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Report

BREEAM POL 05

Report 1534-POL05-01R.

17 April 2025.

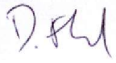
Carried out for: **McLaren Construction Ltd.**

Compiled by: **Adrian Finn.**
AF Acoustics.

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AIR TIGHTNESS SOLUTIONS
BOX 4 MANCHESTER AIRPORT
BREEAM POL 05

DOCUMENT REFERENCE: 1534-POL05-01R

REVIEW AND AUTHORISATION			
Authored by Adrian Finn	**Position** Director	**Signature** 	**Date** 07/05/2025
Reviewed by Daniel Flood	**Position** Senior Consultant	**Signature** 	**Date** 07/05/2025

AMENDMENT HISTORY			
Issue	**Status**	**Description**	**Date**
01	Issue	Report issued	07/05/2025

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1. INTRODUCTION

1.1.1 Air Tightness Solution, on behalf of McLaren Construction, has commissioned AF Acoustics Ltd. to undertake a plant noise assessment to gain the required credits under BREEAM POL 05 for the proposed plant installation at Box 4, Western Maintenance Area, Manchester Airport, M90 5PQ.

2. SITE DESCRIPTION

2.1 Location

2.1.1 The proposed development is located to the west of Manchester Airport. To the north and east, the site is bound by existing industrial premises associated with Manchester Airport. To the south and west, the proposed development site is bound by Wilmslow Old Road, with Manchester Airport parking, and the A538 beyond. The M56 motorway is located approximately 800m to the west of the site. The nearest noise sensitive receptors are located approximately 300m to the south-east and 250m to the west. The site layout is shown in Figure A3 of Appendix A.

3. GUIDANCE

3.1 POL 05 Reduction of noise pollution

3.1.1 There is one BREEAM Credit available under BREEAM Pol 05: Reduction of noise pollution. The credit requires that any proposed plant or equipment associated with the proposed building is assessed and designed to generate noise levels at least 5 dB lower than the background sound level throughout the day and night, at the nearest receptors. This assessment should be carried out in accordance with the guidance in BS 4142:2014+A1:2019.

3.2 British Standard 4142:2014 + A1:2019

3.2.1 BS 4142:2014 + A1:2019 'Methods for rating and assessing industrial and commercial sound' describes methods for rating and assessing sound from "fixed installations which comprise mechanical and electrical plant and equipment", amongst other sources of noise.

3.2.2 The methodology contained within BS 4142:2014 uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

3.2.3 A summary of the approach set out within BS 4142:2014 is set out below:

- establish the specific sound level of the source(s);
- measure the representative background sound level, typically by measurement close to the receptor location;
- rate the specific sound level to account for any distinguishing characteristics;
- estimate the impact by subtracting the background sound level from the rating level; and
- consider the initial estimate of impact, in the context of the noise and its environment.

3.2.4 An initial estimate of the impact of the specific sound is obtained by subtracting the background sound level from the rating level. Using this approach, BS 4142 states:

> "Typically, the greater this difference, the greater the magnitude of impact
> *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*

A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

3.2.5 Certain acoustic features can increase the significance of the impact over that expected from a basic comparison between specific sound level and the background sound level. These features include tonality and impulsivity, as well as additional characteristics and intermittency of the sound.

3.2.6 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.

3.2.7 The specific sound level is rated to account for distinguishing characteristics by using the penalties below:

- 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

3.2.8 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

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

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

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

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

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

3.3 Local Authority – Manchester City Council

3.3.1 Manchester City Council has imposed a condition within Application No. 136879/FO/2023.

8) a) Any 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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to occupation of the development hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority and thereafter implemented in full.

b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise 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. Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site, pursuant to Policy DM1 in the Manchester Core Strategy and saved UDP Policy DC26.

4. NOISE SURVEY AND MEASUREMENTS

4.1 Unattended Noise Survey

4.1.1 Noise monitoring was undertaken by others and is summarised below.

4.1.2 The Monitoring Locations (MLs) used to assess ambient noise levels at the proposed development site, and existing background sound levels at nearby receptors. These MLs are shown in Figure A1 in Appendix A and are described as follows:

- ML1: Attended noise monitoring between 15:17 and 17:02 on 24 November 2023. Representative of the ambient noise levels affecting the proposed development.
- ML2: Attended noise monitoring during the daytime and night-time periods on the 24 and 26 November 2023. Representative of noise sensitive receptors located to the south-east of the proposed site.
- ML3: Attended noise monitoring during the daytime and night-time periods on the 24 and 26 November 2023. Representative of potential noise sensitive receptors located to the south-west of the proposed site.

4.1.3 Road traffic noise on the A538 and M56 dominated the background sound levels at noise sensitive receptors during the daytime and night-time periods, during both weekdays and weekends.

4.1.4 The noise sensitive receptors selected for the assessment are considered to be a worst case. ML2 is representative of existing dwellings located approximately 230m to the south-east of the nearest plant. These were disused at the time of measurement, however as there is potential that the dwellings could be restored and used, therefore these are considered as a worst case.

4.1.5 ML3 is located on the outskirts of 'The Romper' public house car park. Upon desktop review it was considered likely that the pub comprised accommodation/residential premises, therefore this has been considered as a noise sensitive receptor.

4.1.6 Monitoring at ML2 was carried out during daytime and night-time periods, during both weekdays and weekends, considered to be representative of background sound levels at nearby noise sensitive (residential) premises. As the noise monitoring carried out is relatively short-term, the minimum measured background sound levels have been used to inform the noise assessment.

4.1.7 A summary of noise levels measured during the noise survey is shown below in Figure 4.1.

Monitoring Location	Daytime (07:00 – 23:00)		Night-time (23:00 – 07:00)	
	Ambient Sound Levels (dB $L_{Aeq,T}$)	Background Sound Levels (dB $L_{A90,T}$)	Ambient Sound Levels (dB $L_{Aeq,T}$)	Background Sound Levels (dB $L_{A90,T}$)
ML1	61	-	-	-
ML2	59	52	51	39
ML3	59	56	54	47

FIGURE 4.1: SUMMARY OF NOISE MEASUREMENTS

5. PLANT NOISE ASSESSMENT

5.1 Operating Hours

5.1.1 The plant items have the potential to operate 24 hours a day.

5.2 Noise Rating Limit

5.2.1 To achieve the BREEAM credit the plant noise assessed at the nearest residential receptor must be 5dB below the background noise level.

5.2.2 Table 5.1 presents the maximum noise rating level which must not be exceeded at the nearest noise sensitive receptors.

Location	Measurement Period	Assessed Background Noise Level dB L_{A90}	Noise Rating Level Design Criteria	Plant Noise Rating Level Limit dB $L_{Ar,Tr}$
ML2	24 hours	39	5dB below the background noise level – at night	34
ML3	24 hours	47	5dB below the background noise level – at night	42

TABLE 5.1: TARGET BACKGROUND NOISE LEVEL

5.3 Plant Noise Levels

5.3.1 It is proposed to install the following external plant and the manufacturer's noise levels are presented in Table 5.2.

5.3.2 This location of the plant is shown in Figure A2 of Appendix A.

Ref	Plant	Parameter	Sound Level at Octave band Centre Frequency, dB							
			63	125	250	500	1000	2000	4000	8000
ODU/00/01	Daikin REYA12A	L_p at 1m	61	65	59	58	55	52	53	42
ODU/00/02	Daikin RZAG35B	L_p at 1m	63	63	61	48	42	37	28	25
ODU/00/03	Daikin RXM50R	L_p at 1m	48	53	50	47	43	38	31	28
ODU/00/04	Daikin RXM35R9	L_p at 1m	53	54	52	49	45	40	36	28

TABLE 5.2: PLANT NOISE LEVEL

5.4 Calculated Noise Levels

5.4.1 Based on the information above, Table 5.3 provides a summary of the calculated plant noise at the closest residential receptor. Our calculation method has included: 20LogR distance correction; and attenuation kit losses The calculation sheets are presented in Appendix B.

Location	Assessment Period	Target Plant Noise Rating Level dB	Predicted Noise Level dB
ML2	24 hour	39	<0
ML3		47	<0

TABLE 5.3: PREDICTED NOISE AT NEAREST RECEPTORS

5.4.2 No correction factors have been added in accordance with BS4142:2014. There are no tones or other acoustic characteristics present from the proposed plant.

5.4.3 Furthermore, and as per the semantics of BS4142:2014, the assessment indicates little likelihood of adverse impact. The plant meets the POL 05 requirement that noise from the new plant is 5dB below the typical background noise level.

5.4.4 The assessment shows that the plant meets planning condition '8) a) Any 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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.' of application no. 136879/FO/2023.

6. CONCLUSION

6.1.1 Air Tightness Solution on behalf of McLaren Construction has commissioned AF Acoustics Ltd. to undertake a plant noise assessment to gain the required credits under BREEAM POL 05 for the proposed plant installation relation at Box 4, Western Maintenance Area, Manchester Airport, M90 5PQ.

6.1.2 A noise survey was undertaken by others at the site in November 2023, at positions representative of the nearest residential receptors.

6.1.3 The results of the measurements have been used to determine the required criteria for atmospheric noise emissions from the proposed plant installation.

6.1.4 Noise calculations based on the plant data have been undertaken to the nearest noise-sensitive receptors.

6.1.5 The results of the assessment indicate that the atmospheric noise emissions from the plant installation will achieve the target plant rating at the closest residential receptors. The plant meets the Pol 05 requirement that noise from the new plant is 5dB below the typical background noise level.

6.1.6 The assessment shows that the plant meets planning condition ‘8) a) Any 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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.’ of application no. 136879/FO/2023.

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APPENDIX A: FIGURES

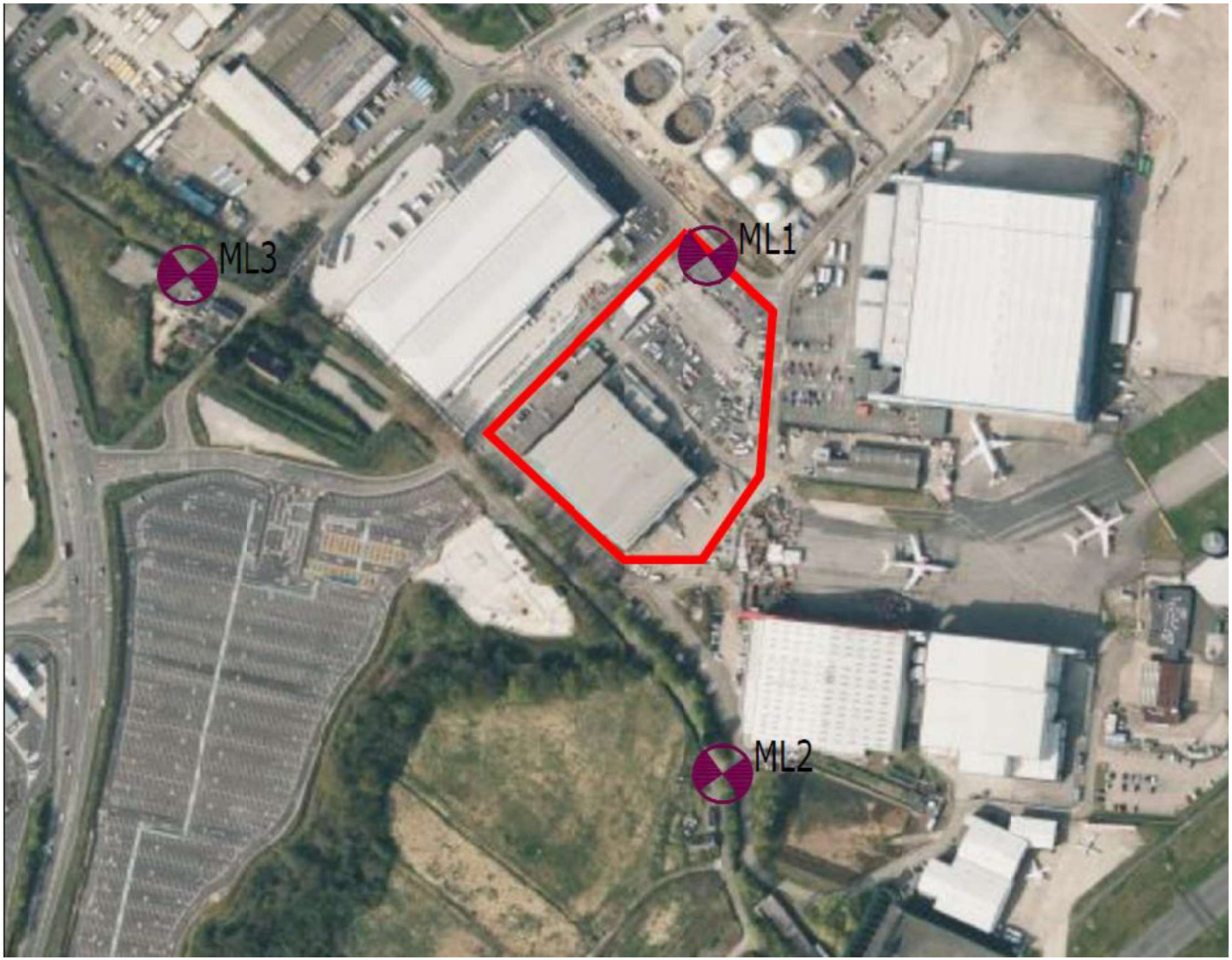


FIGURE A1: NOISE MONITORING LOCATIONS

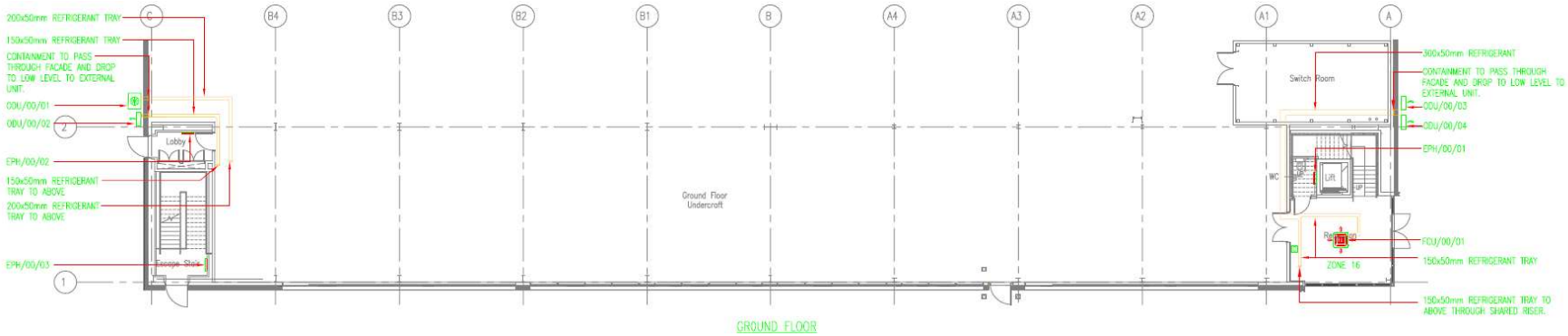


FIGURE A2: PLANT LAYOUT

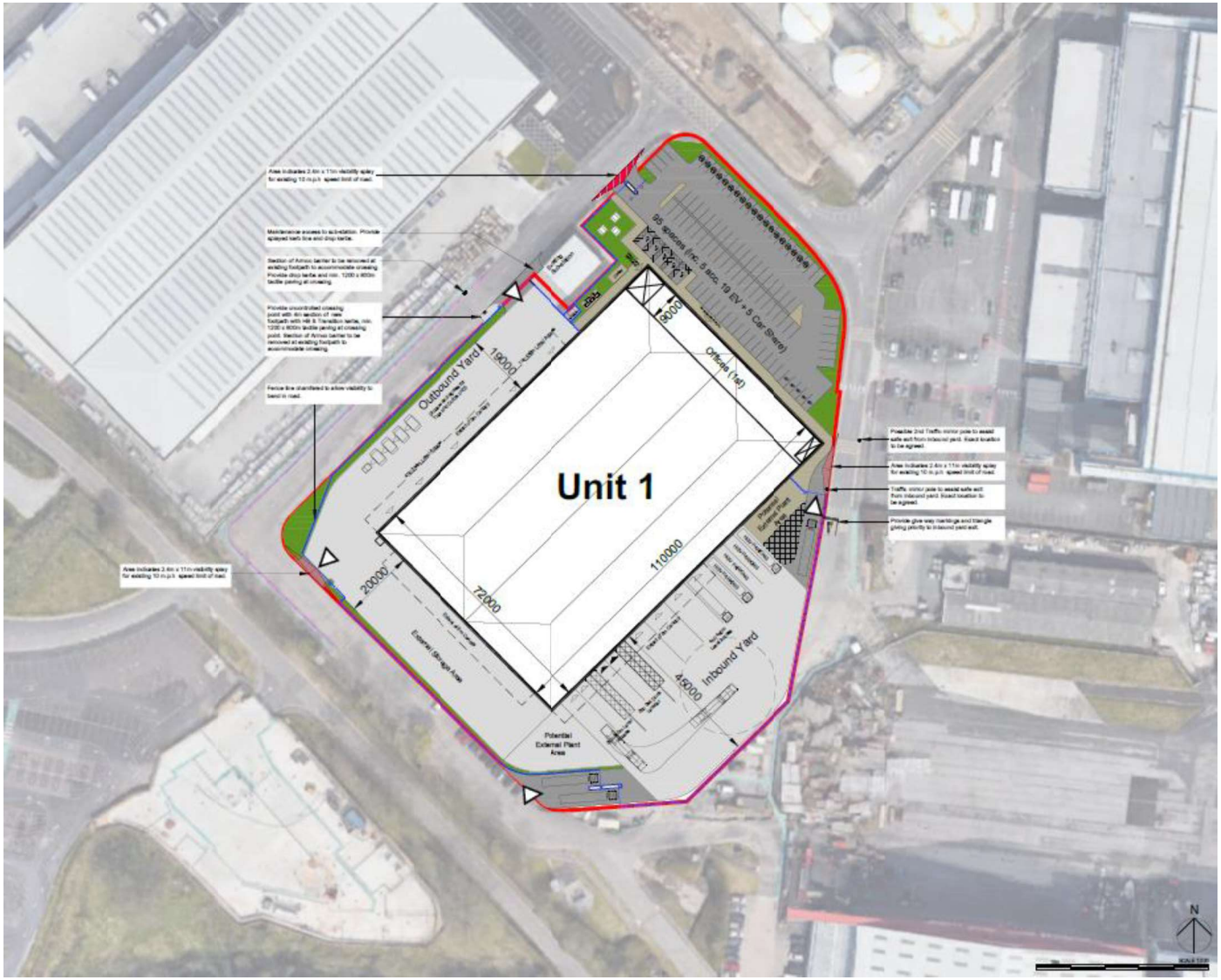


FIGURE A3: SITE LOCATION

APPENDIX B: TABLES

Job No.	Job Title			
3155	Box 4 Manchester Airport - BREEAM			
Date Created	By	Date Revised	Rev	Sheet
06 May 2025	AF	07 May 2025	0	3
Date Reviewed	By	Review Type	Review Status	
07 May 2025	AF	Self Check	No Comments	

Plant Noise Calculations - Box 4 Manchester Airport

	Item / Description		Rating/Broadband/Input Rating	dB	dB(A)	Octave Band Centre Frequency, Hz 31.5	63	125	250	500	1k	2k	4k	8k
	To ML2													
‡	ODU/00/01 – Daikin REYA12A	Lp			61.0		61	65	59	58	55	52	53	42
‡	ODU/00/02 – Daikin RZAG35B	Lp			48.0		63	63	61	48	42	37	28	25
=	Logarithmic Sum						65	67	63	58	55	52	53	42
	Ratio of Distances - Point Source		1.0 m	230.0 m		-47.2	-47	-47	-47	-47	-47	-47	-47	-47
	Path Length difference	6m					-16.4	-19.4	-22.4	-25.4	-28.4	-31.4	-34.4	-37.5
	Level at receiver				-10.3 (A)		1.5	0.5	-6.5	-14.2	-20.4	-26.5	-28.7	-42.6
	ODU/00/03 - Daikin RXM50R				48.0		48	53	50	47	43	38	31	28
	ODU/00/04 – Daikin RXM35R9				49.0		53	54	52	49	45	40	36	28
	Logarithmic Sum						54	57	54	51	47	42	37	31
	Ratio of Distances - Point Source		1.0 m	300.0 m		-49.5	-50	-50	-50	-50	-50	-50	-50	-50
‡	Path Length difference	6m					-16.4	-19.4	-22.4	-25.4	-28.4	-31.4	-34.4	-37.5
‡	Level at receiver				-21.6 (A)		-11.8	-12.4	-17.8	-23.8	-30.8	-38.8	-46.8	-56.0
=	Level at ML1				-10.0 (A)		1.7	0.7	-6.2	-13.8	-20.1	-26.3	-28.6	-42.4
	To ML3													
	ODU/00/03 - Daikin RXM50R				48.0		48	53	50	47	43	38	31	28
	ODU/00/04 – Daikin RXM35R9				49.0		53	54	52	49	45	40	36	28
	Logarithmic Sum						54	57	54	51	47	42	37	31
	Ratio of Distances - Point Source		1.0 m	200.0 m		-46.0	-46	-46	-46	-46	-46	-46	-46	-46
	Path Length difference	6m					-16.4	-19.4	-22.4	-25.4	-28.4	-31.4	-34.4	-37.5
	Level at receiver				-18.1 (A)		-8.3	-8.9	-14.3	-20.3	-27.3	-35.3	-43.3	-52.5
	ODU/00/01 – Daikin REYA12A	Lp			61.0		61	65	59	58	55	52	53	42
	ODU/00/02 – Daikin RZAG35B	Lp			48.0		63	63	61	48	42	37	28	25
	Logarithmic Sum						65	67	63	58	55	52	53	42
	Ratio of Distances - Point Source		1.0 m	270.0 m		-48.6	-49	-49	-49	-49	-49	-49	-49	-49
	Path Length difference	6m					-16.4	-19.4	-22.4	-25.4	-28.4	-31.4	-34.4	-37.5
	Level at receiver				-11.7 (A)		0.1	-0.9	-7.9	-15.6	-21.8	-27.9	-30.1	-44.0
	Level at ML2				-10.8 (A)		0.7	-0.3	-7.0	-14.4	-20.8	-27.2	-29.9	-43.4

TABLE B1: PLANT CALCULATIONS TO RESIDENTIAL RECEPTOR

APPENDIX C: TERMINOLOGY RELATING TO NOISE

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20_{μ}Pa ($20x10^{-6}$ Pascals) on a decibel scale.
Sound Power Level (Lw)	is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by 20 $\log_{10}$ (s_1 / s_2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20_{μ}Pa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
$L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound
$L_{90,T}$	L_{90} is the noise level exceeded for 90% of the period T (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Specific Noise	The noise source under investigation for assessing the likelihood of complaints.
Rating Level	The specific noise level plus any adjustment for the characteristic features of the noise.
Free field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.

APPENDIX D: LIMITATIONS TO THE REPORT

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