Azymuth Acoustics UK

Professional Acoustic Services

Condenser Noise Impact Assessment
Ref: AA0520.1

4no. External Condenser units

Chorlton Baths,
3 Cavendish Terrace,
Chorlton-cum-Hardy,
Manchester
M21 0UA

On behalf of

Caddick Construction (NW) Ltd

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Disclaimer

This report has been prepared by Azymuth Acoustics UK with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our Standard Terms and Conditions of Business and taking into account the resources devoted to it by agreement with the Client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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1.0 Introduction

Azymuth Acoustics UK (henceforth Azymuth) has been contracted by Caddick Construction (NW) Ltd to review the proposed external condensers and dismiss the planning conditions set by Manchester City Council ref 136791/FO/2023 29a and 29b for the development at Chorlton Baths consisting of 2no. apartment blocks and 50no. new dwellings in total with associated communal areas.

Azymuth has previously undertaken a Noise Impact Assessment (NIA) for the site in March 2023. In this NIA Azymuth had provided external building envelope recommendations in order to mitigate the effects of environmental noise on future residents.

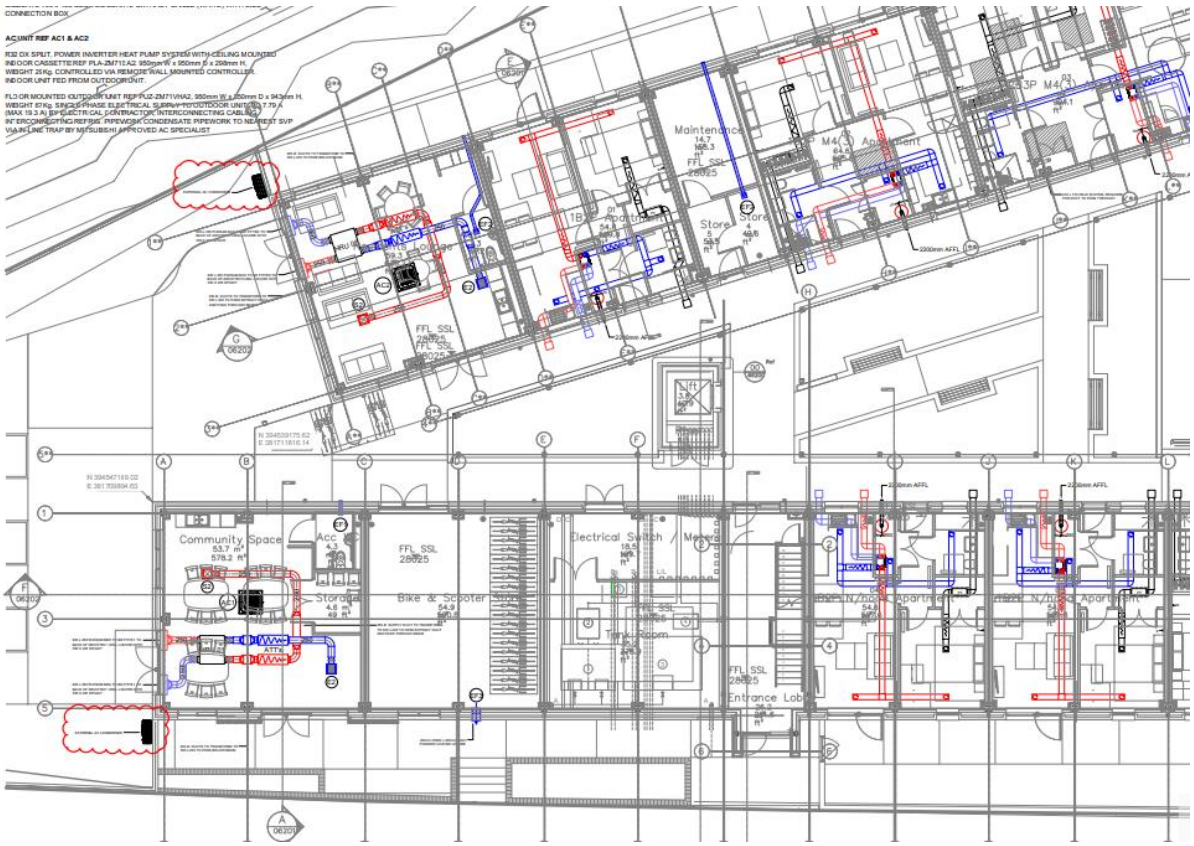


Figure 1 – Drawing of external unit locations

This condenser noise impact assessment is intended to provide information relating to the potential noise impact of the 4no. external units (which Azymuth understands run 09:00hrs to 17:00hrs) on the surrounding environment in order to support the detailed planning application for the installation. In particular, the report sets out the following details:

- The results of a baseline noise survey undertaken in the vicinity of Chorlton Baths in March 2023
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of development.
- Recommendations to meet the targets as set out by the assessment criteria.
- An assessment of the proposed plant items with calculated noise impact.
- Recommendations relating to mitigation measures if appropriate.

2.0 Azymuth March 2023 Baseline Noise Survey

A baseline noise survey was undertaken by Azymuth in March 2023 (report ref. **Z49618revA**)

2.1 Measurement Procedures

Noise and vibration measurements were recorded at 5No. locations around the site.

• Position A: Located at the front of site closest to Unicorn Grocery (at 6m from the edge of the road)

• Position B: Located at the furthest corner of the existing building away from Unicorn Grocery (at 6m from the edge of the road)

• Position C: Opposite The Font inbetween pos A and pos B (at 6m from the edge of the road)

• Position V1/D: On the car park of the BT premises closest to Trams (at an estimated 12m from the tram line)

• Position E: on Manchester Road the far boundary of the proposed site closest to bridge (at 5m from the edge of the road)



Figure 2 - Satellite image showing the measurement locations used for the surveys

2.2 Summary of Azymuth NIA noise measurements

The following table summarises the results of the noise measurements undertaken at the proposed site in terms of the average daytime and night-time noise levels.

Location	Period	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Pos A Closest to Unicorn Grocery	Day	81.6	67.9	71.1	65.6	71.1
Pos B – Edge of existing building	Day	79.8	69.1	72.6	67.3	58.2
Pos C – Opposite the font in middle of Pos A,B	Day	69.4	72.6	66.5	58.3	69.4
Pos D – On BT carpark closest to tram	Day	82.3	68.9	71.2	62.2	51.2
Pos E - Closest to bridge over railway	Night	80.8	65.1	67.6	49.9	38.8

Table 1 – Summary of free field noise measurements

2.3 Description of Noise Climate

The noise climate at the proposed site is dominated by road traffic on Manchester Road where the measurement positions A, B, C, E are located. The regular road traffic includes cars, busses and occasional HGVs. The bus services serving Manchester Road includes the relatively frequent No.86 bus route

The noise climate on Metrolink elevation where position D is located is controlled by tram movements as well the more general road traffic background noise. The Manchester Metrolink line serves routes from Manchester Airport and East Didsbury to Manchester City Centre in both directions on a regular basis. At night, there are few trams and buses passing.

At this site, the vibration climate is dominated by the Metrolink Tram lines near Chorlton Baths Site. However, as both a subjective and the results of the vibration measurements confirmed the vibration levels are imperceptible at this location.

3.0 Assessment Criteria

In order to assess the extent of any measures required in order to comply with suitable conditions relating to potential noise sources, Azymuth Acoustics UK has reviewed various guidance documents and standards, these include:

- Manchester City Council Planning and Noise Technical Guidance
- British Standard 4142:2019
- Mancehster Council Planning Application 136791/FO/2023: Planning Condition 29a and 29b

3.1 Manchester City Council Planning and Noise Technical Guidance

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'.

3.2 British Standard 4142:2014+A1:2019

BS 4142 "Methods for assessing and rating industrial sound" describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use 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.

- Typically, the greater the difference between background sound and industrial/commercial noise, the greater the magnitude of the impact.
- 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.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

BS 4142 notes that: "Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

3.3 Manchester City Council Planning Condition 29a and 29b

Manchester city council applied the conditions 29a and 29b to planning application P2025/1635/NMA relating to this site in connection with any externally mounted plant:

29A) Any externally mounted ancillary plant, equipment and servicing to be installed 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 its installation, the scheme, including any necessary mitigation, shall be submitted to and approved in writing by the City Council as Local Planning Authority in order to secure a reduction in the level of noise emanating from the site.

29B) Prior to any externally mounted ancillary plant, equipment and servicing to be installed becoming operational, an approved 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.

3.4 Recommended Noise Assessment Criteria

Based on the guidance above it is recommended that the following criteria would be reasonable with the aim of minimising the impact of noise on the surrounding environment.

- Noise levels originating from the premises shall be controlled to 5dB below the background sound level at
- the nearest on site residential receptors is apartment 9 and 10 on the Chorlton baths site
- The nearest off site residential receptor is beleived to be 520 Wilbraham Road

4.0 Noise Assessment

4.1 Layout and Receptor Locations

The 4no. external units are to be located at rear ground floor level northern façade of blocks A & B

The nearest noise sensitive receptors **off site** have been identified as 520 Wilbraham Road.

The nearest noise sensitive receptors **on site** have been identified as Apartment 9 and Apartment 10

The proposed outdoor unit(s) are understood to be as follows:

- 4no. Mitsubishi- PUZ-ZM60VHA2

Azymuth have calculated the sound power levels of each octave frequency band using the measured date which was recorded on 24th July 2026 by Azymuth. The ground floor units have been modelled as point sources. The overall sound power levels are shown in the table below:

Unit	Sound Power Level (dB), Octave Band Frequency (Hz)								Overall unit L_{WA} (dB)
	63	125	250	500	1k	2k	4k	8k	
PUZ-ZM60VHA2	53.4	52.9	45.9	43.8	45.4	43.1	41.8	37.4	50.3

Table 2 – Azymuth calculated sound power level for 4no. external units

4.2 SoundPLAN Model Prior to Mitigation

Azymuth have created a noise prediction model in SoundPLAN 9.1 to predict and visualise the effect of the externally mounted plant on the surrounding environment, including the noise levels at nearest worst-case residential receptors.

It is understood all units will operate from 09:00hrs – 17:00hrs to reflect typical working hours and have been modelled to run at full capacity during these hours to simulate a worst-case scenario.

4.2.2 Grid Noise Map (GNM) based on measured condenser noise

Azymuth have produced the following GNM of the site calculated at 1.5m height.

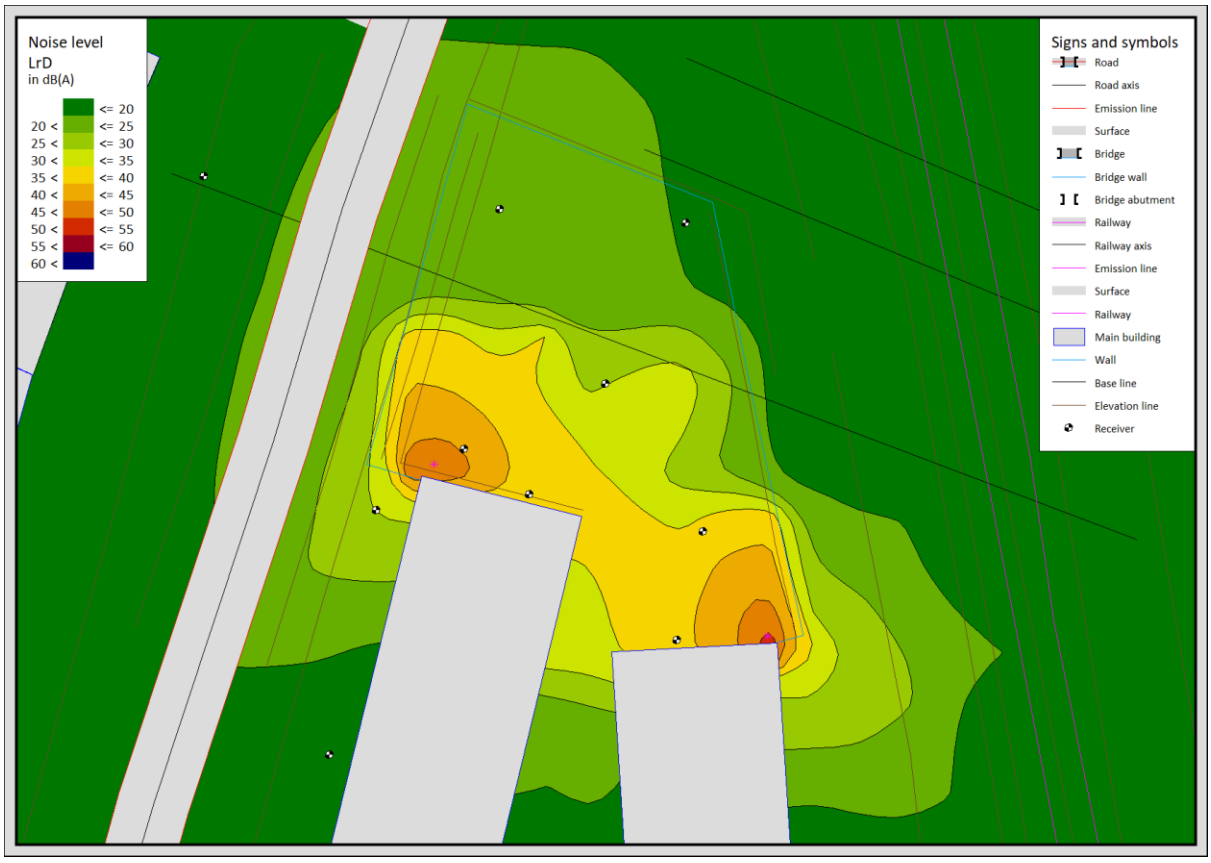


Figure 3 – GNM of the site (calculated at 1.5m above ground height)

4.2.3 BS 4142 / Planning Condition 8 Assessment

Azymuth have undertaken a BS 4142 assessment of noise impact on nearby residents against the noise limit set by Manchester City Council Condition 29A and 29B: noise should be controlled to 5dB below the background sound level.

The following table identifies the nearest noise sensitive receptors, the predicted sound level as a result of the 4no. units at these receptors and how this noise level relates to the background sound level.

The predictions are based on a scenario in which the units are running at full capacity 09:00hrs – 17:00hrs.

Source receiver distances have been measured as the distance between the closest unit to each respective receptor.

Noise emissions from the units can be characterised as broadband air movement over fan blades with low level compressor noise, with no obvious narrow band tonality. As such no penalty has been applied for tonality, impulsivity or intermittency.

Noise Source	Receptor Location	Source – Receiver Distance (~m)	Background Sound Level – 5dB (dBA)	Predicted Noise Level (dBA)	Noise Level re. Background Sound Level
All units on	**ON SITE** Apartment 9	~3	46	37.8	**-8.2**
All units on	**ON SITE** Apartment 10	~3	46	39.4	**-6.6**
All units on	**OFF SITE** 520 Wilbraham Road	~30	46	20.2	**-25.8**

Table 3 – Predicted daytime noise levels at nearest noise sensitive receptors

As shown in the table above, the predicted noise levels at the worst affected noise sensitive receptors are 6-25dB below the background sound level – 5dB which shows there is negligible impact on the surrounding environment.

It should be noted that Azymuth Acoustics do not deem the noise from the condensers installed at this location to have any (audible) specific tonal or intermittent characteristics, hence no penalty has been applied to the specific levels derived from the measurements and SoundPlan calculations. It would also be noted that even if a (very much) worst case penalty of 6dB were applied to the noise levels set out in Table 4 then the noise levels would remain at least 5dB below the background noise.

5.0 Summary

Azymuth Acoustics UK (henceforth Azymuth) has been contracted by Caddick Construction (NW) Ltd to review the proposed external condensers and dismiss the planning conditions set by Manchester City Council ref 136791/FO/2023 29a and 29b for the development at Chorlton Baths consisting of 2no. apartment blocks and 50no. new dwellings in total with associated communal areas.

Azymuth has previously undertaken a Noise Impact Assessment (NIA) for the site in March 2023. In this NIA Azymuth had provided external building envelope recommendations in order to mitigate the effects of environmental noise on future residents.

Daytime background noise levels were measured to be ~58dB L_{A90}. Night-time background noise levels were measured to be ~39dB L_{A90}.

A noise model has been produced in SoundPLAN 9.1 to predict and visualise the impact of noise associated with the external units on the surrounding environment. Azymuth understand all units are to run from 09:00hrs – 17:00hrs.

Azymuth has undertaken a BS 4142 assessment of noise associated with the premises against the noise limit set by Manchester City Council Planning condition 29A and 28B: noise should be controlled to 5dB below the background sound level. It has been found that noise levels at the nearest worst-affected off site residential receptors, located at 520 Wilbraham Road is 25.8dB below the associated background sound level – 5dB and would therefore produce a negligible impact on the surrounding environment.

It has been found that noise levels at the nearest worst-affected on-site residential receptors, located at Apartment 9 and Apartment 10 is 6-8dB below the associated background sound level – 5dB and would therefore produce a negligible impact on the surrounding environment.

Appendix A – Glossary of Acoustic Terms

Decibel (dB)
This is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal).

dB (A)
This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level
The human ear is sensitive to sound over a range of frequencies between approximately 20Hz to 20kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

L_{Aeq}
This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

Reverberation Time (RT or sometimes T_{30} or T_{60})
This is the time taken for the reverberant sound energy in an enclosure to decay one millionth of its equilibrium value, i.e. by 60dB, after the source has been switched off. The reverberation time is frequency dependent and it is customary to measure its value in octave or one-third octave bands. Reverberation occurs when sound waves are repeatedly reflected from each surface of the room.

Sound Reduction Index (SRI)
Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

SRI = L1 - L2 + 10 log (S/A), where:
L1 = Noise level in the source room
L2 = Noise levels in the receiving room
S = Surface area of test specimen
A = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index (R_w)
This is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the R_w is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves.