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Professional Acoustic Services

Discharge of Planning Conditions Report Ref: Z62296

Downley Drive
Ancoats

On behalf of

Rowlinson Constructions Limited

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1.0 Introduction

Azymuth Acoustics UK (henceforth Azymuth) were appointed by Rowlinson Constructions Limited in December 2023 to undertake acoustic testing at the new build development site located on Downley Drive, Ancoats, Manchester. The development site consists of 23no. new build houses.

Testing has been instructed in order to assist with the discharge of two planning conditions in relation to internal noise levels and noise levels omitting from fixed plant (ASHP). The planning application refers to a noise impact assessment that was carried out on site by another acoustic consultancy (Sandy Brown) in April 2021. The purpose of the testing is to confirm that the mitigation advice issued in this assessment is accurate and that noise levels are of an acceptable level.

1.1 Measurement Procedures

1.1.1 Internal Noise Monitoring

The instrumentation used for the internal acoustic testing consisted of a SvanTek 977, Svantek 971 and an NTi XL2-TA which are all type 1 precision sound level meters. The equipment was calibrated before and after measurements. The equipment measured A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement instances.

Measurements in Living Rooms were taken ~1m from the rear window (ground floor) in Plot 23 (Block 6) and Plot 17 (Block 5). Measurements in Bedrooms were taken ~1m from the front facing window (first floor) in these same 2no. plots. The instrumentation measured the internal noise levels to be experienced by the apartment over a continuous time period taking into account rush-hour as well as the night-time. Measurements in the garden/external amenity spaces of these plots were also undertaken to assess the ambient conditions.

Measurements in Plot 23 were undertaken over a continuous period between 15:30hrs on Friday 15th March and 03:30hrs on Monday 18th March 2024.

Measurements in Plot 17 were undertaken over a continuous period between 15:00hrs on Friday 22nd March and 07:30hrs on Monday 25th March 2024.

Full results of the noise levels recorded during the course of the survey are included in Appendix B of this report.

1.1.2 ASHP Measurement

The instrumentation used for the ASHP measurement consisted of a SvanTek 971 type 1 precision sound level meter. The equipment was calibrated before and after measurements. The equipment measured A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement instances.

Measurements were taken at 1m and ~45° angle (in order to minimise potential turbulent air-flow noise) from the main fan of the unit located to the rear of Plot 23. The flow temperature during the measurement was 46°C in order to ensure a reasonable worst case assessment of the noise levels. Measurements were taken over a period of 11 minutes (as a series of 1min measurements) from both the right and left hand side of the unit. The resultant noise levels were then corrected for ambient sound (ie order to quantify the noise level from the ASHP on its own).

2.0 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 has reviewed various guidance documents and standards, these include:

- British Standard 8233:2014
- World Health Organisation Guidelines on Community Noise
- Manchester City Council (MCC) Planning Application No: 137803/NMC/2023, Conditions 16 and 17

2.1 British Standard 8233: 2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate internal ambient noise level criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233 applying to residential properties:

Activity	Room	Good Design Range $L_{Aeq, T}$ dB	
		07:00-23:00hrs	23:00-07:00hrs
Resting	Living Room	35	-
Dining	Dining Room / Area	40	-
Sleeping (daytime resting)	Bedroom (at night)	35	30

Table 1 – Noise Limits for Residential Properties Suggested in BS 8233

2.2 World Health Organisation Environmental Noise Guidelines (ENG) 2018

The main purpose of the 2018 WHO guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from the following sources: transportation (road traffic, railway and aircraft), wind turbines and leisure activities.

The guidelines set out to define recommended exposure levels for environmental noise in order to protect population health. Exposure limits are average levels defined over a period of one year, measured outdoors in free field at the most exposed façade. It should be noted that the document does not provide guideline limit values for multiple noise sources in combination.

The 2018 guidelines supersede the Community Noise Guidelines from 1999. Nevertheless, the document recommends that all CNG indoor guideline values and any values not covered by the current guidelines should remain valid. As such, the following guidance would remain appropriate:

For protection against sleep disturbance inside dwellings, night-time noise levels should not exceed 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for typical single sound events (which are exceeded 15 times or more per night – see ProPG Appendix A.12 for more details).



To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise (interpreted as noise from all sources combined) should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas.

It should be noted that exposure levels defined in ENG and CNG are for guidance purposes as relates potential adverse health impacts and should not be interpreted as absolute limits or regulations.

2.3 MCC Planning Application No: 137803/NMC/2023

2.3.1 Condition 16

The following has been issued by the council in relation to discharging the planning condition:

'(a) Notwithstanding the Noise Assessment prepared by Sandy Brown stamped as received by the City Council, as Local Planning Authority 13 May 2021, prior to the first occupation of each phase of the development identified on plan ref: 8801-BA-00-00-DR-A-(04) 007-C1, a scheme for acoustically insulating the proposed residential accommodation against noise from the local traffic network shall be submitted for approval in writing by the City Council, as Local Planning Authority. The approved noise insulation scheme shall be

completed before the first occupation of that phase of the development. Noise survey data must include measurements taken during a rush-hour period and nighttime to determine the appropriate sound insulation measures necessary. The following noise criteria will be required to be achieved:

- *Bedrooms (night-time - 23.00 - 07.00) 30dB L_{Aeq} (individual noise events shall not exceed 45dB $L_{Amax,F}$ by more than 15 times)*
- *Living Rooms (daytime - 07.00 - 23.00) 35dB L_{Aeq}*
- *Gardens and terraces (daytime) 55dB L_{Aeq}*

(b) Prior to the first occupation of each phase of the development identified on plan ref: 8801-BA-00-00-DR-A-(04) 007-C1, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. A verification report and measures shall be agreed until such a time as the phase of the development complies with part (a) of this planning condition.

(c) Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ'

2.3.2 Condition 17

The following has been issued by the council in relation to discharging the planning condition:

'(a) Prior to the first occupation of each phase of the development identified on plan ref: 8801-BA-00-00-DR-A-(04) 007-C1, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval in writing by the City Council, as Local Planning Authority. For the avoidance of doubt, externally mounted 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.

(b) Prior to the first occupation of each phase of the development identified on plan ref: 8801-BA-00-00-DR-A-(04) 007-C1, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. A verification report and measures shall be agreed until such a time as the phase of the development complies with part (a) of this planning condition. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority. Any measures shall thereafter be retained and maintained in situ'

The Sandy Brown report identified that the "representative background sound levels measured during the survey were $L_{A90, 15min}$ 42 dB during the daytime and $L_{A90, 15min}$ 36 dB at night." This would imply noise limits of 37dBA daytime and 31dBA night-time in order to comply with the 5dB below background level stipulated in this planning condition.

3.0 Assessment of Internal Noise Levels

3.1 Plot 23: Bedroom

The following table summarises the noise measurement data for the Bedroom of Plot 23 over the measurement period.

Location	Period	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Plot 23: Bedroom	Day	39.4	27.0	27.8	26.7	25.8
Plot 23: Bedroom	Night	35.8	27.1	28.0	26.9	25.9

Table 2 – Summary of daytime and night-time noise levels Plot 23 Bedroom

- 15th highest night-time L_{Amax} value = 42.7dB inside Bedroom of Plot 23

3.2 Plot 23: Living Room

The following table summarises the noise measurement data for the Living Room of Plot 23 over the measurement period.

Location	Period	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Plot 23: Living Room	Day	42.0	23.9	24.3	22.5	20.5
Plot 23: Living Room	Night	37.0	23.0	24.1	22.5	20.4

Table 3 – Summary of daytime and night-time noise levels Plot 23 Living Room

3.3 Plot 23: Garden

The following table summarises the noise measurement data for the Garden of Plot 23 over the measurement period.



Location	Period	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Plot 23: Garden	Day	60.7	46.1	47.8	44.2	42.5

Table 4 – Summary of daytime noise levels Plot 23 Garden

3.4 Plot 17: Bedroom

The following table summarises the noise measurement data for the Bedroom of Plot 17 over the measurement period.

Location	Period	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Plot 17: Bedroom	Day	43.5	29.6	27.1	24.7	23.9
Plot 17: Bedroom	Night	39.1	27.5	25.8	24.7	24.2

Table 5 – Summary of daytime and night-time noise levels Plot 17 Bedroom

- 15th highest night-time L_{Amax} value = 44.7dB inside Bedroom of Plot 17

3.5 Plot 17: Living Room

The following table summarises the noise measurement data for the Living Room of Plot 17 over the measurement period.

Location	Period	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Plot 17: Living Room	Day	42.3	22.6	18.1	13.1	10.7
Plot 17: Living Room	Night	40.0	27.4	14.7	9.9	7.8

Table 6 – Summary of daytime and night-time noise levels Plot 17 Living Room

3.6 Plot 17: Garden

The following table summarises the noise measurement data for the Garden of Plot 17 over the measurement period.

Location	Period	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Plot 17: Garden	Day	67.2	53.6	56.1	52.3	49.2

Table 7 – Summary of daytime noise levels Plot 17 Garden

Graphs of the noise measurement data are included in Appendix C of this report.

4.0 Assessment of Fixed Plant

4.1 Plot 23 Air Source Heat Pump (ASHP)

The following table summarises the noise measurement data for the ASHP of Plot 23 over the measurement period of 11 minutes. These levels have been corrected for background sound. The full listing of the un-corrected noise measurement data for the ASHP at plot 23 are set out in Table B7 towards the end of this report.

Location	Period	L _{Aeq}	L _{A10}	L _{A50}
Plot 23: ASHP @1m	Day	48.8	48.6	48.2

Table 8 – Summary of daytime noise levels Plot 23 ASHP

4.2 SoundPLAN Noise Model

Azymuth have modelled the noise omitting from the ASHP to predict and visualise its impact on the dwellings directly adjacent.



Figure 1 – SoundPLAN grid noise map (GNM) of Plot 23 ASHP output

Included in the figure above are predicted noise levels at some of the worst affected neighbouring dwellings. It can be seen that the worst case “noise sensitive receptor” as located at plot 22 would experience a noise level of 32.5dB L_{Aeq} whilst the ASHP is operational at typical worst case level.



5.0 Summary

Azymuth were appointed by Rowlinson Construction Limited in December 2021 to undertake acoustic testing at a new build development site located on Downley Drive, Ancoats, Manchester.

Planning conditions were issued by Manchester City Council, these conditions stated that a verification report would have to be completed in order to validate that the relevant internal noise level targets, noise levels in gardens and noise levels from air source heat pumps have been met.

Condition 16

Plot no.	Room	Target	Result	Compliance
23	Living room	$\leq 35\text{dB } L_{\text{Aeq, day}}$	23.9dB L_{Aeq}	Pass
	Bedroom	$\leq 30\text{dB } L_{\text{Aeq, night}}$ $15^{\text{th}} \text{ highest } L_{\text{Amax}} \leq 45\text{dB}$	27.1dB L_{Aeq} 42.7dB L_{Amax}	Pass
	Garden	$\leq 55\text{dB } L_{\text{Aeq, day}}$	46.1dB L_{Aeq}	Pass
17	Living room	$\leq 35\text{dB } L_{\text{Aeq, day}}$	22.6dB L_{Aeq}	Pass
	Bedroom	$\leq 30\text{dB } L_{\text{Aeq, night}}$ $15^{\text{th}} \text{ highest } L_{\text{Amax}} \leq 45\text{dB}$	27.5dB L_{Aeq} 44.7dB L_{Amax}	Pass
	Garden	$\leq 55\text{dB } L_{\text{Aeq, day}}$	53.6dB L_{Aeq}	Pass

Table 9 – Summary of internal noise monitoring results

The noise levels associated with both the internal and external areas of Plots 23 and 17 are significantly compliant with the MCC criteria.

Condition 17

Plot no.		Target	Result	Compliance
23	ASHP noise levels at adjacent house	$\leq 37\text{dB } L_{\text{Aeq, day}}$	32.5dB L_{Aeq}	Pass
		$\leq 31\text{dB } L_{\text{Aeq, night}}$	32.5dB L_{Aeq}	Fail (by 1.5dB)

Table 10 – Summary of ASHP noise levels

The noise levels emitted from the ASHP are compliant with target criteria during the daytime. Whilst the night-time levels show a minor exceedance of the set criteria, the level of difference would be deemed to be barely audible.



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.

$SRI = L_1 - L_2 + 10 \log (S/A)$, where:

L_1 = Noise level in the source room

L_2 = 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.



Appendix B – Noise Survey Data

- L = Living Room
- BD = Bedroom
- G = Garden

Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 15 th March 2024							
16:00:00	23 BD	00:30:00	31.7	26.8	27.7	26.6	25.7
16:30:00	23 BD	00:30:00	34.2	27.2	28.2	27	26
17:00:00	23 BD	00:30:00	38	27	27.9	26.8	25.9
17:30:00	23 BD	00:30:00	36.9	27	27.8	26.8	25.9
18:00:00	23 BD	00:30:00	34.5	27	27.8	26.8	25.9
18:30:00	23 BD	00:30:00	53.2	27	27.6	26.5	25.6
19:00:00	23 BD	00:30:00	32.6	26.6	27.5	26.5	25.6
19:30:00	23 BD	00:30:00	32.4	26.7	27.5	26.5	25.6
20:00:00	23 BD	00:30:00	44.9	26.9	27.6	26.5	25.6
20:30:00	23 BD	00:30:00	31	26.8	27.6	26.6	25.8
21:00:00	23 BD	00:30:00	32.9	26.9	27.7	26.7	25.8
21:30:00	23 BD	00:30:00	51.6	27.1	27.7	26.7	25.8
22:00:00	23 BD	00:30:00	34.9	26.9	27.7	26.7	25.8
22:30:00	23 BD	00:30:00	53	27.4	27.7	26.7	25.8
23:00:00	23 BD	00:30:00	39.8	26.9	27.7	26.8	25.9
23:30:00	23 BD	00:30:00	29.9	26.9	27.7	26.8	25.9
Saturday 16 th March 2024							
00:00:00	23 BD	00:30:00	43.7	27	27.8	26.9	25.9
00:30:00	23 BD	00:30:00	33.5	26.9	27.7	26.8	25.9
01:00:00	23 BD	00:30:00	31.1	26.9	27.8	26.8	25.9
01:30:00	23 BD	00:30:00	31.8	26.9	27.8	26.8	25.9
02:00:00	23 BD	00:30:00	39.7	26.9	27.7	26.8	25.9
02:30:00	23 BD	00:30:00	31.1	27	28	26.9	25.9
03:00:00	23 BD	00:30:00	44	27.1	28	26.8	25.8
03:30:00	23 BD	00:30:00	51.6	27.3	28.1	26.9	25.9
04:00:00	23 BD	00:30:00	30.5	27	27.9	26.8	25.8
04:30:00	23 BD	00:30:00	33	27.1	28.2	26.9	25.9
05:00:00	23 BD	00:30:00	36.1	27.2	28.3	26.9	25.9
05:30:00	23 BD	00:30:00	32.5	27.4	28.6	27.1	26
06:00:00	23 BD	00:30:00	33.8	27.4	28.7	27.1	26
06:30:00	23 BD	00:30:00	31.4	27.3	28.6	27.1	26
07:00:00	23 BD	00:30:00	41.9	27.3	28.6	27	25.9
07:30:00	23 BD	00:30:00	37.5	27.2	28.5	26.9	25.8
08:00:00	23 BD	00:30:00	46.4	27.1	28.2	26.8	25.8
08:30:00	23 BD	00:30:00	35.5	26.8	27.7	26.6	25.7
09:00:00	23 BD	00:30:00	45.1	26.8	27.7	26.5	25.5

Table B1 – Fully tabulated internal noise measurement results for Plot 23 Bedroom



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 15 th March 2024							
16:00:00	23 L	00:30:00	39.6	23.8	24.5	22.8	21.3
16:30:00	23 L	00:30:00	45.2	23.4	24.5	23	21.5
17:00:00	23 L	00:30:00	42.5	23	24	22.6	21.2
17:30:00	23 L	00:30:00	42.5	23.5	24.4	22.9	21.4
18:00:00	23 L	00:30:00	41.1	23.4	24.5	23.1	21.7
18:30:00	23 L	00:30:00	35.5	22.8	23.9	22.5	21.1
19:00:00	23 L	00:30:00	35.4	22.4	23.6	22.2	20.7
19:30:00	23 L	00:30:00	30.4	22	23.4	21.7	20.2
20:00:00	23 L	00:30:00	47.5	23.2	23.7	22.3	21
20:30:00	23 L	00:30:00	33.6	22.2	23.4	21.9	20.4
21:00:00	23 L	00:30:00	33.1	21.7	23	21.5	20
21:30:00	23 L	00:30:00	40.6	21.9	23	21.7	20.1
22:00:00	23 L	00:30:00	35	21.9	23	21.8	20.2
22:30:00	23 L	00:30:00	49.7	22.1	22.8	21	19.4
23:00:00	23 L	00:30:00	39.6	21.9	22.9	21.6	20
23:30:00	23 L	00:30:00	34	21.9	23.2	21.7	20.1
Saturday 16 th March 2024							
00:00:00	23 L	00:30:00	47.5	21.8	22.9	21.2	19.5
00:30:00	23 L	00:30:00	28.9	21.8	22.9	21.6	20
01:00:00	23 L	00:30:00	40.8	21.8	22.9	21.4	19.8
01:30:00	23 L	00:30:00	40	21.2	22.5	20.8	19.3
02:00:00	23 L	00:30:00	33.8	22	23.2	21.8	20.3
02:30:00	23 L	00:30:00	46.8	21.7	22.4	20.7	19.3
03:00:00	23 L	00:30:00	47.8	22.2	23.1	21.7	20.2
03:30:00	23 L	00:30:00	44	21.7	22.9	21.2	19.7
04:00:00	23 L	00:30:00	37.4	21.5	22.8	21.3	19.7
04:30:00	23 L	00:30:00	45.7	21.5	22.8	20.9	19.3
05:00:00	23 L	00:30:00	44.1	21.7	22.9	21.3	19.6
05:30:00	23 L	00:30:00	42	21.9	23.2	21.5	19.9
06:00:00	23 L	00:30:00	28.6	21.9	23.2	21.6	20.1
06:30:00	23 L	00:30:00	35.8	21.2	22.4	20.9	19.7
07:00:00	23 L	00:30:00	45.6	21.4	22.4	21	19.8
07:30:00	23 L	00:30:00	41.7	21.1	22.1	20.7	19.4
08:00:00	23 L	00:30:00	44.4	23.5	25.9	21	19.3
08:30:00	23 L	00:30:00	53.1	27.5	25.8	22.7	19.7
09:00:00	23 L	00:30:00	55.8	25.9	23.4	21.7	20
09:30:00	23 L	00:30:00	55.5	25.5	23.4	21.3	19.4
10:00:00	23 L	00:30:00	56.5	25.4	23.7	21.7	20
10:30:00	23 L	00:30:00	56.7	27.3	23.4	21.8	20.2
11:00:00	23 L	00:30:00	52.3	23.5	23.5	21.6	20
11:30:00	23 L	00:30:00	46.9	24.4	24.2	21.5	19.8
12:00:00	23 L	00:30:00	51.8	28	30.2	24	21.7
12:30:00	23 L	00:30:00	50.6	25.5	24.8	22.5	21.1
13:00:00	23 L	00:30:00	50.3	24.4	23.7	21.9	20.4
13:30:00	23 L	00:30:00	47.5	23.9	24.1	21.9	20.4
14:00:00	23 L	00:30:00	49.2	23.7	24.1	22.5	21.1
14:30:00	23 L	00:30:00	49.9	23.8	24.7	22.5	21
15:00:00	23 L	00:30:00	44.1	22.9	23.6	22	20.4



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
15:30:00	23 L	00:30:00	48.5	22.9	23.7	22.2	20.9
16:00:00	23 L	00:30:00	45.1	23.2	24.2	22.5	21
16:30:00	23 L	00:30:00	46.8	23.4	24.4	22.5	21.1
17:00:00	23 L	00:30:00	38.6	22.5	23.7	22.2	20.6
17:30:00	23 L	00:30:00	44.9	23.2	23.9	22.4	20.7
18:00:00	23 L	00:30:00	39	22.7	23.8	22.4	21
18:30:00	23 L	00:30:00	41.7	22.4	23.6	22.1	20.6
19:00:00	23 L	00:30:00	49.1	26.3	29.8	22.9	20.5
19:30:00	23 L	00:30:00	39.4	28.3	31.1	27.7	23.2
20:00:00	23 L	00:30:00	39.5	22.9	24.1	22.5	21
20:30:00	23 L	00:30:00	35.1	22.9	24	22.7	21.3
21:00:00	23 L	00:30:00	37.4	22.4	23.5	22.1	21
21:30:00	23 L	00:30:00	36.1	22.1	23.3	21.8	20.5
22:00:00	23 L	00:30:00	29.4	21.8	22.9	21.6	20.2
22:30:00	23 L	00:30:00	31.1	22.2	23.3	22	20.9
23:00:00	23 L	00:30:00	32.7	22.3	23.5	22.1	20.8
23:30:00	23 L	00:30:00	29.2	21.9	23.1	21.7	20.3
Sunday 17 th March 2024							
00:00:00	23 L	00:30:00	36.3	22	23.3	21.8	20.4
00:30:00	23 L	00:30:00	29.4	22.2	23.4	22.1	20.9
01:00:00	23 L	00:30:00	27.8	21.9	22.9	21.7	20.3
01:30:00	23 L	00:30:00	46.9	22.1	22.9	21.4	20
02:00:00	23 L	00:30:00	37.8	21.5	22.7	21.3	19.9
02:30:00	23 L	00:30:00	29.8	21.8	22.9	21.6	20.3
03:00:00	23 L	00:30:00	36.1	21.7	22.9	21.5	20
03:30:00	23 L	00:30:00	27.3	21.7	22.8	21.5	20.1
04:00:00	23 L	00:30:00	32	21.7	23	21.5	20
04:30:00	23 L	00:30:00	32.1	22.2	23.5	22	20.5
05:00:00	23 L	00:30:00	31.4	22.1	23.4	22	20.3
05:30:00	23 L	00:30:00	34.3	22.1	23.5	21.9	20.1
06:00:00	23 L	00:30:00	33.8	21.9	23.4	21.6	19.6
06:30:00	23 L	00:30:00	29.1	22.7	23.9	22.6	20.9
07:00:00	23 L	00:30:00	28.4	22.6	23.9	22.5	20.1
07:30:00	23 L	00:30:00	36.2	22.3	23.8	22.2	19.7
08:00:00	23 L	00:30:00	30.6	22.7	24.1	22.6	20
08:30:00	23 L	00:30:00	39.9	23.6	24.6	23.4	22.1
09:00:00	23 L	00:30:00	36.9	23.6	24.9	23.5	20.4
09:30:00	23 L	00:30:00	31.7	23.2	24.9	23.2	20.2
10:00:00	23 L	00:30:00	38.9	23.2	24.8	23.2	20.3
10:30:00	23 L	00:30:00	41.8	24.3	25.3	24.1	23
11:00:00	23 L	00:30:00	34.9	23.2	24.8	23.3	20.1
11:30:00	23 L	00:30:00	35.5	22.9	24.9	22.1	19.5
12:00:00	23 L	00:30:00	34.7	24.1	25.2	24	20.6
12:30:00	23 L	00:30:00	32.9	23.7	24.9	23.9	20.5
13:00:00	23 L	00:30:00	30.6	23.4	24.9	23.7	20.1
13:30:00	23 L	00:30:00	32.4	23.4	24.9	23.6	20.1
14:00:00	23 L	00:30:00	40.9	24.3	25	24	23
14:30:00	23 L	00:30:00	46.7	23.7	25	23.6	20.4
15:00:00	23 L	00:30:00	40.5	22.1	23.9	21.4	19.5



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
15:30:00	23 L	00:30:00	32.9	24.1	25	24	22.9
16:00:00	23 L	00:30:00	43.7	23.6	24.9	23.4	20.3
16:30:00	23 L	00:30:00	31.7	22.2	24.1	21.6	19.4
17:00:00	23 L	00:30:00	36.4	24.3	25.1	24	23
17:30:00	23 L	00:30:00	42.6	23.7	24.8	22.9	20.3
18:00:00	23 L	00:30:00	36.1	23.1	24.8	23.3	19.9
18:30:00	23 L	00:30:00	33.5	24.1	25.3	24	21.6
19:00:00	23 L	00:30:00	31.9	23.7	25.1	23.9	20.6
19:30:00	23 L	00:30:00	29.1	23.3	24.9	23.5	20.2
20:00:00	23 L	00:30:00	49.1	23.8	25	23.7	20.2
20:30:00	23 L	00:30:00	30.6	23.8	24.9	24	20.7
21:00:00	23 L	00:30:00	28.9	23.8	25.1	24.1	20.5
21:30:00	23 L	00:30:00	32.5	23.6	25.3	23.7	20
22:00:00	23 L	00:30:00	32.6	23.8	26.5	23.1	19.4
22:30:00	23 L	00:30:00	34.6	27.4	29.6	27.4	22.8
23:00:00	23 L	00:30:00	34.5	23.4	24.5	23.3	22.1
23:30:00	23 L	00:30:00	38.5	23.7	24.9	23.8	20
Monday 18 th March 2024							
00:00:00	23 L	00:30:00	27.9	23.1	24.9	23.3	19.7
00:30:00	23 L	00:30:00	28.4	23.3	25.1	23.7	19.5
01:00:00	23 L	00:30:00	28.6	24.2	25.5	24.4	20.8
01:30:00	23 L	00:30:00	32.4	23.3	25.2	23.7	19.5
02:00:00	23 L	00:30:00	43.9	23	24.9	21.7	19.3
02:30:00	23 L	00:30:00	44.3	24.4	25.4	24.3	20.9
03:00:00	23 L	00:30:00	48.6	23.8	25.2	23	19.4
03:30:00	23 L	00:30:00	38.4	22.9	25.1	21.7	19.4

Table B2 – Fully tabulated internal noise measurement results for Plot 23 Living Room

Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 15 th March 2024							
14:56:00	23 G	00:05:00	58.2	45.4	47.2	43.8	42.5
15:01:00	23 G	00:05:00	66.7	46.9	48.1	44.7	42.5
15:06:00	23 G	00:05:00	57.2	45.8	48.2	44.1	42.4

Table B3 – Fully tabulated external noise measurement results for Plot 23 Garden



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 22 nd March 2024							
14:30:00	17 BD	00:30:00	66.9	42	44.9	37.9	32.7
15:00:00	17 BD	00:30:00	61.1	33.4	36	23.8	21
15:30:00	17 BD	00:30:00	46	25.9	27.2	21.6	20.9
16:00:00	17 BD	00:30:00	47	25.7	26.7	21.2	20.6
16:30:00	17 BD	00:30:00	45	24.3	23.5	20.9	20.3
17:00:00	17 BD	00:30:00	45	24.4	25.2	21.1	20.4
17:30:00	17 BD	00:30:00	45.3	24.3	23.9	21	20.3
18:00:00	17 BD	00:30:00	43.7	23.2	23.2	20.6	20.2
18:30:00	17 BD	00:30:00	41.3	22.4	23.5	20.9	20.3
19:00:00	17 BD	00:30:00	43	22	22	20.4	20.1
19:30:00	17 BD	00:30:00	40.3	21.5	21.6	20.4	20.1
20:00:00	17 BD	00:30:00	38.1	21.4	21.6	20.4	20.1
20:30:00	17 BD	00:30:00	34	20.7	21.3	20.2	20
21:00:00	17 BD	00:30:00	42.1	21.8	22.6	20.4	20.1
21:30:00	17 BD	00:30:00	36.1	20.7	20.9	20.3	20.1
22:00:00	17 BD	00:30:00	42.5	22.6	21.7	20.5	20.2
22:30:00	17 BD	00:30:00	38.6	21.2	21.3	20.4	20.1
23:00:00	17 BD	00:30:00	49.8	22.2	20.9	20.2	20
23:30:00	17 BD	00:30:00	38.7	21.8	23.5	20.4	20
Saturday 23 rd March 2024							
00:00:00	17 BD	00:30:00	44.7	22.6	23.8	20.5	20.1
00:30:00	17 BD	00:30:00	38.8	20.8	20.9	20.3	20.1
01:00:00	17 BD	00:30:00	39.7	21.5	21.1	20.3	20.1
01:30:00	17 BD	00:30:00	76	39.2	21.7	20.4	20.1
02:00:00	17 BD	00:30:00	42.6	23	23	20.8	20.4
02:30:00	17 BD	00:30:00	45.5	24.5	23.3	20.9	20.4
03:00:00	17 BD	00:30:00	40.6	22.8	22.7	20.7	20.3
03:30:00	17 BD	00:30:00	42.6	22.6	22.5	20.8	20.4
04:00:00	17 BD	00:30:00	45.2	22.9	22.8	20.8	20.4
04:30:00	17 BD	00:30:00	41.6	22.4	23	20.9	20.4
05:00:00	17 BD	00:30:00	41.2	21.8	22.2	20.8	20.4
05:30:00	17 BD	00:30:00	44.7	22.8	23	20.9	20.4
06:00:00	17 BD	00:30:00	41.2	22.4	23.6	21	20.5
06:30:00	17 BD	00:30:00	42.5	22.6	23.5	21.2	20.7
07:00:00	17 BD	00:30:00	45.1	24.3	24.8	21.6	20.9
07:30:00	17 BD	00:30:00	36.6	23.4	25.4	21.9	21.2
08:00:00	17 BD	00:30:00	43.7	23.1	24.2	21.6	21.1
08:30:00	17 BD	00:30:00	40.9	23.8	25.3	22.1	21.3
09:00:00	17 BD	00:30:00	47.6	25.7	25.9	21.5	20.3
09:30:00	17 BD	00:30:00	45.5	25.1	25.7	22.2	21.3
10:00:00	17 BD	00:30:00	47.4	27.7	30.6	22.8	21.4
10:30:00	17 BD	00:30:00	45.8	25.5	25.7	21.9	21.1
11:00:00	17 BD	00:30:00	45.3	27.2	29.5	21.5	20.6
11:30:00	17 BD	00:30:00	44.1	26.1	27.7	21.2	20.5
12:00:00	17 BD	00:30:00	45.1	27.6	30.5	21.3	20.3
12:30:00	17 BD	00:30:00	45.4	25.6	26.8	21	20.3
13:00:00	17 BD	00:30:00	45.7	26.6	28.3	21.3	20.3
13:30:00	17 BD	00:30:00	46.8	26.2	27	23.6	20.4



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
14:00:00	17 BD	00:30:00	50.4	28.2	27.9	25.9	24.9
14:30:00	17 BD	00:30:00	45.4	27.8	27.6	26.4	25.5
15:00:00	17 BD	00:30:00	50.4	27.1	27.2	26.2	25.3
15:30:00	17 BD	00:30:00	44.1	27.4	28.4	26.3	25.3
16:00:00	17 BD	00:30:00	38.4	26.2	27	25.9	25
16:30:00	17 BD	00:30:00	46	25.5	25.8	25	24.1
17:00:00	17 BD	00:30:00	43.2	28.5	31.7	25.1	24.1
17:30:00	17 BD	00:30:00	75.1	39	31.9	26.6	25.5
18:00:00	17 BD	00:30:00	38.6	27.2	28.4	26.4	25.5
18:30:00	17 BD	00:30:00	38.9	26.4	27.2	26.2	25.4
19:00:00	17 BD	00:30:00	36.6	26.5	27.2	26.2	25.4
19:30:00	17 BD	00:30:00	42.8	27.1	28.2	26.5	25.6
20:00:00	17 BD	00:30:00	43.4	28.1	29.5	26.7	25.7
20:30:00	17 BD	00:30:00	39.6	26.4	26.9	26.2	25.5
21:00:00	17 BD	00:30:00	35.7	26.3	27	26.1	25.4
21:30:00	17 BD	00:30:00	43.3	28.4	28.8	26.3	25.4
22:00:00	17 BD	00:30:00	38.6	26.2	26.7	26	25.2
22:30:00	17 BD	00:30:00	34.6	27.1	28.9	26.3	25.5
23:00:00	17 BD	00:30:00	48.1	27.8	26.8	26.1	25.4
23:30:00	17 BD	00:30:00	35.1	26.1	26.6	26	25.4
Sunday 24 th March							
00:00:00	17 BD	00:30:00	31.7	26	26.4	25.9	25.3
00:30:00	17 BD	00:30:00	44.1	26	26.4	25.8	25.2
01:00:00	17 BD	00:30:00	31.7	25.8	26.3	25.8	25.2
01:30:00	17 BD	00:30:00	32.9	25.8	26.3	25.7	25.2
02:00:00	17 BD	00:30:00	32.3	25.7	26.2	25.7	25.1
02:30:00	17 BD	00:30:00	45.4	25.8	26.1	25.6	25
03:00:00	17 BD	00:30:00	32.8	25.9	26.3	25.8	25.3
03:30:00	17 BD	00:30:00	33.6	26	26.5	26	25.4
04:00:00	17 BD	00:30:00	39	26.2	26.7	26	25.4
04:30:00	17 BD	00:30:00	35.3	26.4	26.9	26.3	25.7
05:00:00	17 BD	00:30:00	37.7	26.3	26.8	26.2	25.6
05:30:00	17 BD	00:30:00	38.9	26.4	26.8	26.2	25.6
06:00:00	17 BD	00:30:00	36.4	26.2	26.6	26.1	25.5
06:30:00	17 BD	00:30:00	35.3	26.1	26.6	26	25.4
07:00:00	17 BD	00:30:00	32.3	26.3	26.8	26.2	25.6
07:30:00	17 BD	00:30:00	33	26.6	27.1	26.6	26
08:00:00	17 BD	00:30:00	47	27.4	27.4	26.7	26.1
08:30:00	17 BD	00:30:00	48.6	28	28	26.4	25.5
09:00:00	17 BD	00:30:00	61.4	29.1	26.8	26	25.1
09:30:00	17 BD	00:30:00	48.3	27	26.6	25.5	24.6
10:00:00	17 BD	00:30:00	45.7	26.2	25.9	24.8	23.9
10:30:00	17 BD	00:30:00	47.6	26.4	25.9	24.7	23.9
11:00:00	17 BD	00:30:00	47.1	26.3	26.3	24.6	23.7
11:30:00	17 BD	00:30:00	42	25.7	26.5	24.3	23.4
12:00:00	17 BD	00:30:00	41.5	25.9	26.6	24.4	23.6
12:30:00	17 BD	00:30:00	41.3	26	26.6	24.9	24.1
13:00:00	17 BD	00:30:00	41.7	26.1	26.7	25.8	24.9
13:30:00	17 BD	00:30:00	45.1	27.9	28.6	27	25.9



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
14:00:00	17 BD	00:30:00	47.5	27.5	28.1	26.9	25.9
14:30:00	17 BD	00:30:00	39.3	27.1	27.6	26.6	25.9
15:00:00	17 BD	00:30:00	42.7	27.9	28.4	27.3	26.5
15:30:00	17 BD	00:30:00	42.9	28	28.6	27.5	26.6
16:00:00	17 BD	00:30:00	42.7	27.9	28.4	27.5	26.7
16:30:00	17 BD	00:30:00	34.3	27.6	28.1	27.5	26.8
17:00:00	17 BD	00:30:00	41.2	27.4	28	27	26.2
17:30:00	17 BD	00:30:00	39.9	26.5	27.1	26.2	25.4
18:00:00	17 BD	00:30:00	33.9	27.3	27.9	27.2	26.5
18:30:00	17 BD	00:30:00	77.5	41.3	28.2	27.5	26.7
19:00:00	17 BD	00:30:00	36.7	27.5	28.1	27.3	26.5
19:30:00	17 BD	00:30:00	35.8	27.3	27.8	27.1	26.4
20:00:00	17 BD	00:30:00	38.7	27.5	27.9	27.1	26.4
20:30:00	17 BD	00:30:00	33.8	27.1	27.7	27	26.4
21:00:00	17 BD	00:30:00	46	27.3	27.7	27.1	26.4
21:30:00	17 BD	00:30:00	39.1	27.3	27.7	27.1	26.5
22:00:00	17 BD	00:30:00	32.5	27.3	27.8	27.2	26.6
22:30:00	17 BD	00:30:00	32.2	27.3	27.9	27.3	26.6
23:00:00	17 BD	00:30:00	35.8	27.5	28	27.4	26.8
23:30:00	17 BD	00:30:00	43.1	27.7	28.1	27.6	26.9
Monday 25 th March 2024							
00:00:00	17 BD	00:30:00	45.8	27.8	28.2	27.6	26.9
00:30:00	17 BD	00:30:00	32.5	27.5	28	27.4	26.7
01:00:00	17 BD	00:30:00	32.1	27.5	28.1	27.5	26.8
01:30:00	17 BD	00:30:00	37.5	27.7	28.2	27.6	27
02:00:00	17 BD	00:30:00	33.4	27.6	28.1	27.5	26.9
02:30:00	17 BD	00:30:00	38.7	27.5	28	27.4	26.8
03:00:00	17 BD	00:30:00	39.8	27.4	27.9	27.3	26.7
03:30:00	17 BD	00:30:00	32.5	27.3	27.9	27.3	26.6
04:00:00	17 BD	00:30:00	31.9	27.5	28	27.4	26.7
04:30:00	17 BD	00:30:00	31.5	27.5	28	27.4	26.8
05:00:00	17 BD	00:30:00	30.6	27.5	28.1	27.5	26.9
05:30:00	17 BD	00:30:00	32.9	27.8	28.3	27.7	27
06:00:00	17 BD	00:30:00	34.4	27.8	28.3	27.7	27.1
06:30:00	17 BD	00:30:00	37.3	28.8	29.5	28.5	27.8
07:00:00	17 BD	00:30:00	38.1	29.8	30.9	29.4	28.5
07:30:00	17 BD	00:30:00	50.5	29.8	30.3	29.2	28.5

Table B4 – Fully tabulated internal noise measurement results for Plot 17 Bedroom



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 22 nd March 2024							
15:30:00	17 L	00:30:00	52.1	23.9	21.9	16.1	13.7
16:00:00	17 L	00:30:00	42.1	20.3	20.3	15.5	12
16:30:00	17 L	00:30:00	45.1	23.1	23.8	14	10.5
17:00:00	17 L	00:30:00	44.5	19.6	21.4	15.1	11.1
17:30:00	17 L	00:30:00	44.9	19.9	20	13.3	10
18:00:00	17 L	00:30:00	44.4	21.2	19.2	11.7	8.5
18:30:00	17 L	00:30:00	39.8	17	18.5	11.9	9
19:00:00	17 L	00:30:00	43.1	17.1	17.3	10.7	7.7
19:30:00	17 L	00:30:00	39.4	15.2	15.3	10.1	7.6
20:00:00	17 L	00:30:00	36.7	12.9	12.8	9.3	7.4
20:30:00	17 L	00:30:00	38.2	12.6	14	8.9	7.2
21:00:00	17 L	00:30:00	42.2	14.5	15.5	9.8	7.4
21:30:00	17 L	00:30:00	36.4	13.6	14.2	9	7.3
22:00:00	17 L	00:30:00	42.8	16.4	15.4	10.1	7.5
22:30:00	17 L	00:30:00	43.4	17.6	16.1	10	7.6
23:00:00	17 L	00:30:00	80.2	42.2	14.6	9.3	7.3
23:30:00	17 L	00:30:00	38.3	15.1	16.7	9.3	7.2
Saturday 23 rd March 2024							
00:00:00	17 L	00:30:00	40.6	18.1	19.6	10	7.4
00:30:00	17 L	00:30:00	39.1	13.9	14.3	9.7	7.4
01:00:00	17 L	00:30:00	39.7	14.6	13.5	9	7.3
01:30:00	17 L	00:30:00	41.8	17.9	16.2	9.2	7.3
02:00:00	17 L	00:30:00	44	18.7	17.4	9.6	7.4
02:30:00	17 L	00:30:00	46.5	22.7	19.5	10.4	7.5
03:00:00	17 L	00:30:00	51.5	18.8	17.4	9.3	7.3
03:30:00	17 L	00:30:00	43	19.9	18.4	9.4	7.3
04:00:00	17 L	00:30:00	46.1	18.3	16.7	9.8	7.5
04:30:00	17 L	00:30:00	41.6	19.3	19	10.4	7.6
05:00:00	17 L	00:30:00	43	17.7	17	9.7	7.4
05:30:00	17 L	00:30:00	45.7	18.3	16.2	9.7	7.4
06:00:00	17 L	00:30:00	43.7	17.6	17.6	10.5	7.6
06:30:00	17 L	00:30:00	39.2	14.9	16.7	10.6	7.9
07:00:00	17 L	00:30:00	47.7	20.6	17.7	11	8.5
07:30:00	17 L	00:30:00	43.4	21.4	23.1	13.9	9.7
08:00:00	17 L	00:30:00	44.7	20.3	21.4	14.4	11.1
08:30:00	17 L	00:30:00	42.6	19.8	21.4	13.9	11.3
09:00:00	17 L	00:30:00	43.3	19.8	19.1	13.3	11.1
09:30:00	17 L	00:30:00	70	34	20.7	14.9	12.4
10:00:00	17 L	00:30:00	47.8	25.3	24.4	16	13
10:30:00	17 L	00:30:00	47.1	26.1	24.2	15.2	12.5
11:00:00	17 L	00:30:00	50.8	23.6	23.5	15.3	12.2
11:30:00	17 L	00:30:00	53.6	23.4	19.6	14.4	12
12:00:00	17 L	00:30:00	48	20.7	20.3	13.7	10.6
12:30:00	17 L	00:30:00	46.5	21.6	20.8	13.4	10.6
13:00:00	17 L	00:30:00	46.1	21.5	21.4	13.5	10.5
13:30:00	17 L	00:30:00	42.9	20	20.7	14.2	10.6



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
14:00:00	17 L	00:30:00	48.9	23.8	22.7	15.8	13.5
14:30:00	17 L	00:30:00	46.3	23.6	23	16.3	13.5
15:00:00	17 L	00:30:00	43.8	20.5	20.9	15.3	13
15:30:00	17 L	00:30:00	44.2	20.3	20.7	14.8	12.7
16:00:00	17 L	00:30:00	39.3	21.7	23.3	16.7	13.4
16:30:00	17 L	00:30:00	36.9	15.4	17.1	13.7	11.9
17:00:00	17 L	00:30:00	43.8	19.5	19.2	13.9	12
17:30:00	17 L	00:30:00	44.6	26.8	30.8	20.3	14.2
18:00:00	17 L	00:30:00	38.8	16.5	18.2	14.4	12.4
18:30:00	17 L	00:30:00	39.4	20	21.5	14.9	12.3
19:00:00	17 L	00:30:00	35.6	15.1	16.8	12.9	11
19:30:00	17 L	00:30:00	43.3	18.9	20.1	13.6	11.3
20:00:00	17 L	00:30:00	44.2	22.9	25.6	15.4	12.2
20:30:00	17 L	00:30:00	41.2	17	16.9	13	11.2
21:00:00	17 L	00:30:00	37.3	14.7	16.2	12.2	10.2
21:30:00	17 L	00:30:00	39.9	21.6	21.6	12.3	10
22:00:00	17 L	00:30:00	35.1	13.7	14.6	12.1	10.2
22:30:00	17 L	00:30:00	35.8	18.5	21.3	14.3	11.1
23:00:00	17 L	00:30:00	35.6	15.7	14.1	11.7	10
23:30:00	17 L	00:30:00	35.1	12.7	13.1	11.1	9.3
Sunday 24 th March 2024							
00:00:00	17 L	00:30:00	56.7	19.2	12.7	10.6	8.8
00:30:00	17 L	00:30:00	32.7	12.9	14	10.8	8.8
01:00:00	17 L	00:30:00	33.3	11	11.9	10	8
01:30:00	17 L	00:30:00	33	11.1	12	10	8
02:00:00	17 L	00:30:00	28	10.6	11.7	9.7	7.7
02:30:00	17 L	00:30:00	28.6	11	11.8	9.4	7.5
03:00:00	17 L	00:30:00	33	10.5	11.3	9.2	7.4
03:30:00	17 L	00:30:00	34.4	11.4	11.6	9.4	7.5
04:00:00	17 L	00:30:00	31.5	10.5	11.3	9.1	7.4
04:30:00	17 L	00:30:00	40.5	14.3	13.5	10.1	7.9
05:00:00	17 L	00:30:00	33.9	11.9	12.8	9.7	7.6
05:30:00	17 L	00:30:00	40.6	15.9	13.7	10.2	8
06:00:00	17 L	00:30:00	37.3	12.6	11.9	9.8	7.8
06:30:00	17 L	00:30:00	39.7	13.9	13.7	10.1	7.9
07:00:00	17 L	00:30:00	34.5	11.4	12.1	9.9	7.8
07:30:00	17 L	00:30:00	33.9	11.9	13.4	10.2	8
08:00:00	17 L	00:30:00	40.6	12.4	12.2	9.9	7.9
08:30:00	17 L	00:30:00	45.3	14.9	12.9	10.7	8.4
09:00:00	17 L	00:30:00	51	16.1	14.7	10.9	8.8
09:30:00	17 L	00:30:00	57.9	29	15.4	13	10.8
10:00:00	17 L	00:30:00	59.8	32.1	19.5	14.6	12.5
10:30:00	17 L	00:30:00	60.4	32.4	20	15.8	14
11:00:00	17 L	00:30:00	59.7	29.1	18.5	15.5	13.4
11:30:00	17 L	00:30:00	54.6	25.9	19.1	16.4	14.3
12:00:00	17 L	00:30:00	51.5	21.8	18.1	15.5	13.5
12:30:00	17 L	00:30:00	49.4	18.6	18.5	15.4	13.3
13:00:00	17 L	00:30:00	38.4	17.6	18.6	15.2	13.1
13:30:00	17 L	00:30:00	50.5	19.1	18.7	14.4	12.1



Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
14:00:00	17 L	00:30:00	32	15.1	17.1	13.5	11.4
14:30:00	17 L	00:30:00	33.8	15.2	16.9	13.9	11.7
15:00:00	17 L	00:30:00	37.5	15.6	16.3	14.2	12.1
15:30:00	17 L	00:30:00	40.8	15.2	16.7	14.1	12
16:00:00	17 L	00:30:00	39.1	15.4	17	14	11.6
16:30:00	17 L	00:30:00	32.5	14.4	16.5	12.8	10.5
17:00:00	17 L	00:30:00	31.7	13.1	14.4	12	9.7
17:30:00	17 L	00:30:00	31.8	12.9	14.4	11.2	9
18:00:00	17 L	00:30:00	31.7	12.1	13.4	11.1	9
18:30:00	17 L	00:30:00	42.9	13.7	14.4	11.6	9.4
19:00:00	17 L	00:30:00	29.5	12.4	13.6	11.5	9.3
19:30:00	17 L	00:30:00	29.8	11.8	12.9	10.9	8.8
20:00:00	17 L	00:30:00	28.2	11.6	12.8	11	8.9
20:30:00	17 L	00:30:00	40.5	14.9	13.4	11	8.8
21:00:00	17 L	00:30:00	29.8	11.3	12.6	10.8	8.9
21:30:00	17 L	00:30:00	30.1	11.6	12.9	10.9	8.8
22:00:00	17 L	00:30:00	35.4	11.6	12.9	10.9	9
22:30:00	17 L	00:30:00	27.4	10.8	12	10.4	8.4
23:00:00	17 L	00:30:00	21.6	10.7	12.2	10.2	8.1

Table B5 – Fully tabulated internal noise measurement results for Plot 17 Living Room

Start	Plot	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 22 nd March 2024							
14:29:00	17 G	00:05:00	66.5	53.2	56.3	51	48.6
14:34:00	17 G	00:05:00	69.2	53.5	56.1	52.4	48.6
14:39:00	17 G	00:05:00	66	54	56	53.5	50.4

Table B6 – Fully tabulated external noise measurement results for Plot 17 Garden

Start	Position	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Friday 15 th March 2024							
15:13:00	45° RHS	00:01:00	66	51.1	51.9	49.4	48.1
15:14:00	45° RHS	00:01:00	72.2	54	54.9	49.7	48.1
15:15:00	45° RHS	00:01:00	55.1	48.8	49.8	48.5	47.5
15:16:00	45° RHS	00:01:00	51.6	48.5	49.5	48.2	47.4
15:17:00	45° RHS	00:01:00	59.3	50.2	52.4	49	47.4
15:18:00	45° RHS	00:01:00	51.2	48.7	49.6	48.6	47.6
15:19:00	45° RHS	00:01:00	50.6	48.7	49.3	48.6	47.9
15:20:00	45° RHS	00:01:00	51.1	48.6	49.3	48.4	47.8
15:22:00	45° LHS	00:01:00	54.2	50.3	50.9	50.2	49.5
15:23:00	45° LHS	00:01:00	64.6	51.1	51.2	50.4	49.8
15:24:00	45° LHS	00:01:00	56.9	51.6	52.8	51.1	50.3

Table B7 – Fully tabulated Plot 23 ASHP noise measurements



Appendix C – Graphed Results

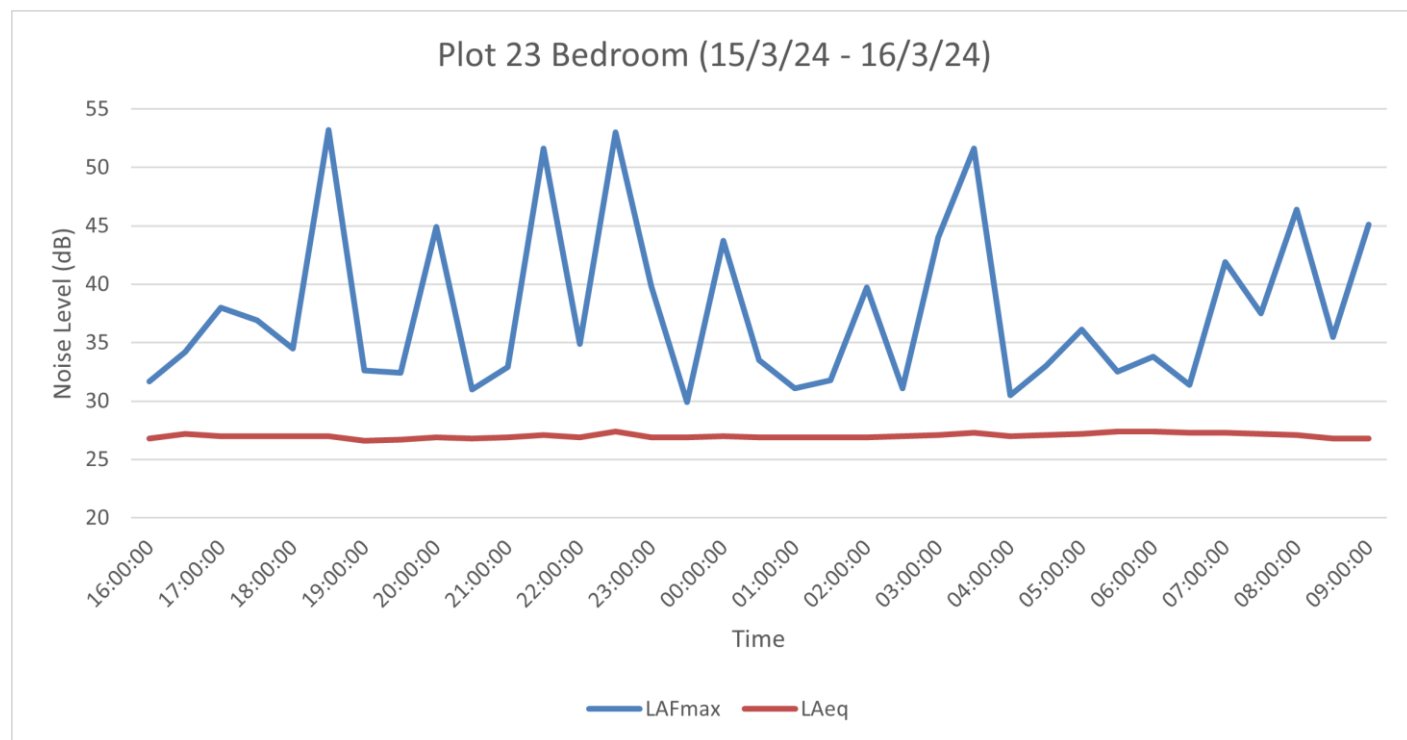


Figure C1 – Plot 23 Bedroom graphed measurement data

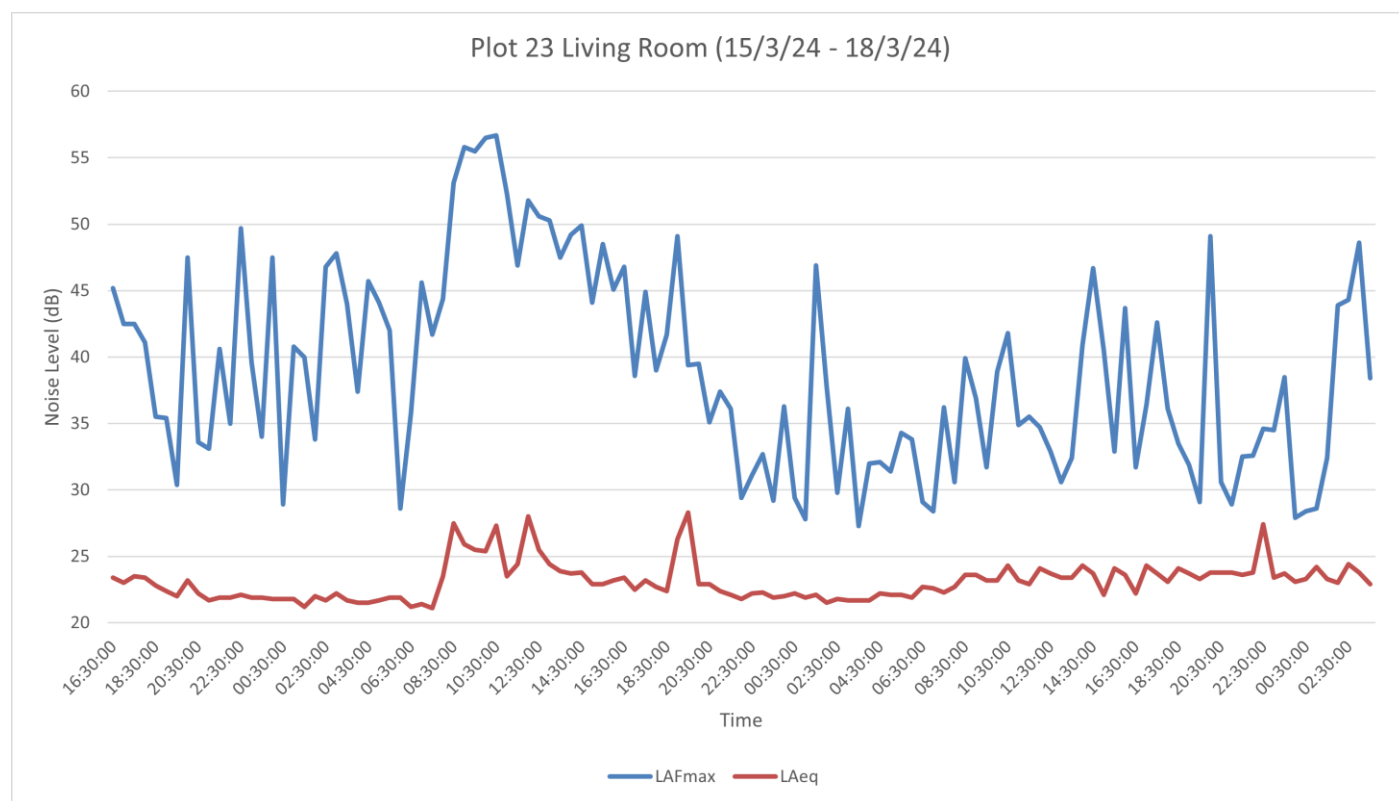


Figure C2 – Plot 23 Living Room graphed measurement data

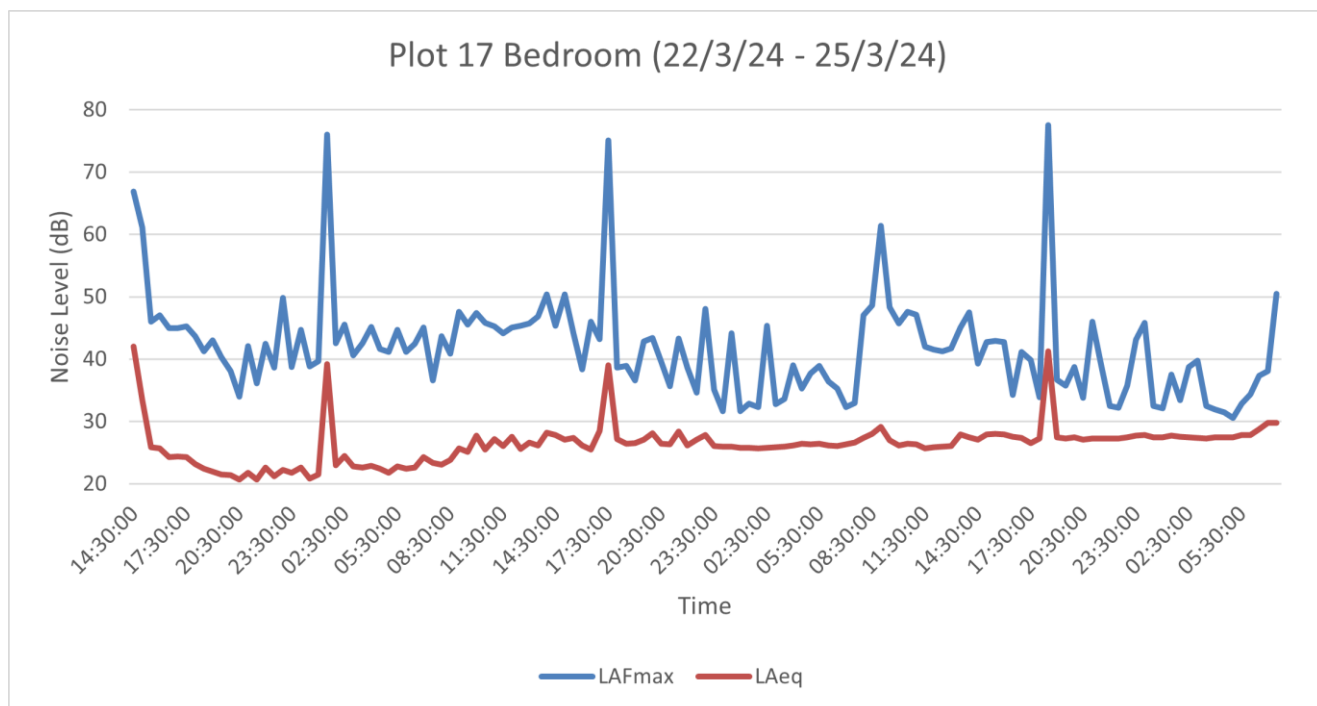


Figure C3 – Plot 17 Bedroom graphed measurement data

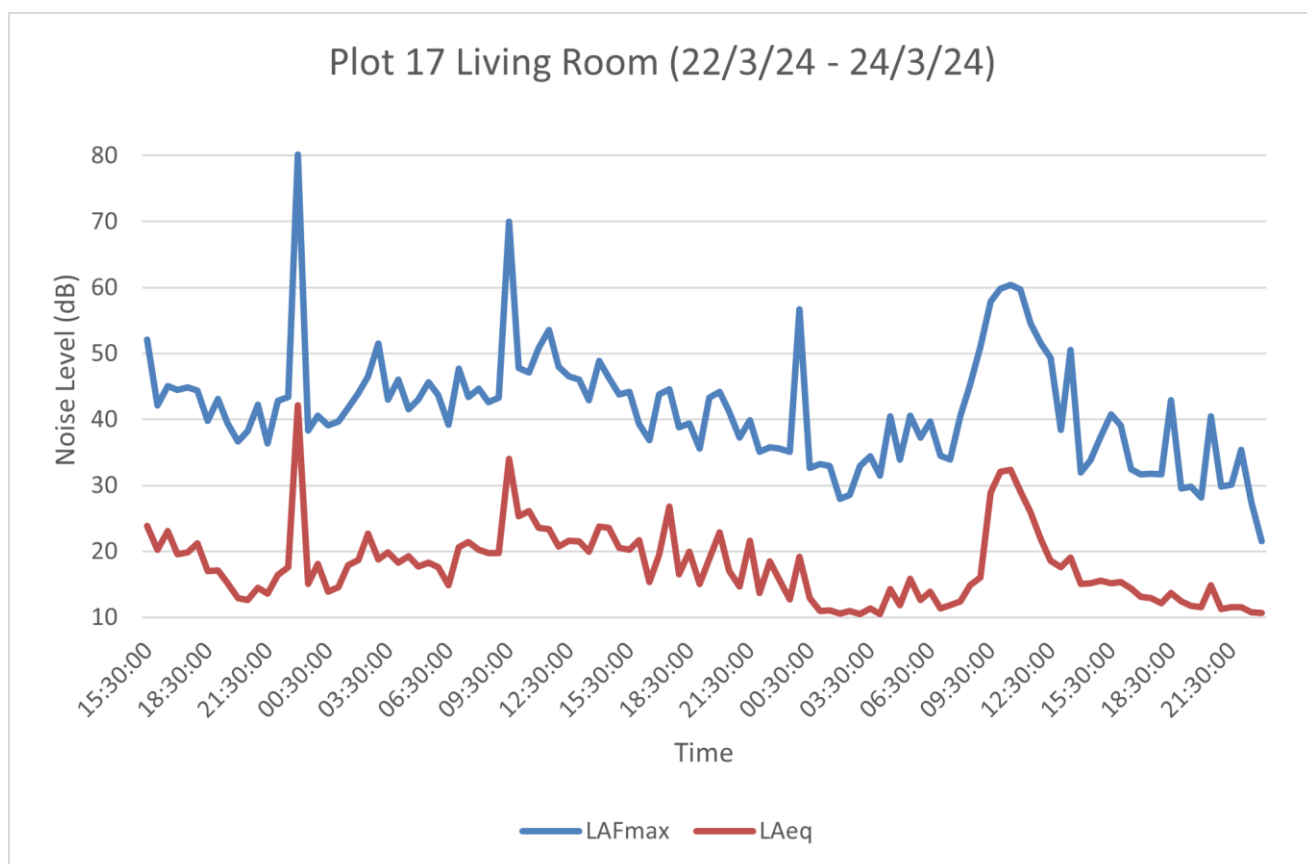


Figure C4 – Plot 17 Living Room graphed measurement data