



# BRAIDEN ACOUSTICS LTD

Innovation Forum | 51 Frederick Road | Salford | Manchester | M6 6FP

## BASELINE NOISE IMPACT ASSESSMENT

Prepared For : Shahid Baig

Date : 6 Sep 2024

Site : Lower Ground Floor, Chatham Mill, 8 Chester St,  
Manchester

Report No. : 11199

### 1 INTRODUCTION

Braiden Acoustics has been commissioned by Shahid Baig to undertake an acoustic survey at the site of the Lower Ground Floor, Chatham Mill, 8 Chester St, Manchester to support a planning application for the change of use from offices to restaurant / karaoke bar.

#### 1.1 AIM

This baseline report will address all the relevant noise sources and receivers and determine relevant noise thresholds.

### 2 DESCRIPTION OF SITE

Chatham Mill is a former cotton mill on Chester Street in Manchester city centre.



Figure 1  
Street view of site

#### 2.1 SITE LOCATION AND SURROUNDING USES

The property is bounded by Chester Street to the south (front) and Lower Ormond Street to the east. There is a single storey building that abuts up to the Mill on its western flank and to the rear there are some other buildings associated with the Mill (although not part of this planning application) and some hardstanding used as a car park.



Figure 2  
Site location

### 2.1.1 Nearest sensitive receptors

The nearest potential receptors will be the offices on first floor level.

The nearest residential receptors are over 40m to the north at Pearl House.

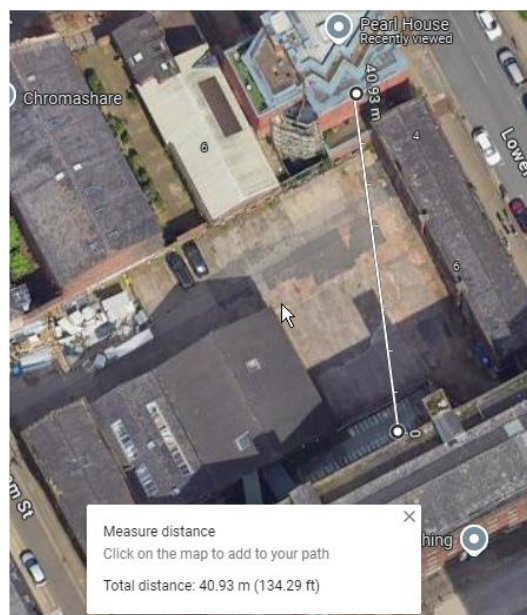


Figure 3  
Proposed residential in relation to proposed bar and eatery

### 2.2 PROPOSED USE

It is proposed to fit out the building as shown in Figure 4.





Figure 4  
Proposed Lower Ground floor layout

### 2.2.1 Opening hours

The site will be open during the following hours:

Daily 12:00 – 00:00

### 2.2.2 Building services

There will be the following building services:

- Kitchen ventilation
- External condenser units.

However, exact details are not yet known.

#### 2.2.2.1 Kitchen Ventilation

#### 2.2.2.2 External Condenser units

### 2.2.3 Sound system

The sound system, at the time of writing, is unknown.

## 3 ACOUSTIC CRITERIA AND METHODOLOGY

### 3.1 BS 4142

BS 4142:1999 “Method for rating industrial noise affecting mixed residential and industrial areas” [1] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*),  $L_{Aeq}$ , to the background noise level,  $L_{A90}$ , at the nearest sensitive receptor (NSR).

This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [2]. Whereas the old standard added 5dB ‘penalty’ to the Specific Noise Level (SNL) if the noise source has a ‘character’ that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise ‘character’. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

*Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.*



Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

*NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source's tonal and/or impulsive characteristics could also vary with time.*

*Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.*

#### Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

#### Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

#### Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

*NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.*

#### Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the Rating Level.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

*“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.”*

## 3.2 BS 8233: 2014

### 3.2.1 Residential spaces

The British Standard BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” gives guidance on recommended indoor ambient noise levels for residential dwellings.



| Room             | Criterion | $L_{Aeq,T}$ |     |
|------------------|-----------|-------------|-----|
|                  |           | night       | day |
| Bedroom          | Sleeping  | 30          | 35  |
| Dining Room/Area | Dining    | --          | 40  |
| Living Room      | Resting   | --          | 35  |

Table 1

Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

Internal levels are simply predicted by the subtraction of the estimated sound reduction index (SRI) of the building façade from the external free field noise measurements. When considering the SRI of a particular façade it is usual to only consider the glazing as this is the weakest element acoustically.

### 3.2.2 Non-residential spaces

Permitted noise ingress levels in non-residential spaces is given in Table 6 of BS8233 “Typical noise levels in non-domestic buildings”.

| Activity                               | Location                                              | Design range<br>dB $L_{Aeq, T}$ |
|----------------------------------------|-------------------------------------------------------|---------------------------------|
| Speech or telephone communications     | Department store                                      | 50 – 55                         |
|                                        | Cafeteria, canteen, kitchen                           |                                 |
| Study and work requiring concentration | Concourse                                             | 45 – 55                         |
|                                        | Corridor, circulation space                           |                                 |
|                                        | Library, gallery, museum                              | 40 – 50                         |
|                                        | Staff/meeting room, training room                     | 35 – 45                         |
| Listening                              | Executive office                                      | 35 – 40                         |
|                                        | Place of worship, counselling, meditation, relaxation | 30 – 35                         |

Figure 6

Table 6 of BS8233 “Typical noise levels in non-domestic buildings”

### 3.3 COUNCIL CRITERIA

#### 3.3.1 External plant noise

It is usual for Councils to adhere to a BS4142:2014 for industrial noise. Manchester council are no different and state that:

*... Rating noise level of 5dB below the existing background ( $L_{A90}$ ) in each octave band at the nearest noise sensitive location*

## 4 MEASUREMENT DETAILS

### 4.1 VISIT 1 – REAR

External noise measurements were made at the rear of the property where the external plant will likely be located.

#### 4.1.1 Monitoring overview

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

The sound level meter was calibrated before after the measurements with no drift reported.



Monitoring was manned but with audio recorded.

#### 4.1.2 Monitoring locations

The microphone was placed 1.2m from the ground and, at least, 3.5m from any other surface, in the location shown in Figure 7.



Figure 7  
Monitoring location

#### 4.1.3 Monitoring results

Noise measurements were taken late morning but before lunchtime in order to obtain a typical daytime (office hours) Background Noise Level.

| Day                   | Time     |          | Duration | Time Period | $L_{A90}$<br>dB | $L_{Aeq}$<br>dB | $L_{Amax}$<br>dB |
|-----------------------|----------|----------|----------|-------------|-----------------|-----------------|------------------|
|                       | Start    | Finish   |          |             |                 |                 |                  |
| Tuesday<br>01-08-2023 | 11:35:54 | 11:45:00 | 00:09:06 | day         | 47.7            | 50.4            | 68.3             |

Table 2  
Summary of noise results

Noise levels at the rear were relatively high but typical for the city centre location.

The typical Background Noise Level, when the offices would be in use was 47.7 dB  $L_{A90}$ .

#### 4.2 VISIT 2 – CAFÉ / RESTAURANT INTERNAL NOISE LEVELS

In order to determine the likely daytime internal noise levels, noise monitoring took place in a similar busy café called North Tea Power on Fri 27/01/2017 – results show in Figure 8.

Noise levels were measured in 5-minute intervals with the highest equivalent 5 minute ambient internal noise level at 77.5 dB(A).

As a worst case scenario, daytime internal noise levels of 80dB(A) will be used as part of the assessment.





Figure 8  
Café internal noise levels

## 5 ACOUSTIC ASSESSMENT

The potential noise sources are:

1. noise from 'external plant'
  - a. the kitchen ventilation
  - b. noise from condenser units
2. noise transmission via the separating floor (lower ground to upper ground)
3. noise break-out.

### 5.1 EXTERNAL PLANT NOISE ASSESSMENT

The exact details of the external plant is not known at the time of writing; however, noise thresholds on equipment can be determined based on the Background Noise Level.

#### 5.1.1 Distances

#### 5.1.2 Background noise levels

The typical background noise level, to the rear, during the daytime (office hours) is 47  $L_{A90\_day}$ .

Therefore, the Rating Noise Level from any external plant should not exceed the following noise level at the nearest habitable window:

42 dB.

#### 5.1.3 Kitchen Extract

#### 5.1.4 AC condensers

### 5.2 EXTERNAL NOISE BREAK-OUT



### 5.3 INTERNAL NOISE TRANSMISSION

The ceiling of the upper ground floor was previously inspected.

Figure 16 shows a timber ceiling, as well as the floor joists and even the underside of the first-floor floorboards.



Figure 16  
Ceiling of first floor

The floor cavity is at least 200mm.

#### 5.3.1 Proposed ceiling upgrade

It is proposed to remove with existing ceiling and friction fit Karma TNF70 firebatts between the joists.

##### 5.3.1.1 Firebatt product between joists

The floor cavity should be cleared of debris.

Once the floor cavity is cleaned out, Karma TNF 70 batts should be friction fitted between the joists and sealed around the perimeter and any joins between the batts, with acoustic sealant.



Figure 17  
Karma TNF70 batts friction fitted between joists

The acoustic sealant could be Everflex Ac50 Acoustic Sealant and Adhesive .



Figure 18  
Everflex Ac50 Acoustic Sealant

Once the firebatts have been fully sealed then the acoustic ceiling can be installed.



### 5.3.1.2 Ceiling build up

The ceiling comprises of the following:

- Resilient bars attached to the underside of the joists
- 2 x 15mm acoustic plasterboards.

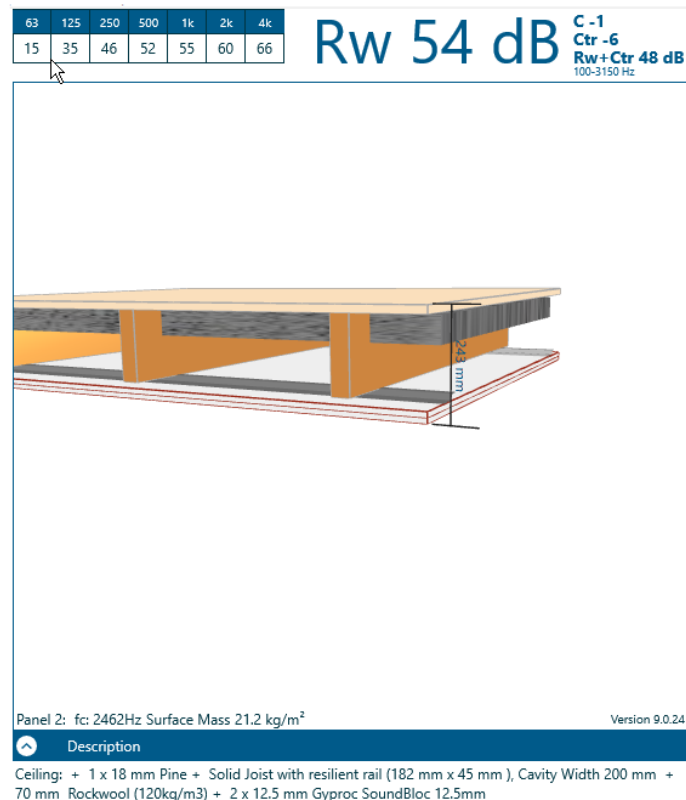


Figure 19  
Proposed floor / ceiling upgrade

### 5.3.2 Noise transfer to first floor

The above construction described in Section 5.3.1 will give an on-site sound insulation performance of, around, 42 dB. The upper noise level in the restaurant, **during office hours of 08:00 – 18:00**, will be 80dB.

Therefore the noise level in the offices, will be around 38dB.

Noise levels within open plan offices is given in Table 2 in BS8233.

Table 2 Indoor ambient noise levels in spaces when they are unoccupied and privacy is also important

| Objective                                                  | Typical situations        | Design range $L_{Aeq,T}$ dB |
|------------------------------------------------------------|---------------------------|-----------------------------|
| Typical noise levels for acoustic privacy in shared spaces | Restaurant                | 40 – 55                     |
|                                                            | Open plan office          | 45 – 50                     |
|                                                            | Night club, public house  | 40 – 45                     |
|                                                            | Ballroom, banqueting hall | 35 – 40                     |
|                                                            | Living room               | 35 – 40                     |

NOTE See Noise control in building services [28] and BS EN ISO 3382.

Table 5  
Indoor ambient noise levels in unoccupied spaces where privacy is important

Noise levels in open plan offices should not exceed the range of 45 – 50dB, therefore the proposed upgraded floor / ceiling is sufficient.



## 6 CONCLUSION

A baseline acoustic survey has taken place at Lower Ground Floor, Chatham Mill, 8 Chester St, Manchester to assess noise levels from the proposed external plant, internal noise transfer and noise break out.

The exact details of the noise break-out and external plant are not known at the time of writing; however, a noise threshold of 42 dB has been stipulated at the nearest office window.

Noise transfer to the first-floor office has been assessed and a design and discussion of the proposed upgraded ceiling has been described:

- Karma TNF 70 firebatts friction fitted to the joists
- Resilient bars to attached to the underside of the joists
- 2 x 15mm acoustic boards attached to the resilient bars.

## 7 REFERENCES

- [1] BS 4142: 1997  
*Method for Rating industrial noise affecting mixed residential and industrial areas*  
British Standards Institute, 1997.
- [2] BS 4142: 2014  
*Methods for rating and assessing industrial and commercial sound*  
British Standards Institute, 2014.
- [3] R. Watson & O. Downey  
*The Little Red Book of Acoustics*  
Blue Tree Acoustics, 2008.



## Appendix



### A1.1 Lower Floor Layout

