residential uses, Section 3.7.1.3 of the guidance states that:

‘Consultants should demonstrate that the structure of the development will be sufficient to adequately contain the noise generated within the development. In doing so consultants should consider:

- *flanking noise;*
- *structure borne noise;*
- *the overall level of noise (L_{Aeq}) generated by the use in question and any tonal or impulsive characteristics that the noise may contain; and*
- *the acoustic properties of the development (including the construction of party floors and/or walls, windows and doors, ventilation systems, and structural columns.)’*

Whilst Section 3.7.1.2 proposes low-frequency music noise limits for entertainment venues, consideration of these target criteria are not warranted at the site, as the music in the restaurant is set at ‘conversational’ levels and was not audible outside the restaurant or within the mezzanine level store room (and would not therefore be audible at any nearby receptor).

³ British Standards Institution (2014). *British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings*.

⁴ Manchester City Council. *Planning and Noise Technical Guidance (2022)*

2.4 Building Regulations Approved Document E

Building Regulations Approved Document E ‘Resistance to the passage of sound’ (ADE 2003)⁵ provides guidance and criteria in relation to internal acoustics within residential developments.

Requirement E1 of ADE 2003 is as follows:

Requirement
Protection against sound from other parts of the building and adjoining buildings
E1. Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings.

For new build developments, the performance requirements of ADE 2003 are as follows:

- Airborne sound insulation of separating walls no less than 45 dB $D_{nT,w} + C_{tr}$
- Airborne sound insulation of separating floors + stairs no less than 45 dB $D_{nT,w} + C_{tr}$
- Impact sound insulation of separating floors + stairs no greater than 62 dB $L'_{nT,w}$

On this basis, the airborne sound requirement between the restaurant’s mezzanine level store room and the overlying first floor apartments is at least **45 dB $D_{nT,w} + C_{tr}$** .

There is no impact sound requirement for commercial units underneath residential units, and, as stated, the restaurant and store room do not share a separating wall with any residential unit.

5 Office of the Deputy Prime Minister (2003). *The Building Regulations: Approved Document E (as amended)*.

3 Noise Survey

3.1 Overview

In order to determine the level of breakout noise from the restaurant, noise monitoring was carried out on Wednesday 21st June 2023.

The adopted noise monitoring positions were as follows:

- MP1 was located internally within the restaurant
- MP2 was located at 5 metres from the doorway of the restaurant
- MP3 was located at 10 metres from the doorway of the restaurant

Noise measurements were undertaken using Bruel & Kjaer 2250 Type 1 integrating sound level meters. Each meter was connected to a windshield covered microphone positioned at the locations detailed above. The external noise measurements were undertaken in free field conditions at 1.5 metres above ground level. The internal noise measurement was undertaken in a reverberant field.

The measurement system calibration was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted.

Measurements consisted of A-weighted broadband parameters including L_{Aeq} , together with linear octave band data.

The noted weather conditions during the survey were dry with wind speeds < 5 m/s. Weather conditions were therefore considered appropriate for noise monitoring.

3.2 Summary

Internal reverberant noise levels within the restaurant (MP1) were measured at **65–68 dB L_{Aeq} (1 hour)** and were due to customer voices, announcement speakers for order, background music and general cooking/plant noise.

Noise levels immediately outside the restaurant were measured at **58–59 dB L_{Aeq} (15 min)** and did not show any variation with doors open/closed, nor with increasing distance from the restaurant.

For reference, these levels are consistent with those recorded at Location 4 (in the immediate vicinity of the restaurant) as reported in Figure 4 and Table 4 of Environmental Noise Study ref: PR0529-REP02-MPF prepared by Fisher Acoustics for the site. These levels were measured prior to the construction of the restaurant.

On the basis of the above, it is evident that noise breakout from the restaurant does not contribute to the residual noise climate even in close proximity to the doors. This is consistent with subjective aural observations that breakout noise from the restaurant was subjectively inaudible over the residual noise climate in the immediate vicinity.

Noise from the ground floor restaurant was also inaudible within the overlying mezzanine store room.

Table 3.1 overleaf presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1: Summary of Noise Measurement Data

Position	Time	L _{Aeq} (dB)	Comments
MP1	1400–1500	67	Internal reverberant position within restaurant, raised voices, speaker system for announcing customer orders, background music
	1500–1600	65	
	1600–1700	65	
	1700–1800	65	
	1800–1900	66	
	1900–2000	68	
	2000–2100	67	
	2100–2133	66	
MP2	1812–1820	59	5m from restaurant door (door closed)
	1820–1828	59	5m from restaurant door (door open)
	1932–1947	59	5m from restaurant door (door closed)
	1947–2002	58	5m from restaurant door (door open)
	2133–2148	58	5m from restaurant door (door closed)
	2148–2200	58	5m from restaurant door (door open)
MP3	1828–1835	58	10m from restaurant door (door closed)
	1835–1843	58	10m from restaurant door (door open)
	2002–2017	58	10m from restaurant door (door closed)
	2017–2032	58	10m from restaurant door (door open)

4 Noise Assessment

4.1 External Noise Breakout

Internal reverberant noise levels within the restaurant were $\leq 68 \text{ dB L}_{\text{Aeq}} (1 \text{ hour})$.

External noise measurements undertaken simultaneously indicate that the breakout noise from the restaurant was not measurable directly outside the restaurant. As such, the noise was noted to be subjectively inaudible over the residual noise climate.

With respect to the PPG Noise Exposure Hierarchy contained in Table 2.1, the restaurant breakout noise is not noticeable and therefore has no effect (NOEL).

At this effect level, no specific mitigation measures are required to control external noise breakout.

4.2 Internal Noise Transfer

The separating floor construction between ground floor and the overlying mezzanine floor was noted to be in-situ concrete slab. Due to the sound insulation provided by a concrete slab floor, noise from the ground floor restaurant was not audible within the overlying mezzanine level store room. No flanking routes were identified, and no flanking noise was noted.

ADE 2003 requires that the airborne sound insulation between a residential unit and commercial adjacencies should be at least $45 \text{ dB D}_{\text{nT,w}} + C_{\text{tr}}$.

Whilst the actual performance of the floor is likely to be in excess of the minimum requirements of ADE 2003, as a worst-case assumption the noise level in the overlying first floor apartments will be at least 45 dB lower than in the mezzanine store room.

It is therefore inconceivable that noise from the ground floor restaurant could be audible within the first floor apartments via two concrete slab floors.

Further to this, if the mezzanine floor level was repurposed from a store room to a restaurant dining area, assuming an internal reverberant noise level of $\leq 68 \text{ dB L}_{\text{Aeq}} (1 \text{ hour})$ and a separating floor compliant with ADE 2003, the noise level within the overlying first floor apartments would be $\leq 23 \text{ dB L}_{\text{Aeq}} (1 \text{ hour})$.

Such levels are significantly (12 dB) below the daytime internal ambient noise level targets described in BS 8233 and are approaching the noise floor of a typical domestic dwelling (and the threshold of audibility).

On the basis of the above, no specific mitigation measures are required to control internal noise transfer.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).