hepworth acoustics

# PROPOSED BAR, UNIT 6 LAYSTALL STREET HOTEL, MANCHESTER
# NOISE IMPACT ASSESSMENT

**On behalf of:**

**Ciel Laystall Ltd**

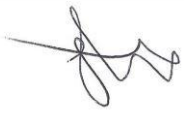
Report No: P19-472-R01v2
October 2019

# PROPOSED BAR, UNIT 6 LAYSTALL STREET HOTEL, MANCHESTER
# NOISE IMPACT ASSESSMENT

Report prepared by:
Hepworth Acoustics Ltd
21 Little Peter Street
Manchester
M15 4PS

On behalf of:
Ciel Laystall Ltd

Report prepared by:
James Shaw BSc AMIOA - Consultant



Report checked by:
Graham Bowland BSc MIOA - Technical Director



**CONTENTS**


| | | |
|---|---|---|
| 1.0 | INTRODUCTION | 4 |
| 2.0 | SITE DESCRIPTION AND PROPOSALS | 5 |
| 3.0 | SOUND INSULATION TESTING | 7 |
| 4.0 | BACKGROUND NOISE MEASUREMENTS | 8 |
| 5.0 | GUIDANCE AND NOISE CRITERIA | 9 |
| 6.0 | NOISE IMPACT ASSESSMENT | 11 |
| 7.0 | SUMMARY | 13 |

FIGURE 1: PROPOSED ELEVATIONS AND PLAN 14

FIGURE 2: NOISE MEASUREMENT LOCATION 15

APPENDIX I: NOISE UNITS & INDICES 16

APPENDIX II: NOISE SURVEY RESULTS 18

# 1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Ciel Laystall Ltd to carry out a noise impact assessment in connection with a proposed bar at Unit 6, Laystall Street in Manchester.

1.2 We have been commissioned to carry out the following:

- An inspection of the site and surrounding area;
- Indicative sound level difference testing between the unit and a hotel suite immediately above;
- A noise survey to establish the existing noise climate over a weekend period;
- An assessment of the potential impact of trading noise transmission to the suite above;
- Providing advice on appropriate mitigation measures where necessary.

1.3 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

# 2.0 SITE DESCRIPTION AND PROPOSALS

## Site Description

2.1 Unit 6 is located on the ground floor of 40 Laystall Street within the Northern Quarter cultural area, close to Manchester city centre. The upper floors of the building have recently undergone a retrospective change of use from C3 (dwelling) to C1 (hotel) and is now operated as an aparthotel under 'The Northern Quarters' brand. The retrospective application (119801/FU/2018) was approved on 27 July 2018.

2.2 Unit 6 is located on the corner of Brock Street and Laystall Street at the north west corner of the building. To the north of Unit 6 is Laystall Street itself and the rear of Urban Exchange (a small retail park) beyond. The service yard and plant enclosures of Urban Exchange are located at the rear of this retail park and therefore face towards Unit 6. It was noted during the site inspection that the plant equipment is continuously operating.

2.3 Brock Street runs parallel to the western elevation of the building.

2.4 Laystall Street is moderately trafficked by cars and HGVs and often cars are queuing along Laystall Street at the nearby traffic lights. Brock Street is lightly trafficked by vehicles serving local commercial units and accessing the car parking at the rear of the building.

2.5 Above Unit 6 on the upper floors of the building are suites that form part of the Stay Inn Aparthotel. Adjacent to Unit 6 is an unused corridor and doorway to the inner courtyard of the building. To the rear of Unit 6 is the bin and cycle stores.

2.6 Unit 6 is approximately 65 sqm and is currently in a shell state with a floor level around 0.9m below street level, however the internal floor level will be built up to provide level access to the unit. It was noted during the inspection that the separating floor between the ground floor unit and the hotel suites above is a cast in-situ concrete slab construction and we understand the flooring above is overlaid with a floating floor system. Such a floor construction can be expected to provide a good level of sound insulation.

**Proposals**

2.7 The current proposals for Unit 6 are for the introduction of a small bar with opening times no later than midnight (00:00) seven days a week. We understand that air-conditioning is proposed for the bar however the condenser will be located within a building services area of the basement. There are no drinks chillers are proposed for the bar.

2.8 We understand that the shopfronts on both the Laystall and Brock Street elevations will be formed of double glazed units and with a single entrance on the Laystall Street elevation.

## 3.0 SOUND INSULATION TESTING

3.1 Sound level difference testing was carried out to establish the existing sound separation between the ground floor demise and the apartment immediately above.

3.2 The testing was carried out by generating high levels of pink noise directly below the apartment within the ground floor unit using a sound source and loudspeaker. The resulting source noise levels were measured in the ground floor space along with the transmitted noise levels in the living/dining room and master bedroom of the room above. Background noise levels (i.e. the prevailing noise levels in the absence of the transmitted noise) were also measured in the apartment. The measurements were taken as a series of short term third octave band noise measurements.

3.3 The measurements were taken with a B&K 2250 'Type 1' sound analyser (serial no. 3011706). The analyser was check calibrated before and after the measurements with no variance noted.

3.4 Using the results of the measurements, it has been possible to calculate the existing level of sound insulation between the proposed bar unit and the apartment above as follows:

**Table 1: Calculated sound level difference values (dB)**

| Location | Octave Band Centre Frequency (Hz) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k |
| Unit 6 to apartment bedroom | 33 | 41 | 44 | 51 | 58 | 63 | 65 |

3.5 The sound insulation performance values shown in Table 1 are good and is due to the substantial solid concrete floor construction and floating floor arrangement above.

# 4.0 BACKGROUND NOISE MEASUREMENTS

4.1 Noise measurements were carried by measuring noise levels outside an upper floor window of an apartment directly above Unit 6. The measurement location is indicated in Figure 1.

4.2 The noise measurements were taken between the afternoon of Friday 4th August 2019 and the morning of Monday 7th October 2019.

4.3 The weather conditions during the survey were generally dry and with light wind speeds, but with some rain on the Saturday.

4.4 The noise survey was carried out using a Rion NL-52 'Class 1' sound level meter (serial no: 0242747). Calibration checks were carried out both before and after the measurement periods with no variance in levels noted.

4.5 The full results of the noise survey are shown in Appendix II and are summarised in Table 2.

**Table 2: Summary of measured noise levels (dB)**

| Day | Period | Front Elevation | | |
|---|---|---|---|---|
| | | $L_{Amax}$ | $L_{Aeq}$ | $L_{A90}$ |
| Friday | Daytime | | 64 | 60 |
| Friday/Saturday | Night | 68-89 | 62 | 57 |
| Saturday | Daytime | | 64 | 59 |
| Saturday/Sunday | Night | 69-89 | 63 | 57 |
| Sunday | Daytime | | 63 | 59 |
| Sunday/Monday | Night | 68-82 | 60 | 56 |

*4.6* As one would expect the noise levels to the front of the building were found to be high due to the city centre location as a result of road traffic noise and the plant area/service yard for the Urban Exchange retail park.

4.7 In terms of noise assessments, 'night' is defined as being from 23:00-07:00 hours, however the bar will not operate after midnight. The ambient and background noise levels measured between 23:00 and midnight were found to be typically 63-65 dB $L_{Aeq}$ and 58-60 dB $L_{A90}$ respectively on the Friday and Saturday night and lower at 61 dB $L_{Aeq}$ and 56 dB $L_{A90}$ on the Sunday night.

## 5.0 GUIDANCE AND NOISE CRITERIA

5.1 Manchester City Council Planning & Noise Technical Guidance 2015 provides guidance for assessing the potential impact from entertainment noise on residential dwellings.

5.2 To ensure that the development is suitable within the context of the planning permission being sought, the guidance states that *"…applicants and consultants should predict the noise impact of a proposed entertainment venue using noise levels that are representative of those found in 'typical' venues of the kind being applied for."*

5.3 The guidance does state that *"When considering the potential impact of a proposal for an entertainment venue consultants should consider the overall noise level ($L_{Aeq}$) and the 63 Hz and 125 Hz octave band noise levels ($L_{eq}$)."*

5.4 To account for potential low frequency noise, the Manchester City Council Technical Guidance provides the following criteria for new developments:

***"'Music noise levels in the 63Hz and 125Hz octave centre frequency bands ($L_{eq}$) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{eq}$), respectively'."***

5.5 The guidance considers that operation within these criteria would result in *'inaudible'* or *'virtually inaudible'* entertainment noise, which would be desirable.

5.6 The following guidance is also provided regarding entertainment venues that are not structurally attached to the nearest dwelling, which may also be appropriate for attached dwellings in some cases:

5.7 '*A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is: 'Entertainment noise (LAeq) should be controlled to 10dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location'.*'

5.8 Therefore, in this case we have adopted the following noise criteria to take into account the broadband $L_{Aeq}$ noise levels and the 63Hz and 125Hz octave band noise levels ($L_{eq}$) in line with the Manchester City Council Guidance discussed above:

- Trading noise levels in the 63Hz and 125Hz octave centre frequency bands ($L_{Zeq}$) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{Zeq}$), respectively; and,

- The trading noise levels ($L_{Zeq}$) should be 10 dB lower than the prevailing background noise levels ($L_{Z90}$) in each octave band.

# 6.0 NOISE IMPACT ASSESSMENT

### Potential Trading Noise Impact

6.1 The proposed bar will be of a modest size and will not have loud music. It will be in a fairly busy location. Therefore, one would not expect the operation of the proposed bar to result in any significant noise impact on residential amenity. However, below we have examined further the likely impact on the hotel room located above from the break-out of sound from the trading area shop front.

6.2 Calculations have been undertaken to determine the likely levels of noise from the bar outside the nearest hotel room above. For the purposes of the calculations, we have adopted a sound break-out level (from voices and background music during a busy trading period) of 84 dB $L_{Aeq}$. The lowest background noise level of 63 dB $L_{A90}$ measured on a Sunday evening between 23:00 and Midnight (00:00) has been adopted for the purposes of the calculation.

6.3 We have calculated the trading noise break-out taking into account the windows in the front and side elevation and appropriate distance to the nearest hotel room. The calculated noise break-out is shown in Table 3 along with the trading noise limits. To achieve the Manchester City Council criteria that trading noise levels in the 63Hz and 125Hz octave centre frequency bands ($L_{Zeq}$) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{Zeq}$) the shopfront should be fitted with double glazing with a sound insulation rating of at least 36 dB $R_w + C_{tr}$. Typically, this could be achieved with the following or equivalent:

- 10.0mm Solaglas 'Stadip Silence' laminated glass – nominal (6-20mm) cavity – 8.8mm glass

**Table 3: Noise Transmission via the shopfront (dB)**

| Description | Octave Band Centre Frequency (Hz) | | | | | | | A |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | |
| Adopted Trading Noise Levels ($L_{eq}$) | 66 | 72 | 75 | 81 | 80 | 76 | 69 | 84 |
| Lowest Measured Background Noise Level ($L_{A90}$) | 52 | 55 | 56 | 57 | 53 | 50 | 51 | 63 |
| Calculated Noise Break-out ($L_{eq}$) | 41 | 41 | 44 | 41 | 35 | 25 | 11 | 42 |
| Difference | -11 | -14 | -12 | -16 | -18 | -25 | -40 | -22 |

6.4 The predicted noise break out levels from the bar shopfront can be expected to be below the prevailing noise climate of the area at the proposed trading times, and Manchester City Centre guidance criteria is met in all octave bands. This indicates that there would not be any significant noise impact on the hotel suites above.

### Noise Transmission within the building

6.5 Using the measured sound level difference values set out in Table 1, we have calculated the following calculated transmitted trading noise levels in the apartment immediately above.

**Table 4: Calculated worst case transmitted trading noise levels (dB)**

| Location | Octave Band Centre Frequency (Hz) | | | | | | | A |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | |
| Apartment above Unit 6 | 33 | 31 | 31 | 30 | 22 | 13 | 4 | 29 |

6.6 Table 4 shows that the resulting transmitted noise levels will be 29 dB $L_{Aeq}$ in the apartment. The 63 Hz and 125 Hz values are well below that of Manchester City Centre's design criteria. As such, the existing separating floor construction will provide an adequate level of protection against the transmission of trading noise through the building structure.

6.7 We would nevertheless recommend that all soil vent pipes and/or rainwater pipes that are routed through the premises are wrapped in Rockwool (min. 33kg/$m^3$) and boxed in with at least two layers of 15mm Gyproc SoundBloc plasterboard with well-sealed and staggered joints mounted onto independent timber or metal studs. PA system loudspeakers should be mounted via proprietary anti-vibration mounts and not rigidly connected to the building structure. Any speakers should be orientated downwards and towards the centre of the trading area (i.e. away from the acoustic ceiling and wall linings). Bass bins should not be installed.

# 7.0 SUMMARY

7.1 Hepworth Acoustics was commissioned to assess the potential impact of noise from the proposed bar at Unit 6 on Laystall Street in Manchester.

7.2 The assessment has included an inspection of the premises; sound insulation testing between the ground floor and an hotel apartment immediately above; and background noise measurements. The bar will be of modest size and located in a busy commercial area.

7.3 The sound insulation testing showed that the existing floor provides a good level of sound insulation. As such, trading noise will be controlled to within Manchester City Centre design criteria without any specific additional sound insulation measures. We would nevertheless recommend as part of the fit out that soil vent pipes and any rainwater pipes are boxed.

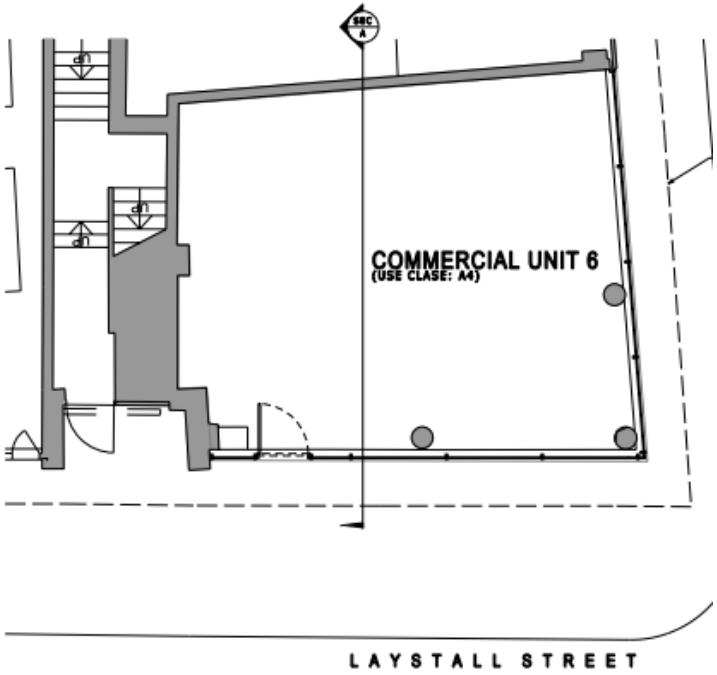
7.4 It has also been demonstrated that there will not be any unacceptable noise impact due to break-out of noise from windows of the trading area.

7.5 We therefore conclude that there will be no unacceptable noise impact associated with the proposed change of use.




**LAYSTALL ST ELEVATION**
1:100

**BROCK ST ELEVATION**
1:100




**Key:**

Not to scale

hepworthacoustics

**Title:** Figure 1: Proposed Elevations & Plan

**Project:** P19-472

Email: manchester@hepworth-acoustics.co.uk
Tel: 0161 242 7900

Key:
Not to scale
1 Noise Measurement Location
hepworthacoustics
Title: Figure 2: Noise Measurement Location
Project: P19-472
1
Google Earth

## Appendix I: Noise Units & Indices

### Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

### Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

## Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq}$ This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, LAeq is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

$L_{Amax}$ This is the maximum A–weighted noise level that was recorded during the monitoring period.

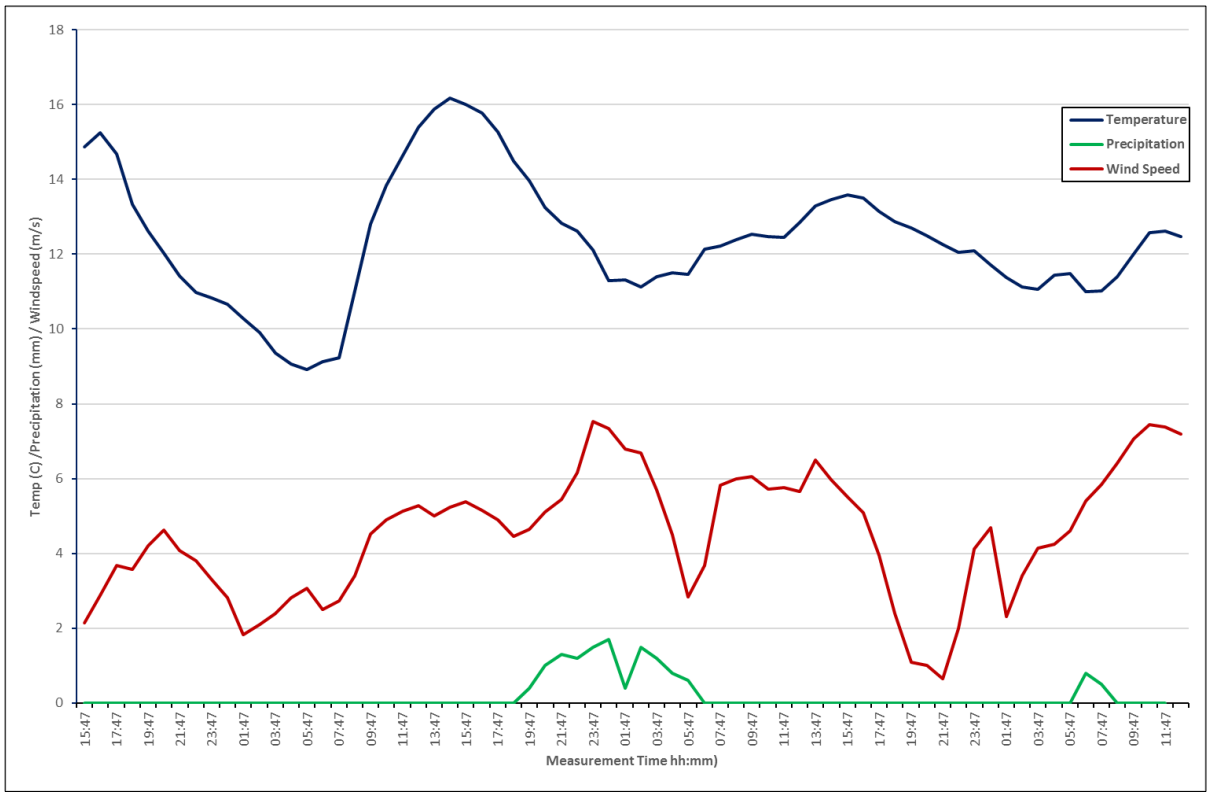
$L_{A90}$ This is the A–weighted noise level exceeded for 90% of the time period. $L_{A90}$ is used as a measure of background noise.

.

## Appendix II: Noise Survey Results

| | |
|---|---|
| Date(s): | Friday 4th October 2019 - Monday 7th October 2019 |
| Equipment: | B&K 2250 'Type 1' sound analyser (serial no. 3011706) with tripod and calibrator<br>Rion NL-52 'Type 1' sound level meter (serial no. 0242747) with tripod and calibrator |
| Weather: | Generally dry with a period of rain on Saturday evening, mild and a generally light breeze |

All levels in dB(A)



**Laystall Street**

