

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Grape Street Containers, Manchester

Acoustic planning report

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

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A	25 Mar 24		JP	JA
B	14 June 24	Updates to patron and amplified sound assessments.	JP	JA

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Summary

Sandy Brown has been commissioned by Manchester Quays Developments (St John's) Ltd to provide acoustic advice in relation to the proposed development along Grape Street within the St Johns estate close to the Bonded Warehouse, Manchester.

An environmental noise survey has been undertaken, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises. The noise survey was performed between 14:30 on 1 September 2023 and 10:45 on 5 September 2023. The representative background sound levels measured during the survey were $L_{A90,15min}$ 50 dB during the day, and $L_{A90,15min}$ 48 during the night.

Based on the requirements of Manchester City Council and the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed L_{Aeq} 45 dB during the day, and L_{Aeq} 43 dB during the night. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above as penalty corrections will apply.

External limits for entertainment noise egress have been set outside nearby noise sensitive premises in line with the requirements of Manchester City Council.

Outline assessments of patron noise egress and entertainment noise egress have been undertaken. Guidance on internal limits for amplified music within the units has been provided.

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1 Introduction

Sandy Brown has been commissioned by Manchester Quays Developments to provide acoustic advice in relation to the proposed temporary development where six retail/F+B container units are to be installed along Grape Street within the St Johns estate close to Bonded Warehouse, Manchester,

An environmental noise survey was undertaken in 2023 to inform the assessment, with the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises.

Appropriate limits for noise egress from the proposed six temporary retail/F+B container units have been set in line with the requirements of Manchester City Council.

2 Site description

2.1 The site and its surroundings

The site location in relation to its surroundings is shown in Figure 1.

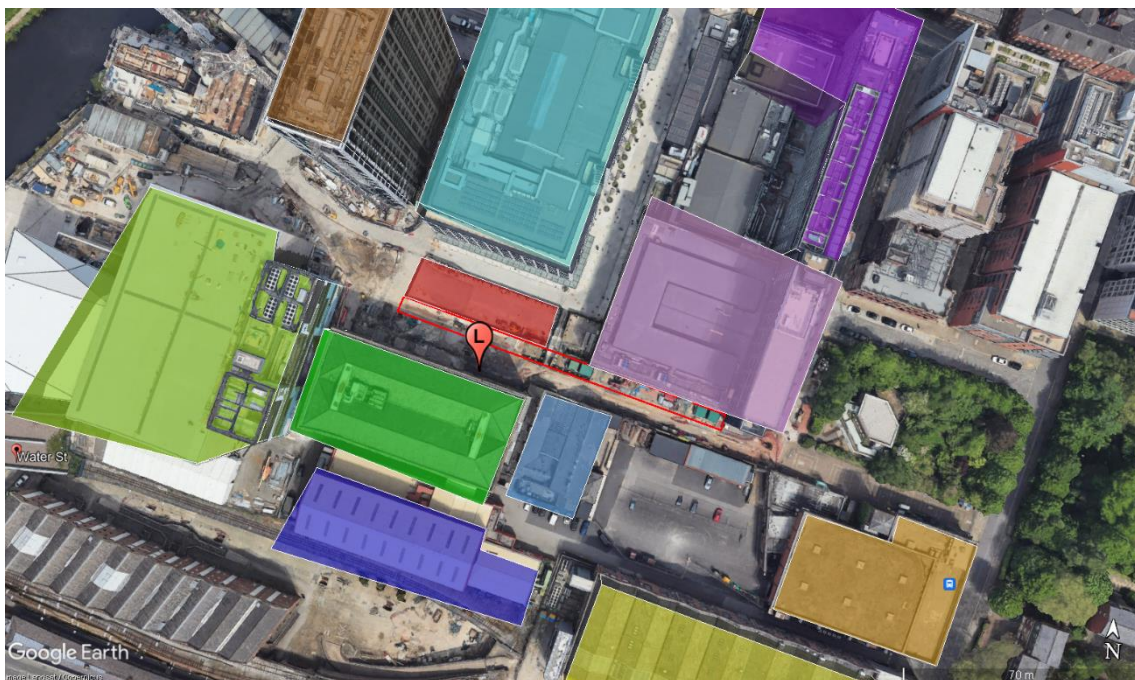


Figure 1 Aerial view of the site (courtesy of Google Earth Pro)

2.2 Adjacent premises

The site is adjacent to the following premises displayed in Figure 1:

To the north are Old Granada Studios – offices (current), Hotel (future), highlighted in purple, Old Granada Studios – offices/studio space, highlighted in pink, Manchester Goods Yard – offices, highlighted in teal, and Union Co-living Apartments to the northwest highlighted in brown.

To the south are The Factory - commercial highlighted in light green, Bonded Warehouse - offices, highlighted in dark green, Studio 1 – studios/offices, highlighted in orange, The Stables – bar/restaurant highlighted in light blue, Science and Industry Museum - commercial, highlighted in yellow in and The Crystal Maze – commercial, highlighted in dark blue. The Bonded Warehouse is therefore the nearest noise sensitive receptor to the south of the proposed development. The Stables is not considered to be a noise sensitive receptor.

The Old Granada Studios studio block immediately adjacent to the site is constructed from a solid masonry box-in-box construction which provides a high sound insulation performance. This receptor has therefore been excluded from the assessment as a noise sensitive receptor.

The site is highlighted by a red outline with No.1 Grape Street highlighted in red which is understood to be a site for future development. This receptor has therefore been excluded from the assessment as a noise sensitive receptor at this stage.

3 Development proposals

The development proposals seek to install six retail/F&B containers as temporary structures that will offer flexible units for retail, food and drink.

Proposals include external seating areas integrated with the containers that can be utilised for dining and drinking/socialising.

Any music associated with the use is understood to be internal (within the units only) and limited to background music levels.

Use of the units is understood to be limited to daytime only (0700 to 2300 hrs).

4 Assessment criteria

4.1 NPPF and NPSE

The National Planning Policy Framework, December 2023 (NPPF) sets out the UK government's planning requirements. It supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) 2010 to which it refers.

The NPPF, clause 191 states:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

and clause 193 states:

'Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

The NPSE states that its aims are as follows:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life*
- *Mitigate and minimise adverse impacts on health and quality of life and*
- *Where possible, contribute to the improvement of health and quality of life.'*

As such, neither document sets out specific acoustic criteria for new residential developments, but they require consideration of the effect of existing noise on the new development and the effect of noise from the development on the surroundings.

4.2 NPPG 2014

The National Planning Practice Guidance (NPPG) is a web-based document which complements the NPPF and provides advice on how to deliver its policies. The document provides guidance on how to recognise when noise could be a concern and the factors that influence this, along with outline guidance on noise mitigation through engineering and design, etc.

4.3 BS 4142:2014+A1:2019

Guidance for noise emission from proposed new items of building services plant is given in BS 4142: 2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'. BS 4142 provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive.

BS 4142 suggests that if the noise level is 10 dB or higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact. Guidance on corrections for attention catching features is provided in Appendix A.

4.4 Manchester City Council criteria

4.4.1 Plant noise egress

Manchester City Council (MCC) provides guidance in relation to plant noise emissions in their *Noise and Planning guidance* document dated October 2022. The following is stipulated:

'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.'

4.4.2 Entertainment noise egress

MCC *Noise and Planning Guidance* dated October 2022 states the following:

"Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5 dB below the typical background noise level (L_{A90}) in each octave-band at the nearest noise sensitive location."

5 Environmental noise survey

5.1 Method

Unattended noise monitoring was undertaken at the site over 4 days.

Details of the equipment used and the noise indices measured are provided in Appendix A.

The unattended measurements were taken over 15-minute periods between 14:30 on 1 September 2023 and 10:45 on 5 September 2023.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. A photograph showing the measurement location is provided in Figure 2. This location was chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.



Figure 2 Photograph of unattended logger position

5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

5.3 Noise survey results

5.3.1 Observations

The dominant noise sources observed at the site during the survey were construction noise from Manchester Goods Yard. From analysis of the survey data, it is unlikely that construction noise was affecting measurements over the weekend period.

Less significant noise sources included road traffic from Lower Byrom Street and external plant from the Science and Industry Museum. This plant area was fully screened from the unattended noise measurement location.

5.3.2 Unattended measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

Ambient noise levels measured during the unattended survey are presented in Table 1. These measurements are facade measurements.

Table 1 Ambient noise levels measured during the unattended survey

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Friday 1 September 2023	57 ^[1]	51
Saturday 2 September 2023	56	51
Sunday 3 September 2023	59	51
Monday 4 September 2023	64 ^[2]	50
Tuesday 5 September 2023	72 ^[1]	-
Average	58	51

^[1] Measurement not made over a full period due to monitoring start and end time (the measurement on 1 September 23 was over 8 hours, and on 5 September 23 over 4 hours); not included in the average.

^[2] Measurement is likely heavily influenced by construction noise, not included in the average.

In line with BS 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Day and night statistical analysis of representative values for the site are given in Figure 3.

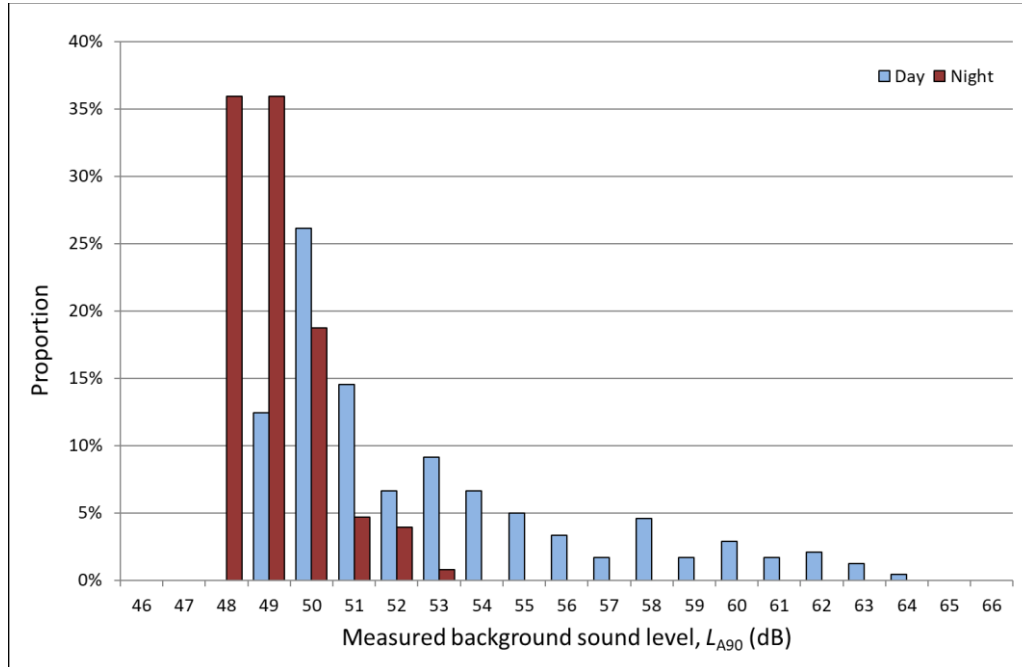


Figure 3 Statistical analysis of measured background sound levels

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 50 dB during the day and $L_{A90,15min}$ 48 dB at night.

It was noted that the dominant noise source during the weekday measurement period was construction noise from nearby developments. Hours where construction noise may have influenced the measurement results have been removed from the assessment data. Additional day and night statistical analysis has been given in Figure 4. Comparing these two data sets shows no difference in the selected representative background sound levels.

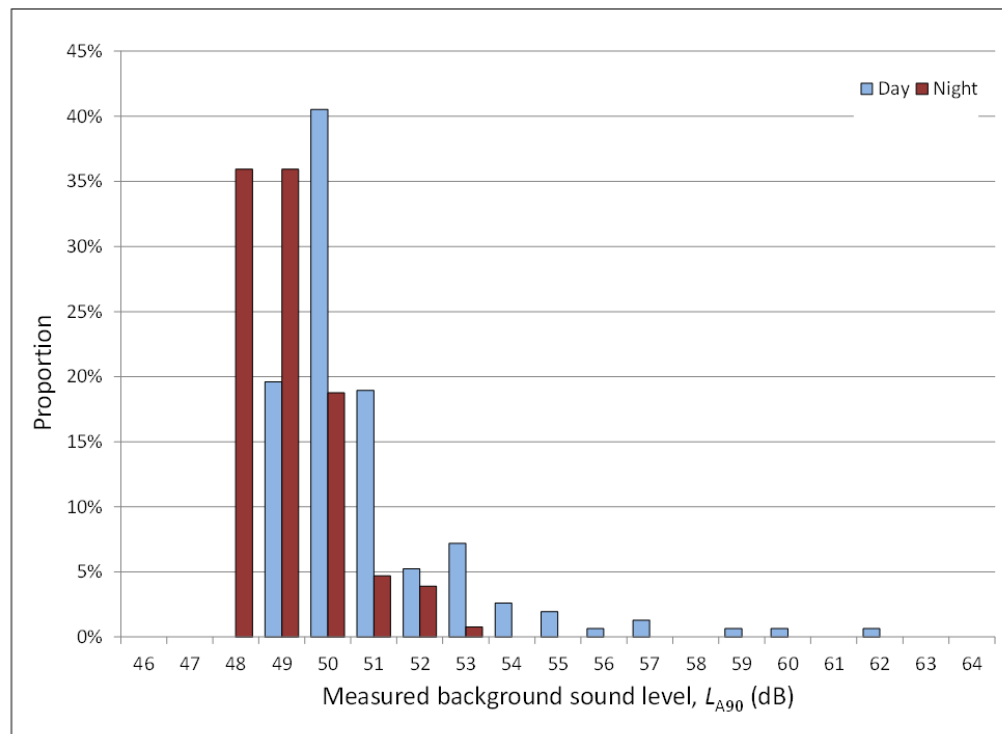


Figure 4 Statistical analysis of measured background sound levels (construction noise removed)

6 Plant noise egress

6.1 Limits

Based on the MCC criteria given in Section 4.4, and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 from the worst affected windows of the nearest noise sensitive premises should not exceed the limits presented in Table 2.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. In this case, these limits would apply at all locations identified in Section 2.2 during the day, and at Union Co-living Apartments and Old Granada Studios hotel during the night.

Table 2 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)
Day (07:00-19:00)	45
Night (23:00-07:00)	43

The limits set out do not include any attention catching features. Penalty corrections for attention catching features may be significant and will need to be considered as the building services design progresses. This is discussed in Appendix B.

6.2 Assessment

All building services plant will be designed to achieve the noise limits set out above, including any corrections for attention catching features. At this stage, no information is available in relation to the proposed plant. This will need to be assessed as the design progresses.

7 Patron noise egress

7.1 Noise egress from occupants of external seating areas

MCC does not stipulate any specific criteria in relation to noise egress associated with operational noise from the occupants of external amenity spaces. the *Noise and Planning Guidance* document dated October 2022 refers to the WHO *Guidelines for Community Noise* 1999.

The guideline values provided in the WHO guidelines for the impact of community noise on residential premises are given in Table 3.

Table 3 WHO guidelines for the impact of community noise

Specific environment	Health effect	Noise level
Outdoor living areas	Serious annoyance, daytime and evening	$L_{Aeq,16hr}$ 55 dB
	Moderate annoyance, daytime and evening	$L_{Aeq,16hr}$ 50 dB
Outside bedrooms	Sleep disturbance, window open	$L_{Aeq,8hr}$ 45 dB

Given that speech noise associated with the outdoor seating areas is only likely to occur during peak periods and not for the whole 16-hour time base given during the daytime (07:00 to 23:00), and that the existing ambient noise levels exceed those provided in the WHO guidelines, the health effects are likely to be less severe than those stated. Based on the

above, it is considered that an external noise level of $L_{Aeq,1hr}$ 55 dB between 07:00 – 20:00 hrs would be appropriate.

Comments on the application have been received from MCC with concern over the noise level during the evening between 20:00 – 23:00. To accommodate this, the noise levels are to be limited to $L_{Aeq,1hr}$ 50 dB during this evening period outside nearby noise sensitive receptors.

7.2 Assessment

Assessment of noise egress from patrons at the proposed development has been carried out. Typical numbers of patrons are based on the arrangements in the Pre-app document which have been confirmed by the developer as follows:

- 6 no. retail/ F&B containers with external seating for up to approximately 76 people.
- Small groups of up to 6 people standing and congregating outside each of the containers

Noise egress predictions are based up to half of the patrons speaking at once which is worst-case.

A sound pressure level of L_{Aeq} 60 dB at 1 m per person speaking (based on normal vocal effort levels as defined in ISO9921, at each set table and in each group in line with the arrangement given in Figure 5.

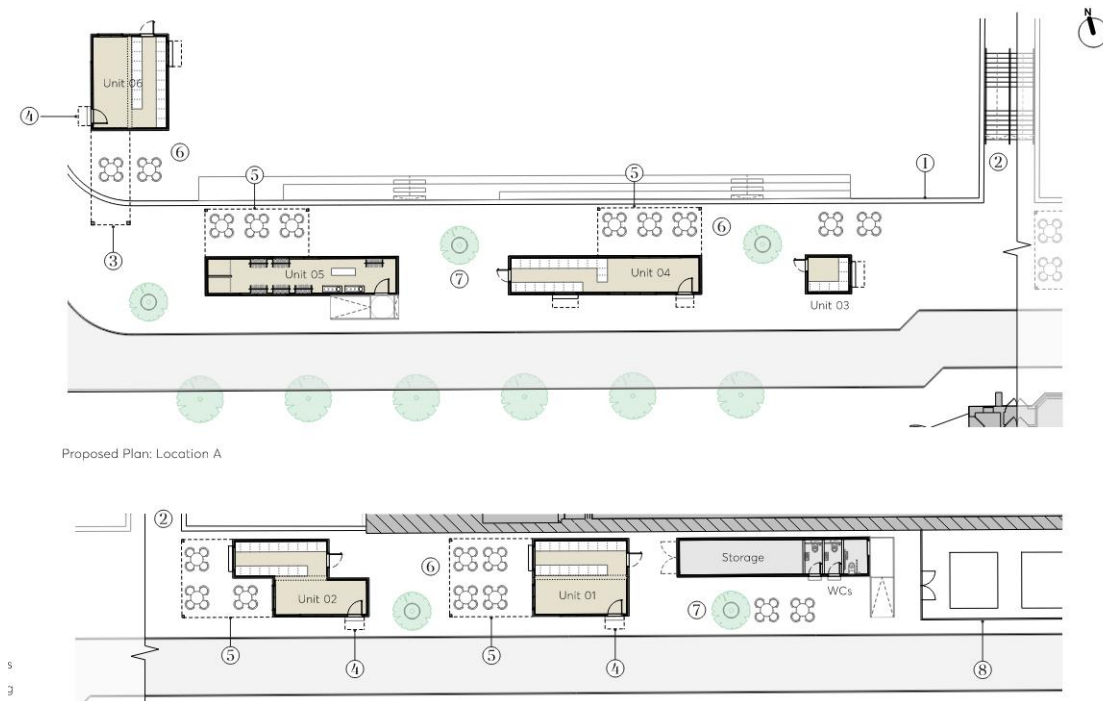


Figure 5 Indicative locations included in the assessment

The predicted noise levels at the nearby noise sensitive receptors due to patron noise within the external amenity areas are presented below:

- L_{Aeq} 42 dB at Old Granada Studios (office block)
- L_{Aeq} 43 dB at Manchester Goods Yard
- L_{Aeq} 48 dB at Bonded Warehouse
- L_{Aeq} 34 dB at Union Co-Living.

These are lower or in line with the recommended criterion of L_{Aeq} 55 dB applicable during the day and L_{Aeq} 50 dB during the evening and are lower the average ambient noise levels measured at the site during the day/evening periods.

To minimise the risk of noise disturbances occurring in practice due to the use of external seating areas, the following good practice mitigation measures are recommended:

- Use of external seating areas be limited to daytime only (0700-2300 hrs)
- No loud amplified music in the external seating areas.

8 Amplified sound egress

8.1 Limits

Based on the above criteria and the measurement results, the cumulative noise level from amplified sound should not exceed the limits set out below.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. In this case, these limits would apply at all noise sensitive locations identified during the day, and at Union Co-living Apartments and Old Granada Studios hotel during the night.

Table 4 Amplified sound egress limits at 1 m from the nearest noise sensitive premises

Time of day	Amplified sound egress limits at 1 m from noise sensitive premises, $L_{eq,5min}$ (dB)							
	Octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	dBA
Day (07:00-23:00)	51	44	45	43	41	35	27	45
Night (23:00-07:00)	49	42	43	41	39	33	25	43

8.2 Assessment

Outline assessment of the container structures has been undertaken to assess the maximum internal limits for background music to achieve the criteria given in Section 4. The following assumptions have been made.

- That the proposed structures will have all doors/hatches/windows which may be open for means of serving customers and ventilation.
- Amplified music is only played within the structures with no external speaker systems.
- Usage limited to be during the day only (0700-2300 hrs).

The limits are provided for guidance only as in practice, there will be some variation in background noise levels within the containers. If amplified music is desired in practice, exact amplified noise limits should be determined via in-situ testing along with the setting of electronic limiters.

Table 5 Guideline maximum internal amplified sound limits

	Octave-band centre frequency (Hz)							dBA
	63	125	250	500	1000	2000	4000	
Guideline maximum internal noise limits, L_{eq} (dB)	63	56	57	55	53	47	39	57

The above limits would be suitable for low-level background music only (L_{Aeq} 57 dB) within the F&B containers during the day. The limits are driven by noise egress towards the adjacent office building (Bonded Warehouse).

9 Deliveries/collections

To minimise the risk of noise disturbance to nearby noise sensitive receptors, it is recommended that all deliveries, collection and servicing associated with the proposed development be limited to be during the day only (0700 to 2300 hrs).

10 Conclusion

The representative background sound levels from the noise survey were L_{A90} 50 dB during the day, and L_{A90} 48 dB during the night.

Based on the requirements of the Local Authority, the relevant plant noise limits at the worst affected existing noise sensitive premises are L_{Aeq} 45 dB during the day, and L_{Aeq} 43 dB during the night. These limits are cumulative and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied.

External limits for entertainment noise egress have been set outside nearby noise sensitive premises in line with the requirements of Manchester City Council.

Outline assessments of patron noise egress and entertainment noise egress have been undertaken. Guidance on internal limits for background music within the units has been provided.

Appendix A

Survey details

Equipment

The unattended and attended noise measurements were taken using Rion NL-52 sound level meters

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
<i>Unattended measurements</i>				
Sound level meter	NL-52/01143564	Rion	15 Dec 24	TCRT22/1766
Microphone	UC-59/10153	Rion	15 Dec 24	TCRT22/1766
Pre-amp	NH-25/43581	Rion	15 Dec 24	TCRT22/1766
Calibrator	NC-74/34257023	Rion	15 Dec 24	TCRT22/1765
<i>Attended measurements</i>				
Sound level meter	NL-52/00932326	Rion	9 Aug 25	TCRT23/1580
Microphone	UC-59/05549	Rion	9 Aug 25	TCRT23/1580
Pre-amp	NH-25/32354	Rion	9 Aug 25	TCRT23/1580
Calibrator	NC-74/34125432	Rion	9 Aug 25	TCRT23/1576

[1] Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

Weather conditions

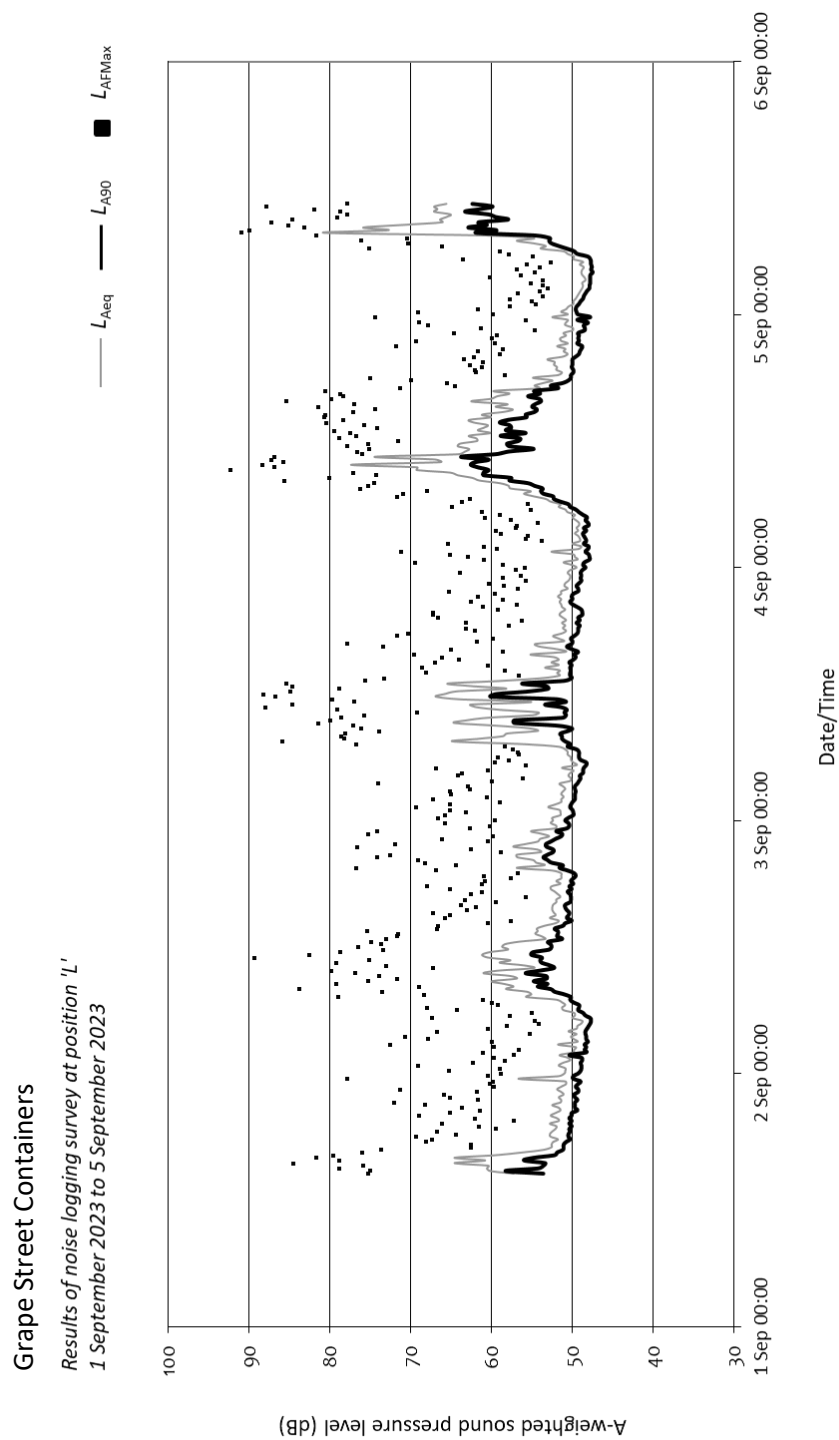
During the attended noise measurements, the weather was generally clear and dry and no rain occurred.

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 10°C at night and 27°C during the day, and the wind speed was less than 5 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location 'L'



Appendix C

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible.

For noise which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.