

987 Stockport Road Manchester

Acoustic Planning Report
0725/APR1

5 August 2020

For:

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Time History Graphs 0725/THG1 & 0725/THG2

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1.0 Introduction

Lighthouse Acoustics has been appointed by Aunty Ji's Ltd to undertake a detailed sound survey at the cafe situated at 987 Stockport Road, Manchester and to assess atmospheric plant sound emissions from the 1No. kitchen supply fan and 1No. kitchen extract fan.

In addition, to undertake an assessment of typical operational sound from the cafe to the nearest noise sensitive receptors.

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

2.0 Objectives

To establish the Local Authority's acoustic requirements for the cafe.

To undertake a detailed environmental sound survey in order to establish existing environmental sound levels at the site.

To undertake an assessment of atmospheric sound emissions from the 1No. kitchen supply fan and 1No. kitchen extract fan to the nearest noise sensitive receptor and propose mitigation measures where required in order to achieve the requirements of the Local Authority.

To undertake an assessment of cafe operational sound breakout through the front façade of the cafe to the windows of the nearest noise sensitive receptor based on typical source noise levels.

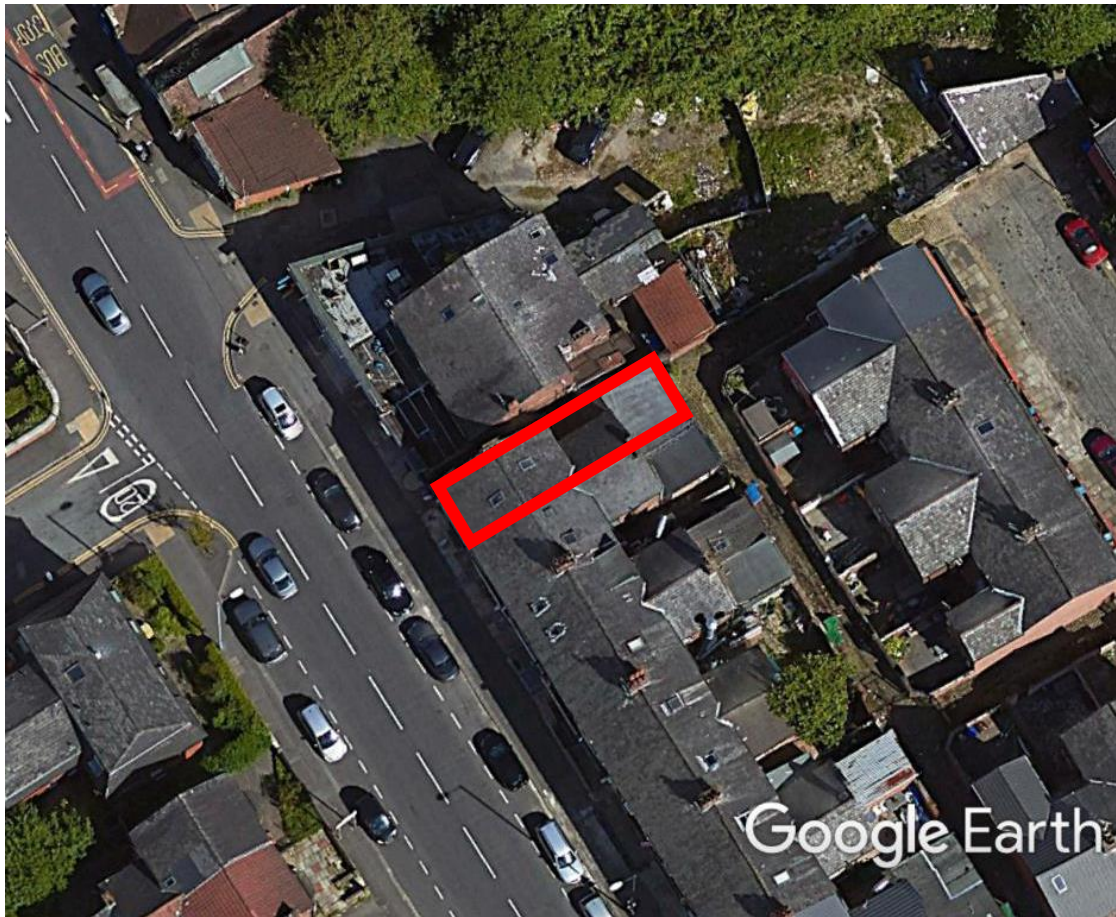
To propose mitigation measures where required in order to achieve the requirements of the Local Authority.

3.0 Site Description

The cafe is situated at 987 Stockport Road, Manchester and comprises an end terrace building. The building is 3 storey with single storey extension at the rear. The café and kitchen are situated at ground floor level whilst additional seating, office and toilets are situated at 1st floor level.

The site is bound by an access road to the north east, adjoining building to the south east (commercial at ground floor with residential flat above), Stockport Road (A6) to the south west and detached building to the north west (commercial at ground floor with residential flat above).

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



Site plan indicating the site boundary and the surrounding environment

4.0 Local Authority Requirements

4.1 Building Services

With regard to noise and vibration from fixed plant/equipment, Section 3.6.1.5.1 of the Planning & Noise Technical Guidance document (dated December 2015) produced by Manchester City Council states the following:

"The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

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."

4.2 Operational Noise

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.

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 12:00 hours on Thursday 16 July 2020 to 12:00 hours on Friday 17 July 2020. 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 overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 15°C.

At the end of the survey period there was a gentle southerly breeze (<5m/s) and the sky was scattered overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 17°C.

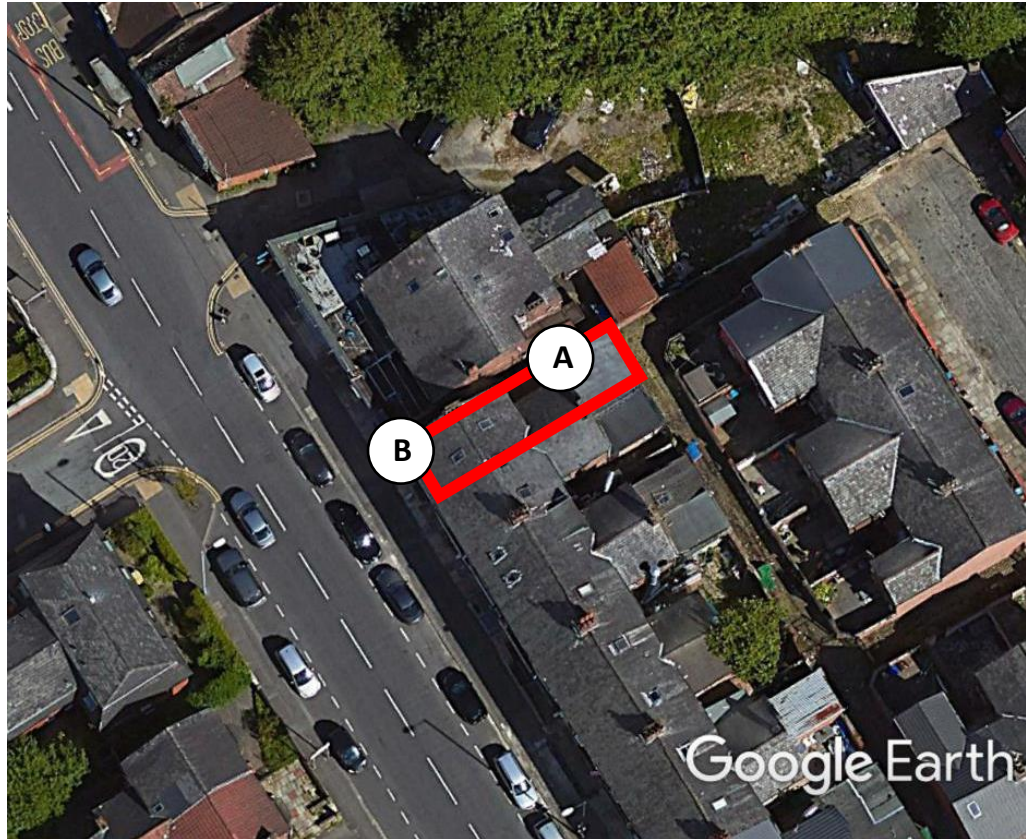
Based on publicly available weather data for the survey period it is understood that weather conditions remained similar for the duration of the survey with no significant periods of rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for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

5.3 Measurement Positions

Environmental sound levels were measured at two positions 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 the building overlooking the access road.
B	Microphone at 1 st floor level at 1.0m from the south west façade of the building overlooking Stockport Road.

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



Site plan showing measurement positions and site boundary

Measurement Position A was selected in order to assess typical environmental sound levels representative of those at the facade of the surrounding noise sensitive receptors to the rear of the building.

Measurement Position B was selected in order to assess typical environmental sound levels representative of those at the facade of the surrounding noise sensitive receptors to the front of the building.

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	0721320	25/09/2019
Preamplifier	Casella	495	001414	25/09/2019
Microphone	Casella	251	1025	25/09/2019
Class 1 Sound Level Meter	Casella	633C	0721319	25/09/2019
Preamplifier	Casella	495	001446	25/09/2019
Microphone	Casella	251	1996	25/09/2019
Class 1 Sound Calibrator	Casella	120/1	3864878	15/11/2019
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 meters 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 Graphs

The results of the environmental sound survey are presented on Time History Graphs 07254/THG1 and 0725/THG2 enclosed at the rear of the report.

The presented results for Positions A and B 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 $LA_{90,T}$ Background Sound Levels

The lowest representative $LA_{90,15min}$ background sound level measured at Positions A and B during the proposed opening hours (06:00 to 18:00 hours) are detailed in the table below.

Position	Lowest Representative $LA_{90,15min}$ Background Sound Level (dB)
	(06:00–18:00)
A	52
B	57

The presented results for Positions A and B 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 source at Position A was noted to be steady building services sound from the rear of 991 Stockport Road (Khan's Takeaway). This can clearly be seen on Time History Graph 0725/THG1 between 12:00 and 23:00 hours on Thursday and between 09:15 and 12:00 hours on Friday.

At the start and end of the survey period the dominant sound source at Position B was 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 existing building services and road traffic remained the dominant sound source.

6.0 Atmospheric Plant Sound Emission Limits

Based on the lowest representative $L_{A90,15min}$ background sound level measured during the environmental sound survey and the requirements of the Local Authority, cumulative atmospheric plant sound emissions should not exceed the following limit at the nearest existing noise sensitive receptor.

Receptor	L_{Aeq} Cumulative Atmospheric Plant Sound Emission Limit (dB) at Nearest Noise Sensitive Receptors
	(06:00–18:00)
Rear	47
Front	52

The above limits are subject to final approval by Manchester City Council.

7.0 Plant Sound Emission Assessment

7.1 Plant Location

The 1No. kitchen supply fan and 1No. kitchen extract fan are situated externally on the on the flat roof of the single storey extension to the rear of the building.

The inlet opening to the 1No. kitchen supply faces towards the north east whilst the exhaust ductwork to the 1No. kitchen extract fan terminates at roof level complete with atmospheric silencer situated in the vertical section of ductwork.

7.2 Plant Sound Data

Since the 1No. kitchen supply fan and 1No. kitchen extract fan were already installed, measurements were undertaken at a distance of 1m from the units in order to obtain the individual contributions. This data will subsequently be used to calculate the cumulative atmospheric plant noise emission levels at the nearest noise sensitive receptors.

The measurements were undertaken between 11:30 and 12:00 hours on 16 July 2020. The 1No. kitchen supply fan and 1No. kitchen extract fan were understood to be operating at design duty for the duration of the measurements. The measurements were undertaken of the L_{Aeq} sound pressure levels over periods of 1 minute (due to steady noise). Atypical noises were excluded as far as reasonably possible.

7.3 Weather Conditions

During the survey period there was a gentle westerly breeze (<5m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 15°C.

The weather conditions during the survey period is therefore considered to be suitable for undertaking measurements of sound levels.

7.4 Equipment

The following equipment was used to undertake the atmospheric plant noise emission level measurements.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Bruel & Kjaer	2250	2626230	18/10/2018
Preamplifier	Bruel & Kjaer	ZC-0032	21309	18/10/2018
Microphone	Bruel & Kjaer	4189	2621208	18/10/2018
Class 1 Sound Calibrator	Casella	120/1	3864878	15/11/2019

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.

7.5 Results

The results of the atmospheric plant noise emission level measurements are presented in the table below.

Plant Item	Location	Measured L_{Aeq} at 1m (dB)
Kitchen Supply Fan Soler & Palau CBM-9/9 4P 3V	Flat Roof to Rear	65*
Kitchen Extract Fan Soler & Palau TCBB/4-450/H-B	Flat Roof to Rear	52*

* Corrected for building services sound from the rear of 991 Stockport Road.

A review of the one third octave band noise data for the above measurements indicates that they are unlikely to be considered to emit tonal noise.

7.6 Discussion

The kitchen supply fan was noted to generate a steady broadband sound and was audible above the building services sound from the rear of 991 Stockport Road (Khan's Takeaway).

The kitchen extract fan was noted to generate a steady broadband sound and was barely audible above the building services sound from the rear of 991 Stockport Road (Khan's Takeaway).

7.7 Operating Hours

It is understood that the 1No. kitchen supply fan and 1No. kitchen extract fan have the potential to operate between 06:00 to 18:00 hours Monday to Friday, 09:00 to 18:00 hours Saturday and 09:00 to 16:00 hours Sunday.

In order to undertake a worst case assessment, it is assumed that the 1No. kitchen supply fan and 1No. kitchen extract fan will operate for the full assessment period.

7.8 Nearest Receptor

It is understood that the nearest noise sensitive receptor is the residential flat situated approximately 5m to the north west of the 1No. kitchen supply fan and 1No. kitchen extract fan.

7.9 Assessment

The table below details the calculated cumulative L_{Aeq} atmospheric plant sound emission level at the nearest receptor along with the proposed cumulative atmospheric plant sound emission limit and the differences between them.

Receptor	Descriptor	Period
		(06:00–18:00)
Residential Flat to the North West	Calculated Cumulative Atmospheric Plant Sound Emission Level L_{Aeq} (dB)	58
	Cumulative Atmospheric Plant Sound Emission Limit L_{Aeq} (dB)	47
	Difference (dB)	+11

The calculated cumulative L_{Aeq} atmospheric plant sound emission level at the nearest receptor is 11dB above the proposed cumulative atmospheric plant sound emission limit.

The assessment therefore indicates that the building services are likely to exceed the proposed cumulative atmospheric plant sound emission limit at the nearest receptor.

7.10 Mitigation Measures

In order to minimise atmospheric plant sound emissions from the building services at the nearest noise sensitive receptor the kitchen supply fan unit shall be fitted with an atmospheric silencer as specified in the Silencer Schedule 0725/SS1 enclosed at the rear of the report.

7.11 Repeat Assessment Incorporating Mitigation Measures

The results of the repeat assessment with the incorporation of the proposed mitigation measures are summarised in the following table.

Receptor	Descriptor	Period
		(06:00–18:00)
Residential Flat to the North West	Calculated Cumulative Atmospheric Plant Sound Emission Level L_{Aeq} (dB)	47
	Cumulative Atmospheric Plant Sound Emission Limit L_{Aeq} (dB)	47
	Difference (dB)	0

The calculated cumulative L_{Aeq} atmospheric plant sound emission level at the nearest receptor is equal to the proposed cumulative atmospheric plant sound emission limit.

The assessment therefore indicates that the building services are likely to achieve the proposed cumulative atmospheric plant sound emission limit at the nearest receptor with the incorporation of the proposed mitigation measures.

8.0 Facade Assessment

8.1 Introduction

The proposed cafe is situated at ground floor level whilst the nearest noise sensitive receptor is the existing adjoining residential flat to the south east situated at 1st floor level.

Typical cafe L_{Aeq} operational sound levels for similar size premises to that proposed are therefore assessed to the windows of the existing adjoining residential flat against the lowest representative $L_{A90,15min}$ background sound level measured at Position B during the proposed opening hours.

8.2 Operating Hours

It is understood that the proposed opening hours of the cafe are 06:00 to 18:00 hours Monday to Friday, 09:00 to 18:00 hours Saturday and 09:00 to 16:00 hours Sunday.

8.3 $L_{Aeq,T}$ Operational Sound Levels

Typical cafe 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	
Cafe 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.

8.4 $L_{A90,T}$ Background Sound Level

The lowest representative $L_{A90,15min}$ background sound level measured at Position B during the proposed opening hours (06:00 to 18:00 hours) is detailed in the table below.

Position	Lowest Representative $L_{A90,15min}$ Background Sound Level (dB)
	(06:00–18:00)
B	57

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

8.5 Existing Construction

It is understood that the existing ground floor front façade of the proposed cafe comprises the following constructions.

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

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

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Facade	34	41	44	48	55	55	55	55
Openings	16	22	25	28	31	26	31	33

The area of the front facade is understood to be approximately 12m².

8.6 Calculation

The sound pressure level radiated from the front façade due to cafe 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.

8.7 Results

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

Nearest Noise Sensitive Receptor	Calculated L_{Aeq} (dB)
Adjoining residential flat	37

The assessment indicates that cafe L_{Aeq} operational sound levels incident upon the windows of the existing adjoining residential flat due to breakout through the front façade will be 37dB.

This is therefore likely to achieve the proposed requirement to achieve the representative L_{A90} background sound level of 57dB at the window of the nearest noise sensitive receptors.

8.8 Music Level Limits

For the cafe 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 Saturday with none on Sundays/Bank holidays.
- 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 cafe have been established.

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels at the site.

An assessment of atmospheric sound emissions from 1No. kitchen supply fan and 1No. kitchen extract fan to the nearest noise sensitive receptor has been undertaken and mitigation measures have been proposed where required in order to achieve the requirements of the Local Authority.

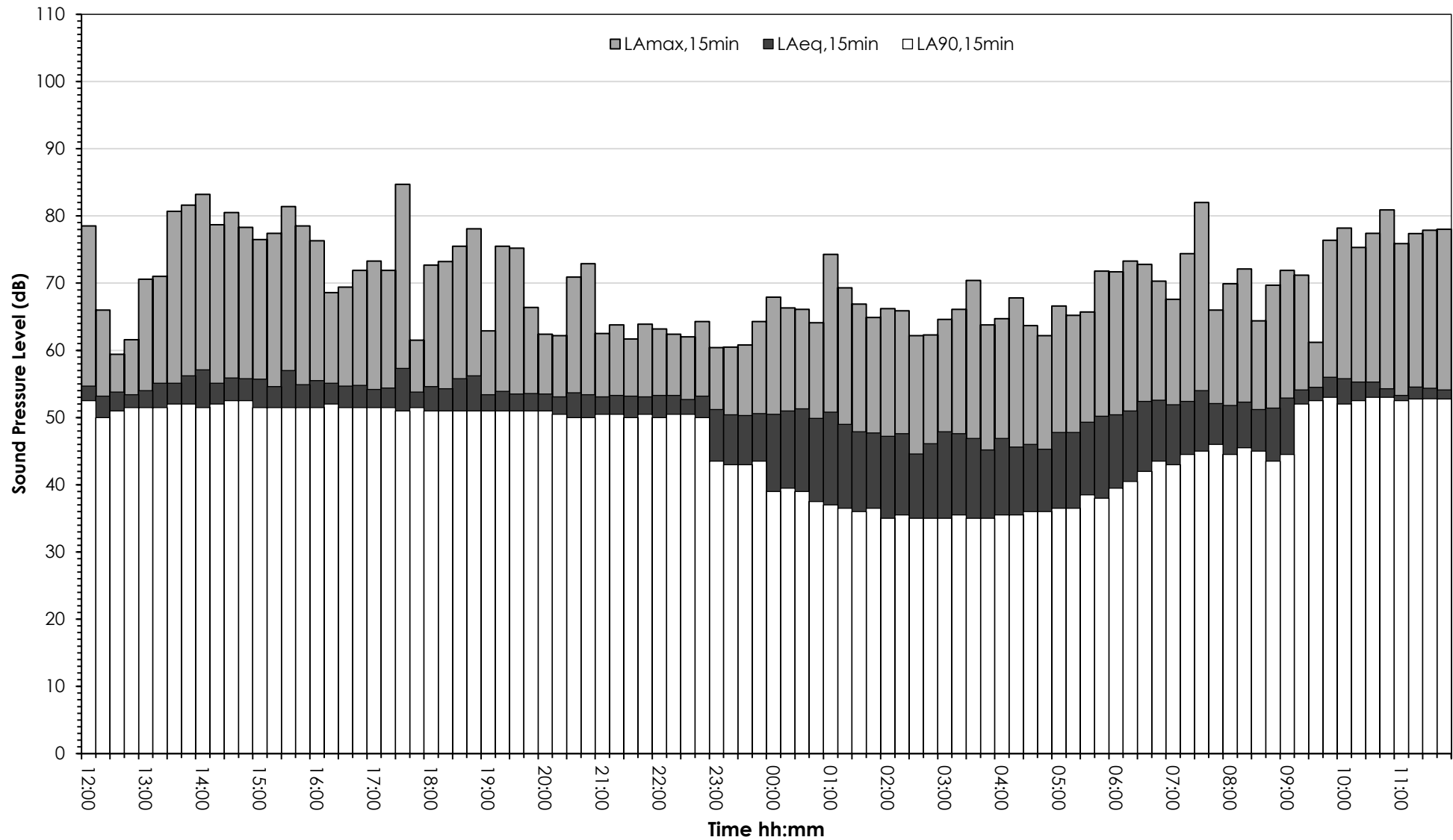
An assessment of cafe operational sound breakout through the front façade of the cafe has been undertaken to the windows of the nearest noise sensitive receptor.

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

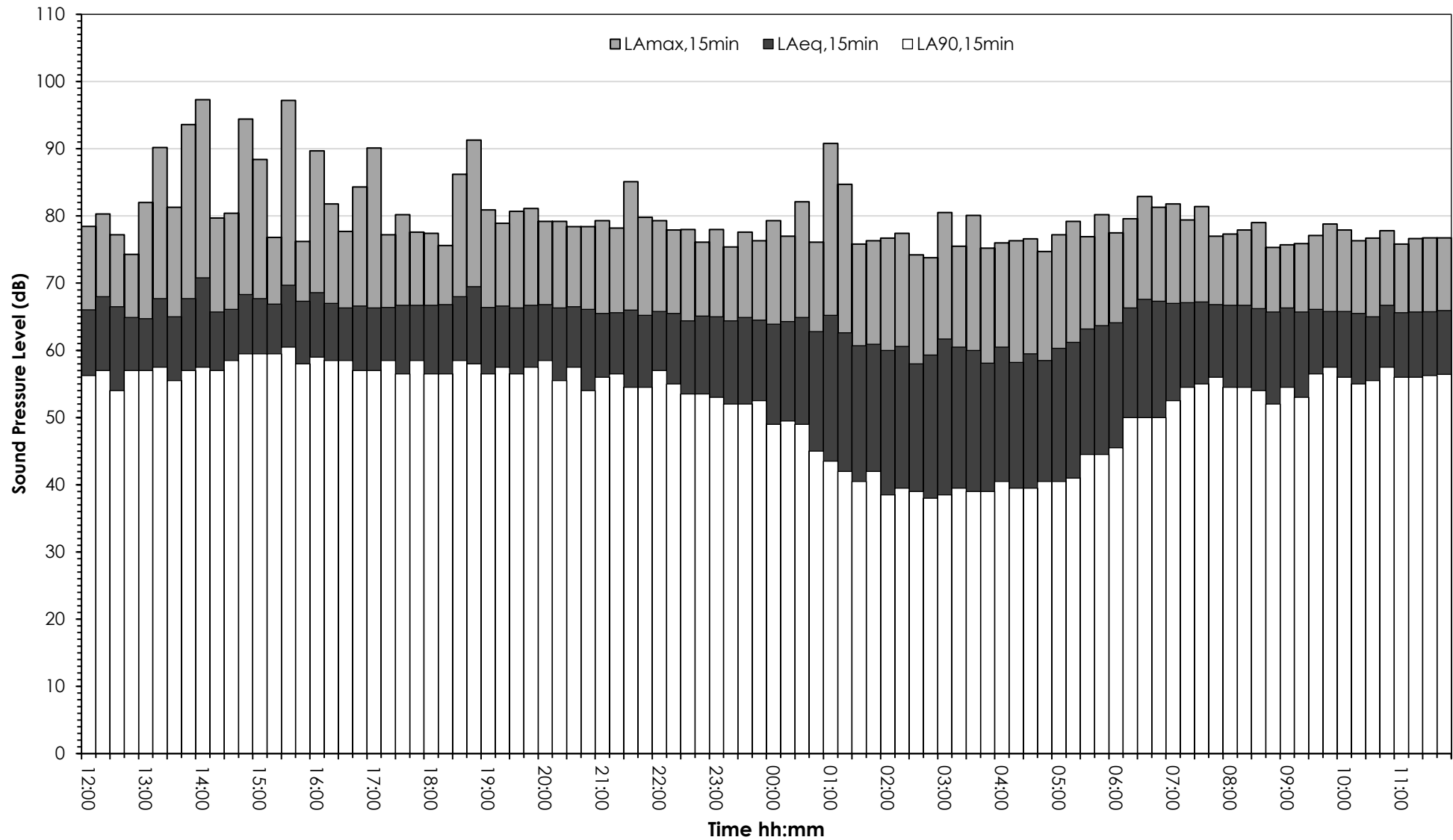
A handwritten signature in black ink, appearing to read 'Robin Wood', with a large, sweeping horizontal stroke underneath.

Robin Wood
LIGHTHOUSE ACOUSTICS

987 Stockport Road, Manchester
Time History Graph - Thursday 16 July 2020 to Friday 17 July 2020
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A



987 Stockport Road, Manchester
Time History Graph - Thursday 16 July 2020 to Friday 17 July 2020
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position B



Ref: 0725/SS1

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Revision: -

Comments: -

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Plant Ref.	Description	Inlet/Outlet	Vol. (m ³ /s)	Typical Length (mm)	Face Velocity (m/s)	Pressure Drop (Pa)	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
							63	125	250	500	1k	2k	4k	8k
-	Kitchen Supply Fan Soler & Palau CBM-9/9 4P 3V	Inlet	-	1200	<5.0	<55	7	11	21	26	24	15	14	12