

7 Ashfield Lodge Manchester

Plant Sound
Assessment Report
0977/PSA1
Revision 1

25 July 2022

For:

John Gleadow



2nd Floor 3 Hardman Square
Spinningfields Manchester M3 3EB

☎ 0161 457 0515 ■ 07415 151 901
✉ Enquiry@LighthouseAcoustics.co.uk
🌐 www.LighthouseAcoustics.co.uk

Plant Sound Assessment Report
0977/PSA1
Revision 1

Contents	Page
1.0 Introduction	1
2.0 Objectives	1
3.0 Site Description	1
4.0 Local Authority Requirements	2
5.0 Environmental Sound Survey	3
6.0 Atmospheric Plant Sound Emission Limits	5
7.0 Atmospheric Plant Sound Emission Assessment	5
8.0 Conclusion	8

Appendices

Time History Graph 0977/THG1

This report (including any enclosures and attachments) has been prepared by Lighthouse Acoustics with reasonable skill and care in accordance with generally accepted acoustic principles and the terms agreed between Lighthouse Acoustics and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by Lighthouse Acoustics unless expressly stated otherwise. This document contains confidential information and no part of this report should be reproduced, distributed or communicated to any third party unless Lighthouse Acoustics provide express prior written consent. We do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report. Where a sound survey has been undertaken, this report is based on the sound climate at the site at the time of the survey and no warranty is given as to the possibility of changes at differing times.

Lighthouse Acoustics is the trading name of Lighthouse Enterprises UK Limited
Registered Office: 2nd Floor 3 Hardman Square Spinningfields Manchester M3 3EB
Registered in England and Wales Company No. 09085491

1.0 Introduction

Lighthouse Acoustics has been appointed by John Gleadow to undertake an environmental sound survey at 7 Ashfield Lodge, Manchester and to assess atmospheric sound emissions from the installed 1No. condenser unit.

The survey methodology, results and assessment are presented in this report.

2.0 Objectives

To establish the Local Authority's acoustic requirements for the installed 1No. condenser unit.

To visit site to undertake a detailed environmental sound survey in order to establish existing environmental sound levels at the property.

To undertake manned measurements of atmospheric plant sound emission levels at 1m from the installed 1No. condenser unit and determine the level of attenuation to the nearest noise sensitive receptors by means of a loudspeaker test.

To undertake an assessment of atmospheric sound emissions from the installed 1No. condenser unit upon the nearest noise sensitive receptors.

3.0 Site Description

7 Ashfield Lodge is situated at 2nd floor level in a 5 storey block of flats situated on Palatine Road, Manchester. The installed 1No. condenser unit is situated on the 2nd floor balcony located on the south west corner of the building.

The nearest noise sensitive receptors to the installed 1No. condenser unit are the balconies and windows of the flats situated above (3rd Floor) and below (1st floor).

The M60 motorway is situated approximately 650m to the south west of the site whilst Palatine Road (B5167) is situated approximately 70m to the north west of the site.

The site plan below indicates the extent of the site and the surrounding environment.



Site plan indicating the extent of the site and the surrounding environment

4.0 Local Authority Requirements

With regard to noise and vibration from fixed plant/equipment, Section 3.6.1.5.1 of the Planning & Noise Technical Guidance document (dated December 2015) produced by Manchester City Council states the following:

"The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

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."

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 16:00 hours on Monday 4 July 2022 to 16:00 hours on Tuesday 5 July 2022. During this period the L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods. The installed 1No. condenser unit was non-operational for the duration of the survey period.

5.2 Weather Conditions

At the start of the survey period there was a gentle westerly breeze (<5m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 17°C.

At the end of the survey period there was a gentle westerly breeze (<5m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 18°C.

Based on publicly available weather data for the survey period it is understood that weather conditions remained similar for the duration of the survey with no periods of significant rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for undertaking measurements of sound levels.

5.3 Measurement Position

Environmental sound levels were measured at a single position on-site as described in the table below.

Position	Description
A	Microphone situated on the balcony of 7 Ashfield Lodge at 1.2m above floor 2 nd floor level.

The measurement position is shown on the site plan below.



Site plan showing measurement position

Measurement Position A was selected in order to assess typical environmental sound levels representative of those at the nearest noise sensitive receptors.

5.4 Equipment

The following equipment was used to undertake the environmental sound survey.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Casella	633C	0721319	28/09/2021
Preamplifier	Casella	495	001446	28/09/2021
Microphone	Casella	251	1996	28/09/2021
Class 1 Sound Calibrator	Casella	120/1	3864878	02/11/2021
Environmental Noise Kit	Casella	6847	-	-
Microphone Extension Cable	Casella	C6717/5	-	-
Weather Protection System	Casella	6737	-	-

Field calibration checks were performed on the sound level meter prior to and on completion of the survey and were found to be within acceptable tolerance limits.

5.5 Results

5.5.1 Time History Graph

The results of the environmental sound survey are presented on Time History Graph 0977/THG1 enclosed at the rear of the report.

5.5.2 LA₉₀ Background Sound Level

The lowest representative daytime and night-time LA_{90,15min} background sound levels measured during the survey period are detailed in the table below.

Position	Lowest Representative LA _{90,15min} Background Sound Levels (dB)	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
A	54	44

5.5.3 Discussion of Sound Climate

At the start and end of the survey period the dominant sound source at Position A was noted to be road traffic along Palatine Road (B5167) and the distant M60 motorway.

Whilst we are unable to comment on dominant sound sources or individual sound events during the survey period, based on the surrounding environment it is likely that road traffic remained the dominant sound source.

6.0 Atmospheric Plant Sound Emission Limits

Based on the lowest representative daytime and night-time LA_{90,15min} background sound levels measured during the environmental sound survey and the requirements of the Local Authority, cumulative atmospheric plant sound emissions should not exceed the following limits at the nearest existing noise sensitive receptors.

Receptor	LA _{eq} Cumulative Atmospheric Plant Sound Emission Limit (dB) at Nearest Noise Sensitive Receptor	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
Noise Sensitive	49	39

The above limits are subject to final approval by Manchester City Council.

7.0 Atmospheric Plant Sound Emission Assessment

7.1 Plant Location

The installed 1No. condenser unit is situated on the 2nd floor balcony located on the south west corner of the building as shown in the photo below.



Photo showing the installed 1No. condenser unit

7.2 Nearest Noise Sensitive Receptors

The nearest noise sensitive receptors to the installed 1No. condenser unit are the balconies and windows of the flats situated above (3rd Floor) and below (1st floor).

7.3 Operating Hours

It is understood that the installed 1No. condenser unit has the potential to operate 24 hours a day.

In order to undertake a worst case assessment, it is assumed that the installed 1No. condenser unit will operate for the full 1 hour daytime and 15 minute night-time assessment periods.

7.4 Sound Measurements

The requirements of the Local Authority are for L_{Aeq} atmospheric plant sound emission levels to achieve 5dB below the typical L_{A90} background sound level at the nearest noise sensitive receptors.

It was not possible to demonstrate this by measurement of atmospheric plant sound emissions at the nearest noise sensitive receptors due to the prevailing residual sound climate.

Atmospheric plant sound emission level measurements of the installed 1No. condenser unit were therefore undertaken at a distance of 1m from the casing in order to minimise the contribution from the residual sound climate. This data will subsequently be used to calculate the cumulative atmospheric plant sound emission level at the nearest noise sensitive receptors.

Measurements of the installed 1No. condenser unit were undertaken between 15:30 and 15:40 hours on Monday 4 July 2022. The unit was understood to be operating at normal duty for the duration of the measurements. The measurements were undertaken of the L_{Aeq} sound pressure levels over periods of 1 minute (due to steady noise). Atypical noises were excluded as far as reasonably possible.

7.5 Weather Conditions

During the measurement period there was a gentle westerly breeze (<5m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 17°C.

The weather conditions during the measurement period are therefore considered to be suitable for undertaking measurements of sound levels.

7.6 Equipment

The following equipment was used to undertake the atmospheric plant sound emission level measurements.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Bruel & Kjaer	2250	2626230	26/10/2020
Preamplifier	Bruel & Kjaer	ZC-0032	21309	26/10/2020
Microphone	Bruel & Kjaer	4189	2621208	26/10/2020
Class 1 Sound Calibrator	Casella	120/1	3864878	02/11/2021

Field calibration checks were performed on the sound level meter prior to and on completion of the survey and were found to be within acceptable tolerance limits.

7.7 Results

The results of the atmospheric plant sound emission level measurements are presented in the table below. The presented results have been corrected for the residual sound climate.

Installed 1No. Condenser Unit – Daikin RXM35N2V1B9

L_{eq} Sound Pressure Level (dB) at 1m at One Third Octave Band Centre Frequency (Hz)								dBA
50	63	80	100	125	160	200	250	
47	34	57	53	55	54	51	36	51
315	400	500	630	800	1000	1250	1600	
43	39	38	45	37	43	39	35	
2000	2500	3150	4000	5000	6300	8000	10000	
35	33	33	32	29	30	25	23	

Subjectively, the atmospheric plant sound emissions were barely audible above the residual sound climate and there was no plant irregularity, impulsiveness or tonality.

BS 4142: 2014 provides an objective method for assessing the audibility of tones in sound. The one-third octave method states that if the level of a one third octave band exceeds the level of both adjacent one third octave bands by the following amounts, then a tonal component may be identified as present:

- 15dB in the low-frequency one-third-octave bands (25Hz to 125Hz);
- 8dB in the mid-frequency one-third-octave bands (160Hz to 400Hz);
- 5dB in the high-frequency one-third-octave bands (500Hz to 10kHz).

A review of the one third octave band sound data in the table above indicates that it is unlikely to be considered to exhibit a tonal component. As such, no character correction has been applied to the specific sound level for this item.

7.8 Attenuation Measurements

In order to establish the on-site level of attenuation due to distance and screening losses between the installed 1No. condenser unit and the nearest noise sensitive receptors, a loudspeaker generating a broadband sound spectrum was used. The loudspeaker was located adjacent to the installed 1No. condenser unit and the receive levels were measured at the balcony below (1st floor) and out of a 2nd floor window towards the nearest windows of the flats situated above (3rd Floor) and below (1st floor).

The measurements were undertaken between 15:40 and 15:50 hours on Monday 4 July 2022 using the equipment detailed in Section 7.6.

The results of the attenuation measurements are presented in the tables below.

Attenuation From Installed 1No. Condenser Unit to 1st Floor Balcony

Distance Loss (dB) at One Third Octave Band Centre Frequency (Hz)							
50	63	80	100	125	160	200	250
-14	-17	-20	-22	-15	-10	-19	-21
315	400	500	630	800	1000	1250	1600
-15	-19	-26	-29	-26	-28	-30	-31
2000	2500	3150	4000	5000	6300	8000	10000
-34	-35	-34	-35	-36	-38	-40	-43

Attenuation From Installed 1No. Condenser Unit to 2nd Floor Window

Distance Loss (dB) at One Third Octave Band Centre Frequency (Hz)							
50	63	80	100	125	160	200	250
-20	-23	-30	-25	-29	-31	-35	-27
315	400	500	630	800	1000	1250	1600
-22	-27	-34	-35	-34	-33	-34	-34
2000	2500	3150	4000	5000	6300	8000	10000
-37	-38	-36	-37	-37	-39	-40	-43

7.9 Assessment

The tables below detail the calculated L_{Aeq} atmospheric plant sound emission levels at the nearest receptors along with the proposed cumulative atmospheric plant sound emission limits and the differences between them.

Daytime Assessment

Receptor	Calculated L_{Aeq} Atmospheric Plant Sound Emission Level (dB)	L_{Aeq} Cumulative Atmospheric Plant Sound Emission Limit (dB)	Difference (dB)
Balcony	33	49	-16
Window	20		-29

Night-time Assessment

Receptor	Calculated L_{Aeq} Atmospheric Plant Sound Emission Level (dB)	L_{Aeq} Cumulative Atmospheric Plant Sound Emission Limit (dB)	Difference (dB)
Balcony	33	39	-6
Window	20		-19

The calculated L_{Aeq} atmospheric plant sound emission levels at the nearest noise sensitive receptors are between 6dB and 29dB below the proposed cumulative atmospheric plant sound emission limits.

The assessment therefore indicates that the installed 1No. condenser unit achieves the requirements of the Local Authority at the nearest noise sensitive receptors.

8.0 Conclusion

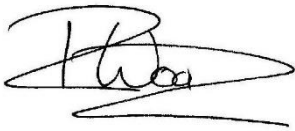
The Local Authority's acoustic requirements for the installed 1No. condenser unit have been established.

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels at the property.

Manned measurements of atmospheric plant sound emission levels at 1m from the installed 1No. condenser unit have been undertaken and the level of attenuation to the nearest noise sensitive receptors has been determined by means of a loudspeaker test.

An assessment of atmospheric sound emissions from the installed 1No. condenser unit to the nearest noise sensitive receptors has been undertaken.

The assessment indicates that the installed 1No. condenser unit achieves the requirements of the Local Authority at the nearest noise sensitive receptors.

A handwritten signature in black ink, appearing to read 'Robin Wood', with a stylized, sweeping underline.

Robin Wood
LIGHTHOUSE ACOUSTICS

7 Ashfield Lodge, Manchester
Time History Graph - Monday 4 July 2022 to Tuesday 5 July 2022
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A

