SANDY BROWN

Consultants in Acoustics, Noise & Vibration

023690-R01-C

20 December 2023

The Stables, Bonded Warehouse

Acoustic planning report

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

post@sandybrown.com
www.sandybrown.com

Sandy Brown Ltd
Registered in England & Wales No. 13227735

Registered Office: 55 Charterhouse Street, London EC1M 6HA

Version	Date	Comments	Author	Reviewer
A	14 Sep 23		Skylar Clark	Matthew Robinson
B	19 Sep 23	Minor updates	Skylar Clark	Matthew Robinson
C	20 Dec 23	Updates to operational and courtyard noise egress assessments	Skylar Clark	James Atha

Disclaimer

This report has been prepared for the sole benefit and use of our client based on their instructions and requirements. Sandy Brown Ltd extends no liability in respect of the information contained in the report to any third party.

Summary

Sandy Brown has been commissioned by All Work and Social Bonded Ltd to provide acoustic advice in relation to the proposed development at The Stables, Bonded Warehouse.

An environmental noise survey has been carried out to determine the existing sound levels in the area. 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 on 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.

These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

An initial assessment of the proposed plant items associated with the development has been carried out. The proposed plant items are expected to comply with the relevant noise limits.

Based on the requirements of the Local Authority, the external operational 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. Guidance on internal operational noise limits have been set on this basis, and would allow for typical background music during the day and typical function music (pre-recorded music/DJs) at night.

An assessment of noise egress from courtyard occupants has been carried out. The predicted noise egress levels at the worst affected residential noise sensitive receptor meets the suggested criteria during the day and night, and is significantly lower than the existing measured background sound levels.

Contents

1 Introduction 5
2 Site description 5
3 Development proposals 6
4 Assessment criteria 6
5 Noise survey method 7
6 Noise survey results 9
7 Plant noise egress 11
8 Operational noise egress 14
9 Conclusion 16
Appendix A 17
Survey details 17
Appendix B 20
Results of unattended measurements at Location 'L' 20
Appendix C 22
BS 4142 corrections for attention catching features 22

1 Introduction

Sandy Brown has been commissioned by All Work and Social Bonded Ltd to provide acoustic advice in relation to the proposed development at The Stable, Bonded Warehouse.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant and amplified sound.

This report presents the survey method and results, and a discussion of acceptable limits for noise emissions from building services plant and operational sound egress.

2 Site description

2.1 The site and its surroundings

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

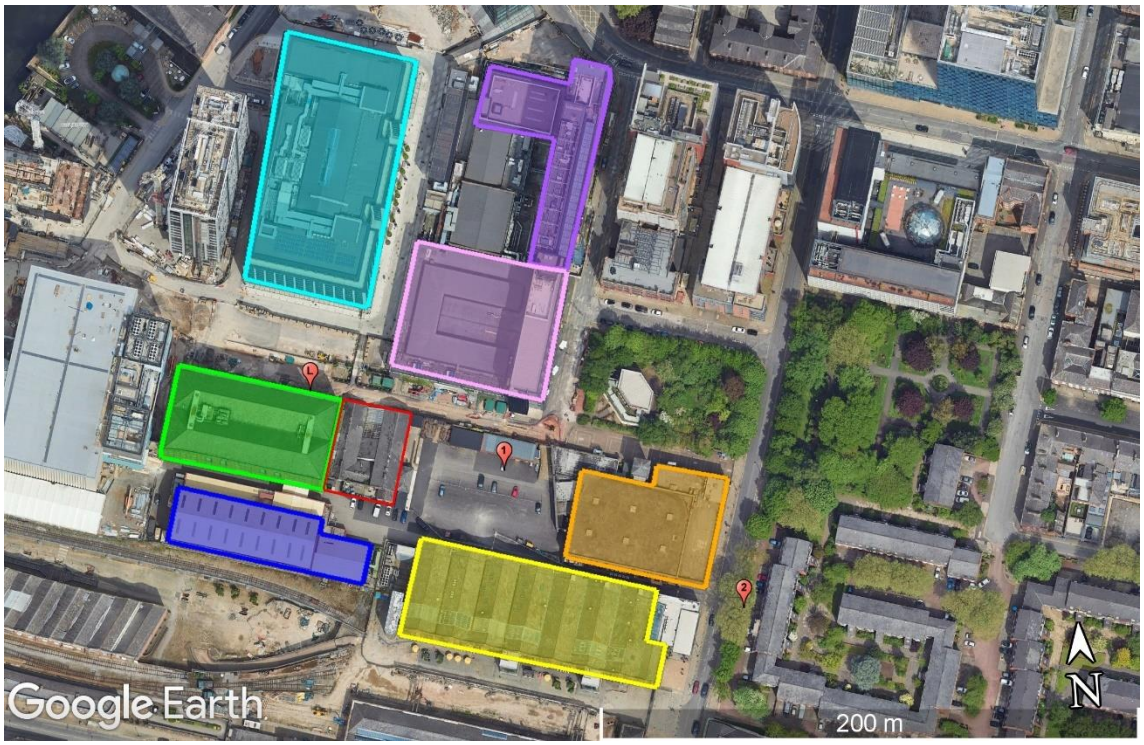


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

The site is bounded by a private road to the south, an in-construction road to the north, Bonded Warehouse to the west and a carpark to the east.

2.2 Adjacent premises

The site is adjacent to the following premises:

- Old Granada Studios – offices (current), Hotel (future), highlighted in purple in Figure 1.
- Old Granada Studios – offices/studio space, highlighted in pink in Figure 1
- Manchester Goods Yard – offices , highlighted in cyan in Figure 1.
- Bonded Warehouse – offices, highlighted in green in Figure 1.
- Studio 1 – studios/offices, highlighted in orange in Figure 1.
- Science and Industry Museum - commercial, highlighted in yellow in Figure 1.
- The Crystal Maze – commercial, highlighted in blue in Figure 1.

3 Development proposals

The proposed development comprises a change of use, refurbishment and alteration of the existing Old Granada Studios' Rovers Return pub, to a new bar/restaurant space including new toilet provisions and kitchen facilities.

External plant items associated with the new development include 2 x external condensing units located adjacent to the south facade.

4 Assessment criteria

4.1 Building services 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.'*

4.2 Operational 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.'*

4.3 Noise egress from courtyard occupants

MCC do not stipulate any specific criteria in relation to noise egress associated with operational noise from the occupants of external amenity spaces. However 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 is given in Table 1.

Table 1 WHO guidelines for impact from community noise

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

Though not strictly deemed to be residential premises, application of these noise thresholds as criteria outside the proposed Hotel development at Old Granada Studios is considered to be appropriate.

5 Noise survey method

The survey included unattended and attended noise measurements.

5.1 Unattended measurements

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.

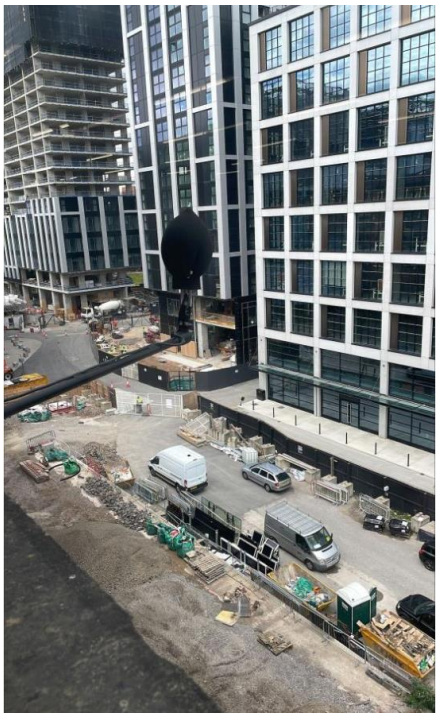


Figure 2 Photograph of unattended logger position

5.2 Attended measurements

Attended sample measurements were taken at 2 locations around the site. These are indicated in Figure 1 as positions 1 to 2. The attended measurements were carried out on 5 September 2023, over 15 minute periods.

At each position the microphone was mounted on a tripod approximately 1.2 m above the ground level and at least 2 m from any other reflective surface. Details of the equipment used and the noise indices measured are provided in Appendix A.

Dominant noise sources occurring during the measurements were noted.

5.3 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Noise survey results

6.1 Observations

The dominant noise sources observed at the site during the survey were from 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.

6.2 Noise measurement results

6.2.1 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 2. These measurements are facade measurements.

Table 2 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 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 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.

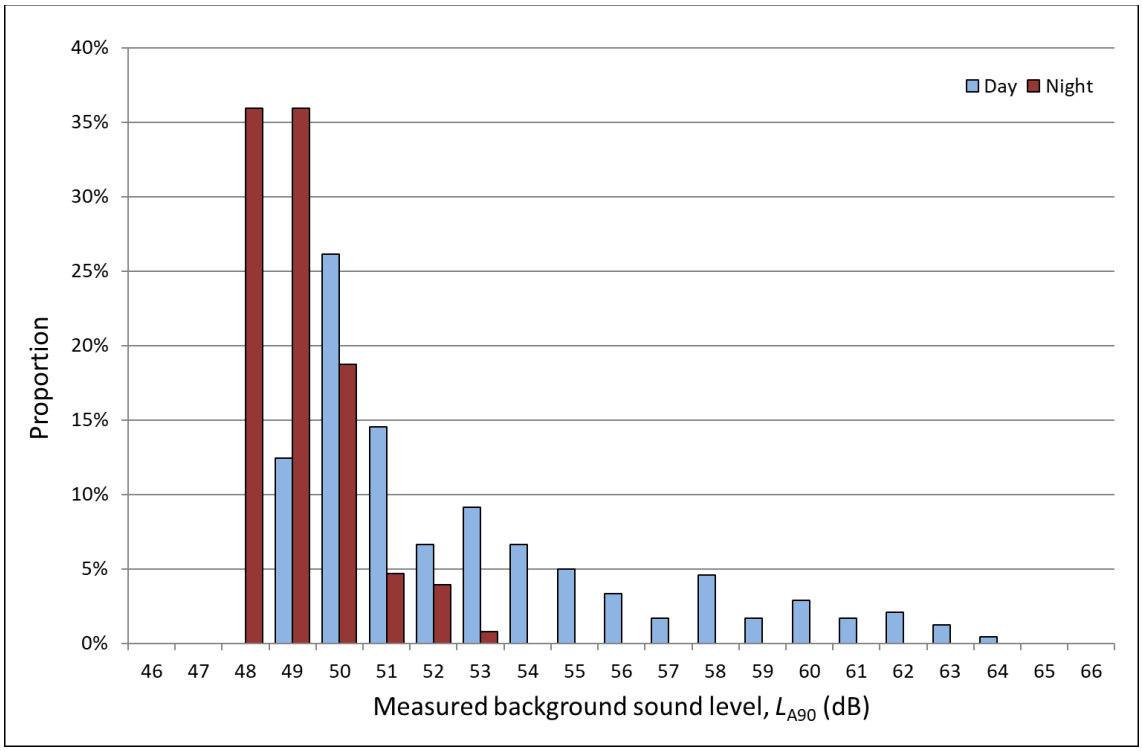


Figure 3 Statistical analysis of measured background sound levels

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. Based on the statistical analysis of background sound pressure levels during the night, it is likely that the dominant noise source during this period was plant noise from nearby developments.

6.2.2 Attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 3. These measurements are free-field.

Table 3 Noise levels and key noise sources from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$	
1	11:51	52	62	50	Dominated by construction noise from Manchester Goods Yardand nearby developments. Secondary sources included faint plant noise from Science and Industry museum
	11:56	52	63	50	
	12:02	52	60	51	
2	11:38	66	81	54	Dominated by road traffic from Lower Byrom Street. Regular bus passes via bus-route adjacent.
	12:11	64	78	53	
	12:16	67	83	54	

7 Plant noise egress

7.1 Plant noise egress limits

Based on the above criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 4.

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 Old Granada Studios during the night.

Table 4 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 (07:00-23:00)	45
Night (23:00-07:00)	43

[1] The limits set out in Table 4 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 C.

7.2 Plant noise assessment

7.2.1 Proposed plant items

2 x Daikin AZAS100MV1 Condenser units are proposed externally at ground level. The proposed location of these units is shown in Figure 4.

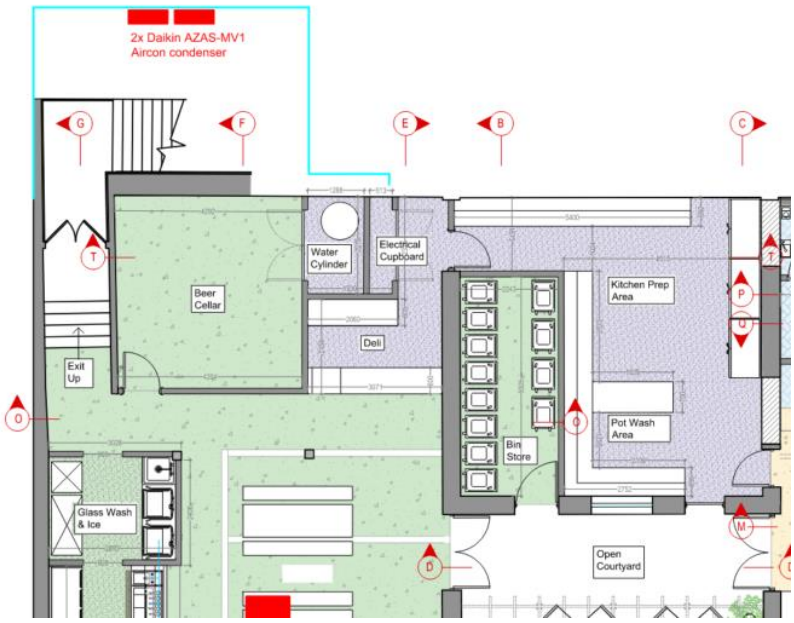


Figure 4 Proposed location of Daikin condenser units

The provided noise data for the proposed units is summarised in Table 5. The plant is assumed to operate 24 hours a day as a worst-case scenario, and the results reflect this assumption.

Table 5 Noise data provided for proposed plant items

	Sound power level, L_w (dB) Octave-band centre frequency (Hz)							
Item	63	125	250	500	1000	2000	4000	8000
Daikin AZAS100MV1	78	72	72	69	66	56	53	47

7.2.2 Assessment

An assessment of predicted plant noise egress levels to nearby noise sensitive receptors has been undertaken. The assessment includes distance and screening attenuation, where applicable. The assessment is based on one reflective surface at the source position, and include a + 3 dB correction for facade reflections.

A summary of the results from the plant noise egress assessment is given in Table 6.

The plant noise egress calculations are presented in Appendix D

Table 6 Predicted plant noise egress levels at nearest noise sensitive premises

Location	Predicted plant noise egress level, L_{Aeq} (dB)
Bonded Warehouse	42
The Crystal Maze	43
Science and Industry Museum	40
Old Granada Studios (Offices)	28
Old Granada Studios (Hotel)	16
Studio 1	32
Mancheser Goods Yard	14

The predicted plant noise egress level meets the limits at all nearby noise sensitive premises during the day and night.

As the limits are below the representative background sound level, attention catching features such as tonality or intermittency would not be perceived. As such no additional corrections are required.

8 Operational noise egress

8.1 Operational noise egress limits

Based on the above criteria and the measurement results, the cumulative noise level from amplified sound should not exceed the limits set out in Table 4.

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 Old Granada Studios during the night.

Table 7 Entertainment noise limits at 1 m from the nearest noise sensitive premises

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

These are equivalent to $L_{Aeq,5min}$ 45 dB during the day and $L_{Aeq,5min}$ 43 dB at night.

8.2 Operational noise egress assessment

Internal operational noise limits for the bar and restaurant spaces have been established based on the proposed layouts, and external noise egress limits outlined in Table 7.

The assessment has been based on the following information:

- Non-glazed sections of the facade are to have a thickness of 350 mm (as scaled from drawing 002- Proposed GA Plan) and are brick-built as per the approach used on Bonded Warehouse.
- Standard thermal double glazing is proposed for glazed sections of the facades. Assumed sound insulation performance of R'_w+C_{tr} 28 dB.
- Open doors as a worst-case scenario.

Guidance on internal operational noise limits is provided in Table 8.

Table 8 Maximum internal operational noise limits

Space	Maximum internal operational noise limit, $L_{eq,5min}$ (dB) Octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Wolfgang Bar								
Day (07:00-23:00)	69	68	70	68	66	60	52	52
Night (23:00-07:00)	80	85	85	80	80	75	75	75
Maria's								
Day (07:00-23:00)	69	69	68	68	66	60	52	80
Night (23:00-07:00)	80	85	85	80	80	75	75	75

The limits set out in Table 8 would be suitable for limited background music during the day, and amplified function music (ie pre-recorded music/DJs) at night, and are to be controlled using electronic limiters during operation. Noise levels for specific commercial activities proposed would need to be checked against these limits.

If noise levels greater than those in Table 8 are desired, external doors would required to be locked off during operational hours.

Planning condition 11b requires a verification report to be issued to validate that the work undertaken throughout the development conforms to the recommendations and requirements in this report. The report shall also undertake post completion testing to confirm that acceptable criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Use of a noise limiter has been specified within the operational management strategy.

8.3 Noise egress from courtyard occupants

Noise modelling has been carried out to determine the potential impact of occupants of the courtyards speaking upon the worst affected dwellings. Calculations which take into account effects from distance and screening have been undertaken to assess the impact of the noise egress.

Noise calculations have been carried out with a total of 74 people on the courtyard, based on the seating numbers in the general arrangement plans.

The calculations assume half of the people are talking simultaneously, of which 20% are talking with raised voices. Normal levels for speech of L_{Aeq} 60 dB at 1 m and raised voices of L_{Aeq} 66 dB at 1 m have been used in the assessment, as defined in ISO 9921.

Predicted noise levels from occupants of the courtyard area to the hotel at OGS is L_{Aeq} 40 dB, which is within the suggested noise criteria.

The predicted level is also significantly lower than the existing daytime background noise levels measured during the survey.

9 Conclusion

The representative background sound levels from the noise survey were $L_{A90,15min}$ 50 dB during the day, and $L_{A90,15min}$ 48 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.

An initial assessment of the proposed plant items associated with the development has been carried out. The proposed plant items are expected to comply with the relevant noise limits.

Based on the requirements of the Local Authority, the external operational 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. Internal operational noise limits have been set on this basis, and would allow for typical background music during the day and typical function music (pre-recorded music/DJs) at night

An assessment of noise egress from courtyard occupants has been carried out. The predicted noise egress levels at the worst affected residential noise sensitive receptor meets the suggested criteria during the daytime and night, and is significantly lower than the existing measured background sound levels.

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
Unattended measurements				
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
Attended measurements				
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

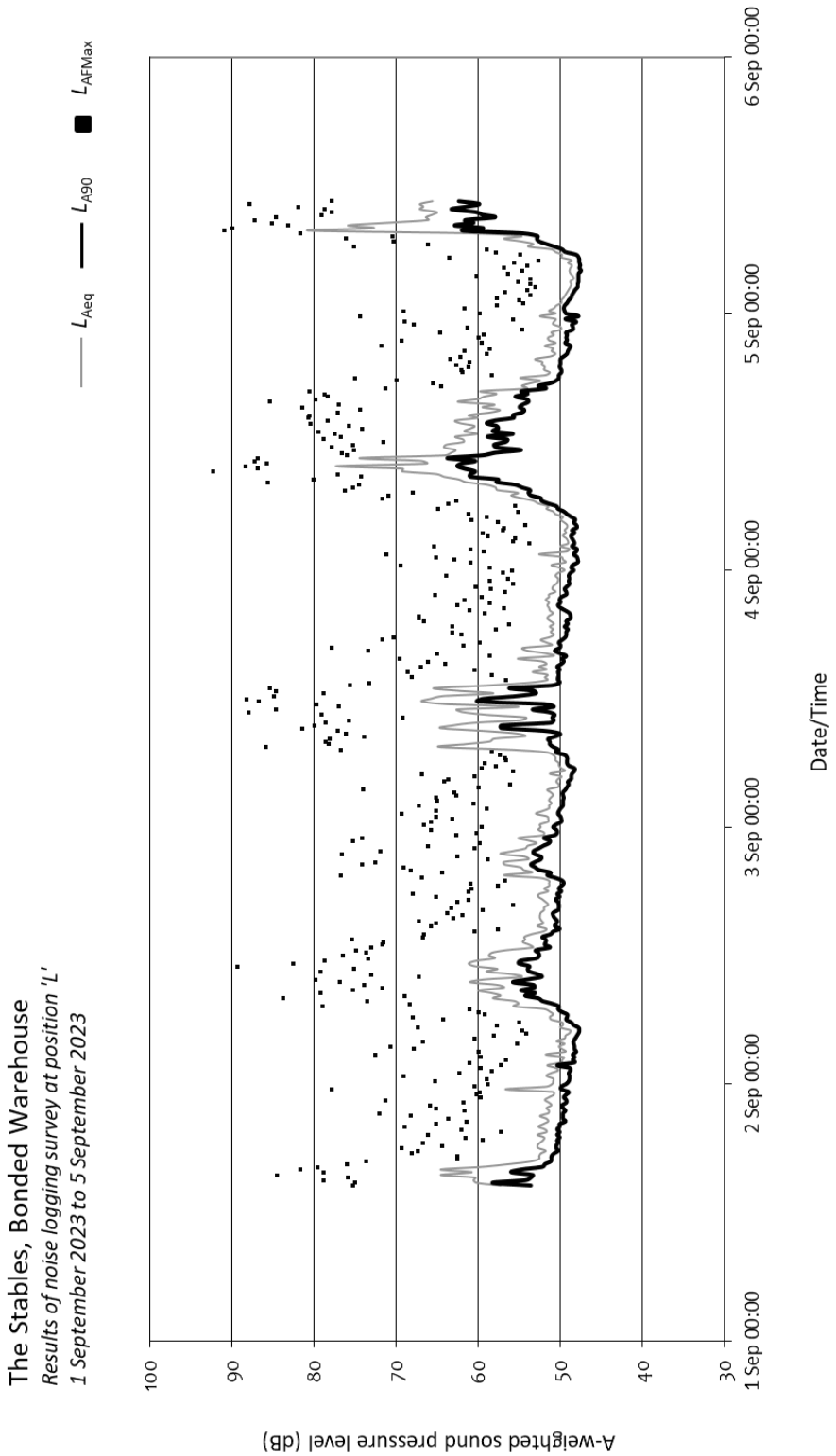
During the attended noise measurements, the weather was generally clear and dry and no rain occurred.

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'


The Stables, Bonded Warehouse
Results of noise logging survey at position 'L'
1 September 2023 to 5 September 2023
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
1 Sep 00:00
2 Sep 00:00
3 Sep 00:00
4 Sep 00:00
5 Sep 00:00
6 Sep 00:00
Date/Time

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.

Appendix D

Plant noise egress calculations

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for bonded warehouse - day		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=21.6m	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	
Total losses	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	
Sound pressure level after losses	46	40	40	37	34	24	21	15	39
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	49	43	43	40	37	27	24	18	42

Criteria	
Criteria - Daytime	45
Difference	-3

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for Crystal Maze - day		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=18.19m	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	
Total losses	*36*	*36*	*36*	*36*	*36*	*36*	*36*	*36*	
Sound pressure level after losses	48	42	42	39	36	26	23	17	40
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	51	45	45	42	39	29	26	20	43

Criteria	
Criteria - Daytime	45
Difference	-2

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for Science and Industry Museum - day		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=27.6m	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	
Total losses	*40*	*40*	*40*	*40*	*40*	*40*	*40*	*40*	
Sound pressure level after losses	44	38	38	35	32	22	19	13	37
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	47	41	41	38	35	25	22	16	40

Criteria	
Criteria - Daytime	45
Difference	-5

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for Old Granada Studios - Offices, day		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=18m	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	
Screening loss - Path difference = 0.638m	8.2	10.2	12.8	15.7	18.7	21.7	24.0	24.0	
Total losses	*44*	*46*	*49*	*52*	*55*	*58*	*60*	*60*	
Sound pressure level after losses	40	32	29	23	17	4	-1	-7	25
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	43	35	32	26	20	7	2	-4	28

Criteria	
Criteria - Daytime	45
Difference	-17

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for Old Granada Studios - Hotel, night		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=75m	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	
Screening loss - Path difference = 0.638m	8.2	10.2	12.8	15.7	18.7	21.7	24.0	24.0	
Total losses	*57*	*59*	*61*	*64*	*67*	*70*	*73*	*73*	
Sound pressure level after losses	27	19	17	11	5	-8	-13	-19	13
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	30	22	20	14	8	-5	-10	-16	16

Criteria	
Criteria - Night time	43
Difference	-27

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for Studio 1 - Day		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=65.9m	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
Total losses	*47*	*47*	*47*	*47*	*47*	*47*	*47*	*47*	
Sound pressure level after losses	37	31	31	28	25	15	12	6	29
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	40	34	34	31	28	18	15	9	32

Criteria	
Criteria - Daytime	45
Difference	-13

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project number	023690	**Project name**	The Stables
Calculation revision			
Calculation by	JP	**Date created**	12/09/2023
Checked by	JA	**Date checked**	20/12/2023
Calculation description	Calculation for Manchester Goods Yard - Day		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
AZAS100MV1									
Sound power level (indicative spectrum)	78	72	72	69	66	56	53	47	71
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 2	3	3	3	3	3	3	3	3	
Total sound power level	84	78	78	75	72	62	59	53	77
Losses									
Distance attenuation - Point source, r=75.9m	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	
Screening loss - Path difference = 1.039m	9.6	12.0	14.8	17.8	20.8	23.8	24.0	24.0	
Total losses	*58*	*61*	*63*	*66*	*69*	*72*	*73*	*73*	
Sound pressure level after losses	26	17	15	9	3	-10	-14	-20	11
Facade correction	3	3	3	3	3	3	3	3	
Total facade sound pressure level at receptor	29	20	18	12	6	-7	-11	-17	14

Criteria	
Criteria - Daytime	45
Difference	-31