



21 LIVING

**PROPOSED RESTAURANT, 215 MANCHESTER NEW ROAD,
MIDDLETON**

NOISE IMPACT ASSESSMENT FOR PLANNING PURPOSES

14 March 2024

AEC REPORT: P5170/R01/RDC

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1.0 INTRODUCTION

- 1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by 21 Living to undertake a noise assessment in relation to the proposed conversion of the existing florist into a restaurant at 215 Manchester New Road, Middleton.
- 1.2 This report details the baseline noise levels measured, presents the assessment criteria and discusses the implications of noise emissions from the site on nearby noise sensitive receptors as required by the Local Authority.
- 1.3 Acoustic terminology is discussed in brief in Appendix A.

2.0 BACKGROUND AND SITE DESCRIPTION

Site Location

- 2.1 The proposed development is located at 215 Manchester New Road (A664) in Middleton. A site location plan is presented in Figure 3.1, overleaf.
- 2.2 The neighbouring buildings to the site are the All That Sparkles tea room and the Sharper Hair Design salon. The former operates from 0900 – 1630h, Monday to Saturday and has an external seating area that fronts onto Manchester New Road.
- 2.3 The site is surrounded to the north-east, east and south by existing residential properties. The nearest properties being to the rear of the All That Sparkles tea room, Stirrup House which is directly behind the proposed site, and at 219 Manchester New Road. All these receptors are at least 10m away from any windows associated with the proposed restaurant.

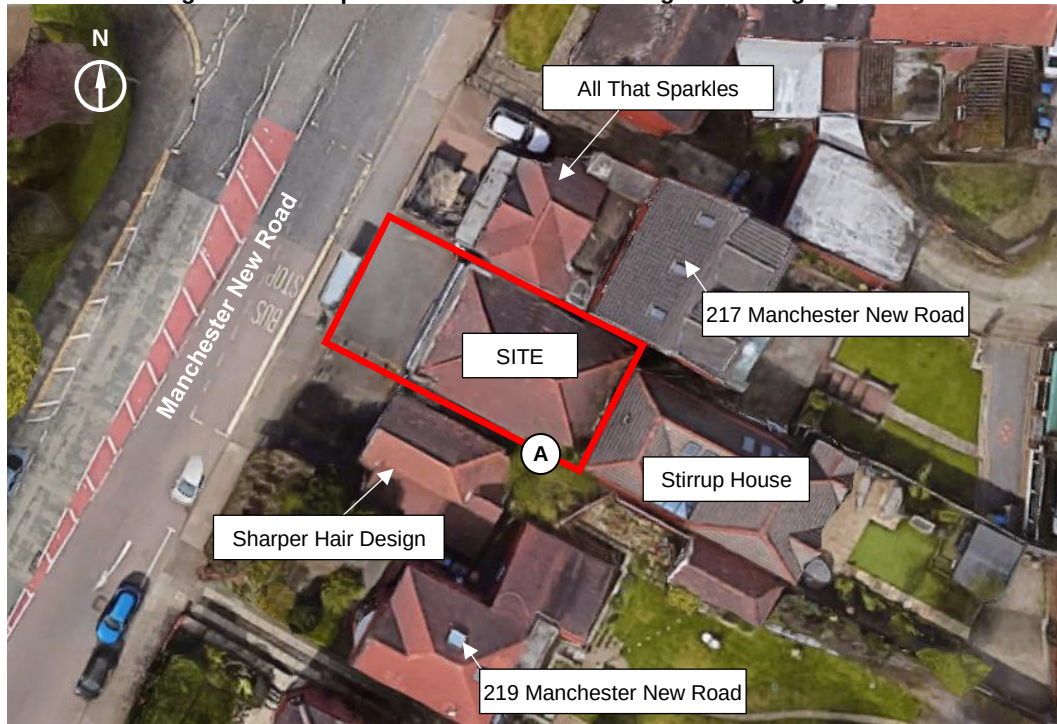
Proposed Scheme

- 2.4 The proposed scheme will include the conversion of the existing florist building into a restaurant that will operate from 1100 – 2300h, Monday to Sunday.
- 2.5 There will be an external seating area fronting onto Manchester New Road with room for approximately 27 covers.
- 2.6 The site will only have low level background music and will not host events which include loud amplified music or a live band. There will be no amplified music in the external seating area.
- 2.7 There will be one item of external plant that will serve the kitchen of the restaurant and this will only operate during opening hours.
- 2.8 The existing building shares a separating rear wall with Stirrup House. The layout of the site has been designed such that no noise generative rooms are located against this wall. As such only toilets and a pot wash area will be located here. For structural reasons it is assumed that this wall would be either twin masonry or 300mm thick masonry and, therefore, this would be sufficient to control any noise break-in from the toilets into Stirrup House. Therefore, this element has not been discussed further.

3.0 NOISE CLIMATE

- 3.1 An extended unattended noise level survey was undertaken by AEC between 1100h on Thursday 29 February 2024 and 0800h on Friday 01 March 2024. Measurements were undertaken at a single location under façade conditions at ground floor level down the rear alleyway of the proposed site, identified as A on Figure 3.1, below. Full logged data over 15-minute periods is held on file by AEC and is available on request.

Figure 3.1 – Proposed Site Location Showing Monitoring Location



Imagery @2024 Google, Imagery @2024 Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map Data @2024

- 3.2 Throughout the entire daytime period, the ambient and typical background noise levels were 54dBL_{Aeq, 12h} and 48dBL_{A90, 1h}, respectively.
- 3.3 During the quietest period that the restaurant will operate (2100 – 2300h), the ambient and background noise levels were 52dBL_{Aeq, 1h} and 42dBL_{A90, 1h}.
- 3.4 The noise climate was entirely due to road traffic on Manchester New Road.

4.0 BASIS OF ASSESSMENT

- 4.1 Based on AECs experience of these types of developments, the following will need to be considered:

(1) Assessment of patron noise, including internal noise breakout via external envelope and noise from the external seating area;
(2) Noise emitted from the external building services plant.

- 4.2 AEC understands that Rochdale Borough Council do not have any specific noise requirements in relation to noise emitted from these sources. An assessment methodology for each has been prepared and this is discussed below.

(1) Patron Noise

- 4.3 In order to limit the potential for patron noise to have an adverse impact, it is proposed that noise from the patrons within the restaurant and in the external seating area is controlled such that ambient and maximum noise levels are controlled to not exceed the existing background (42dBL_{A90,1h}) and ambient (52dBL_{Aeq,1h}) noise levels, respectively, at the nearest noise sensitive receptors. This would include noise from any background music played in the restaurant.
- 4.4 By ensuring the above is achieved, this would ensure that whilst noise may be just audible at the receptor(s), it would not be deemed intrusive.
- 4.5 Based on AEC's experience of similar restaurants of this size (when full) with low level background music, the expected internal ambient and maximum noise levels are presented in Table 4.1, below.

Table 4.1 – Measured Noise Levels in Restaurant

Noise Type	Overall Noise Level, dB(A)	Noise Levels, dB @ Octave Band Centre Frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
Maximum, L _{max}	90	90	90	90	85	85	80	80	80
Ambient, L _{eq}	80	80	80	80	75	75	70	70	70

- 4.6 The above figures will be used to assess the internal noise breakout from within the restaurant.

(2) Externally Mounted Building Services Plant

- 4.7 In relation to controlling noise from building services plant, it is proposed that noise levels from this source are controlled to not exceed the existing background noise level external to the nearest noise sensitive receptor.
- 4.8 Based on the noise levels measured on-site and reported in Section 3.0, this would mean that noise from the plant unit would need to be controlled to no greater than 42dB(A) external to the nearest receptor. Doing so would insure that internal ambient noise levels as a result of plant noise would be 27dB(A) (assuming -15dB of attenuation provided by an openable window).

- 4.9 As the plant will only operate during daytime hours (0700 – 2300h), for context, this is 8dB below the internal noise level limits set by British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' (BS8233). In doing so, this would ensure that plant would be controlled to an acceptable level.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

- 5.1 Noise breakout from the following two sources has been assessed and discussed separately, below:

- (1) Assessment of patron noise, including internal noise breakout via external envelope and noise from the external seating area;
- (2) Noise emitted from the external building services plant.

(1) Patron Noise

Noise Breakout via External Envelope

- 5.2 Based on a review of the latest floorplans (dated March 2024 by Tua Technical Limited), the weakest element of the external envelope would be the glazing.
- 5.3 Based on the noise levels from Table 4.1 and assuming that the glazing installed is standard double glazing with a sound insulation performance of $31\text{dBR}_w / 27\text{dBR}_w + C_{tr}$ (6mm glass / 6 – 16mm glass / 6mm glass make-up), as well as distance and screening attenuation from the windows (on all three elevations) to the receptor, the determined noise levels breaking out from each elevation to the receptor are presented in Table 4.1, below. The ambient and maximum noise levels from each aperture are included.
- 5.4 As all receptors in the area are partially screened from the western (front) and one of the side facades (i.e. every receptor will be partially screened from one of the side facades - northern & southern facades), a nominal -5dB of attenuation has been applied. These are denoted by an Asterisk in Table 4.1.

Table 4.1 – Noise Breakout Calculations

Elevation	Noise Breakout to Receptor, dB(A)	Resultant, dB(A)
Ambient Noise Level Breakout, L_{eq}		
Northern	27	27*
Western (Front)	30	30*
Southern	38	38
TOTAL		39
Maximum Noise Level Breakout, $L_{max,F}$		
Northern	37	37*
Western (Front)	40	40*
Southern	48	48
TOTAL		48

- 5.5 Example calculations for noise breaking out of just the western (front) façade are shown in Appendix C in Calculations C.1 and C.2.
- 5.6 Comparing the total resultant ambient and maximum noise levels breaking out from the proposed development, as per Table 4.1, with the existing background (41dB_{LA90,1h}) and ambient (51dB_{LAeq,1h}) noise levels indicates that there would be no exceedances.
- 5.7 It should be noted that these calculations assume that the front door of the restaurant is not left open for sustained periods of time other than for brief entry and exit from the establishment. If the door was to be left open for ventilation purposed then a lobbied door system would need to be installed.
- 5.8 Based on the above, the criteria stated has been achieved.

Noise Breakout via External Seating Area

- 5.9 Based on the provided drawings it is understood that there will be seating areas for approximately 16 covers. There will be no external amplified music.
- 5.15 Noise levels in the external seating areas have been determined using the calculation method presented in the J.H. Rindel, C.I Christensen, A.C. Grade research paper: '*Dynamic sound source for simulating the Lombard effect in room acoustic modelling software*' (Proceedings of Inter-Noise 2012, New York, USA, (2012)).
- 5.16 For ambient noise levels, it has been deemed appropriate to use a noise level representative of '*normal*' speech conversation levels. The sound power level of a person speaking in a *raised* voice is equal to roughly 68dB_{L_{WA}} (ref. ANSI 3.5).
- 5.17 Based on the provided drawings, there will be six tables installed and for the purposes of the calculations, it is assumed that one person could be talking per table (6).
- 5.18 Considering the number of people speaking and the sound power level of raised conversation (68dB_{L_{WA}}) the resultant sound power level would be around 76dB_{L_{WA}}.
- 5.19 The equation shown below is then used, to convert the sound power to a sound pressure level, where *r* is the distance to the nearest noise sensitive receiver.

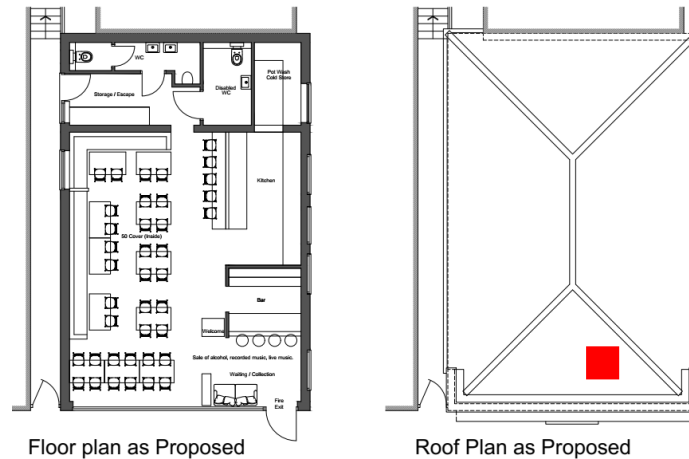
$$\begin{aligned} \text{Sound pressure level, } L_p &= L_{WA} - 20\log(r) - 8 - AS \\ L_{WA} &= 76\text{dB} \\ r &= 15\text{m} \\ AS &= \text{Associated screening} = \text{equates to } 5\text{dB}. \end{aligned}$$

- 5.20 Based on the above, the ambient noise level external to the receptor would be 40dB_{LAeq,T}.
- 5.21 For assessing maximum levels from the external seating areas, this has been based on the sound power level of a person *shouting*, of around 91dB_{L_{WA}} (ref. ANSI 3.5). As a result, calculations indicate that maximum noise levels from patron would be approximately 50dB_{L_{Amax,F}}.
- 5.22 Comparing the calculated ambient (40dB_{LAeq,T}) and maximum (50dB_{L_{Amax,F}}) against the existing background (42dB_{LA90,1h}) and ambient (52dB_{LAeq,1h}) noise levels in the area, , would indicate that there are no exceedances and the criteria has been achieved.

(2) Externally Mounted Building Services Plant

- 5.10 During the quietest period of operation, the existing background noise level at the nearest receptors is $42\text{dB}_{\text{LA90,1h}}$.
- 5.11 At this stage, a 50MaXfan Compac extract fan with a RO2 Long Splitter Silencer has been specified. An approximate location for the plant is identified in Red on Figure 5.1. The plant will exhaust through the roof overlooking the front elevation of the site onto Manchester New Road, approximately 10m away from the nearest receptor.

Figure 5.1 – Proposed Location of Rooftop Plant



- 5.12 Manufacturer test data indicates that the extract fan has an outlet noise level of 74dB_{LpA} at 3m. With the silencer fitted, manufacturer test data indicates that noise breakout from the fan will be reduced to 40dB(A) at 12m.
- 5.13 Based on distance attenuation 10m, this would result in a noise level external to the receptor of 42dB(A) . Therefore, noise as a result of the plant equipment would not exceed the proposed noise level limit.
- 5.14 Therefore, noise from the proposed plant would be appropriately controlled to the nearby receptors and the requirements have been met.

APPENDIX A – Acoustic Terminology in Brief

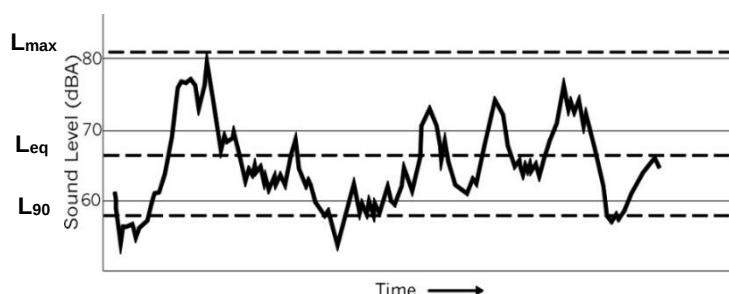
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The dBA weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



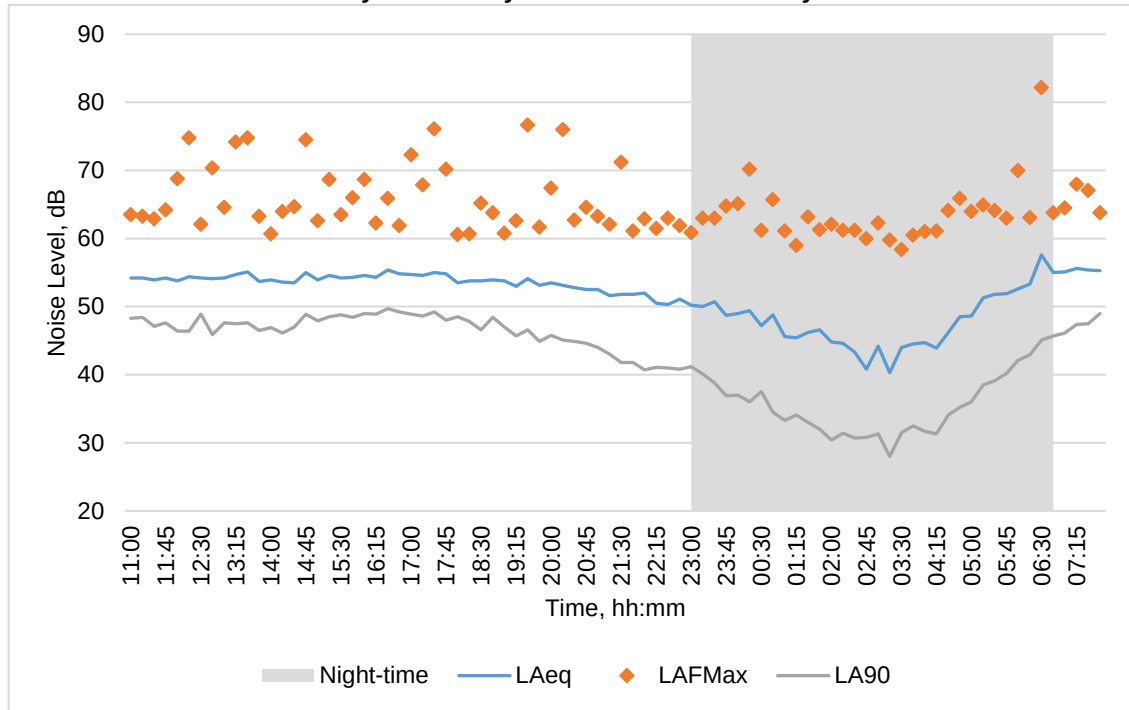
Commonly Used Descriptors for Sound / Noise

$L_{Amax,F/S}$	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. It can be considered as the "ambient" noise level.
$L_{A90,T}$	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe the "background" noise.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	This refers to the sound level measured outside, at 1m from a hard reflecting surface, typically 3dB greater than the free-field level.
NR	Noise rating – a graphical method for assigning a single number rating to a noise spectrum and is often used to specify noise level limits for mechanical services.
R_w	Single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
R'_w	Apparent sound reduction index - Single number rating used to describe the sound reduction index of an on-site construction over a range of frequencies, typically 100-3150Hz.

APPENDIX B – Noise Survey Details

Date & Time of Survey:	1100h on Thursday 29 February 2024 and 0800h on Friday 01 March 2024.					
Personnel:	Ross Chamberlain (AEC).					
Equipment Used:	Cirrus CR:171B Real Time Analyser (AEC Kit 3).					
Calibration:	The sound level analysers, which conforms to BS EN 61672-1: 2013 ' <i>Electroacoustics – Sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	29.02.24	Day	Dry	7°C	Negligible	50%
	29.02.23 - 01.03.24	Night	Dry	1°C	Negligible	80%
	01.03.24	Day	Dry	4°C	Negligible	100%
Measurement Locations:	The microphone was connected via an extension cable and fixed externally at a location down the rear alleyway of the existing building, at ground floor level, identified as A on Figure 3.1.					
Measurement Details:	Measurements at Location A were undertaken under free-field conditions. Measurements were undertaken over various periods in terms of L_{eq}, L_{90}, and L_{max} and were logged continuously over 1s for post processing and assessment. The measured daytime and night-time periods for the unattended survey is presented on Graph B.1.					
Measured Data:	Full octave band centre frequency data was obtained for all measurements.					

Graph B.1 - Location A
1100h on Thursday 29 February 2024 and 0800h on Friday 01 March 2024



APPENDIX C – Calculations

Calculation C.1 – Maximum Noise Breakout from Restaurant

	Contract No:	P5170				Date:	01-Mar			
	Client:	21 Living								
	Project:	215 Manchester New Road				Consultant:	RDC			
NOISE BREAK OUT TO OUTSIDE										
Noise Source	Main Room									
	Corrections to obtain L_p at element ? (eg distance/directivity)									
Building & Element	Glazing									
Area (S)	17	m ²	Width(a)=	8	m	Height(b)=	2	m		
Position Directivity (Q)	4	(-4 for a wall, 2 for a roof)								
Additional Directivity										
Receiver	Nearby Housing									
Distance (R) from element	10	m								
Propagation Corrections										
Barrier	0									
Façade	0									
Calculation										
Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA	
Internal Level, dB	90	90	90	85	85	80	80	80	90	
Internal Corrections, dB										
Corrected Internal Level, Lin, dB	90	90	90	85	85	80	80	80	90	
SRI of Element, dB	15	20	18	28	38	34	38	38		
Additional Directivity, dB	-5	-5	-5	-5	-5	-5	-5	-5		
Propagation Corrections										
Barrier, dB										
Façade, dB										
Level (1) at Receiver	51	46	48	33	23	22	18	18	40	

Calculation C.2 – Ambient Noise Breakout from Restaurant

	Contract No:	P5170				Date:		01-Mar		
	Client:	21 Living								
	Project:	215 Manchester New Road				Consultant:		RDC		
NOISE BREAK OUT TO OUTSIDE										
Noise Source	Main Room									
	Corrections to obtain Lp at element ? (eg distance/directivity)									
Building & Element	Glazing									
Area (S)	17	m ²	Width(a)=	8	m	Height(b)=	2	m		
Position Directivity (Q)	4	(-4 for a wall, 2 for a roof)								
Additional Directivity										
Receiver	Nearby Housing									
Distance (R) from element	10	m								
Propagation Corrections										
Barrier	0									
Façade	0									
Calculation										
Frequency, Hz		63	125	250	500	1k	2k	4k	8k	dBA
Internal Level, dB		80	80	80	75	75	70	70	70	80
Internal Corrections, dB										
Corrected Internal Level, Lin, dB		80	80	80	75	75	70	70	70	80
SRI of Element, dB		15	20	18	28	38	34	38	38	
Additional Directivity, dB		-5	-5	-5	-5	-5	-5	-5	-5	
Propagation Corrections										
Barrier, dB										
Façade, dB										
Level (1) at Receiver	dB	41	36	38	23	13	12	8	8	30