



Azymuth Acoustics UK

Professional Acoustic Services

Noise Impact Assessment

Ref: Z52388

52No New Build Dwellings

at

Oakenrod,
Rochdale

for

Hallmark Ltd



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1.0 Introduction

Azymuth Acoustics UK (henceforth Azymuth) has been contracted by Nicol Thomas to perform a Noise Impact Assessment (NIA) in relation to a residential development consisting of 52no. new build dwellings in Rochdale. The site is located just off the B6222 Bury Road which is one of the main roads into Rochdale.



Figure 1 – Drawing of proposed development

This noise impact assessment is intended to provide information relating to potential noise levels affecting the site in order to support the detailed planning application for the residential development. In particular, the report sets out the following details:

- The results of a baseline noise survey undertaken in the vicinity of the development site.
- 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.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the NIA consisted of a SvanTek 977 type 1 precision sound level meter. The equipment was calibrated before and after measurements. The sound level meter measured A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement record.

Daytime noise level measurements were undertaken between 13:15hrs - 15:52hrs on Tuesday 30th August as well as between 08:31hrs – 10:01hrs and 16:58hrs – 17:38hrs on Wednesday 31st August 2022. The night-time measurements were undertaken between 23:01hrs and 00:01hrs on Wednesday 31st August / Thursday 1st September 2022.

The noise measurements were undertaken using the sound level meter at the position(s) shown in figure 2 below:

- Position 1: Car Park
- Position 2: Bury Road
- Position 3: Site 1
- Position 4: Site 2



Figure 2 – Noise measurement positions

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

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



Location	Period	L _{AFmax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
1) Car Park	Day	66.6	53.6	55.9	52.0	47.6
2) Bury Road	Day	81.3	68.3	72.0	64.8	55.1
2) Bury Road	Night	77.5	62.7	67.1	52.8	43.7
3) Site 1	Day	59.5	53.1	55.1	52.1	48.2
3) Site 1	Night	60.8	49.4	52.5	44.8	41.2
4) Site 2	Day	58.2	50.8	52.5	50.5	48.5

Table 1 – Summary of noise measurements

2.2 Description of Noise Climate

The main source of noise affecting the site is traffic noise originating from the B6222 Bury Road. To the south of the site there exists a substation as well as an assumed car breaker yard, upon site visits there was no significant noise observed from these two locations.

The weather during the measurement period was dry with wind speeds of approximately 5 to 10mph.

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:

- ProPG: Professional Practice Guidance on Planning and Noise (New residential development)
- National Planning Policy Framework (NPPF 2021)
- British Standard 8233:2014
- World Health Organisation Guidelines on Community Noise
- British Standard 4142:2014
- Acoustics Ventilation and Overheating Residential Design Guide 2020

3.1 ProPG: Planning and Noise - May 2017

This Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The National Planning Policy Framework (NPPF) encourages improved standards of design. The CIEH, IOA and the ANC have worked together to produce this guidance which encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise.

The Professional Practice Guidance on Planning and Noise States 'The recommended approach is intended to give the developer, noise practitioner, and decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of acoustic issues that would be faced'. It is important that acoustic design is reviewed at an early stage of the development process.

3.2 National Planning Policy Framework (NPPF) 2021

The NPPF provides guidance to local authorities taking into account noise in making planning decisions. Paragraph 185 of the National Planning Policy Framework (NPPF) states that planning policies and decisions should aim to:

- Avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development.
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.

The National Planning Policy Framework states that the planning system should ‘prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability’.

3.3 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 2 – Noise Limits for Residential Properties Suggested in BS 8233

3.4 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.

3.5 British Standard 4142:2014

British Standard 4142: 2014 “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.”

3.6 Acoustics Ventilation and Overheating Residential Design Guide 2020

The Acoustics, Ventilation and Overheating Guide (AVO) is intended to be used by acoustic practitioners as well as all those involved in the planning, development, design and commissioning of new dwellings.

It recommends an approach to acoustic assessments for new residential developments that take due regard of the interdependence of provisions for acoustics, ventilation and overheating. Application of the AVO Guide is intended to demonstrate good acoustic design as described in the ProPG, when considering internal noise level guidelines.



3.7 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 the environmental noise on the proposed new residential accommodation:

- Daytime noise levels not to exceed 35dB $L_{Aeq, 16hr}$ in living rooms / bedrooms.
- Daytime noise levels not to exceed 40dB $L_{Aeq, 16hr}$ in dining room / kitchen.
- Night-time noise levels in bedrooms not to exceed 30dB $L_{Aeq, 8hr}$.
- Night-time single sound events in bedrooms not to exceed 45dB L_{Amax} more than 15 times a night.

Table 4, Note 5 of BS 8233:2014 states: 'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.'

4.0 Assessment of Results

4.1 Assessment of Noise Risk

The following noise risk assessment highlights the level of risk of an adverse noise effect based on the guidance from the ProPG and AVO documents.

Plots have been grouped into categories regarding their position on site and the noise levels that affect them. The values used in Table 3 are the noise levels predicted using the SoundPLAN noise model from the worst-case receptor in each category.

Location	Time of Day	Predicted Receptor Worst Case Noise Level (dBA)	ProPG Risk of Adverse Effect	AVO Guide Risk (overheating) Category
1-13 Oakenrod	Daytime $L_{Aeq, 16hr}$	62	Low / Medium	Medium
	Night-time $L_{Aeq, 8hr}$	56	Medium	High
14-29 Oakenrod	Daytime $L_{Aeq, 16hr}$	67	Medium	High
	Night-time $L_{Aeq, 8hr}$	61	Medium / High	High
30-49 Oakenrod	Daytime $L_{Aeq, 16hr}$	57	Low	Low / Medium
	Night-time $L_{Aeq, 8hr}$	49	Low	Low
40-52 Oakenrod	Daytime $L_{Aeq, 16hr}$	56	Low	Low
	Night-time $L_{Aeq, 8hr}$	49	Low	Low

Table 3 – ProPG and AVO noise risk assessment for Oakenrod, Rochdale

4.2 SoundPLAN Model

AAUK has undertaken acoustic modelling with the SoundPLAN noise modelling software to predict and visualise the impact of noise on the proposed development site.

4.2.1 Grid Noise Map

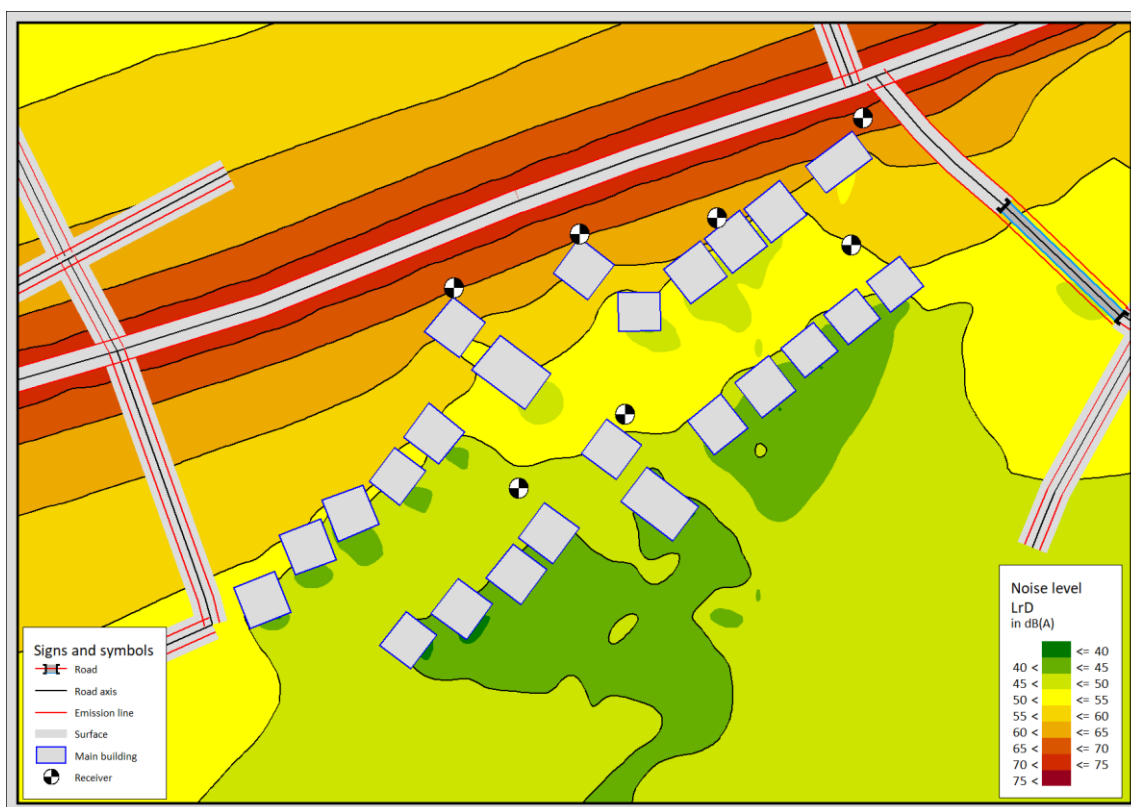


Figure 3 – Grid noise map of predicted noise levels affecting the site

4.2.2 Façade Noise Map

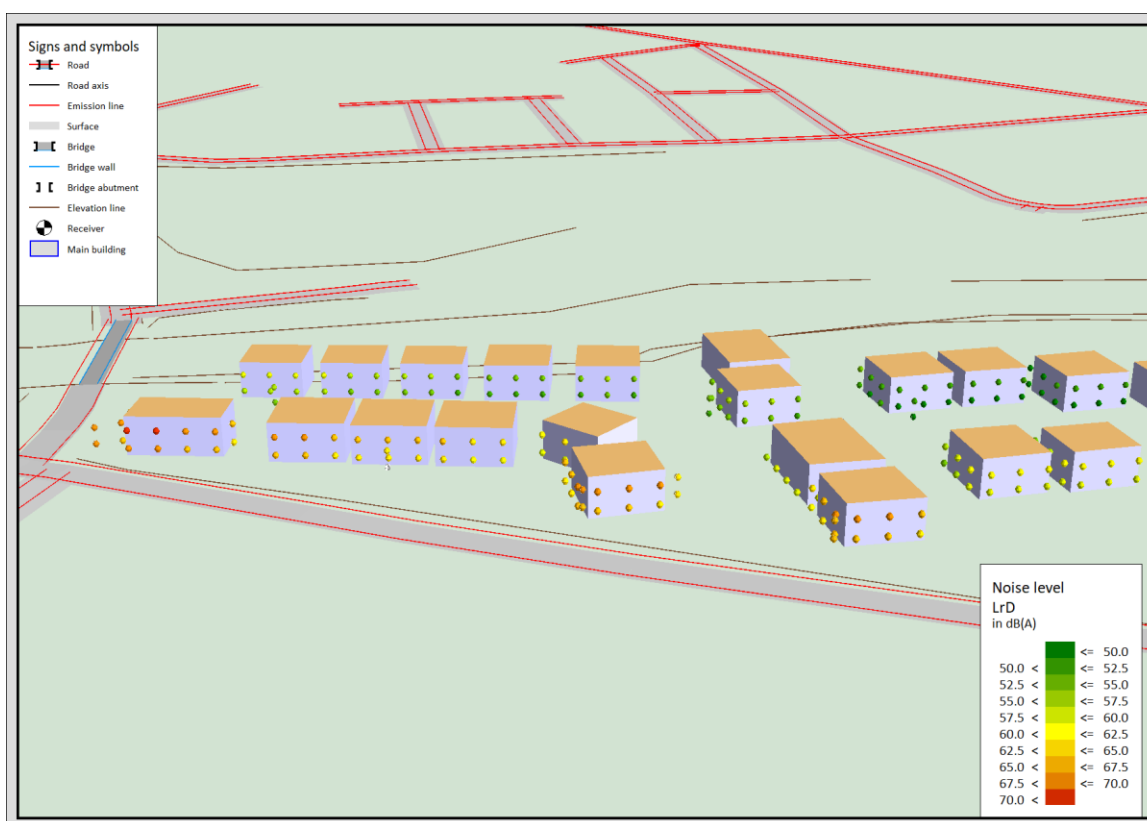


Figure 4 – Façade noise map of predicted noise levels affecting the site

5.0 Recommendations for Noise Mitigation

Based on survey data and the predicted noise levels derived from SoundPLAN, AAUK have produced the following recommendations in order to mitigate the effects of noise within the proposed development. If these recommendations are followed, noise levels within the proposed development will satisfy the criteria as set out in Section 3.7.

5.1 Recommended Glazing Specification

The table below outlines the glazing specifications Azymuth would recommend in order to achieve the indoor internal ambient noise level targets.

Location (Habitable Spaces)	Glazing Specification	Appropriate Glazing Types
Facades marked (Red)	Any building regulations approved min. 37dB R_W and 34dB R_W+C_{tr}	Acoustic glazing e.g 6mm / 16mm argon / 6.8mm Pilkington Optiphon™
Facades marked (Yellow)	Any building regulations approved min. 35dB R_W and 32dB R_W+C_{tr}	Insulating glazing e.g 10mm / 16mm / 6mm good quality double glazed units
Facades marked (Green)	Any building regulations approved min. 29dB R_W and 25dB R_W+C_{tr}	Insulating glazing e.g 4mm / 16mm / 4mm good quality double glazed units

Table 4 – Azymuth recommended glazing specification for the proposed development



Figure 5 – Colour coded schedule of glazing specifications for each plot

5.2 Recommended Ventilation Specification

Location (Habitable Spaces)	Ventilation Specification	Appropriate Ventilation Types
Dwellings marked (Red)	System 4 MVHR – windows may be opened but system has purge / boost setting	No trickle vents. Any air inlets / outlets for MVHR should be appropriately attenuated
Dwellings marked (Yellow)	System 3 continuous mechanical extract fan	Trickle vents D_{new} 38dBA
Dwellings marked (Green)	Any building regulations approved, min D_{new} 32dB (open)	Standard ventilation types e.g standard trickle vents for background vent where necessary

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5.3 Other Elements of Building Envelope

Other elements of the building envelope should have the following sound insulation performance:

- External Walls: minimum sound insulation R_w 55dB. This minimum is likely to be significantly exceeded by a normal brickwork façade. Where alternative external wall types (eg composite cladding panels / Metsec build-ups) are proposed on habitable areas it will be appropriate to check whether they comply with the target R_w 55dB.
- Roof: minimum sound insulation R_w 48dB. This minimum would likely be exceeded with a traditional slate or tile roof with mineral wool loft insulation above plasterboard ceilings or by a suitably insulated concrete roof or composite flat roof. (NB for composite flat roof build-ups a minimum 200mm roof void and 100mm mineral wool insulation would be recommended over and above the rigid insulation required to provide the required levels of thermal insulation).

6.0 Summary

AAUK has undertaken a Noise Impact Assessment (NIA) in relation to a residential development consisting of 52no. dwellings in Rochdale. The site is situated adjacent to the B6222 Bury Road, one of the main roads into Rochdale.

The proposed dwellings situated in close proximity to Bury Road will be subject to higher noise levels than the dwellings that are located at a greater distance from the road.

The worst-case ambient noise levels on site were measured to be ~68dB L_{Aeq} during the daytime and ~62dB L_{Aeq} during the night-time measurement period.

Using the guidance as set out by the ProPG and AVO guide, the first row of dwellings located closest to Bury Road possess a medium / high risk of adverse noise affect. Dwellings located further away from Bury Road typically present a low risk of adverse noise affect.

AAUK has also produced a model using the SoundPLAN noise modelling software in order to better visualise and predict the noise levels that may affect the site.

AAUK has recommended the following glazing and ventilation specification to each façade of the development as colour coded in Table 4 and Figure 4:

- Facades marked **Green**: min. 29dB R_w glazing specification and any standard ventilation types.
- Facades marked **Yellow**: min. 35dB R_w glazing specification and system 3 continuous mechanical extract fan.
- Facades marked **Red**: min. 37dB R_w glazing specification and system 4 MVHR ventilation.

If these recommendations are to be followed, the proposed internal noise levels should satisfy the criteria as set out in section 3.7.

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

Start	Position	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
30 th August 2022							
13:15:00	1	00:05:00	63.2	54	56.8	52.6	49
13:20:00	1	00:05:00	59.1	52.3	55.2	51.4	47
13:25:00	1	00:05:00	67.2	53	55.3	51.9	46.7
13:30:00	1	00:05:00	75	55	56.8	51.9	45.9
13:35:00	1	00:05:00	66.4	53.1	55.6	51.6	47.7
13:40:00	1	00:05:00	68.5	53.6	55.9	52.8	49.1
13:47:00	2	00:05:00	75.9	66.6	70.6	64.3	55.4
13:52:00	2	00:05:00	77.5	66.8	71	64.1	54.4
13:57:00	2	00:05:00	81	66.6	70.8	63.4	53.1
14:02:00	2	00:05:00	74.7	65.5	70	61.8	52.2
14:07:00	2	00:05:00	82.8	67	70.6	64.3	55.7
14:12:00	2	00:05:00	81.4	66.6	70.7	62.9	53.7
14:26:00	3	00:05:00	58.1	52	54.5	51.8	46.5
14:31:00	3	00:05:00	58.9	52.7	55.3	52.1	48.1
14:36:00	3	00:05:00	60.2	52.9	55.2	52.4	49.6
14:41:00	3	00:05:00	58.8	51.7	54.1	51.4	47.3
14:46:00	3	00:05:00	57.7	52.2	54.4	51.8	48.6
14:51:00	3	00:05:00	57.8	52.1	54.4	51.8	48
15:00:00	2	00:05:00	80.8	68.1	72.4	63.3	53.6
15:05:00	2	00:05:00	80.5	68.9	72.8	65.8	56.3
15:10:00	2	00:05:00	98.2	71.2	73.2	65.7	56.4
15:15:00	2	00:05:00	77.7	68.8	72.6	67.1	57.5
15:20:00	2	00:05:00	77.6	67.6	72.1	63.9	53.5
15:25:00	2	00:05:00	77.3	68.1	72.5	64.6	53.8
15:32:00	3	00:05:00	61.8	52.6	54.6	52.4	48.8
15:37:00	3	00:05:00	60.3	52.7	55.2	52.1	48.5
15:42:00	3	00:05:00	56.9	51.7	54.3	51.4	46.1
15:47:00	3	00:05:00	57.5	51.5	54.3	50.9	46.2
15:52:00	3	00:05:00	73.5	57.7	56.6	52.5	47.4
31 st August 2022							
08:31:00	3	00:05:00	58.5	53.3	56	52.6	48.3
08:36:00	3	00:05:00	57.9	53.3	55.6	53.1	49.4
08:41:00	3	00:05:00	57.4	52.5	54.9	51.9	48.5
08:46:00	3	00:05:00	58.3	53.1	55.6	52.5	48.8
08:51:00	3	00:05:00	59.1	52.7	55.5	51.7	48.6
08:56:00	3	00:05:00	58.2	53.6	55.7	53.3	50.6
09:03:00	2	00:05:00	79.4	68.5	72.7	65.4	55.2
09:08:00	2	00:05:00	77.1	67.3	71.6	63.4	51.5
09:13:00	2	00:05:00	79.7	67.5	72	63.1	52.6
09:18:00	2	00:05:00	79	68.4	72.4	66	56.2
09:23:00	2	00:05:00	81	68	72.3	64.8	52.5
09:28:00	2	00:05:00	83	68	72.4	64.1	54.4
09:36:00	4	00:05:00	55.8	50.9	52.7	50.5	48.8
09:41:00	4	00:05:00	55.4	51	52.5	50.7	49.2
09:46:00	4	00:05:00	54.6	50.5	52.3	50.2	48.3



09:51:00	4	00:05:00	58.3	50.6	52	50.4	48.2
09:56:00	4	00:05:00	64.9	50.7	52.4	50.2	48.2
10:01:00	4	00:05:00	59.9	51.2	53.1	50.8	48.5
16:58:00	2	00:05:00	81.5	68.7	72.4	66.6	57.7
17:03:00	2	00:05:00	82.7	68.9	71.9	66.6	59.6
17:08:00	2	00:05:00	79.4	67.8	72.2	64.1	54.9
17:13:00	2	00:05:00	78.2	68.4	71.9	66.4	58.5
17:18:00	2	00:05:00	77.8	68.8	72.6	66.7	58.4
17:23:00	2	00:05:00	88	69.3	72.3	66.6	59.2
17:28:00	2	00:05:00	88.4	69.1	72.3	65.5	52.7
17:33:00	2	00:05:00	96	71.1	73.1	65	53.7
17:38:00	2	00:05:00	77.6	67.5	71.7	64.3	54.2

Table B1 – Fully tabulated daytime noise measurement results

Start	Position	Time	L _{Amax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
31 st August 2022							
23:01:00	2	00:05:00	75.3	62.6	66.9	52.6	44.6
23:06:00	2	00:05:00	80.6	63	67.6	52.3	42.6
23:11:00	2	00:05:00	75.7	61.1	66	52.7	44.1
23:16:00	2	00:05:00	77.9	64.2	69.2	56.6	44.9
23:21:00	2	00:05:00	79.3	62.3	65.6	49.8	41.7
23:26:00	2	00:05:00	76	62.6	67.1	53	44.2
23:33:00	3	00:05:00	60	49.4	53.3	44.9	41.6
23:38:00	3	00:05:00	64.4	50.4	53.2	46.1	41.7
23:43:00	3	00:05:00	68.7	51.7	53	46.9	42.1
23:48:00	3	00:05:00	57.1	47.1	51.3	42.7	40.1
23:53:00	3	00:05:00	56.7	46.8	51.3	42.1	40.4
23:58:00	3	00:05:00	58.1	49	52.7	46.1	41

Table B2 – Fully tabulated night-time noise measurement results