



Cartway, St James Building, Manchester

Plant Noise Impact Assessment

dBx Acoustics Ltd
Beehive Mill
Jersey Street
Manchester
M4 6JG
0161 711 0320

20079-R01 Cartway, St James Building

Client: Bruntwood

Date: 3 March 2021

Contents

Introduction..... 3

Basis of Noise Assessment..... 4

Site Description 5

Environmental Noise Survey 6

Environmental Noise Survey Results..... 7

Building Services Noise Emissions 8

Conclusions..... 10

Appendix A – Glossary of Acoustic Terminology..... 11

Appendix B – Plant Specific Sound Level Calculation... 12

Revision History

Revision	Date	Revision Details	Author	Checked
R01	03/03/2021	Original Issue	DocuSigned by: <i>Matt Jones</i> 45C749F61A3B42E... Matt Jones MEng AMIOA	DocuSigned by: <i>Susan Witterick</i> 3E69257DCFC14C6... Susan Witterick BSc MIOA



Introduction

dBx Acoustics Ltd has been appointed by Bruntwood to carry out a verification noise survey and noise impact assessment for the newly installed kitchen extract fan associated with the proposed Bundobust bar/restaurant at the Cartway, St James Building, Manchester.

The intention of this report is therefore to report upon the noise survey carried out at the site, and to assess the impact of the new building services plant on the noise sensitive neighbouring properties.

The principal aims of the assessment are summarised below:

- Determine the impact the newly installed plant has had on the nearby noise sensitive receptors.

A glossary of acoustic terminology has been supplied in Appendix A in order to assist the reader.

Basis of Noise Assessment

The noise impact assessment is based on the following:

Manchester City Council – Planning & Noise Technical Guidance (December 2015)

This document sets out Manchester City Council's requirements with regard to current guidance and policy, with the aspiration that new developments achieve the highest standards without compromising the health and wellbeing of residents. The guidance refers to the NPPF and NPSE as described below.

The following requirements are considered relevant to this project;

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 BS 4142 rating level (see below) of 5dB L_{Aeq} below the typical background L_{A90} level at the nearest noise sensitive location.

BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound'

BS 4142:2014 sets out a procedure for assessing noise impact whereby a Noise Rating is determined and compared with the existing local Background Sound Level.

The Rating Level ($dB_{L_{Ar,Tr}}$) is evaluated from the Specific Noise Level by including several, cumulative corrections to account for factors such as distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristics.

The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:

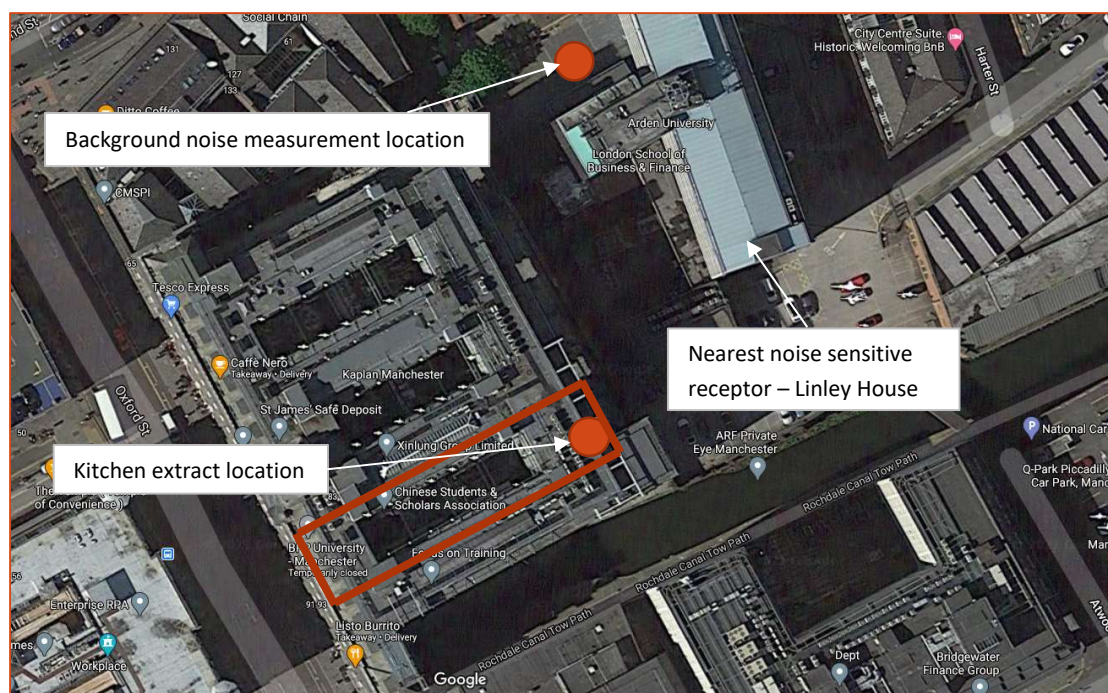
- a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- d) 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.

Site Description

Site Description

The site is on the ground floor of the St James Building adjacent to Oxford Road. The neighbouring commercial units are *Robert and Victor* to the North and *Fresco Deli* to the South. To the rear of the site are office buildings, with Linley House being the closest to the site. Car parks that service the St James Building and the surrounding offices lie to the Northeast.

Figure 1 – Site Location Plan



The installed plant is located to the rear of the Cartway, St James, within the plant area that services the whole of the St James Building. This plant area is a space approximately 15m deep and 30m long, which is an enclosure which breaks the line of sight between the new plant unit and the nearest noise sensitive receptor.

Environmental Noise Survey

Methodology

To assess the noise impact of the newly installed kitchen extract fans, a noise survey was conducted. Due to the Covid19 lockdown, it is likely that background noise levels are lower than pre-lockdown conditions and so the noise survey would be considered as a ‘worst-case’ scenario.

Figure 1 shows the measurement location for the background noise measurements, which was approximately 2m from the Northern façade of Linley House. All other measurements were taken at a distance of 1m from the newly installed plant.

Weather Conditions

Weather conditions during the measurement periods were generally cloudy and dry. Wind speeds were within suitable parameters for the measurement of environmental noise (i.e. generally under 5 ms⁻¹). All microphones were protected with a windshield for the duration of the survey.

Equipment

The equipment used during the environmental noise survey is detailed in Table 1, below.

Table 1 – Equipment used in the environmental noise survey

Equipment	Manufacturer & Part No.	Serial Number
Sound Level Meter	Casella CEL 633C	1539298
Microphone	CEL 251	000847
Pre-Amplifier	CEL 495	001773
Calibrator	CEL 1201	2045151

The sound level meter was calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, with the exception of the calibrator, which had been calibrated not more than one year prior to the survey.



Environmental Noise Survey Results

A summary of the measurements taken is shown in Table 2, below;

Table 2 - Summary of unattended measured noise levels

Date	Measurement	Start Time (hh:mm)	Ambient Noise Level (dBL _{Aeq,T})	Background Noise Level (dBL _{A90,T})	Maximum Noise Level (dBL _{Amax,f})
24 February 2021	Ambient Noise Level (Plant unit on)	15:30	64	59	76
	Residual Noise Level (Plant unit off)	15:43	62	56	76
	Background Noise Level	15:51	56	53	73
	Background Noise Level	16:06	56	53	72
	Background Noise Level	16:21	56	53	68

The background noise source measured was distant road traffic, while the ambient noise source in the area was plant noise from the other operating units from the St James Building. Maximum events were caused by cars entering the car park for Linley House.

The nearest noise sensitive receptor, Linley House, is an office and so only daytime measurements were necessary for the assessment. The daytime background noise level at this receptor used in the assessment is 53 dB L_{A90}.

The noise survey results can be compared to the pre-construction noise survey and plant noise impact assessment carried out by dBx Acoustics Ltd in report reference *18049 St James Building R01A* dated 27 February 2019. The background noise level at Linley House reported at this time was 54dBL_{A90,T}. Therefore the background noise measurements made during this more recent survey indicate that the noise climate at this location is not significantly impacted by Covid-19 restrictions.

Building Services Noise Emissions

MCC Requirements

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 BS 4142 rating level (see below) of 5 dB L_{Aeq} below the typical background L_{A90} level at the nearest noise sensitive location.

Based on the noise survey data presented, and the plant noise requirements of MCC, external plant items should be designed for a rating level of no more than 48 dB $L_{A,Tr}$.

BS4142 Assessment

The following BS 4142:2014 assessment has been carried out to examine the cumulative effect of proposed plant on the nearest residential properties.

Using the measured ambient and residual noise levels, the specific noise level of the new plant unit was calculated. This calculation is presented in Appendix B.

Further calculations have been carried out to predict noise propagation from the plant location to the residential receptor. In completing the calculations, the measured noise levels have been corrected for the attenuation of sound over distance, source directionality, plant tonality and screening effects, as appropriate.

The nearest noise sensitive receptor is an office and so only a daytime assessment is necessary.

Table 3 – BS4142 Assessment

Results	Calculation	Relevant Clause	Commentary
Measured background sound level	53 dB $L_{A90, 1hr}$	8.3	The typical background sound level measured during the daytime period. Consistent throughout survey period.
Specific sound level	25 dB $L_{Aeq,T}$	7.3.3	A prediction made using the methodology outlined above, includes all sources, screening and distance corrections.
Assessment made during the daytime period, so reference period is 1 hour		7.2	-
Acoustic feature correction	6 dB	9.2	Tonality correction applied based on manufacturers' data
Rating level	31 dB $L_{Ar,Tr}$	9.2	The predicted Rating Level during the daytime period.
Background sound level - daytime	53 dB $L_{A90, 1hr}$	8	The typical background sound level measured.
Excess of rating over background sound level	-21 dB	11	-
Assessment indicates low likelihood of adverse impact		11	Predicted Rating Level does not exceed the lowest measured background level. This is an indication of the development having a low impact.
Uncertainty of the assessment	Minor	10	Background sound level based on repeatable measurements. The predicted Rating Level is based on established prediction methodologies.

Reviewing Table 3, it can be seen that a cumulative plant rating noise level of 31 dB $L_{Ar,Tr}$ is predicted at the closest NSR. The predicted cumulative plant noise level is significantly lower than the measured background sound level, and hence, ***meets the requirements of MCC.***

Conclusions

dBx Acoustics Ltd has been appointed by Bruntwood to carry out a noise survey and noise impact assessment for the external plant units at Cartway, St James Building, Manchester.

A noise survey was undertaken to determine the noise levels of the new plant and the background noise levels at the nearest noise sensitive receptor.

Using these noise levels, a BS4142 assessment has been carried out to determine the impact of the proposed plant at the nearest noise sensitive receptor.

It was found that the newly installed plant unit meets the criterion laid out by Manchester City Council.

Appendix A – Glossary of Acoustic Terminology

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is $2 \times 10^{-5} \text{ N/m}^2$. The sound pressure level existing when microphone measured pressure is $2 \times 10^{-5} \text{ N/m}^2$ is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.

Appendix B – Plant Specific Sound Level Calculation

St James Cartway - Calculation of Specific Sound Level			
Ambient noise level - plant on	64 dB, Laeq,T	A	
Residual noise level - plant off	62 dB, Laeq,T	B	
Specific plant level at 1m (A-B)	60 dB, Laeq,T	C	
Distance to Linley House r	30 m	D	
Distance attenuation -20 log r	-30 dB	E	
Screening from plant enclosure	-5 dB	F	
Specific sound level at receptor C-E-F	25 dB, Laeq,T		