

**1044 Stockport Road
Levenshulme
Manchester**

Acoustic Planning Report
0441/APR1

21 September 2018

For:

Little Bittern Ltd
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Acoustic Planning Report

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1.0 Introduction

Lighthouse Acoustics has been appointed by Little Bittern Ltd to undertake a detailed sound survey at the proposed café/bar situated at 1044 Stockport Road, Levenshulme, Manchester and to undertake impact assessments of typical operational sound from the proposed café/bar to the existing residential flat above.

The survey methodology, results and assessments are presented in this report.

2.0 Objectives

To establish the Local Authority's acoustic requirements for the proposed café/bar.

To undertake a detailed sound survey in order to establish existing environmental sound levels at the front/side of the proposed café/bar /existing residential flats above.

To undertake an assessment of café/bar operational sound breakout through the front/side façade of the proposed café/bar to the windows of the existing residential flats above based on typical source noise levels.

To undertake an airborne sound insulation test of the separating floor construction between the proposed café/bar and existing residential flats above in order to establish the existing performance and highlight any flanking paths.

To undertake an assessment of café/bar operational sound transfer through the separating floor constructions to the existing residential flats above.

To propose mitigation measures where required in order to achieve the requirements of the Local Authority.

3.0 Site Description

The proposed café/bar is situated at 1044 Stockport Road, Levenshulme, Manchester and comprises a two storey end terrace building. The café/bar and toilets are located at ground floor level whilst two existing residential flats are located at first floor comprising lounge/dining/kitchen, bedroom and bathroom spaces.

The site is bound by Stockport Road (A6) to the north east, Kevin Street to the south east, an alley to the south west and 1042 Stockport Road to the north west (commercial at ground floor with residential flat above).

The site plan below indicates the site boundary and the surrounding environment.



Site plan indicating the site boundary and the surrounding environment

4.0 Local Authority Requirements

Whilst the Planning & Noise Technical Guidance document (dated December 2015) produced by Manchester City Council states requirements for entertainment venues, they are applicable to venues where music is the dominant sound source of operational activities.

We are unaware of any requirements that Manchester City Council have for venues where conversation is the dominant sound source of operational activities with background music only.

As such, for sound breakout it is proposed that L_{Aeq} bar operational sound levels are designed to achieve the representative L_{A90} background sound levels at the window of the nearest noise sensitive receptors.

For sound transfer, it is proposed that L_{Aeq} bar operational sound levels are designed to achieve $L_{Aeq,15min}$ 30dB daytime and $L_{Aeq,15min}$ 25dB night-time within structurally connected noise sensitive receptors.

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 12:00 hours on Wednesday 12 September 2018 to 12:00 hours on Thursday 13 September 2018. During this period the L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods.

5.2 Weather Conditions

At the start of the survey period there was a gentle westerly breeze (<5m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 14°C.

At the end of the survey period there was a gentle westerly breeze (<5m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were damp. The temperature was approximately 16°C.

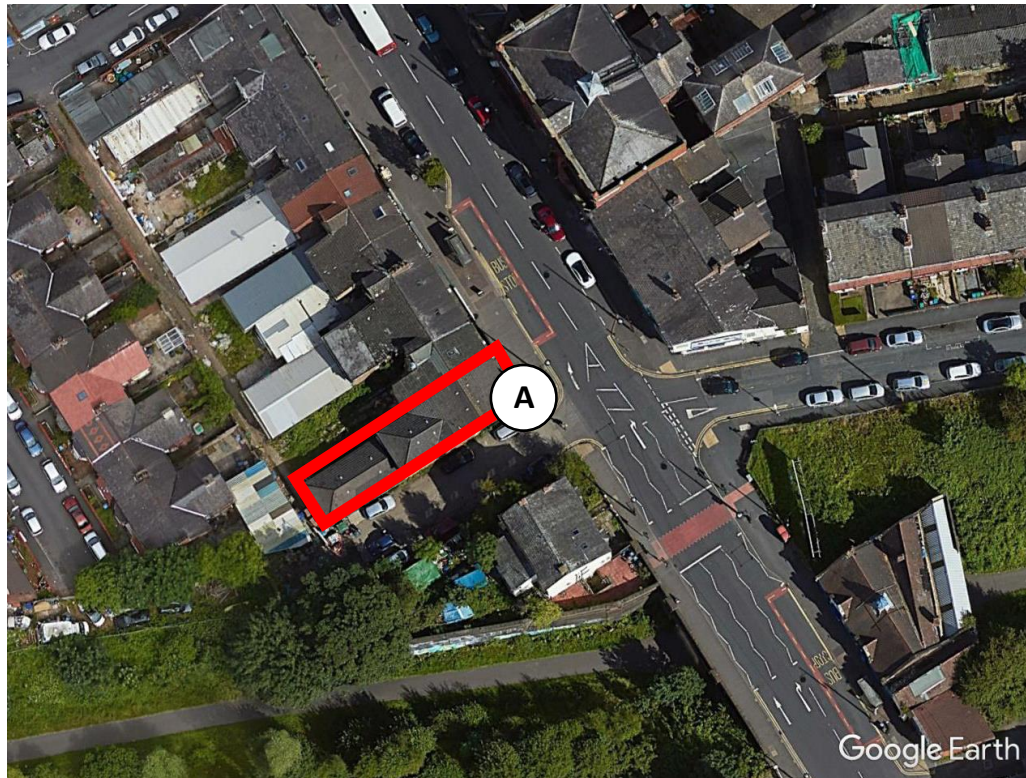
Based on publicly available weather data for the survey period it is understood that weather conditions remained similar for the duration of the survey with no significant periods of rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for undertaking measurements of sound levels.

5.3 Measurement Position

Environmental sound levels were measured at a single position on-site as described in the table below.

Position	Description
A	Microphone at 1 st floor level at 1.0m from the north east façade of residential flat overlooking Stockport Road/Kevin Street.

The measurement position and site boundary are shown on the site plan below.



Site plan showing measurement position and site boundary

Measurement Position A was selected in order to assess typical environmental sound levels representative of those at the facade of the existing residential flat above facing Stockport Road/Kevin Street.

5.4 Equipment

The following equipment was used to undertake the environmental sound survey.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Casella	633C	0721319	08/09/2017
Preamplifier	Casella	495	001446	08/09/2017
Microphone	Casella	251	1996	08/09/2017
Class 1 Sound Calibrator	Casella	120/1	3864878	13/11/2017
Environmental Noise Kit	Casella	6847	-	-
Microphone Extension Cable	Casella	C6717/5	-	-
Weather Protection System	Casella	6737	-	-

Field calibration checks were performed on the sound level meter prior to and on completion of the survey and were found to be within acceptable tolerance limits.

5.5 Results

5.5.1 Time History Graph

The results of the environmental sound survey are presented on Time History Graph 0441/THG1 enclosed at the rear of the report.

The presented results for Position A have been corrected for reflections from the façade by subtracting 3dB from the measured sound levels in order to obtain free field sound levels.

5.5.2 $L_{A90,T}$ Background Sound Levels

The lowest representative daytime and night-time $L_{A90,15min}$ background sound level measured at Position A during the proposed regular opening (09:00 to 23:00 hours) and late night opening (23:00 to 00:00 hours Fri/Sat only) are detailed in the table below.

Position	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime (11:00–23:00)	Night-time Fri/Sat only (23:00–01:00)
A	56	52

The presented results for Position A have been corrected for reflections from the façade by subtracting 3dB from the measured sound levels in order to obtain free field sound levels.

5.6 Discussion of Sound Climate

At the start and end of the survey period the dominant sound sources at Position A were noted to be road traffic along Stockport Road and passing pedestrians.

Whilst we are unable to comment on dominant sound sources or individual sound events during the survey period, based on the surrounding environment it is likely that road traffic remained the dominant sound source.

6.0 Front Facade Assessment

6.1 Operating Hours

The café/bar is proposed to operate between 09:00 and 23:00 hours Sunday to Thursday and 09:00 to 00:00 hours Friday/Saturday and is situated at ground floor level.

Typical café/bar L_{Aeq} operational sound levels for similar size premises to that proposed are therefore assessed to the windows of the existing residential flat above against the lowest representative $L_{A90,15min}$ background sound level measured at Position A during these periods.

6.2 $L_{Aeq,T}$ Operational Sound Levels

Typical café/bar L_{Aeq} operational sound levels for similar size premises to that proposed are detailed in the table below along with the corresponding L_{eq} octave band sound pressure levels.

Source Description	Leq Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Bar with background music (no subwoofers)	69	69	69	74	73	69	63	56	77

The above includes background music (no subwoofers) and customer/staff conversations.

6.3 LA90,T Background Sound Levels

The lowest representative daytime and night-time LA90,15min background sound level measured at Position A during the proposed regular opening (09:00 to 23:00 hours) and late night opening (23:00 to 01:00 hours Fri/Sat only) are detailed in the table below.

Position	Lowest Representative LA90,15min Background Sound Levels (dB)	
	Daytime (11:00–23:00)	Night-time Fri/Sat only (23:00–01:00)
A	56	52

The presented results for Position A have been corrected for reflections from the façade by subtracting 3dB from the measured sound levels in order to obtain free field sound levels.

6.4 Existing Construction

It is understood that the existing ground floor front/side façade comprises the following constructions.

Element	Typical Construction
Facade	Cavity masonry wall
Openings	Single glazed windows with single glazed door

The following Sound Reduction Indices have been allowed for the existing ground floor front/side façade constructions.

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Facade	30	43	42	41	49	54	55	55
Openings	16	22	25	28	31	26	31	33

The area of the front/side facade is understood to be approximately 57m².

6.5 Calculation

The sound pressure level radiated from the front/side façade due to café/bar operational sound levels has been calculated using the following formula:

$$L_p = L_{prev} + 10 \log S - 6 - SRI + 10 \log Q - 20 \log R - 11 - D$$

Where:

L_p is the sound pressure level at the receiver, dB;

L_{prev} is the reverberant sound pressure level in the source room, dB;

S is the surface area of the separating element, m²;

SRI is the sound reduction indices of the separating element, dB;

Q is the directivity factor for the separating element, dB;

R is the distance in meters between the separating element and the receiver, m;

D is the directivity correction for the separating element, dB.

6.6 Results

The calculated bar L_{Aeq} operational sound levels incident upon the windows of the existing residential flat above due to breakout through the front façade/side are presented in the table below.

Nearest Noise Sensitive Receptor	Calculated L_{Aeq} (dB)
First floor residential flat above	39

The assessment indicates that café/bar L_{Aeq} operational sound levels incident upon the windows of the existing residential flat above due to breakout through the front/side façade will be 39dB.

This is therefore likely to achieve the proposed requirement to achieve the representative daytime and night-time L_{A90} background sound levels of 56dB and 52dB respectively at the window of the nearest noise sensitive receptors.

6.7 Music Level Limits

For the bar in-house loudspeaker system, amplified music levels should be limited by means of an electronic noise limiter/compressor. The device should be capable of limiting individual octave bands over the frequency range 20Hz to 20kHz and controlling the number of speakers/zones required.

In order to set the device to achieve the proposed requirements a commissioning visit will be required in conjunction with an acoustic consultant upon completion of the fit-out works and prior to the operation of the bar. The devices should be lockable once set to prevent tampering. Upon completion, a commissioning report should be issued to the Local Authority specifying details of the devices installed and the limits that they have been set to.

7.0 Separating Floor Sound Insulation Test

7.1 Test Procedure

Lighthouse Acoustics visited site on Monday 10 September 2018 to undertake airborne sound insulation tests of the separating floor construction between the proposed café/bar and existing residential flats above.

Airborne sound insulation tests were undertaken across separating floor constructions in full accordance with BS EN ISO 140-4: 1998, "Acoustics. Measurement of sound insulation in buildings and of building elements. Field measurements of airborne sound insulation between rooms". The test procedures detailed in Annex B of The Building Regulations Approved Document E: 2003 Edition have been followed in full.

7.2 Equipment

The following equipment was used to undertake the sound insulation tests.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Brüel & Kjær	2250	2626230	17/10/2016
Preamplifier	Brüel & Kjær	ZC-0032	21309	17/10/2016
Microphone	Brüel & Kjær	4189	2621208	17/10/2016
Class 1 Sound Calibrator	Casella	120/1	3864878	13/11/2017
10" Active Loudspeaker with Vented Cabinet	Yamaha	DBR10	-	-

Field calibration checks were performed on the sound level meter prior to and on completion of the tests and were found to be within acceptable tolerance limits.

7.3 Test Locations

Airborne sound insulation testing of the separating floor construction was undertaken between the following spaces.

Test Ref.	Source Room	Receive Room
A	Front Ground Floor Proposed Café/Bar 1044 Stockport Road	1 st Floor Lounge/Kitchen Existing Front Flat 1044 Stockport Road
B	Rear Ground Floor Proposed Café/Bar 1044 Stockport Road	1 st Floor Lounge/Kitchen Existing Rear Flat 1044 Stockport Road

7.4 Test Conditions

The proposed café/bar space was unfurnished whilst the lounge/kitchen spaces were furnished and all noise sources within the room were switched off where applicable. The rooms tested had doors and windows fitted and were closed for the duration of the tests.

The front of the proposed café/bar space featured a suspended ceiling tile system with two or three tiles absent whilst the rear of the proposed café/bar space featured a boarded ceiling with some gaps. It is understood that both these existing ceilings are to be replaced as part of the fit-out works.

7.5 Background Noise

During the testing, background noise was noted to be due to vehicle passby's along Stockport Road. Receive and background measurements were therefore taken during lulls between vehicle passby's.

7.6 Test Results

The results of the airborne sound insulation test are presented in the following tables.

Test Ref.	Source Room	Receive Room	Measured Airborne Sound Insulation
A	Front Ground Floor Proposed Café/Bar 1044 Stockport Road	1 st Floor Lounge/Kitchen Existing Front Flat 1044 Stockport Road	$D_{nT,w} + C_{tr}$ 48dB
B	Rear Ground Floor Proposed Café/Bar 1044 Stockport Road	1 st Floor Lounge/Kitchen Existing Rear Flat 1044 Stockport Road	$D_{nT,w} + C_{tr}$ 45dB

Element	Measured Apparent Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Separating Floor (Front)	27	40	44	45	53	59	60	65
Separating Floor (Rear)	21	35	41	42	48	53	61	66

7.7 Discussion of Results

Test A exceeded the minimum performance standard of Building Regulations Approved Document E 2010, "Resistance to the passage of sound", for separating floors to purpose built flats of $D_{nT,w} + C_{tr}$ 45dB by 3dB. An element of flanking via the masonry external walls was noted with no obvious weak points in the separating floor itself.

Test B exceeded the minimum performance standard of Building Regulations Approved Document E 2010, "Resistance to the passage of sound", for separating floors to purpose built flats of $D_{nT,w} + C_{tr}$ 45dB by 0dB. An element of flanking via the masonry external walls was noted with no obvious weak points in the separating floor itself.

The level of airborne sound insulation is likely to increase once both the existing ceilings are replaced as part of the fit-out works.

8.0 Separating Floor Assessment

8.1 Operating Hours

The café/bar is proposed to operate between 09:00 and 23:00 hours Sunday to Thursday and 09:00 to 00:00 hours Friday/Saturday and is situated at ground floor level.

Typical bar L_{Aeq} operational sound levels for similar size premises to that proposed are therefore assessed to the existing residential flats above via the existing separating floor constructions.

8.2 $L_{Aeq,T}$ Operational Sound Levels

Typical café/bar L_{Aeq} operational sound levels for similar size premises to that proposed are detailed in the table below along with the corresponding L_{eq} octave band sound pressure levels.

Source Description	L_{eq} Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Bar with background music (no subwoofers)	69	69	69	74	73	69	63	56	77

The above includes background music (no subwoofers) and customer/staff conversations.

8.3 Existing Constructions

The following Apparent Sound Reduction Indices have been measured for the existing separating floor constructions.

Element	Measured Apparent Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Separating Floor (Front)	27	40	44	45	53	59	60	65
Separating Floor (Rear)	21	35	41	42	48	53	61	66

8.4 Receive Room Assumptions

The following typical dimensions and finishes/furnishings for the rooms have been assumed for the purpose of the assessment.

Room Type	Typical Room Dimensions	Typical Room Finishes / Furnishings
Lounge/ Kitchen	4m x 3m x 2.4m	Hard floor finish, plastered walls, plasterboard ceiling, sofa, cupboards, table, chairs, curtains
Bedroom	3m x 2.5m x 2.4m	Carpeted floor finish, plastered walls, plasterboard ceiling, bed, curtains

8.5 Calculation

The reverberant L_{Aeq} sound pressure level within the rooms of the existing residential flat above due to café/bar operational sound levels has been calculated using the following formula:

$$L_{pr2} = L_{pr1} - SRI + 10 \log (S/A)$$

Where:

L_{pr2} is the reverberant sound pressure level in the receiving room, dB;

L_{pr1} is the reverberant sound pressure level in the source room, dB;

SRI is the sound reduction indices of the separating element, dB;

S is the surface area of the separating element, m²;

A is the total absorption area in the receiving room, m².

8.6 Results

The reverberant L_{Aeq} sound pressure level within the rooms of the existing residential flat above due to café/bar operational sound levels are presented in the table below.

Receptor	Calculated L_{Aeq} (dB)
Lounge/Kitchen of existing front residential flat above	29
Bedroom of existing front residential flat above	28
Lounge/Kitchen of existing rear residential flat above	33
Bedroom of existing rear residential flat above	32

The assessment indicates that the reverberant L_{Aeq} sound pressure levels within the lounge/kitchen and bedroom of the existing front residential flat above due to café/bar operational sound levels will be 29dB and 28dB respectively during the daytime and night-time periods.

The assessment indicates that the reverberant L_{Aeq} sound pressure levels within the lounge/kitchen and bedroom of the existing rear residential flat above due to café/bar operational sound levels will be 33dB and 32dB respectively during the daytime and night-time periods.

The assessment therefore indicates that the proposed requirement to achieve $L_{Aeq,15min}$ 30dB daytime and $L_{Aeq,15min}$ 25dB night-time within structurally connected noise sensitive receptors is likely to be exceeded.

8.7 Mitigation Measures

In order to improve the existing level of airborne sound insulation between the proposed café/bar and existing residential flats above the existing ceilings should be removed and replaced with the following construction:

- Acoustic hangers fixed to underside of slab;
- 100mm thick mineral wool (min. 10kg/m³) within ceiling void (min. 200mm depth);
- 2 layers plasterboard with staggered joints (min. 10kg/m² per layer).

The ceilings should cover the entire proposed café/bar space up to external/separating walls.

8.8 Music Level Limits

For the bar in-house loudspeaker system, amplified music levels should be limited by means of an electronic noise limiter/compressor. The device should be capable of limiting individual octave bands over the frequency range 20Hz to 20kHz and controlling the number of speakers/zones required.

In order to set the device to achieve the proposed requirements a commissioning visit will be required in conjunction with an acoustic consultant upon completion of the fit-out works and prior to the operation of the bar. The devices should be lockable once set to prevent tampering. Upon completion, a commissioning report should be issued to the Local Authority specifying details of the devices installed and the limits that they have been set to.

9.0 Additional Guidance

In order to minimise sound emissions from the premises the following guidance should be incorporated.

- All staff should be trained on the noise management measures employed by the venue to minimise operational sound emissions from the premises.
- All external entrance/escape doors should be fitted with self-closing devices and good fitting seals. Staff should ensure that the entrance/escape doors are not kept open unnecessarily in order to minimise sound emissions from the premises.
- Internal loudspeakers should face away from external doors and windows and the use of subwoofers should be prohibited.
- Staff should regularly monitor and manage external areas to ensure that customers are not causing a disturbance to local residents. Rowdy behaviour from customers should not be tolerated and anyone behaving in an anti-social way should be asked to leave the premises.
- Deliveries, refuse collections and storage/disposal of waste/recyclables in external areas should be restricted to normal working hours between 08:00 and 18:00 hours Monday to Friday and 08:00 and 13:00 Saturdays.

- A contact telephone number should be made available to local residents/businesses which they can use to report noise disturbances to the venue as and when they occur.

10.0 Conclusions

The Local Authority's acoustic requirements for the proposed cafe/bar have been established.

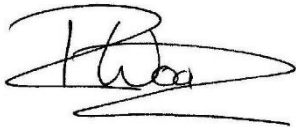
A detailed sound survey has been undertaken in order to establish existing environmental sound levels at the front/side of the proposed café/bar/existing residential flats above.

An assessment of cafe/bar operational sound breakout through the front/side façade of the proposed cafe/bar has been undertaken to the windows of the existing residential flats above based on typical source noise levels.

An airborne sound insulation test of the separating floor constructions between the proposed cafe/bar and existing residential flats above has been undertaken in order to establish the existing performance and highlight any flanking paths.

An assessment of cafe/bar operational sound transfer through the separating floor constructions has been undertaken to the existing residential flats above.

Mitigation measures have been proposed where required in order to achieve the requirements of the Local Authority.

A handwritten signature in black ink, appearing to read 'Robin Wood', with a stylized, sweeping underline.

Robin Wood
LIGHTHOUSE ACOUSTICS

1044 Stockport Road, Levenshulme, Manchester
Time History Graph - Wednesday 12 September 2018 to Thursday 13 September 2018

$L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A

