

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Premier Inn, Manchester Airport

Acoustic Assessment

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds, Bristol

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Version	Date	Comments	Author	Reviewer
A	20 Sep 24		KM	JA
B	2 Oct 24	Updated plant noise assessment	GM	JA

Disclaimer

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Summary

Sandy Brown has been commissioned by Manchester Airport Group to provide acoustic advice in relation to the proposed Premier Inn development which is located on plot H5 at Manchester Airport.

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was carried out between 16:20 on 7 March 2024 and 14:10 on 12 March 2024.

To the west, the representative background sound levels measured during the survey have been taken to be $L_{A90,15min}$ 61 dB during the day and $L_{A90,15min}$ 60 dB at night.

To the east, the representative background sound levels measured during the survey have been taken to be $L_{A90,15min}$ 60 dB during the day and $L_{A90,15min}$ 57 dB at night.

Based on the requirements of the 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 $L_{Aeq,15min}$ 55 dB during the day, and $L_{Aeq,15min}$ 52 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 plant noise egress from normally operating items of plant has been undertaken based on outline plant selections. The proposed items of plant are expected to comply with the normally operating day and night plant noise egress limits.

Assessments of plant noise egress based on the procured normally and emergency operating plant items will need to be undertaken as the design progresses.

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1 Introduction

Sandy Brown has been commissioned by Manchester Airport Group to provide acoustic advice in relation to the proposed Premier Inn development which is located on plot H5 at Manchester Airport.

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, and a discussion of acceptable limits for noise emissions from building services plant. An initial assessment of plant noise egress for normally operating plant items has been undertaken.

2 Site description

2.1 The site and its surrounding

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

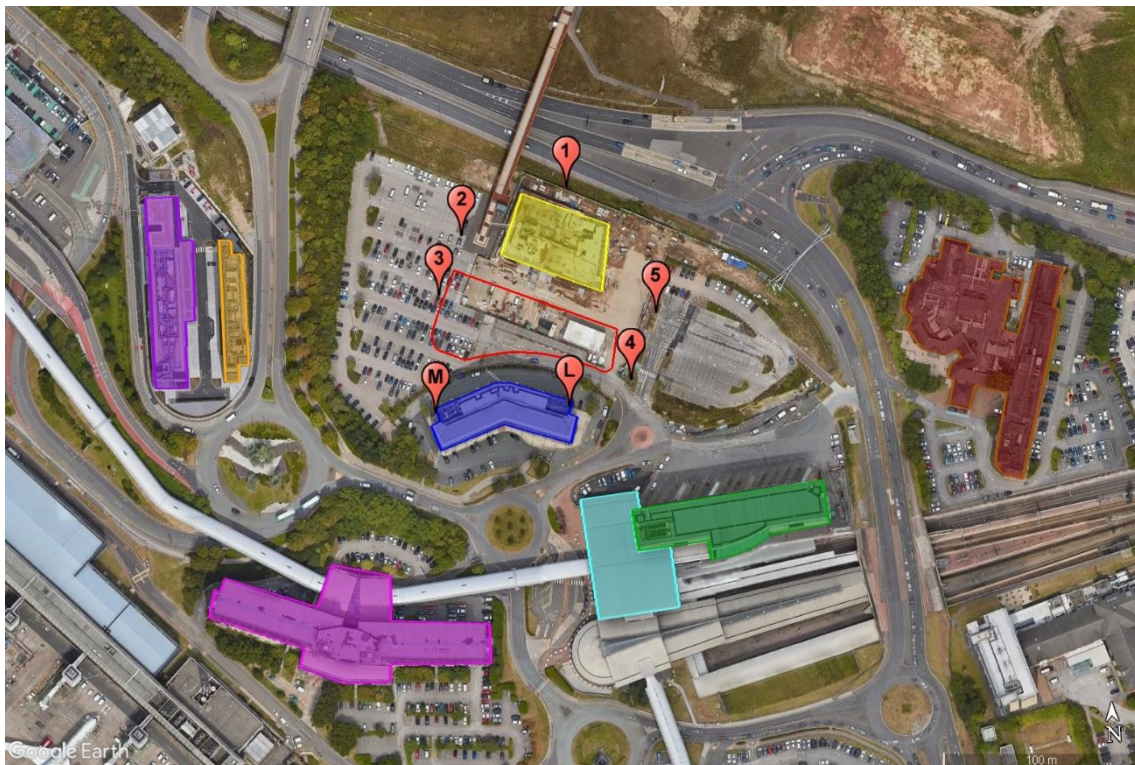


Figure 1 Aerial view of site (courtesy of Google Earth Pro) showing noise sensitive premises and measurement positions around the proposed site

2.2 Adjacent premises

The site is predominantly surrounded by hotel, office accommodation, brown land and roads.

The nearest noise sensitive premises are summarised below:

- Tribe Hotel approximately 20 m to the north highlighted in yellow in Figure 1.
- Ibis Budget hotel and Holiday Inn Manchester Airport hotel approximately 100 m and 125 m to the east and highlighted in orange and purple respectively in Figure 1.
- Voyager office building approximately 24 m to the south highlighted in blue in Figure 1.
- Manchester airport train station and 4M office building approximately 78 m and 88 m to the south-east highlighted in blue and green respectively in Figure 1.
- Radisson Blue Hotel approximately 135 m to the south-west highlighted in pink in Figure 1.
- Double Tree by Hilton hotel approximately 168 m to the east and highlighted in brown in Figure 1.

3 Development proposals

The development involves the construction of a new Premier Inn hotel at Manchester Airport. The hotel will provide 270 guestrooms over 9 storeys. At ground floor, there will be back and front of house areas, which are to comprise of a restaurant and associated kitchen areas. External plant areas are proposed as part of the development.

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.

4.2 Local Authority criteria

Manchester City Council provides guidance in relation to plant noise emissions in the *Planning and Noise Technical Guidance* document dated October 2022. It states the following:

‘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 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.’

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 6 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 16:20 on 7 March 2024 and 14:10 on 12 March 2024.

The measurement positions used during the survey are indicated in Figure 1, denoted by the letters ‘L’ and ‘M’. These positions were located on balconies of the Voyager building. Photographs showing the measurement locations are provided in Figure 2.

These measurement locations were chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.

The measured noise levels at these positions are considered to be facade levels.



Figure 2 Photographs of unattended measurement position at Level 7 west ‘M’ (left) and east ‘L’ (right)

5.2 Attended measurements

Attended sample measurements were taken at 5 locations around the site. These are indicated in Figure 1 as positions 1 to 5. The measurements were carried out on 7 March 2024, over 1 minute periods.

The microphone was mounted on a tripod approximately 1.5 m above the ground level. For position 1, the microphone was located approximately 1 m from a reflective surface, for positions 2 to 5, the microphone was at least 3 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 constant road traffic on M56, A555, Outwood Lane, and World way with contributions to maximum levels from aircrafts taking off and landing.

Less significant noise sources included pedestrians talking, distant generator, distant train, and distant road traffic on Chicago Avenue.

The proposed site is adjacent to a building site (TRIBE hotel), construction works and associated machinery are expected to be a dominant noise source during constructions hours.

6.2 Noise measurement results

6.2.1 Unattended measurement results (position M)

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

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

Measured minimum background sound levels are given in Table 2.

The presented results exclude noise levels measured between 07:00 to 18:00 on weekdays and between 07:00 to 14:00 on Saturday as these periods were affected by construction works at the adjacent site (TRIBE).

Table 1 Ambient noise levels measured during the unattended survey (position M)

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 7 March 2024	62 ^[1]	61
Friday 8 March 2024	63	61
Saturday 9 March 2024	63	62
Sunday 10 March 2024	64	62
Monday 11 March 2024	63	62
Tuesday 12 March 2024	-	-
Average	63	62

^[1] Measurement not made over full period due to monitoring start and end time (the measurement on 7 March 24 was over 6.25 hours); not included in the average.

Table 2 Minimum background sound levels measured during the unattended survey (position M)

Date	Day (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 7 March 2024	57 ^[1]	48
Friday 8 March 2024	58	51
Saturday 9 March 2024	57	51
Sunday 10 March 2024	60	49
Monday 11 March 2024	58	50
Tuesday 12 March 2024	-	-

^[1] Measurement not made over full period due to monitoring start and end time.

The lowest background sound levels measured during the survey were $L_{A90,15min}$ 57 dB during the day and $L_{A90,15min}$ 48 dB at night.

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

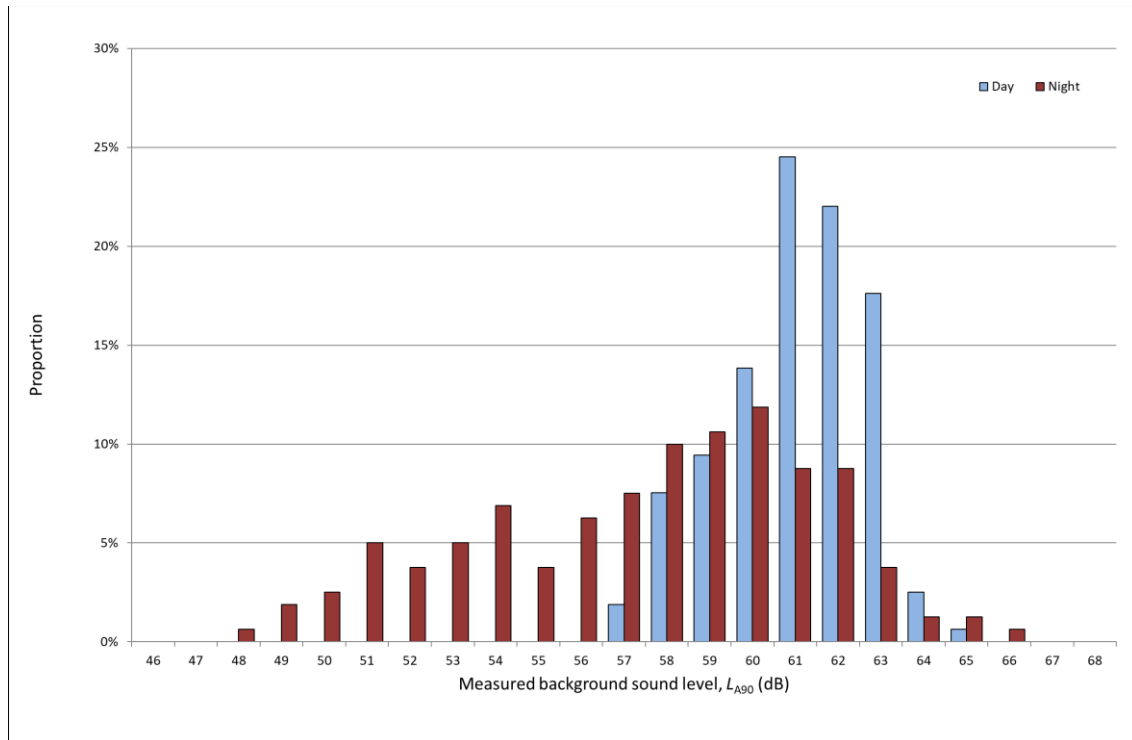


Figure 3 Statistical analysis of background sound level (position M)

From this analysis, the representative background sound levels measured during the survey have been taken to be $L_{A90,15min}$ 61 dB during the day and $L_{A90,15min}$ 60 dB at night.

6.2.2 Unattended measurement results (position L)

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 3.

Measured minimum background sound levels are given in Table 4.

The presented results do not include noise levels between 07:00 to 18:00 weekday and between 07:00 to 14:00 on Saturday as the data was affected by construction works.

Table 3 Ambient noise levels measured during the unattended survey (position L)

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 7 March 2024	62 ^[1]	59
Friday 8 March 2024	62	60
Saturday 9 March 2024	62	59
Sunday 10 March 2024	63	59
Monday 11 March 2024	61	61
Tuesday 12 March 2024	-	-
Average	62	60

^[2] Measurement not made over full period due to monitoring start and end time (the measurement on 7 March 24 was over 5 hours) not included in the average.

Table 4 Minimum background sound levels measured during the unattended survey (position L)

Date	Day (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 7 March 2024	57 ^[1]	46
Friday 8 March 2024	57	52
Saturday 9 March 2024	57	50
Sunday 10 March 2024	56	48
Monday 11 March 2024	56	48
Tuesday 12 March 2024	-	-

^[3] Measurement not made over full period due to monitoring start and end time.

The lowest background sound levels measured during the survey were $L_{A90,15min}$ 56 dB during the day and $L_{A90,15min}$ 46 dB at night.

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 sire are given in Figure 4.

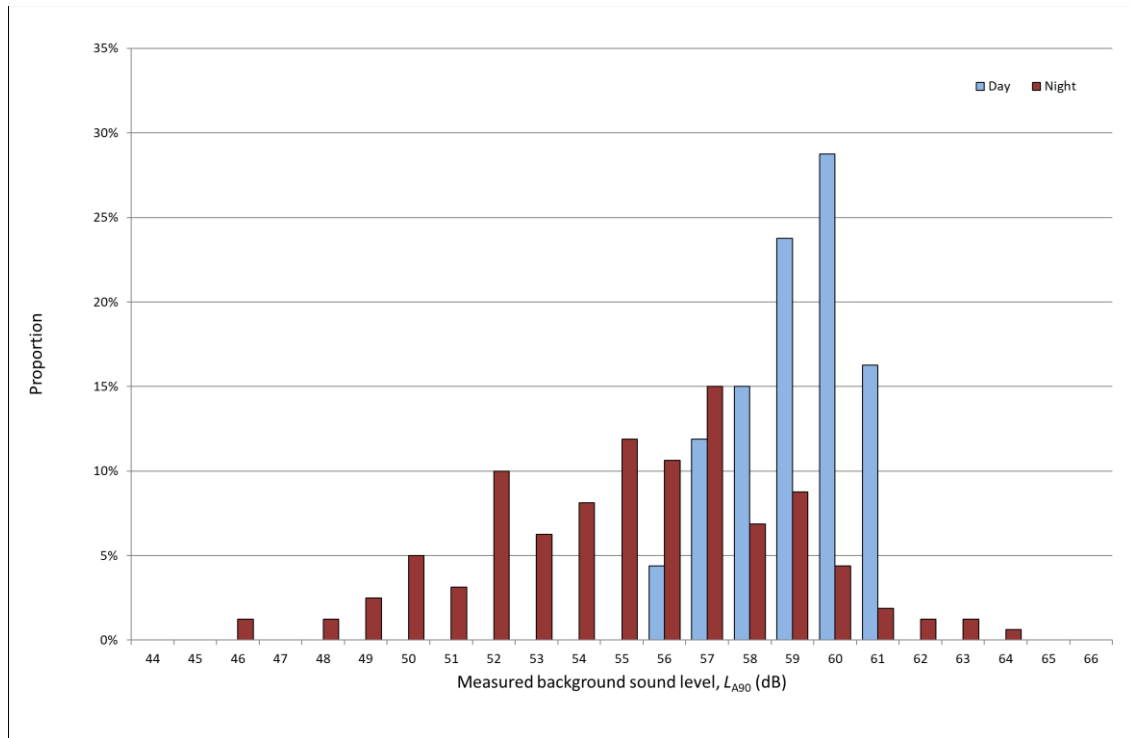


Figure 4 Statistical analysis of background sound level (position L)

From this analysis, the representative background sound levels measured during the survey have been taken to be $L_{A90,15min}$ 60 dB during the day and $L_{A90,15min}$ 57 dB at night.

6.2.3 Attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 5 and below.

- At position 1, the dominant noise sources were road traffic on M56 with contribution from aircraft overheard.
- At position 2, the dominant noise sources were road traffic on M56 with contributions from distant generator in operation.
- At position 3, the dominant noise sources were road traffic on M56 with contributions from road traffic on World way and aircraft overhead, with less significant contributions from distant generator in operation.
- At position 4, the dominant noise sources were road traffic on M56 with contributions from road traffic on bus station and road traffic on nearby round about.
- At position 5, the dominant noise sources were road traffic on M56 with contributions from aircraft overhead, road traffic on bus station and road traffic on nearby round about.

Comments on sources causing maximum noise levels are summarised in Table 5.

Table 5 Noise levels from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,1min}$	$L_{AFmax,1min}$	$L_{A90,1min}$	
1	17:12	73	76	68	Road traffic on M56
	17:13	71	80	62	Aircraft overhead (taking off)
	17:14	75	84	71	Road traffic on M56
	17:15	70	75	64	Road traffic on M56
	17:16	72	78	60	Road traffic on M56+ aircraft overhead (taking off)
	17:17	73	79	65	Road traffic on M56
	17:18	72	80	60	Road traffic on M56
	17:19	73	77	71	Road traffic on M56
	17:20	75	87	67	Road traffic on M56
	17:21	73	76	71	Car speeding up on M56
	17:22	72	78	65	Aircraft overhead (taking off)
	17:23	73	76	71	Car horn on M56
	17:24	74	81	71	Road traffic on M56
	17:25	72	76	70	Road traffic on M56
	17:26	72	79	66	Road traffic on M56
	17:27	72	78	67	Aircraft overhead (taking off)
2	18:48	62	68	58	Road traffic on M56
	18:49	63	66	60	Aircraft overhead (taking off)
	18:50	62	68	60	Aircraft overhead (taking off)
	18:51	61	66	58	Road traffic on M56

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,1min}$	$L_{AFmax,1min}$	$L_{A90,1min}$	
2	18:52	62	68	59	Road traffic on M56
	18:53	60	63	57	Road traffic on M56
	18:54	62	66	59	Road traffic on M56
	18:55	61	65	58	Road traffic on M56
	18:56	62	65	59	Road traffic on M56
	18:57	60	63	58	Road traffic on M56
	18:58	60	72	57	Pedestrian passing by talking
	18:59	62	72	59	Pedestrian passing by talking
	19:00	61	64	58	Road traffic on M56
	19:01	61	68	58	Road traffic on M56
	19:02	62	65	58	Road traffic on M56
	19:03	63	67	60	Road traffic on M56
	19:04	62	66	58	Road traffic on M56
	19:05	62	71	59	Road traffic on M56
	19:06	62	63	62	Road traffic on M56
3	19:09	57	60	55	Road traffic on world Way
	19:10	57	60	55	Road traffic on world Way
	19:11	56	60	55	Road traffic on world Way
	19:12	58	63	56	Motorbike on M56
	19:13	58	62	56	Road traffic on M56
	19:14	56	60	54	Road traffic on M56
	19:15	58	70	54	Road traffic on M56
	19:16	57	60	55	Road traffic on M56
	19:17	57	60	54	Road traffic on M56

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,1min}$	$L_{AFmax,1min}$	$L_{A90,1min}$	
3	19:18	57	61	55	Road traffic on M56
	19:19	60	69	57	Aircraft overhead (taking off)
	19:20	62	72	57	Aircraft overhead (taking off)
	19:21	58	63	56	Road traffic on M56
	19:22	57	60	54	Road traffic on M56
	19:23	61	69	55	Aircraft overhead (taking off)
	19:24	57	59	55	Road traffic on M56
4	18:00	56	59	55	Road traffic on M56
	18:02	57	65	55	Road traffic on nearby round about
	18:03	56	62	55	Road traffic on M56
	18:04	57	65	56	Road traffic on nearby round about
	18:05	60	72	55	Aircraft overhead (taking off)
	18:06	58	67	56	Road traffic on nearby round about
	18:07	57	63	55	Road traffic on nearby round about
	18:08	56	62	53	Road traffic on nearby round about
	18:09	55	57	54	Road traffic on M56
	18:11	59	69	54	Aircraft overhead (taking off)
	18:12	58	63	56	Road traffic on nearby round about
	18:14	57	67	55	Road traffic on nearby round about

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,1min}$	$L_{AFmax,1min}$	$L_{A90,1min}$	
4	18:15	55	65	53	Bus horn
	18:19	58	63	56	Road traffic on M56
	18:20	57	63	55	Road traffic on M56
5	17:38	58	66	56	Bus horn
	17:39	58	60	57	Road traffic on M56
	17:40	56	59	55	Road traffic on M56
	17:41	56	59	55	Road traffic on M56
	17:42	58	63	56	Road traffic on M56
	17:43	58	65	56	Road traffic on M56
	17:44	57	64	55	Road traffic on M56
	17:45	58	62	56	Distant train
	17:46	56	59	54	Road traffic on M56
	17:47	56	60	55	Road traffic on M56
	17:48	56	68	54	Road traffic on M56
	17:49	56	60	55	Distant reverse beeping
	17:50	57	64	55	Road traffic on M56
	17:51	62	75	57	Aircraft overhead (taking off)
	17:52	64	78	54	Aircraft overhead (taking off)
	17:53	57	63	56	Road traffic on M56

6.3 Plant noise egress limits

For the purpose of setting plant noise egress limits, the background noise levels measured at unattended measurement position 'L' detailed in Section 6.2.2 have been used.

The background noise levels at this location were lower than those measured at position 'M' and so represent a worst-case scenario.

6.3.1 Normally operating 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 6.

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 the hotel receptors identified in Section 2.2 during the day (07:00-23:00) and night (23:00) and at office buildings during the day (07:00-23:00) only.

Table 6 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)	55
Night (23:00-07:00)	52

[1] The limits set out in Table 6 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 D.

6.3.2 Emergency operating plant noise egress limits

Manchester City Council typically accept emergency plant noise egress to be designed to achieve noise levels no greater than 10 dB above the existing representative background noise level (L_{A90}) at the nearest noise sensitive location. This is on the basis that the plant would only run in a genuine emergency and for brief periods during the day for occasional routine testing. On this basis, the emergency plant noise limits are set out in Table 7.

Table 7 Emergency operating 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)	70
Night (23:00-07:00)	67

7 Plant noise assessment

The following section provides an assessment of plant noise egress based on initial plant selections.

A more detailed assessment of plant noise egress will need to be undertaken based on the procured items of plant as the design progresses.

7.1 Proposed items of plant

7.1.1 Normally operating items of plant

On the rooftop plant area, 30 x PURY EP200YNW-A2 condenser units and a specialist kitchen air handling unit (AHU) are proposed. The rooftop plant layout is shown in Figure 5, with the condenser units indicated to the left and the AHU indicated to the right.

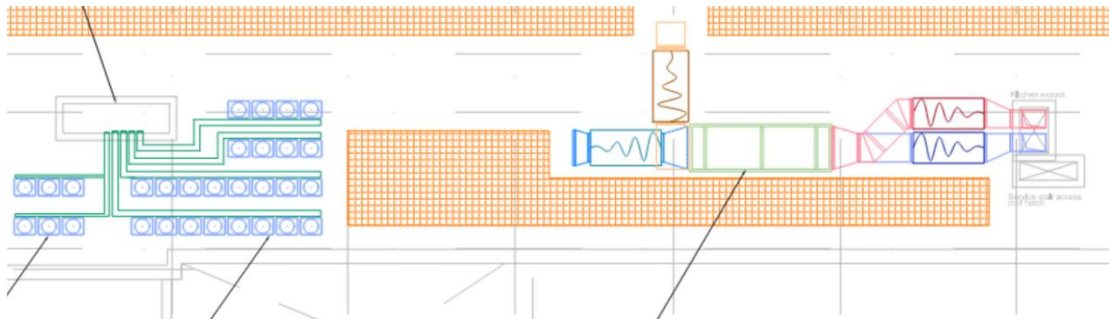


Figure 5 WIP rooftop plant layout

Based on the manufacturer's acoustic data, the condensers produce a sound pressure level of L_{Aeq} 59 dB at 1 m.

The maximum sound pressure level at 1m from each noise emitting component of the AHU has been set out below:

- AHU Casing – L_{Aeq} 65 dB
- Intake – L_{Aeq} 65 dB
- Exhaust – L_{Aeq} 65 dB

On the rooftop of the plant annex building, 6 x air source heat pumps (ASHPs) are proposed as shown in Figure 6.

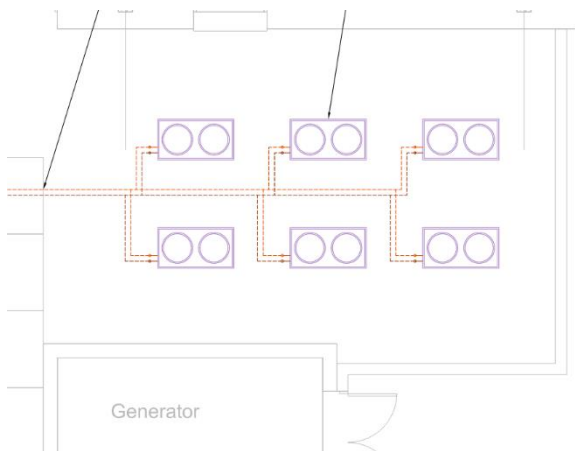


Figure 6 Annex rooftop plant layout

Based on the manufacturer's acoustic data, each ASHP produces a sound pressure level of L_{Aeq} 58 dB at 1 m.

The plant items will be capable of operating during both the day (07:00-23:00) and night (23:00-07:00).

7.1.2 Emergency operating items of plant

An emergency life safety generator is proposed within the Annex building, as shown in Figure 7.

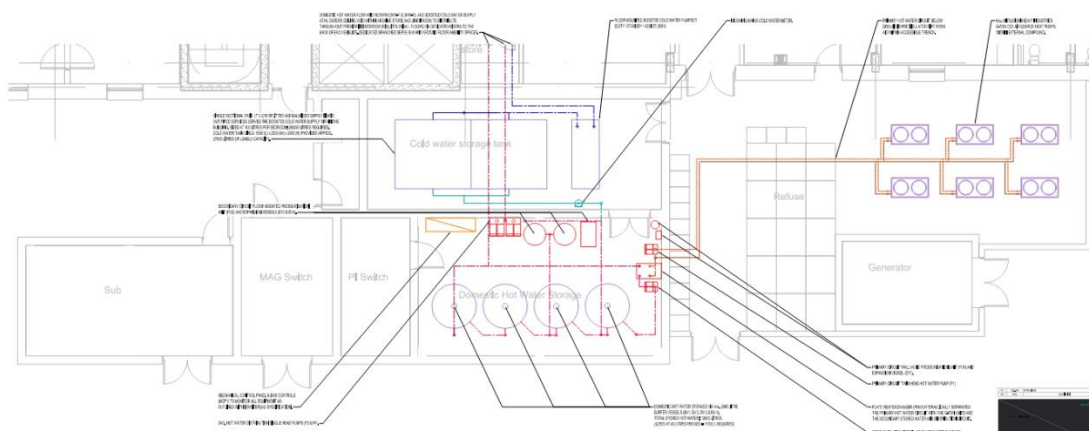


Figure 7 Annex building generator room

The locations of the generator atmospheric terminations are not yet known. No details of the emergency generator are available at this stage.

7.2 Assessment

7.2.1 Normally operating plant

Based on the proposed items of normally operating plant and their operational hours, the following plant noise egress levels are predicted at the nearest / worst-affected noise sensitive receptors:

- L_{Aeq} 51 dB at Tribe Hotel
- L_{Aeq} 49 dB at the Voyager Building.

The predicted levels of plant noise egress comply with both the day (07:00-23:00) and night (23:00-07:00) normally operating plant noise egress limits as per Table 6. This is on the basis that the plant contains no attention catching features in line with BS4142,

7.2.2 Emergency operating plant

An assessment of noise egress from emergency operating plant will be undertaken as the design develops. Attenuation and mitigating measures shall be provided to ensure the emergency plant noise limits set out in Table 7 are not exceeded.

8 Conclusion

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was carried out between 16:20 on 7 March 2024 and 14:10 on 12 March 2024.

To the west, the representative background sound levels measured during the survey have been taken to be $L_{A90,15min}$ 61 dB during the day and $L_{A90,15min}$ 60 dB at night.

To the east, the representative background sound levels measured during the survey have been taken to be $L_{A90,15min}$ 60 dB during the day and $L_{A90,15min}$ 57 dB at night.

Based on the requirements of the 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 $L_{Aeq,15min}$ 55 dB during the day, and $L_{Aeq,15min}$ 52 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 plant noise egress from normally operating items of plant has been undertaken based on outline plant selections. The proposed items of plant are expected to comply with the normally operating day and night plant noise egress limits.

Assessments of plant noise egress based on the procured normally and emergency operating plant items will need to be undertaken as the design progresses.

Appendix A

Survey details

Equipment

The unattended and attended noise measurements were taken using two Rion NL-52 sound level meters and a NL-52 sound level meter, respectively.

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	7 Nov 25	TCRT23/1806
Microphone	UC-59/24147	Rion	7 Nov 25	TCRT23/1806
Pre-amp	NH-25/32354	Rion	7 Nov 25	TCRT23/1806
Calibrator	NC-74/34125432	Rion	9 Aug 25	TCRT23/1576
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
Sound level meter	NL-52/01010788	Rion	20 Sep 25	TCRT23/1666
Microphone	UC-59/20416	Rion	20 Sep 25	TCRT23/1666
Pre-amp	NH-25/11436	Rion	20 Sep 25	TCRT23/1666
Calibrator	SV30A/10559	Svantek	20 Sep 25	TCRT23/1665

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 attended noise measurements, the weather was generally clear and dry and no rain occurred. Wind speeds were measured at each position and varied between 0 m/s and 3 m/s.

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 1°C at night and 13°C during the day, and the wind speed was less than 5 m/s.

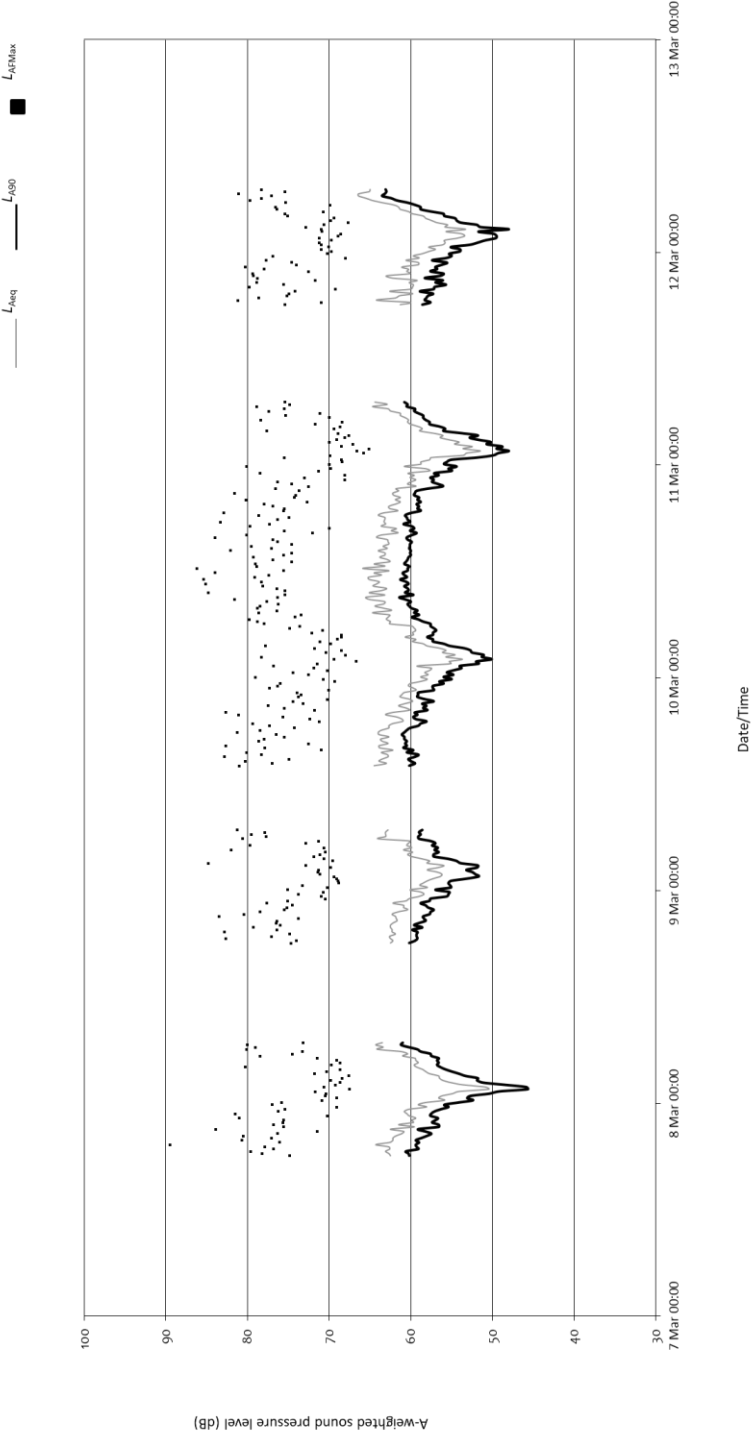
Rain showers occurred throughout the survey however, the survey duration was sufficiently long to include periods unaffected by adverse weather and no variation in noise levels was seen to correlate with the weather. These measurements are consequently considered to have obtained a representative sample of noise data.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location L

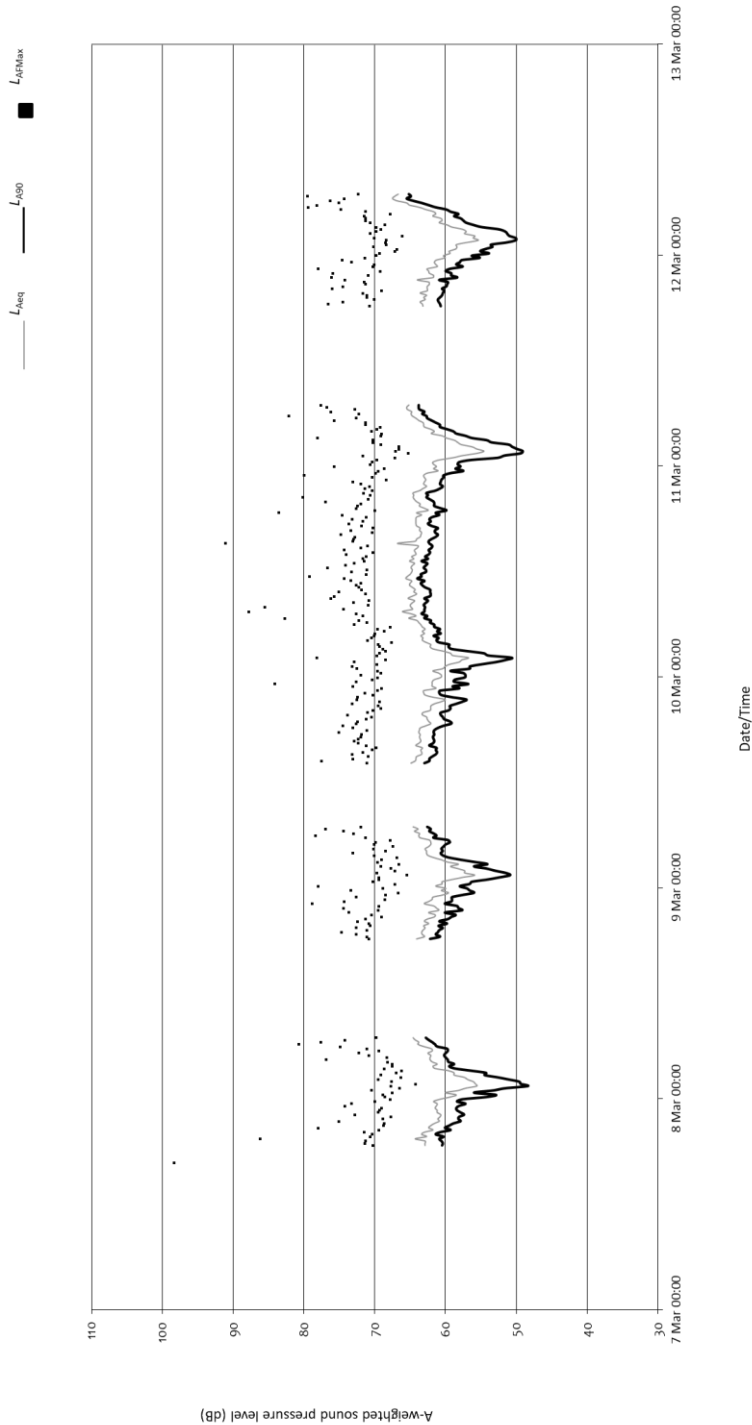
Premier Inn, Manchester Airport
Results of noise logging survey at position L
7 March 2024 to 12 March 2024



Appendix C

Results of unattended measurements at Location M

Premier Inn, Manchester Airport
Results of noise logging survey at position M
7 March 2024 to 12 March 2024



Appendix D

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.