SANDY BROWN

Consultants in Acoustics, Noise & Vibration

026813-R01-C

6 January 2026

Balloon Street, Manchester

Noise planning report

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Version	Date	Comments	Author	Reviewer
A	24 Nov 25		JP	JA
B	27 Nov 25	Minor updates	JP	JA
C	6 Jan 26	Minor amendments to Table 6 and appending plant noise calculations	JP	JA

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Summary

Sandy Brown has been appointed by Wittingham Investments (properties) Limited to provide acoustic advice in relation to the design of new external chiller compound at 1 Balloon St, Manchester M4 4BE. Two new external chillers are proposed.

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. The representative background sound levels measured during the survey were $L_{A90,15min}$ 59 dB during the day and $L_{A90,15min}$ 56 dB at night.

Based on the requirements of Manchester City Council and on the results of the environmental noise survey, the new plant installation must be designed such that the cumulative noise levels at 1 m from the worst affected window of the nearest noise sensitive premises are controlled to be at least 5 dB below the measured background level. The 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.

This report presents the survey method and results, a discussion of acceptable limits for noise emissions from building services plant and an assessment of noise egress associated with the new chiller units. Calculations undertaken as part of this assessment are provided in Appendix C.

The proposed chiller units are predicted to comply with required noise egress criteria without additional acoustic mitigation.

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1 Introduction

Sandy Brown has been appointed by Wittingham Investments (properties) Limited to provide acoustic advice in relation to the design of new external chiller compound at 1 Balloon St, Manchester M4 4BE. Two new external chillers are proposed.

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.

This report presents the survey method and results, a discussion of acceptable limits for noise emissions from building services plant and an assessment of plant noise egress based on received plant selections.

2 Site description

The site location in relation to its surroundings is outlined in red in Figure 1

The site is bounded by Corporation Street to the west, Balloon Street to the north and Printworks to the south and east of the development.

Balloon street is used solely for tram services and is located directly adjacent to the site.

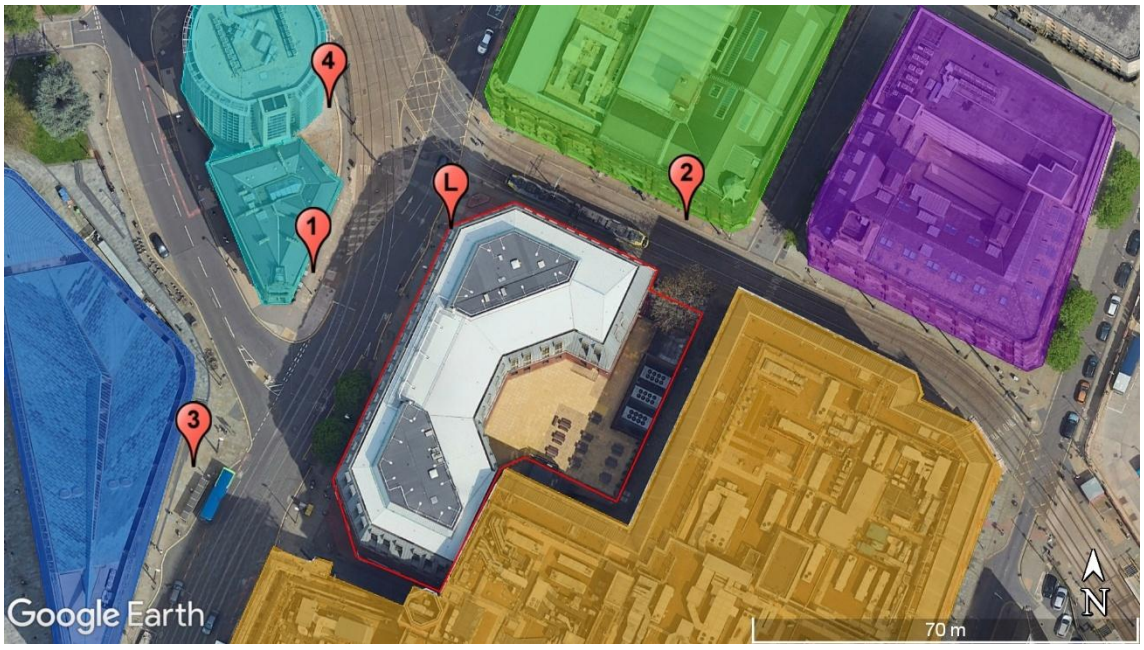


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

2.1 Adjacent premises

The nearest noise sensitive premises are summarised below with respect to mark-ups shown in Figure 1, and site boundary outlined in red.

- Hotel Indigo on Corporation Street, approximately 20 m from the site boundary to the west, highlighted in cyan
- Commercial premises located at Hanover House along Balloon Street, approximately 10 m from the site boundary to the north, highlighted in green
- National Football Museum along Corporation Street, approximately 25 m from the site boundary to the west, highlighted in blue.
- Printworks (retail and leisure) located along Balloon Street, approximately 15 m from the site boundary to the east and south highlighted in orange.
- Commercial premises located at 2 Federation Street, approximately 30 m from the northeast site boundary, highlighted in purple.

It should be noted that the Printworks premises is not considered to be noise sensitive due to the facade consisting of solid masonry with no windows overlooking the plant area.

3 Development proposals

A new external chiller compound is proposed at 1 Balloon St, Manchester M4 4BE. Two new external chillers are proposed.

There is also one existing chiller within the compound area which is to be retained which belongs to the ground floor tenants (Cooperative Retail Unit) but noise associated with this is outside the scope of the assessment.

4 Building services noise egress criteria

4.1 Standard guidance

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 nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more 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 sound level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

4.1 Local Authority criteria

Manchester City Council (MCC) provides guidance in relation to plant noise emissions in Planning and Noise Technical Guidance document dated October 2022 states the following in relation to plant noise egress:

> *'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'*

Corrections for tonal or attention catching characteristics would need to be applied to the rating level in accordance with BS4142: 2014.

5 Noise survey method

The survey included unattended and attended noise measurements.

The measurements and information provided in this report are in accordance with requirements of BS 7445, as referenced in Appendix A.

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

5.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 6 days.

Measurements were taken over 15 minute periods between 11:35 on 13 November 2025 and 13:35 on 19 November 2025. The microphone for the sound level meter was installed on a tripod which was mounted to a pole extended approximately 1 m out of a partially open window on level 3 on the northwest facade.

The measurement position is indicated in Figure 1, denoted by the letter 'L', and a photograph showing the measurement position 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.

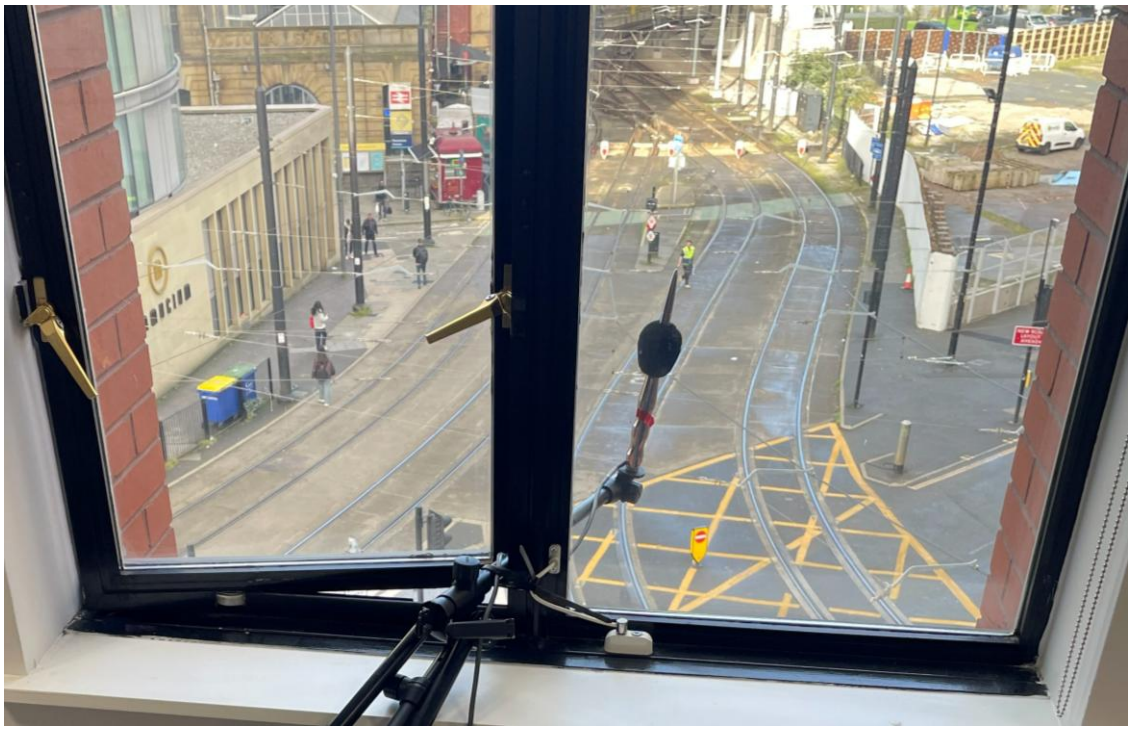


Figure 2 Photo of unattended measurement position

The unattended logger was securely anchored to the partially open window using weighted chains, padlocks and zip ties to ensure the meter was fastened tightly.

5.2 Attended measurements

Attended sample measurements were taken at 4 positions around the site. These are indicated in Figure 1, as positions 1 to 4. The measurements were carried out on 9 September 2025. All attended measurements were 3 x 5 minutes in duration. These measurements were carried out to determine the existing facade noise levels which can be used to assess environmental noise ingress to the building as part of the design development.

At each position the microphone was mounted on a tripod approximately 1.5 m above the ground level and approximately 1 m from any other reflective surface. Dominant noise sources occurring during the measurements were noted. Photographs of the measurement positions are shown in Figure 3.



Figure 3 Photographs of attended measurement positions 1 to 4 (top left to bottom right)

5.3 Weather conditions

Weather conditions during the survey are described in Appendix A.

Based on weather reports, some adverse weather occurred during the survey with wind speeds in the region of 10 m /s between 12:00 and 00:00 on Friday 14 November. This data has been excluded from the subsequent noise survey analysis.

6 Noise survey results

6.1 Observations

The dominant noise sources noted observed at the site during attended measurements were traffic along corporation street and tram noise from the Metrolink lines located on both Corporation Street and Balloon Street.

Less significant sources included distant train noise from Victoria Railway Station and distant plant noise from nearby commercial buildings.

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 1.

Table 1 Ambient noise levels measured during the unattended survey

Date	Day (07:00 - 23:00) $L_{Aeq,\ 16\ hour}$ (dB)	Night (23:00 - 07:00) $L_{Aeq,\ 8\ hour}$ (dB)
Thursday 13 November 2025	67[1]	63
Friday 14 November 2025	68[2]	63
Saturday 15 November 2025	69	64
Sunday 16 November 2025	67	64
Monday 17 November 2025	69	62
Tuesday 18 November 2025	69	63
Wednesday 19 November 2025	68[1]	

[1] Measurement not made over full period due to logger start and end time (the measurement on 13 November 2025 was over 11.5 hours, and on 19 November 2025 over 6 hours).

[2] Measurement not made over full period due to adverse weather conditions

Measured minimum background sound levels are given in Table 2.

Table 2 Minimum background sound levels measured during the unattended survey

Date	Day (07:00 - 23:00) $L_{A90,15min}$ (dB)	Night (23:00 - 07:00) $L_{A90,15min}$ (dB)
Thursday 13 November 2025	58[1]	56
Friday 14 November 2025	56[2]	56
Saturday 15 November 2025	58	56
Sunday 16 November 2025	57	56
Monday 17 November 2025	58	56
Tuesday 18 November 2025	58	56
Wednesday 19 November 2025	60[1]	-

[1] Measurement not made over full period due to logger start and end time (the measurement on 13 November 2025 was over 11.5 hours, and on 19 November 2025 over 6 hours).

[2] Measurement not made over full period due to adverse weather conditions

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 4.

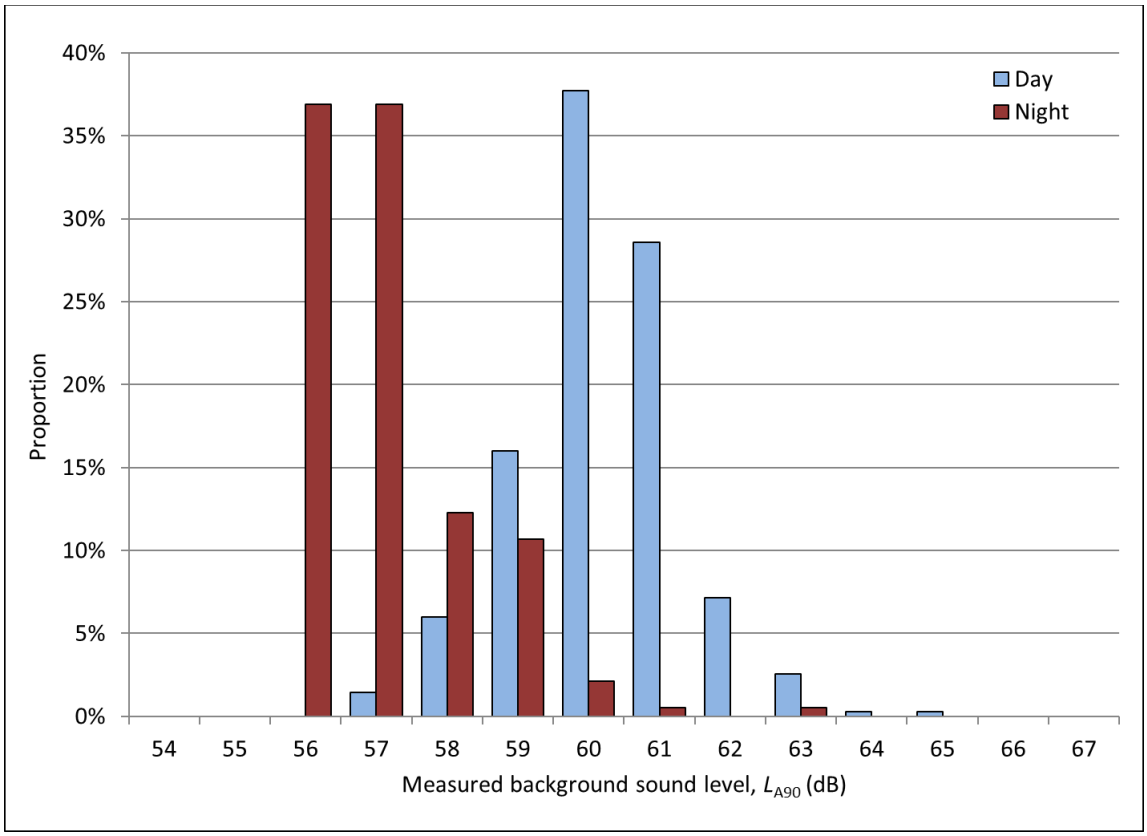


Figure 4 Statistical analysis of background sound levels

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 59 dB during the day and $L_{A90,15min}$ 56 dB at night.

6.2.2 Attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 3. Attended measurements were carried out at 1 m from a reflective surface and considered to be facade noise measurements.

Table 3 Attended noise measurement results

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$	
1	12:30	69	89	60	Dominant noise sources noted on-site were caused by trams passing nearby the measurement position and traffic noise egress along Corporation Street.
	12:35	70	85	61	
	12:40	67	80	59	
2	11:50	71	90	61	Dominant noise source noted on-site were caused by trams passing nearby the measurement position. Less significant noise sources included plant noise egress from nearby commercial premises
	11:55	72	92	61	
	12:00	72	90	61	
3	12:50	67	81	60	Dominant noise sources noted on-site were caused by trams passing nearby the measurement position and traffic noise egress along Corporation Street.
	12:55	68	90	60	
	13:00	65	77	59	
4	12:10	68	86	58	Dominant noise sources noted on-site were caused by trams passing nearby the measurement position and traffic noise egress along Corporation Street.
	12:15	68	82	58	
	12:20	68	90	59	

7 Plant noise egress assessment

7.1 Plant noise limits

Based on the above criteria and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from the worst affected windows of the nearest noise sensitive premises should not exceed the limits set out in Table 4.

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)	54
Night (23:00-07:00)	51

The plant noise egress levels should not contain any attention catching features with reference to BS4142.

7.2 Proposed plant items

The proposed chiller compound location and the existing chillers are shown in Figure 5, highlighted in yellow and red, respectively. Two new external chillers are proposed. One existing chiller belonging to ground floor tenants (Cooperative Retail Unit) is to be retained but this is outside the scope of this assessment.



Figure 5 Proposed chiller compound location (yellow) and existing chillers (red)

The noise data provided for the proposed chiller units is set out in Table 5

It has been not yet been confirmed if the new chiller units are to be switched off at night. The predicted chiller noise egress levels at night at the nearby residential receiver have been calculated on the basis that both new chillers are operational.

Table 5 Noise data for proposed chiller units

Plant item	Sound pressure level at 1 m, L_p (dB) Octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Daikin EWAH505TZBSD1	82	72	72	73	70	62	62	54

7.3 Predicted noise egress levels and assessment

An assessment has been undertaken to predict the plant noise egress levels for the new chillers at the nearby noise sensitive receptors. The calculations are provided in Appendix C and include losses due to geometry as well as distance attenuation and screening.

Based on the information outlined above, the predicted chiller noise egress levels are detailed in Table 6 along with the noise criteria.

Table 6 Plant noise egress assessment results

NSP location	Day criterion (07:00-23:00), L_{Aeq} (dB)	Predicted chiller noise level (day 07:00-23:00), L_{Aeq} (dB)	Night criterion (23:00-07:00), L_{Aeq} (dB)	Predicted chiller level (night 23:00-07:00) L_{Aeq} (dB)
Commercial premises (Hanover House)	54	54	-	-
Commercial premises (2 Federation Street)	54	50	-	-
Hotel Indigo	54	42	51	42
National Football Museum	54	39	-	-

The proposed chiller units are predicted to comply with noise egress criteria without additional acoustic mitigation. This is on the basis that the plant noise does not contain any attention catching characteristics with reference to BS4142.

8 Conclusion

Sandy Brown has been appointed by Wittingham Investments (properties) Limited to provide acoustic advice in relation to the design of new external chiller compound at 1 Balloon St, Manchester M4 4BE. Two new external chillers are proposed.

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.

The representative background sound levels measured during the survey were $L_{A90,15min}$ 59 dB during the day and $L_{A90,15min}$ 56 dB at night.

Based on the requirements of Manchester City Council and on the results of the environmental noise survey, the new chillers must be designed such that the cumulative noise levels at 1 m from the worst affected window of the nearest noise sensitive premises should be designed 5 dB below the measured background level. The 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.

This report presents the survey method and results, a discussion of acceptable limits for noise emissions from building services plant and an assessment of plant noise egress based on received plant selections.

Based on the calculations undertaken, the proposed chiller units are predicted to comply with plant noise egress criteria. These calculations are provided in Appendix C.

Appendix A

Survey details

Reference standards

- BS 7445 Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*
- BS 7445: Part 2: 1991 *Description and measurement of environmental noise, Part 2. Guide to the acquisition of data pertinent to land use*.

Equipment

The unattended and attended noise measurements were taken using a Rion NL-52 and 01dB Cube sound level meter.

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
Sound level meter	NL-52/00932326	Rion	24 Apr 26	TCRT23/1806
Microphone	UC-59/09251	Rion	24 Apr 26	TCRT23/1806
Pre-amp	NH-25/32354	Rion	24 Apr 26	TCRT23/1806
Calibrator	NC-74/34536129	Rion	24 Apr 26	TCRT23/1576
Sound level meter	CUBE/11128	01dB	12 Mar 27	TCRT25/1226
Microphone	40CD/260775	GRAS	12 Mar 27	TCRT25/1226
Pre-amp	PRE22/1610371	01dB	12 Mar 27	TCRT25/1226
Calibrator	Cal 21/34375239	01dB	12 Mar 27	TCRT25/1193

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 BS 7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Weather conditions

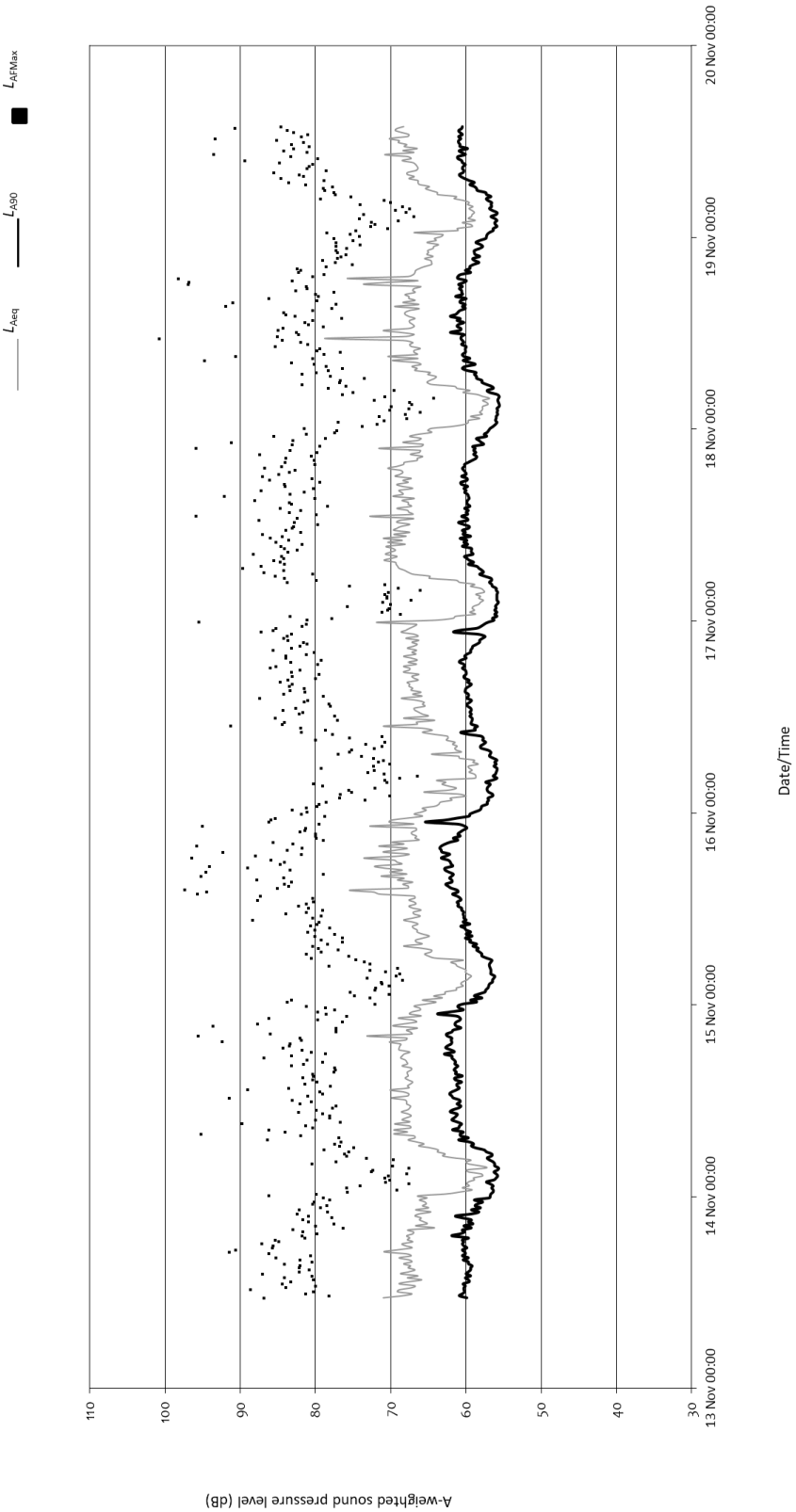
During the unattended noise measurements, weather reports for the area indicated that temperatures varied between -1°C at night and 14°C during the day.

Based on weather reports, some adverse weather occurred during the survey with wind speeds in the region of 10 m /s between 12:00 and 00:00 on Friday 14 November. This data has been excluded from the subsequent noise survey analysis.

Appendix B

Results of unattended measurements at Position L

Balloon Street, Manchester
Results of noise logging survey at L
13 November 2025 to 19 November 2025



Appendix C

Plant noise egress calculations

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Project number	026813	**Project name**	Balloon St, Manchester
Calculation revision	A		
Calculation by	JP	**Date created**	06/01/2026
Checked by	JA	**Date checked**	06/01/2026
Calculation description	Calculation of predicted plant noise egress level at Commercial premises (Hanover House)		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
Daikin EWAH505TZBSD1 (2 No.)									
Sound pressure level at 1m	82	72	72	73	70	62	62	54	74
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 1	0	0	0	0	0	0	0	0	
Total SPL at 1m + add. source directivity	85	75	75	76	73	65	65	57	77
Losses									
Distance attenuation - Point source, r=20m	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	
Total losses	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	
Sound pressure level after losses	59	49	49	50	47	39	39	31	51
Total facade sound pressure level at receptor	62	52	52	53	50	42	42	34	54

Criteria	
Criteria	54
Difference	0

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Project number	026813	**Project name**	Balloon St, Manchester
Calculation revision	A		
Calculation by	JP	**Date created**	06/01/2026
Checked by	JA	**Date checked**	06/01/2026
Calculation description	Calculation of predicted plant noise egress level at Commercial premises located at 2 Federation Street		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
Daikin EWAH505TZBSD1 (2 No.)									
Sound pressure level at 1m	82	72	72	73	70	62	62	54	74
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 1	0	0	0	0	0	0	0	0	
Total SPL at 1m + add. source directivity	85	75	75	76	73	65	65	57	77
Losses									
Distance attenuation - Point source, r=31m	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	
Total losses	*30*	*30*	*30*	*30*	*30*	*30*	*30*	*30*	
Sound pressure level after losses	55	45	45	46	43	35	35	27	47
Total facade sound pressure level at receptor	58	48	48	49	46	38	38	30	50

Criteria	
Criteria	54
Difference	-3

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Project number	026813	**Project name**	Balloon St, Manchester
Calculation revision	A		
Calculation by	JP	**Date created**	06/01/2026
Checked by	JA	**Date checked**	06/01/2026
Calculation description	Calculation of predicted plant noise egress level at Hotel Indigo		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
Daikin EWAH505TZBSD1 (2 No.)									
Sound pressure level at 1m	82	72	72	73	70	62	62	54	74
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 1	0	0	0	0	0	0	0	0	
Total SPL at 1m + add. source directivity	85	75	75	76	73	65	65	57	77
Losses									
Distance attenuation - Point source, r=50m	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
Screening loss - Path difference = 0.001m	4.6	4.5	4.4	4.3	4.1	3.9	3.7	3.6	
Total losses	*39*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	
Sound pressure level after losses	46	37	37	38	35	27	27	19	39
Total facade sound pressure level at receptor	49	40	40	41	38	30	30	22	42

Criteria	
Criteria	54
Difference	-12

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Project number	026813	**Project name**	Balloon St, Manchester
Calculation revision	A		
Calculation by	JP	**Date created**	06/01/2026
Checked by	JA	**Date checked**	06/01/2026
Calculation description	Calculation of predicted plant noise egress level at National Football Museum.		

Comments	**Octave band centre frequency (Hz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
Daikin EWAH505TZBSD1 (2 No.)									
Sound pressure level at 1m	82	72	72	73	70	62	62	54	74
Correction for 2 units	3	3	3	3	3	3	3	3	
Additional source directivity; Q = 1	0	0	0	0	0	0	0	0	
Total SPL at 1m + add. source directivity	85	75	75	76	73	65	65	57	77
Losses									
Distance attenuation - Point source, r=75m	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	
Screening loss - Path difference = 0.001m	4.6	4.5	4.4	4.3	4.1	3.9	3.7	3.6	
Total losses	*42*	*42*	*42*	*42*	*42*	*41*	*41*	*41*	
Sound pressure level after losses	43	33	33	34	31	24	24	16	36
Total facade sound pressure level at receptor	46	36	36	37	34	27	27	19	39

Criteria	
Criteria	54
Difference	-15