

JPM ACOUSTICS

PARKHILL AVENUE, CRUMPSALL

NOISE IMPACT ASSESSMENT

APRIL 2024





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1.0. INTRODUCTION

1.1. OVERVIEW

- 1.1.1. JPM Acoustics Ltd has been appointed to undertake a noise impact assessment to support a planning application for the proposed residential development at Parkhill Avenue, Crumpsall.
- 1.1.2. This report considers the potential impact of road traffic noise and industrial/commercial noise on proposed noise sensitive properties within the development site. The assessment has been undertaken with due regard to relevant planning policies, British Standards, and technical guidance documents relating to noise.
- 1.1.3. This report is necessarily technical in nature. Therefore, to assist the reader, a glossary of acoustic terminology is provided in **Appendix A**.

1.2. SITE LOCATION AND PROPOSED DEVELOPMENT

- 1.2.1. At present, the site comprises open land which is located in a mixed-use area of Crumpsall. Immediately to the north lies Cleveland Road, with the premises of British Cables Company approximately 60 m further north; to the east lies Delaunays Road; to the south are residential properties along Delaunays Road and Parkhill Avenue; and to the west lies Parkhill Avenue.
- 1.2.2. The site location is presented in **Figure 1.1**.

Figure 1.1: Site location plan



- 1.2.3. The development proposals include for 9 no. properties with private gardens and 15 no. apartments with an associated shared garden space. **Figure 1.2** shows the Proposed Site Layout Plan.

Figure 1.2: Proposed site layout plan



Source: Triangle Architects. Drawing reference: 21-041 02, April 2024

2.0. STANDARDS AND GUIDANCE

2.1. BS 8233:2014: GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS (BS 8233)

- 2.1.1. BS 8233 provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.
- 2.1.2. The Standard includes recommended internal and external guideline noise levels which are applicable to dwellings for steady external noise sources. The Standard states that it is desirable that the internal ambient noise levels do not exceed the criteria set out in **Table 2.1**.

Table 2.1: Desirable internal guideline values from BS 8233

Activity	Location	Period	
		07:00 to 23:00 (Daytime)	23:00 to 07:00 (Night-Time)
Resting	Living Room	35 dB $L_{Aeq, 16h}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq, 16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16h}$	30 dB $L_{Aeq, 8h}$

- 2.1.3. Whilst BS 8233 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated.
- 2.1.4. It is common practice, however, to adopt 45 dB L_{AFmax} as a criterion for typical events at night, based on the guidance from the World Health Organisation ‘Guidelines for Community Noise’ (WHO Guidelines).
- 2.1.5. With respect to external amenity spaces such as gardens and patios, it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres, urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

- 2.1.6. Regarding external noise levels for balconies, BS 8233 states that the specification of noise limits is not necessarily appropriate. The Standard states that small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these spaces. However, the general guidance on noise in amenity spaces is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas.

3.0. BASELINE NOISE SURVEY

3.1. OVERVIEW

- 3.1.1. A baseline noise survey has been undertaken to determine the prevailing noise climate across the site. A short summary of the baseline noise survey methodology and relevant results is included below.

3.2. MEASUREMENT LOCATIONS

- 3.2.1. Measurements were undertaken at three locations during the survey. The adopted measurement locations are presented in **Figure 3.1**.

Figure 3.1: Baseline noise survey measurement locations



Measurement Location 1 (ML1)

- 3.2.2. Unattended measurements were undertaken at ML1 between 23:00 on 28th February 2024 and 23:00 on 29th February 2024.
- 3.2.3. The equipment at ML1 was installed in free-field conditions at a height of 1.5 m above local ground level and 4.5 m from the nearest kerb of Parkhill Avenue. The noise climate at ML1 was dominated by road traffic on Parkhill Avenue.

Measurement Location 2 (ML2)

- 3.2.4. Unattended measurements were undertaken at ML2 between 23:00 on 28th February 2024 and 23:00 on 29th February 2024.
- 3.2.5. The equipment at ML2 was installed in free-field conditions at a height of 2.5 m above the road level of Delaunays Road, and 8 m from the nearest kerb of Delaunays Road. The noise climate at ML2 was dominated by road traffic on Delaunays Road.

Measurement Location 3 (ML3)

- 3.2.6. Unattended measurements were undertaken at ML3 between 23:00 on 28th February 2024 and 23:00 on 29th February 2024.
- 3.2.7. The equipment at ML3 was installed in free-field conditions at a height of 1.5 m above local ground level and 10 m from Cleveland Road. The noise climate at ML3 was dominated by road traffic on Cleveland Road. Whilst on site, no noise was perceptible from the British Cables Company premises to the northeast.

3.3. EQUIPMENT

- 3.3.1. The baseline noise survey was undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3.1**. The measurement equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed.
- 3.3.2. The sound level meter, pre-amplifier and microphone were calibrated to traceable standards within 24 months prior to the measurements. The portable calibrator was calibrated within 12 months prior to the measurements.

Table 3.1: Equipment details

Location	Equipment	Make and Model	Serial Number	Calibration due Date
ML1	Sound Level Meter	Svantek 971	60745	06/09/2025
	Microphone	Aco Pacific 7052E	64535	
	Preamplifier	Svantek SV18	66815	
ML2	Sound Level Meter	Svantek 971	80344	26/05/2024
	Microphone	Aco Pacific 7052E	69566	

Location	Equipment	Make and Model	Serial Number	Calibration due Date
	Preamplifier	Svantek SV18	71577	
ML3	Sound Level Meter	Svantek 971	80342	10/11/2024
	Microphone	Aco Pacific 7052E	71683	
	Preamplifier	Svantek SV18	71576	
ML1,2 and 3	Calibrator	01dB-Stell Cal 21	34675335	06/09/2024

3.4. WEATHER CONDITIONS

- 3.4.1. Weather conditions during the survey were conducive to the measurement of environmental noise, it being dry with low wind speeds ($<5 \text{ ms}^{-1}$).

3.5. RESULTS

- 3.5.1. Summaries of the equivalent continuous ($L_{Aeq,T}$), background sound ($L_{A90,T}$), and maximum noise ($L_{AFmax,T}$) levels at each measurement location are presented in **Table 3.2** to **Table 3.7**, below, and presented graphically in **Appendix B**.

Table 3.2: Summary of measured sound pressure levels at ML1

Date and Start time	Period	Measured Sound Pressure Levels		
		dB $L_{Aeq,T}$	dB $L_{A90,T}^1$	dB $L_{AFmax,T}^2$
28/02/24 23:00	Night-time	52	42	67
29/02/24 07:00	Daytime	54	48	-
<p>¹ - Taken to be the lower of the mean and modal values from the measured $L_{A90,15min}$ values during relevant period</p> <p>² - Taken to be the 10th highest of the measured $L_{AFmax,5min}$ values during the night-time period</p>				

Table 3.3: Measured octave band sound pressure levels at ML1

Period	Octave Band Sound Pressure Levels (L_{eq} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Night-time	55	47	43	41	44	47	45	40	52
Daytime	62	55	51	47	50	47	45	40	54

Table 3.4: Summary of measured sound pressure levels at ML2

Date and Start time	Period	Measured Sound Pressure Levels		
		dB $L_{Aeq,T}$	dB $L_{A90,T}^1$	dB $L_{AFmax,T}^2$
28/02/24 23:00	Night-time	60	41	78
29/02/24 07:00	Daytime	65	51	-
¹ - Taken to be the lower of the mean and modal values from the measured $L_{A90,15min}$ values during relevant period ² - Taken to be the 10th highest of the measured $L_{AFmax,5min}$ values during the night-time period				

Table 3.5: Measured octave band sound pressure levels at ML2

Period	Octave Band Sound Pressure Levels (L_{eq} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Night-time	59	52	49	50	55	54	51	47	60
Daytime	67	60	57	57	62	59	52	47	65

Table 3.6: Summary of measured sound pressure levels at ML3

Date and Start time	Period	Measured Sound Pressure Levels		
		dB L _{Aeq,T}	dB L _{A90,T} ¹	dB L _{AFmax,T} ²
28/02/24 23:00	Night-time	52	44	68
29/02/24 07:00	Daytime	56	48	-
¹ - Taken to be the lower of the mean and modal values from the measured L _{A90,15min} values during relevant period ² - Taken to be the 10th highest of the measured L _{AFmax,5min} values during the night-time period				

Table 3.7: Measured octave band sound pressure levels at ML3

Period	Octave Band Sound Pressure Levels (L _{eq} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Night-time	55	50	46	42	45	46	46	42	52
Daytime	63	58	55	48	51	50	46	42	56

4.0. ASSESSMENT

4.1. OVERVIEW

- 4.1.1. This section presents an assessment of the suitability of the site for residential use, which considers the potential impact from road traffic noise, based on the Proposed Site Layout Plan (see **Figure 1.2**). This assessment is informed by the results of the noise survey, outlined in Section 3.
- 4.1.2. With respect to noise from the British Cables Company premises, located northeast of the site, no noise was perceptible during installation or collection of the measurement equipment. Additionally, the survey data at ML3 (i.e. the location nearest to the premises) does not indicate the presence of noise from the premises when compared with the measurement data at ML1 and ML2, which are both dominated by road traffic. Therefore, noise from the premises is not deemed to be of significance and has not been considered further in this assessment.

4.2. ACOUSTIC MODEL

- 4.2.1. In order to predict the ambient noise levels across the site during the daytime and night-time periods, a 3D acoustic model of the site and surrounding area has been generated using the acoustic modelling software CadnaA®. The model was generated applying the following methodology:
- The model was set to apply the prediction methodology from the Department for Transport document Calculation of Road Traffic Noise (CRTN) for road traffic noise sources (L_{Aeq}).
 - L_{AFmax} noise levels have been predicted with a simplified model of a 6 dB reduction per doubling of distance from the nearside kerb edge of the road.
 - The model included the Proposed Site Layout, which is shown in **Figure 1.2**.
 - Topographical data for the ground levels across the site and surrounding area, obtained from LIDAR data of 1 m resolution, publicly available from the Department for Environment Food and Rural Affairs (DEFRA) was included.
 - The model was set to include second order reflected noise from solid structures. All buildings were set to be acoustically reflective.
 - The heights of proposed properties within the model have been set at 8 m and the heights of existing buildings surrounding the site have been determined using online mapping sources.
 - Ground cover has been assumed to have an absorption coefficient of 0.5 to account for the varied absorptive and reflective conditions across the site and surrounding area.
 - For the prediction of noise levels during the daytime, receptor points within the model have been set at 1.5 m above local ground level. For the night-time, receptor points have been set at 4 m, to be representative of bedrooms at first floor level.

- Embedded mitigation in the form of perimeter garden fencing has been included in the model at a standard height of 1.8 m.

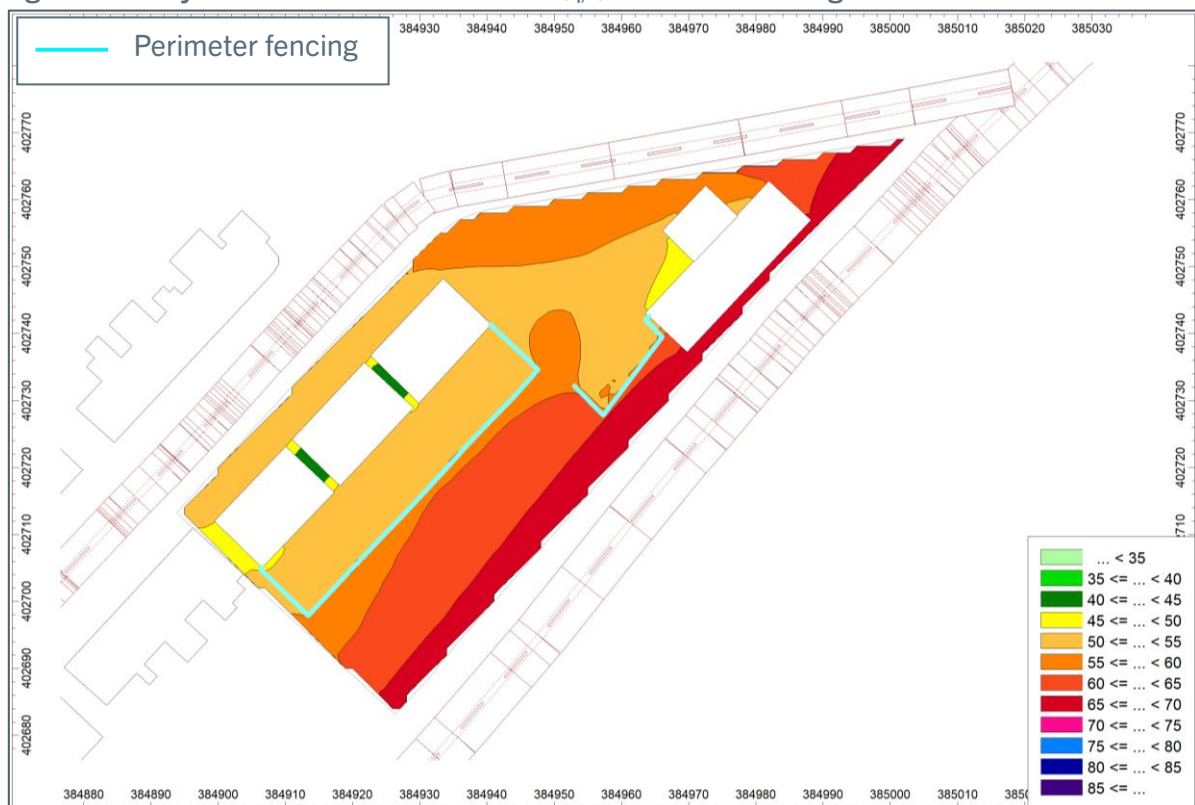
4.2.2. In order to calibrate the acoustic model, receptor points have been set within the model which are representative of the height and locations of ML1, ML2 and ML3. The road sources have then been calibrated at those receptor points until the modelled ambient noise levels for the daytime and night-time periods equalled those measured at ML1, ML2 and ML3.

EXTERNAL NOISE LEVELS

4.2.3. **Figure 4.1** presents the predicted ambient noise levels from road traffic across the site during the daytime ($L_{Aeq,16h}$).

4.2.1. **Figure 4.1** indicates that noise levels during the daytime are predicted to meet or fall below the recommended upper guideline value of 55 dB $L_{Aeq,16h}$ in all external amenity spaces (i.e. private gardens and the shared garden space) demarked in the Proposed Site Layout Plan. Therefore, noise levels across external amenity spaces are acceptable and consideration of forms of mitigation to reduce external noise levels is not required.

Figure 4.1: Daytime ambient noise levels ($L_{Aeq,16h}$) at 1.5 m above ground



INTERNAL NOISE LEVELS

- 4.2.2. For the assessment of road traffic noise levels within sensitive internal spaces during the daytime, consideration must be given to the ambient noise level ($L_{Aeq,16h}$). For the night-time, consideration must be given to both the ambient noise level ($L_{Aeq,8h}$), and the maximum noise level from individual, or distinctive noise events (L_{AFmax}).
- 4.2.3. Based on the adopted internal ambient noise level criterion of 35 dB $L_{Aeq,16h}$ for the daytime, the equivalent external level, assuming an open window provides 15 dB noise attenuation, is 50 dB $L_{Aeq,16h}$.
- 4.2.4. Based on the adopted internal ambient noise level criterion of 30 dB $L_{Aeq,8h}$ for the night-time, and 45 dB L_{AFmax} for maximum noise levels, the equivalent external levels, assuming an open window provides 15 dB noise attenuation, are 45 dB $L_{Aeq,8h}$ and 60 dB L_{AFmax} , respectively.
- 4.2.5. **Table 4.1** presents the range of predicted external noise levels at the proposed houses and the apartment block during the daytime and night-time.

Table 4.1: Predicted noise levels during the daytime and night-time

Property	Predicted Ambient Noise Levels, dB $L_{Aeq,T}$		Predicted Maximum Noise Levels, dB $L_{AFmax,5min}$
	Daytime (07:00-23:00)	Night-time (23:00-07:00)	Night-time (23:00-07:00)
Houses	43 - 54	42 - 53	62 - 66
Apartment Block	49 - 67	45 - 62	63 - 80

- 4.2.6. **Table 4.1** indicates that noise levels at the worst affected facades of the houses and the apartment block are predicted to exceed the daytime and night-time ambient noise level criteria and the night-time maximum noise level criterion. Therefore, consideration is given to forms of mitigation to reduce internal noise levels in the following section.

5.0. MITIGATION

5.1. OVERVIEW

- 5.1.1. The assessment of potential noise impacts from road traffic local to the site has indicated that noise levels within some sensitive internal spaces of the development are likely to exceed the 'desirable' guideline values from BS 8233.
- 5.1.2. This section presents the acoustic performance requirements relating to the sound insulation of the facades such that internal ambient and maximum noise levels within sensitive internal spaces comply with the guideline values from BS 8233. The predictions have been undertaken in accordance with the 'More rigorous calculation' methodology from BS 8233.

5.2. MITIGATION ASSESSMENT

- 5.2.1. The following assumptions have been made for the assessment of the sound insulation requirements of the facades:
- The predictions assume good quality workmanship, for example that windows, doors and opening lights are well sealed. Poor workmanship or low-quality seals may result in predicted internal noise levels being exceeded.
 - External walls are assumed to be of brick construction.
 - Bedrooms are assumed to have a single trickle ventilator.
 - Living rooms are assumed to have two trickle ventilators.
 - All rooms are assumed to have a reverberation time of 0.5 s in the frequency bands of interest.
 - Room and glazing dimensions have been based on drawings provided by Triangle Architects.
- 5.2.2. Based on the results of the above predictions, details of the recommended acoustic performance requirements of the glazing and ventilation systems are given in **Table 5.1**.

Table 5.1: Summary of the recommended glazing and ventilation systems

Key colour in Appendix C	Window System	Ventilation Strategy
	36 dB $R_w + C_{tr}$ Example configuration: 10 mm glass/12 mm air gap/8.8 mm acoustic laminated glass or similar	ADF System 1 Background ventilators and intermittent extract fans with a minimum performance of 39 dB $D_{n,e,w} + C_{tr}$
	33 dB $R_w + C_{tr}$ Example configuration: 6 mm glass/12 mm air gap/8.8 mm acoustic laminated glass or similar	ADF System 1 Background ventilators and intermittent extract fans with a minimum performance of 35 dB $D_{n,e,w} + C_{tr}$
	27 dB $R_w + C_{tr}$ Example configuration: 4 mm glass/12 mm air gap/4 mm glass or similar	ADF System 1 Background ventilators and intermittent extract fans with a minimum performance of 29 dB $D_{n,e,w} + C_{tr}$
<p>“ADF System” is the name given to various ventilation strategies set out in Approved Document F (ADF) – Means of Ventilation, 2010 Edition.</p>		

- 5.2.3. Accounting for the glazing and ventilation performances from Table 5.1 the desirable guideline values from BS 8233 and, the 45 dB L_{AFmax} criterion during the night-time, would be predicted to be achieved with windows closed and ventilators open.
- 5.2.4. Note that windows can still be opened at the occupier’s discretion and when purge ventilation is required for the rapid removal/dispersal of odour or pollutants (e.g. water vapour, burnt toast, paint vapours).

6.0. CONCLUSION

- 6.1.1. JPM Acoustics Ltd has been appointed to undertake a noise impact assessment to support a planning application for the proposed residential development at Parkhill Avenue, Crumpsall
- 6.1.2. An assessment has been undertaken in accordance with relevant British Standards, and has been informed by a baseline noise survey.
- 6.1.3. With respect to noise levels within external amenity spaces, the assessment indicates that the recommended upper guideline value from BS 8233 can be achieved in all private and shared garden spaces without the need for specific forms of mitigation.
- 6.1.4. The assessment indicates that desirable internal noise levels are unlikely to be achieved at the worst affected facades with windows open. Therefore, recommendations have been made regarding suitable glazing and ventilation acoustic performances, which, if adopted, indicate that desirable internal noise levels can be achieved.
- 6.1.5. In summary, with the proposed forms of mitigation in place, desirable internal noise levels are achievable. Consequently, noise need not be a significant factor in the determination of this application.

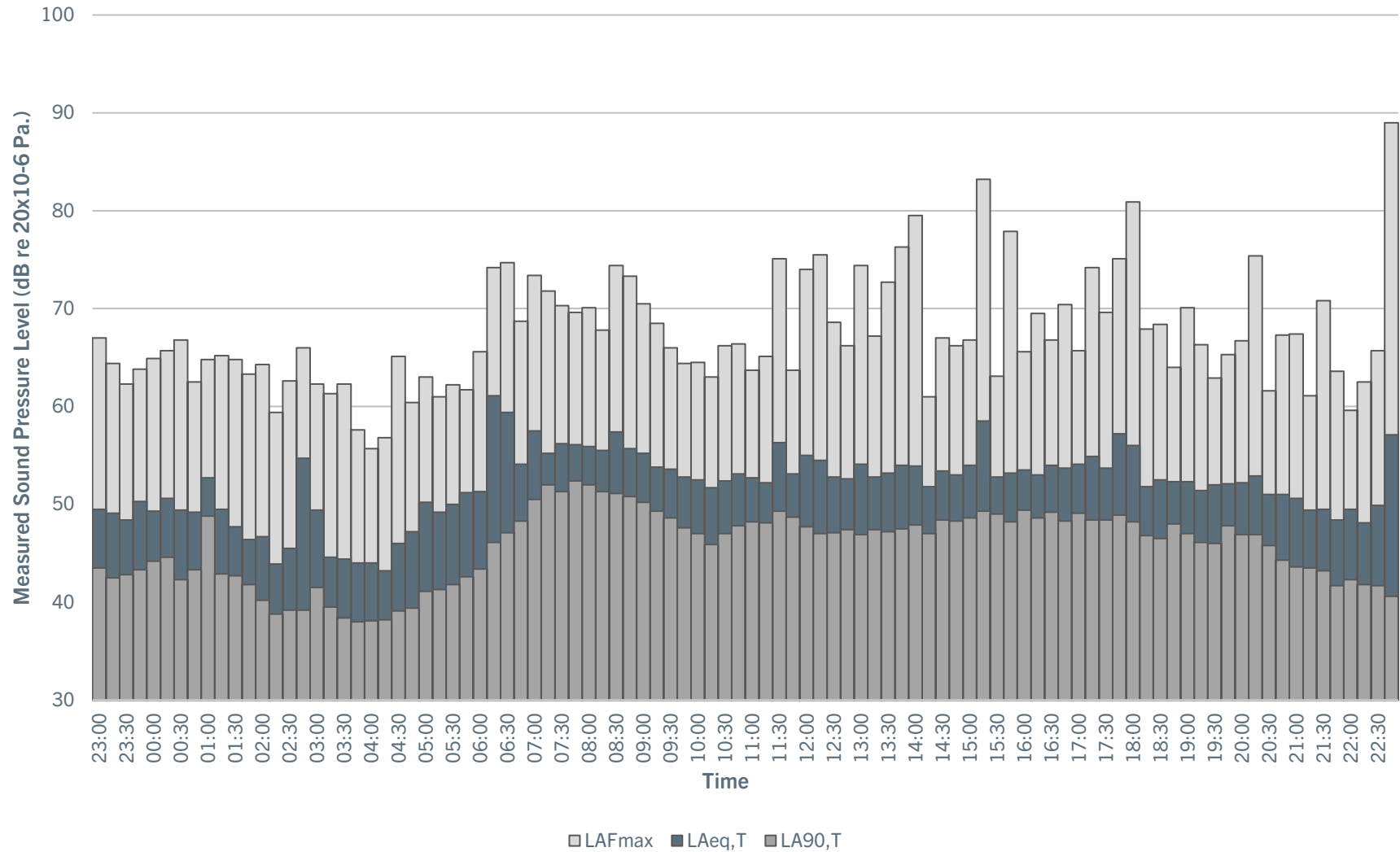
APPENDIX A: GLOSSARY

Table A.2: Acoustic terminology

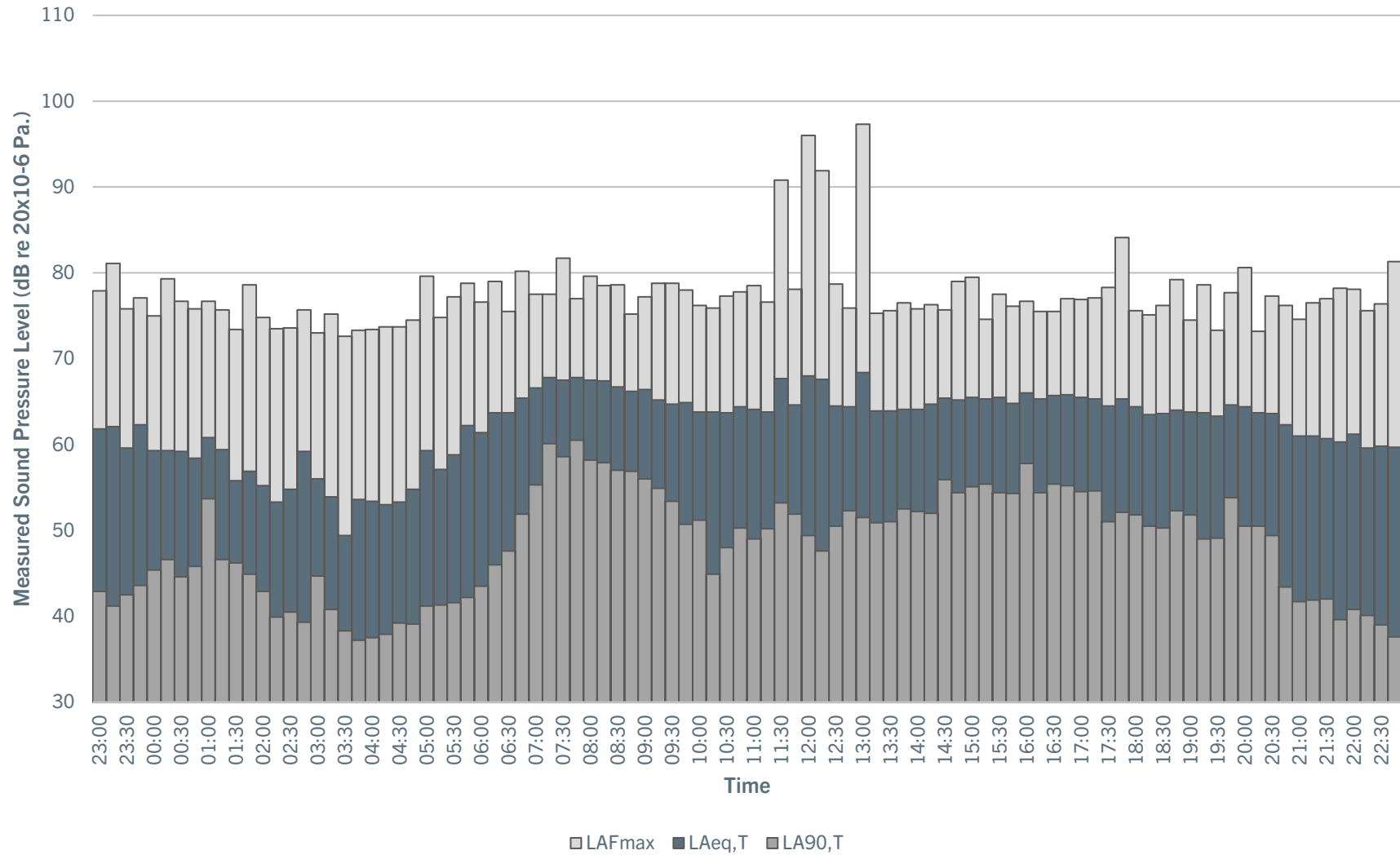
Terminology	Description
A-weighting, dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Decibel, (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 Pa.
Façade	At a distance of 1 m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting (F)	Averaging time constant used in sound level meters and commonly used in the measurement of environmental noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period, T. L_{90} may be thought of as the "average minimum" noise level. Generally used to describe background noise.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period, T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period, T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure. Measured in pascals (Pa).
Sound Pressure Level (Sound Level), L_p	The sound level is the sound pressure on a decibel scale, relative to a reference value of 20×10^{-6} Pascals.

APPENDIX B: SURVEY RESULTS

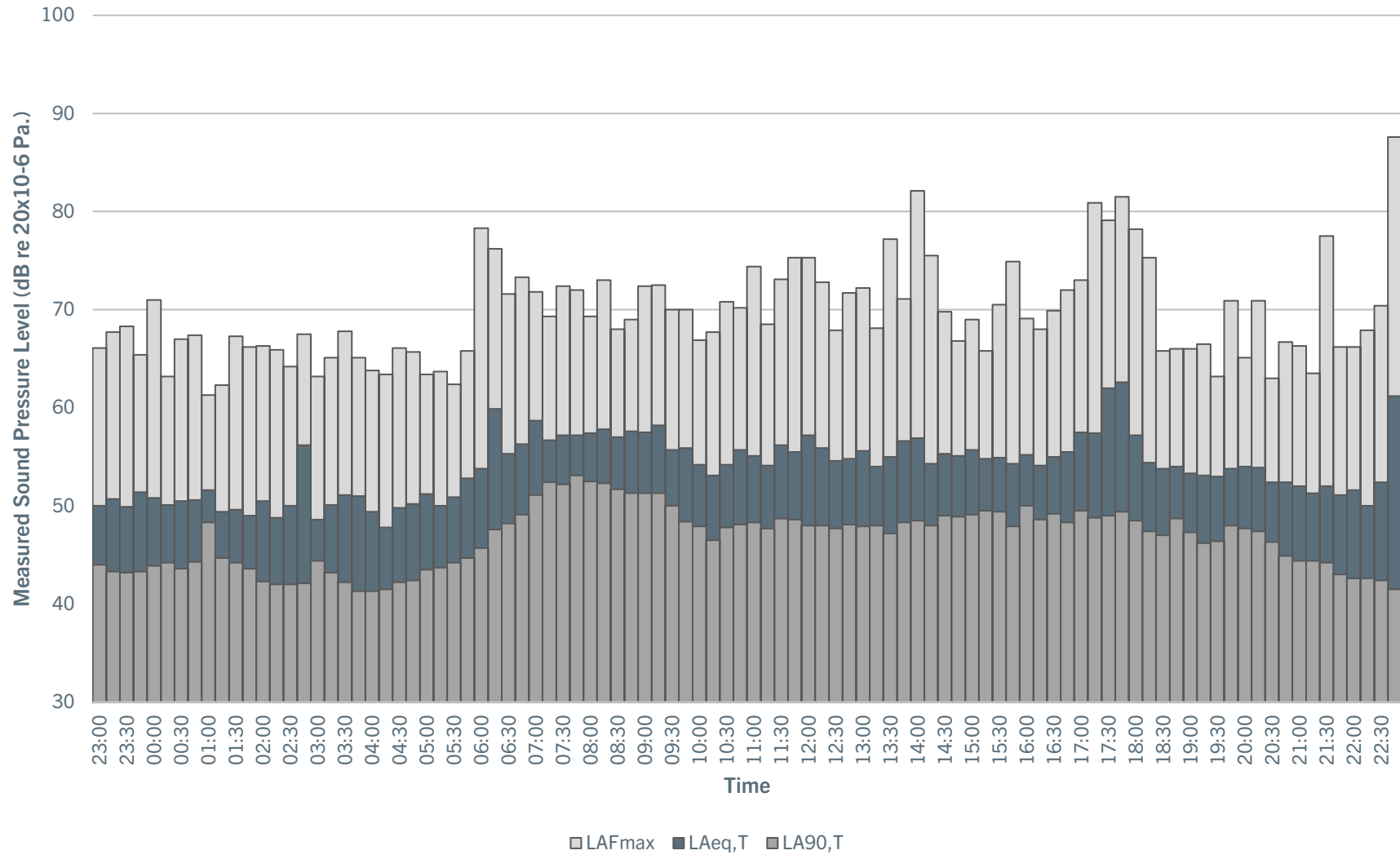
Parkhill Avenue - ML1
Environmental Noise Monitoring Survey Results
LAeq, LAFmax & LA90 Measured Noise Levels
12/02/2024 - 13/02/2024



Parkhill Avenue - ML2
Environmental Noise Monitoring Survey Results
LAeq, LAFmax & LA90 Measured Noise Levels
12/02/2024 - 13/02/2024



Parkhill Avenue - ML3
Environmental Noise Monitoring Survey Results
LAeq, LAFmax & LA90 Measured Noise Levels
12/02/2024 - 13/02/2024



APPENDIX C: GLAZING AND VENTILATION

