

Co-operative Store Chester Road Cornbrook

Plant Noise Assessment Report

26357/PNA

7 October 2020

For:
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Environmental Noise Survey Report 26357/PNA

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	04/08/2020	-		
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Appendix A – Acoustic Terminology

Time History Graph 26357/TH1



1.0 Introduction

New items of building services plant are proposed to be installed at this store. Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey to provide a basis for assessment of the environmental plant noise emissions for planning purposes.

This report presents the plant noise assessment and our advice on further mitigation measures, where/if necessary.

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings and to identify a suitable accessible location for environmental noise measurements.

To undertake noise level measurements during the quietest daytime and night-time periods on a typical weekday in general accordance with BS 7445. To record the A-weighted (dBA) L_{eq} and L_{90} environmental noise levels.

To recommend suitable plant noise emission criteria based on the requirements of the Local Authority and BS 4142:2014 so as to avoid causing a statutory noise nuisance.

To assess the atmospheric noise emissions from the new items of external mounted building services plant.

To comment on the acceptability of the proposed plant installation, and where necessary, specific suitable noise mitigation measures.

3.0 Acoustic Terminology

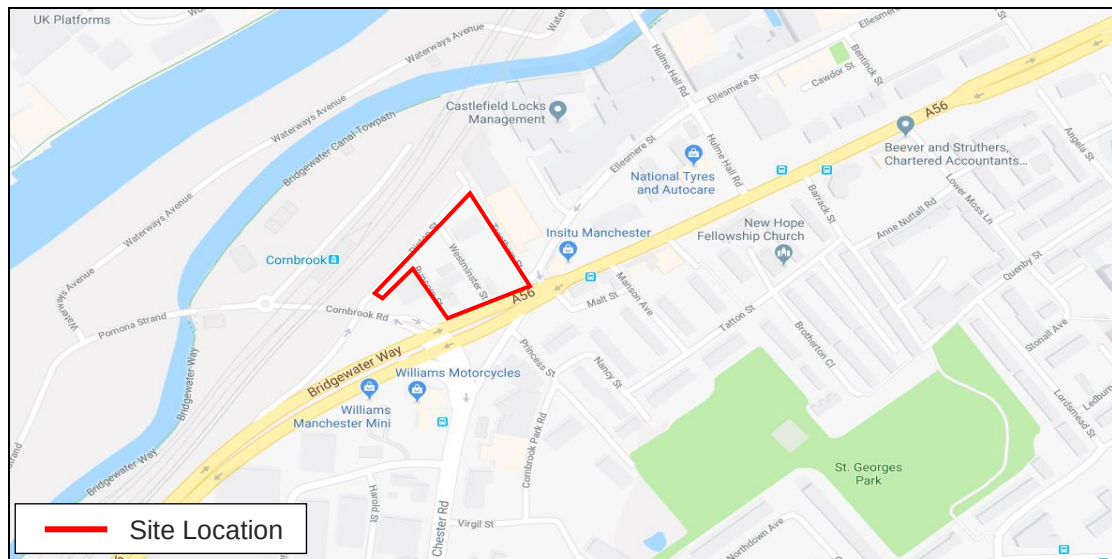
For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.



4.0 Site Description

4.1 Location

The site is located on Chester Road in Cornbrook, Manchester as shown on the Location Map below. The site falls under the jurisdiction of Manchester City Council (MCC).



Location Map (maps.google.co.uk)

4.2 Description

The site is bounded by Dinton Street to the north, small industrial units off Westminster Street to the west, Chester Road to the south and Trentham Street to the east. The nearest residential window is noted to be associated with the development, and lies Level 1 of the proposed development (proposed plant area is situated on the ground floor). See Site Plan below.



Site Description (maps.google.co.uk)

5.0 Survey Methodology

The survey was undertaken by Ben Phipps, BSc(Hons).

5.1 Procedure

A fully automated noise survey was undertaken from approximately 14:00 hours Thursday 24 January 2019 to 14:00 hours on Friday 25 January 2019.

At the beginning and at the end of the survey the sky was overcast and there was no rain. We understand that throughout the survey period conditions were generally similar to this. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90} and L_{eq} sound pressure levels over 15 minute periods. Measurements were undertaken in general accordance with BS 7445-1:2003 Description and Measurement of Environmental Noise.



5.2 Measurement Position

The sound level meter was installed inside a small security box with the microphone protruding approximately 6cm out of the box and fitted with a windshield. The security box was fixed to a lamp post Off Chester Road (on the side facing the road) with the microphone at a height of approximately 3m above ground level.

In order to minimise the effect of the box, the microphone was orientated vertically downwards on the side of the lamppost facing the road such that it was not screened from the road. The position is shown on the plan below.



Plan Showing Unmanned Measurement Positions (maps.google.co.uk)

5.3 Instrumentation

The instrumentation used during the survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Svantek	971	72540	23/04/2018
Type 1 Calibrator	Larson Davis	CAL200	3083	16/04/2018

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1 dB).



6.0 Measurement Results

The results have been plotted on Time History Graph 26357/TH1 enclosed, presenting the 15 minute A-weighted (dBA) L_{90} and L_{eq} levels at the measurement position throughout the duration of the survey.

The typical lowest L_{A90} (15 min) measurements recorded during the survey are presented in the table below:

Lowest Measured L_{A90} (15 mins) (dB re 2×10^{-5} Pa)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
58 dBA	46 dBA

6.1 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be road traffic from the surrounding road network, railway traffic from the nearby tramlines as well as activity from nearby construction sites.

7.0 Plant Noise Emission Criteria

7.1 Local Authority Requirements

Manchester City Council requirements are outlined in Section 3.0 of Manchester City Council's Planning & Noise Technical Guidance document (December 2015).

Section 3.6.1.5.1 outlines that the noise assessment for fixed plant should be based on BS 4142:2014 and the assessment must demonstrate that:

“Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.”

7.2 BS 4142:2014

BS 4142: 2014 describes methods for rating and assessing the effects of outdoor sound levels, of an industrial and/or a commercial nature, “on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident”.



The impact of a specific sound is indicated by subtracting the existing background noise level from the rating level (i.e. noise level from the proposed items of plant/machinery/etc plus any acoustic feature corrections). The standard states that:

- “a difference of around +10dB or more is likely to be an indication of a significant adverse impact”;
- “a difference of around +5dB is of marginal significance is likely to be an indication of an 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”.

The noise from the new development is expressed in terms of a rating level and given as a $L_{Aeq, T}$ noise level. The existing background noise level is expressed in terms of a $L_{A90, T}$ noise level. T is the assessment time interval, which is 1-hour for operations during daytime hours (07:00 to 23:00 hr) and 15-minutes for operations during night-time hours (23:00 to 07:00 hr).

BS 4142:2014 states that if a noise source contains an 'acoustic feature', such as tonality, intermittency or impulsiveness, an appropriate penalty should be applied.

7.3 Proposed Criteria

On the basis of the above, we propose that noise from new fixed items of building services plant are controlled to the following incident noise levels at nearest noise sensitive residential window with all plant operating simultaneously. These limits are presented as free-field sound pressure levels.

Plant Noise Emission Criteria (dB re 2×10^{-5} Pa)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
53 dBA	41 dBA

Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality.

It should be noted that the above are subject to the final approval of the Local Authority.

8.0 Plant Noise Assessment

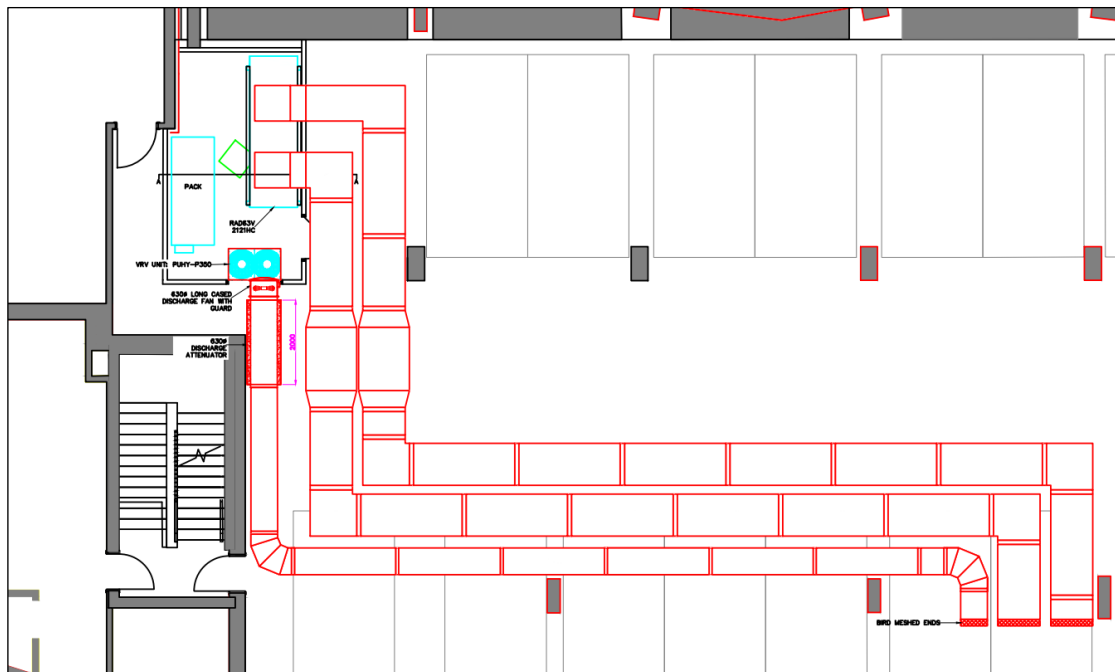
8.1 Overview

Hann Tucker Associates have undertaken an assessment of atmospheric plant noise egress based on manufacturers' noise data for the proposed plant items. The following sections outline the basis of the plant noise egress assessment and our findings.

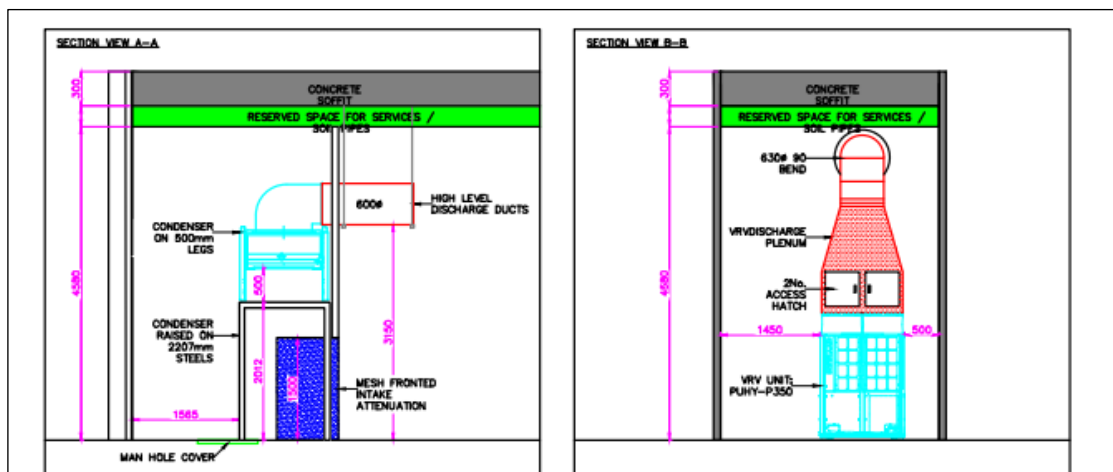


8.2 Proposals

The following plan provided by Andy McPhun of City Building Engineering Services Ltd illustrates the proposed layout and location for the proposed plant units.



Proposed building services plant layout – plan view



Proposed building services plant layout – section views



The details of the proposed building services plant items are as follows:

Description	Plant Model Reference	Sound Pressure Level
Refrigeration Pack	79003	30 dBA @ 10m
Gas Cooler	Louve RAD63 212HC-AL/MG	43 dBA @ 10m
	Space ST-3A 36kW	60 dBA @ 10m
AC Condensers	Mitsubishi PUHY350YNW-A	62 dBA @ 1m

There is also noted to be noise mitigation measures proposed as part of the installation in the form of discharge attenuators and an air intake louvre. Details of the insertion losses for the proposed attenuation measures, as advised by Miriam Pratap of NSL (Noise Solutions Ltd), are provided in the following table.

Description	Sound Pressure Level at Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Attenuated air intake louvre	6	11	18	30	37	37	35	29
Gas Cooler discharge attenuator	4	10	19	32	40	36	27	19
AC unit discharge attenuator	5	10	16	28	33	22	17	16

8.3 Affected Receptors

8.3.1 Residential Receptor

It is noted that the worst affected off-site noise sensitive premises are those situated within the development itself, as illustrated in Section 4.0. Our calculations have been undertaken to this receptor, and account for attenuating factors such as for any screening provided by the site geometry (ie barrier attenuation), distance attenuation, as well as noise mitigation measures that are proposed.

Our assessment to residential noise sensitive receptors has been undertaken against the night-time plant noise limits (ie assuming plant can operate 24/7) in order to assess a worst case scenario.

8.3.2 Car Park Receptor

In addition to noise sensitive residential receptors, based on the location of the plant room (ie next to a car park), it is recommended that the plant installation be commensurate with achieving an appropriate internal noise level within the car park. In such instances, it is recommended that an internal Noise Rating (NR) level of NR 55 be achieved within the car park.



8.4 Assessment

8.4.1 Assessment to Residential Receptor

Based on the manufacturers' noise data, the cumulative sound pressure level at the worst affected residential noise sensitive receptor has been calculated and assessed as below.

Description	Sound Pressure Level (dB L _{Aeq}) at 1m from Level 1 Residential Window
Noise breakout from plant room	40
Noise from discharge ductwork	36
Cumulative noise level for all plant compounds	41
Night-time Plant Noise Limit (23:00 – 07:00)	41
+/- dB compared to limits	0

The above calculations indicate that the proposed plant items comply with the more onerous night-time plant noise limit at the worst affected noise sensitive receptor. In reality, it has been advised that not all items of plant will operate during the night-time, therefore the above noise level is considered worst-case and in reality the noise level would be expected to be lower.

Calculations can be made available upon request.

8.4.2 Assessment to Residential Receptor

Due to the fact that the discharge ductwork for both the AC Unit and Gas Cooler are ducted away from the plant room, there is considered to be 2no. assessment locations within the car park to be considered. These are A) immediately outside the plant room within the car park, and B) beneath outlet of the discharge ducts towards the middle of car park.

Based on the manufacturers' noise data, the cumulative sound pressure level at the worst affected residential noise sensitive receptor has been calculated and assessed as below.

Description	Sound Pressure Level
Noise breakout from plant room	NR 51
Noise from discharge ductwork	NR 51
Internal Noise Criteria	NR 55



The above calculations indicate that the proposed plant items comply with the recommended internal noise criterion within the car park.

Calculations can be made available upon request.

9.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate.

Environmental plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the requirements of the Local Authority and BS 4142 so as to avoid causing statutory noise nuisance.

An assessment of plant noise egress has been carried out to determine whether the proposed plant items comply with the proposed limits at the nearest noise sensitive residential window, as well as within the internal car park. Our assessment indicates no need for attenuation measures in addition to those already provided to control plant noise egress.



Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. $30\text{dB} + 30\text{dB} = 33\text{dB}$, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ 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.

$L_{eq,T}$ $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, T .

Co-operative Store, Chester Road, Cornbrook

A-weighted Sound Levels at Automated Position 1

Thursday 24 January - Friday 25 January 2019

26357/TH1

- L_{Amax},15min
- ▒ L_{Aeq},15min
- L_{A90},15min

