



Maple Place

Noise Assessment of Residential Amenity

June 2023

Waterman Infrastructure & Environment Limited

Pickfords Wharf, Clink Street, London, SE1 9DG
www.watermangroup.com

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

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003	29 June 2023	Innes Urbanski Associate Director	Mark Maclagan Technical Director	Mark Maclagan Technical Director
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Comments	Update to development description.
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Comments

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1. Introduction

Waterman Infrastructure & Environment Ltd (Waterman) has been appointed by Aspect (Eastleigh) Ltd (*the applicant*) to undertake a noise assessment to determine the suitability of land at Former Crockery and Samson's Gym (237 Chamberlayne Road and 5b Derby Road), Eastleigh, SO50 5HX (*the Site*) for residential development. The proposed Development is referred to as Maple Place.

The Site is located within the administrative boundary of Eastleigh Borough Council (EBC).

A glossary of the acoustic terminology used within this report is presented as **Appendix A**.

1.1 Existing Site Description

The Site is currently unoccupied. The Former Crockery and Samson's Gym has been demolished. To the north is Derby Road and to the east is Chamberlayne Road, both with residential land use beyond. South and west of the Site are residential. Chamberlayne is a no-through road to Derby Road and therefore only serves the residents. **Figure 1** presents the location of the Site.

1.2 The Development

The description of the development is as follows:

"Construction of 12no. dwellings comprising of 9no. apartments and 3no. houses, with associated landscaping, parking and access from Derby Road."

1.3 Noise & Vibration Considerations

The main consideration to residential development is road traffic noise from Derby Road directly north. The surrounding area is residential and therefore no other localised noise sources are anticipated with the exception of some residential traffic on Chamberlayne Road.

Southampton Airport runway is approximately 765 metres to the southwest of the Site. The airport has been granted planning permission (F/19/86707) in August 2022 for a 164-metre extension to the northern end of the runway. The Environmental Statement of the permitted extension reports the Site is outside the 54dB $L_{Aeq,16h}$ 2033 with Development noise contour¹. Further to this it is understood that the Site is not under the flight path of aircraft associated with Southampton Airport. This is therefore not considered further.

There are no vibration sources, such as a railway line adjacent or near (within 25 metres) to the Site, which can give rise to tactile vibration or structure borne noise. On this basis vibration is not considered a material consideration to the development and has been scoped out.

¹ ESA2 Appendix 11.2. Appendix 11.2 WSP (Noise & Vibration) Aircraft Noise Contours.

Figure 1: Site Location



2. Planning, Policy and Guidance

This section presents the key planning policy and guidance documents pertaining to noise within England relevant to the proposed development. These documents set out the aims, many of which are comparable, without providing details on specific noise levels, the latter of which are transposed into British Standards or sector specific guidance which are presented within Section 3 of this report.

2.1 National Planning Policy Framework

The National Planning Policy Framework² (NPPF) promotes ‘good design’ as part of ‘sustainable development’ and advocates ‘preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels ofnoise pollution...’

Paragraph 185 of NPPF states ‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;’

Paragraph 187 of the NPPF introduces the ‘Agent of change principle’. ‘Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’

2.2 Noise Policy Statement For England

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development the Noise Policy Statement For England³ (NPSE) aims to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

It introduces the concept of noise “effect levels” although it does not equate these to a specific level of noise as this is likely to be different for different noise sources, receptors and time of day. The effect levels are as follows:

- NOEL – No Observed Effect Level: Level below which no effect on health and quality of life due to noise can be detected;
- LOAEL – Lowest Observed Adverse Effect Level: Level above which adverse effects on health and quality of life can be detected;
- SOAEL – Significant Observed Adverse Effect Level: Level above which significant adverse effects on health and quality of life occur.

² Ministry of housing, Communities and Local Government. (July 2021) National Planning Policy Framework. HMSO.

³ Defra. (2010) Noise Policy Statement For England (NPSE).

Predominantly, guidance is drawn from the World Health Organisation (WHO) when setting specific noise levels to the above effect levels, which essentially have been transposed into various British Standards, Policy and Guidance.

2.3 Local Planning Policy

Policy DM8, Pollution of Eastleigh Borough's Local Plan 2016-2036⁴ states:

Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through;

iii. noise or vibration...

Development susceptible to particular forms of pollution will not be permitted:

- a. where it will be affected by such pollution, unless measures can be taken that adequately mitigate the polluting effects; or
- b. where it would inhibit existing economic or other activities giving rise to unacceptable polluting effects.

⁴ Eastleigh Borough Council, (June 2018), Eastleigh Borough Local Plan 2016-2036. EBC.

https://eastleighboroughcouncil.citizenspace.com/planning/sitenotices/user_uploads/final-local-plan-document-june-2018-print.pdf

3. Residential Amenity Criteria

Compliance with the noise assessment criteria presented within Section 3 of this report allows the Planning Policy requirements discussed within Section 2 to be satisfied.

Table 1 presents a summary of guideline values currently used in the assessment of residential amenity in England, drawn from BS8233:2014 and ProPG.

Table 1: Summary of Recommended Noise Levels – Residential Amenity (ProPG)

Activity	Location	Noise Level	
		Day time	Night-time
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedrooms	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$ 45 dB $L_{Amax,F}$ (note 1)
Relaxing, Enjoyment	Private gardens	50-55dB $L_{Aeq,16h}$	-

Note: ¹Not to be exceeded for more than 10 times within the night-time period.

When considering external amenity spaces such as gardens, balconies and terraces, the guidance provided in BS 8233 and reproduced in ProPG is:

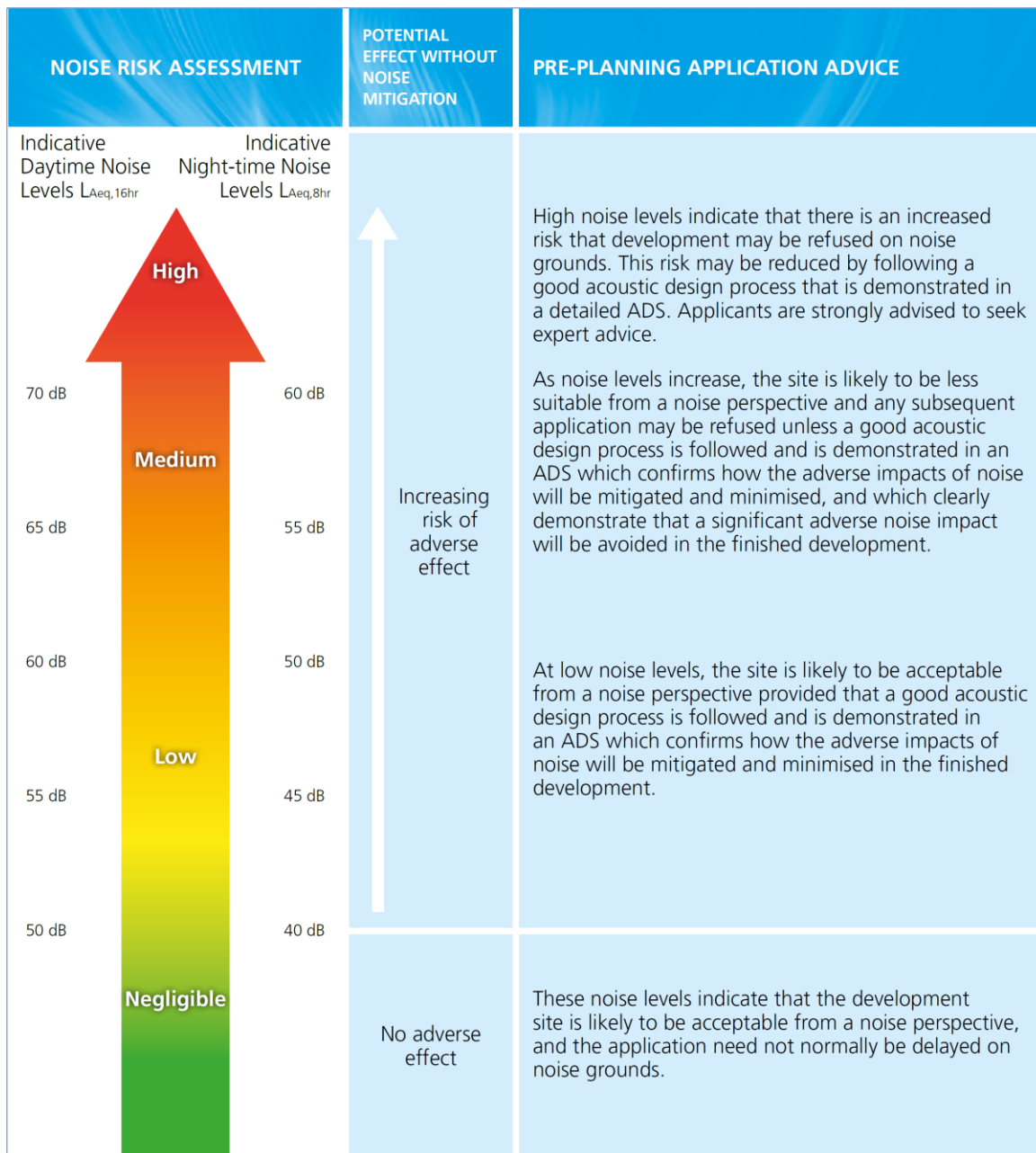
“the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50-55 dB $L_{Aeq,16h}$. These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.”

3.1 ProPG – New Residential Development

ProPG provides a methodology for undertaking a preliminary noise assessment of a proposed development site. The Stage 1 ProPG Initial Noise Risk Assessment is based on the prevailing day (07:00-23:00) and night-time (23:00-07:00) noise levels at the site, established through either measurement or prediction, without any new or additional mitigation. This provides an indication of the likely risk of adverse effects from noise were no subsequent mitigation be included as part of the development proposals. It should indicate whether the Site is considered to pose a negligible, low, medium or high risk from a noise perspective. It is on this basis that the preliminary noise assessment of the Site will be undertaken.

Figure 2 has been reproduced from ProPG illustrating the associated noise risks based on the prevailing noise levels. It is important to note that the assessment of noise risk serves to provide an indication as to the initial suitability of the site for residential development and as to what the acoustic issues are likely to be.

Figure 2: ProPG Stage 1 Initial Site Noise Risk Assessment



Note:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,16h}$ is for daytime 0700-2300, $L_{Aeq,8hr}$ is for night-time 2300-0700.
- An indication that there may be more than 10 noise events at night (2300-0700) with $L_{Amax,F} > 60dB$ means the site should not be regarded as negligible

4. Environmental Baseline Noise Conditions

A baseline environmental noise survey was undertaken between Monday 13th June to Wednesday 15th June 2022 over a 48-hour weekday period. An environmental noise logger was at the northern boundary with the Derby Road (LT1) with the other at the south-eastern boundary with Chamberlayne Road (LT2).

The noise monitoring locations are shown on **Figure 3** with a summary of the measured noise levels presented as **Table 2**. Full details are presented in **Appendix B**.

Table 2: Summary of Measured Noise Levels

Location	Period	dB			dB LA90,range	dB LA90,Mode
		dB LAeq,T	LAFmax (90th perc)	dB LA10,T		
LT1 Derby Road (Northern Boundary)	Day (07:00-23:00)	62	81	65	33-54	45
	Night (2300-0700)	54	77	50	32-50	38
LT2 Chamberlayne Road (Eastern Boundary)	Day (07:00-23:00)	54	73	57	31-52	44
	Night (2300-0700)	48	67	48	31-53	37

The dominant noise source incident on the Site was noted to be road traffic noise from Derby Road.

4.1 CadnaA Noise Model

A 3-dimensional CadnaA noise model of the existing Site and surrounds was developed using OS free data⁵ and assumed flat ground, which is considered a robust approach given the site, setting and surrounds. The noise model was calibrated using the measured noise levels.

Table 3 presents a comparison between the measured noise levels and those predicted using CadnaA noise modelling software.

Table 3: Comparison Between Measured & Predicted Noise Levels

Location (dominant source)	Period	Measured Noise Level		
		dB LAeq	Cadna dB LAeq,	CadnaA minus Measured
LT1 (Derby Road)	Day	61.8	61.8	0
	Night	53.4	53.4	0
LT2 (Chamberlayne Road)	Day	53.7	54.0	+0.3
	Night	48.6	48.5	-0.1

There is good correlation between the predicted noise levels using CadnaA noise modelling software and the measured noise levels. It is considered this provide a robust basis on which to assessment the

⁵ [OS OpenMap - Local](#) | [OS Data downloads](#) | [OS Data Hub](#)

suitability of the site for residential use.

Figure 3: Noise Monitoring Locations



5. Noise Assessment

5.1 Road Traffic Noise

5.1.1 ProPG Initial Site Noise Risk Assessment

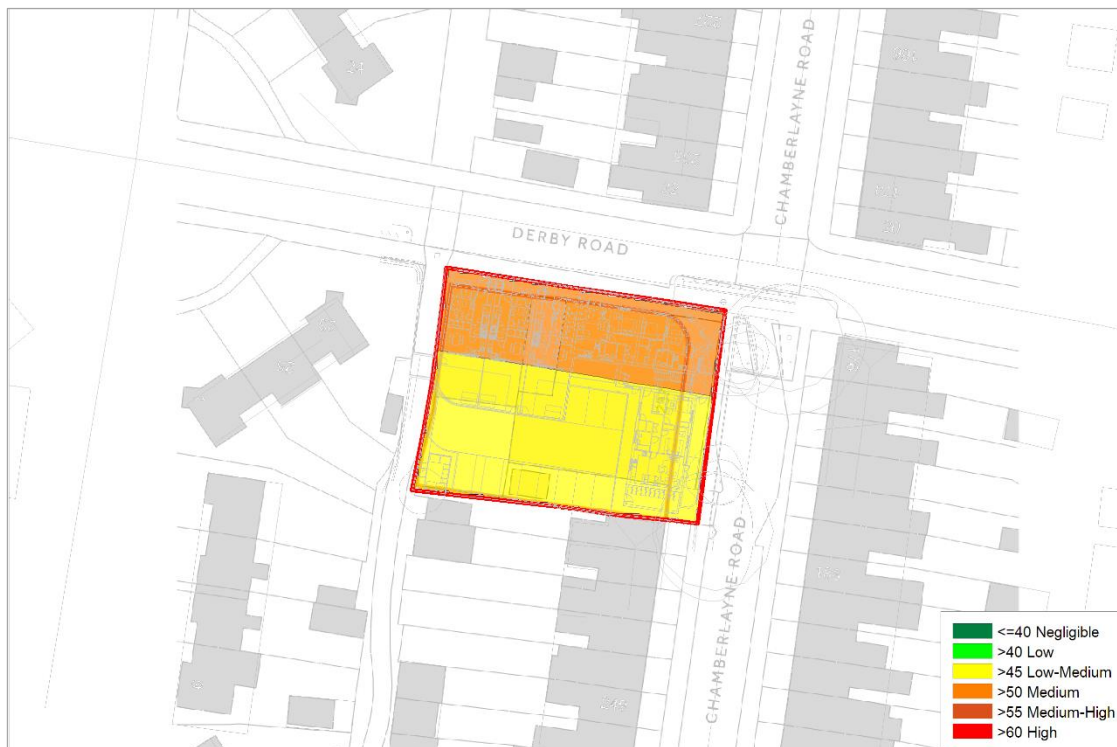
The calibrated CadnaA noise model has been used to produce noise contour plots across the site without any buildings (un-developed Site) to provide an indication of the ProPG noise risk. **Figure 4** presents the predicted daytime noise contours at 1.5m above ground level and **Figure 5** presents the predicted night-time noise contours at 4.0m above ground level, which generally reflects the location of residents during these time periods (daytime ground floor/garden; night-time first floor level bedroom), although it is appreciated that the proposed Development is multi-storey.

During the daytime period the noise risk is predominantly low-medium risk within the northern area decreasing to low risk within the southern area of the site, with a strip of land adjacent to the northern boundary facing Derby Road being medium risk. During the night-time period, 1/3 of the site (northern area) is medium noise risk with 2/3 of the site (southern area) being low-medium risk. This indicates that a good acoustic design process will need to be followed to mitigate and minimise the effects of noise within the northern area of the site. As previously stated, this is for the undeveloped site. Once the Development is built out noise levels within the southern area of the Site and rear facades of the Development buildings, noise levels will be significantly lower, as illustrated in Sections 5.1.2 and 5.1.3.

Figure 4: ProPG Daytime Noise Contour Plot dB L_{Aeq,16h} (1.5m agl) – Undeveloped



Figure 5: ProPG Night-Time Noise Contour Plot dB LAeq,8h (4.0m agl) - Undeveloped



5.1.2 External Amenity

With regard to external amenity, a daytime noise level of $\leq 55\text{dB LAeq,16h}$ is generally the accepted approach based on current credited guidance within ProPG and BS8233. **Figure 6**, indicates that this condition is predicted to be satisfied within the garden areas at the rear of the houses and apartments together with the area west of Chamberlayne Road. Balconies facing Derby Road are predicted to exceed the guideline value of $\leq 55\text{dB LAeq,16h}$ with levels slightly above 60dB(A) , which is not unexpected facing a main road.

Noise levels within the balcony areas facing Derby Road could be reduced further through provision of solid balustrades.

5.1.3 Internal Ambient Noise Levels

It is generally accepted that where daytime façade noise levels are $\leq 50\text{dB LAeq,16h}$ the internal ambient noise level (IANL) with windows open (based on 50% glazing) would be $\leq 35\text{dB LAeq,16h}$ thereby satisfying the criteria of BS8233:2014. Similarly, night-time façade noise levels of $\leq 45\text{dB LAeq,8h}$ and $\leq 60\text{dB LAmax}$ would result in IANLs of $\leq 30\text{dB LAeq,8h}$ and $\leq 45\text{dB LAmax}$ with windows open, again satisfying the criteria of BS8233.

Where the design intent is a natural ventilation strategy through opening of windows then BS8233:2014 considers that IANLs could be increase by 5dB and reasonable internal conditions still provided. This equates to a daytime façade noise level of $\leq 55\text{dB LAeq,16h}$ and night-time façade noise levels of $\leq 50\text{dB LAeq,8h}$ and $\leq 65\text{dB LAmax}$. This approach is also reflected in ProPG.

Figures 7 and 8 indicate that for the northern façade of the houses and apartments, guideline IANLs would be exceeded when windows are open. The noise levels are such that enhanced glazing would be required. On facades which are screened, such as the southern façade of the houses and apartments, noise levels are sufficiently reduced that reasonable IANLs are predicted to be satisfied when windows are open and therefore there are no specific mitigation requirements. The predicted façade noise levels on the eastern

facades of apartments on Chamberlayne Road would result in reasonable IANLs with windows open. At the rear due to screening there are no noise mitigation considerations, good IANLs would be achieved with windows open.

Figure 6: Daytime External Amenity



Figure 7: Daytime Façade Noise Levels dB LAeq,16h and Indicative Mitigation

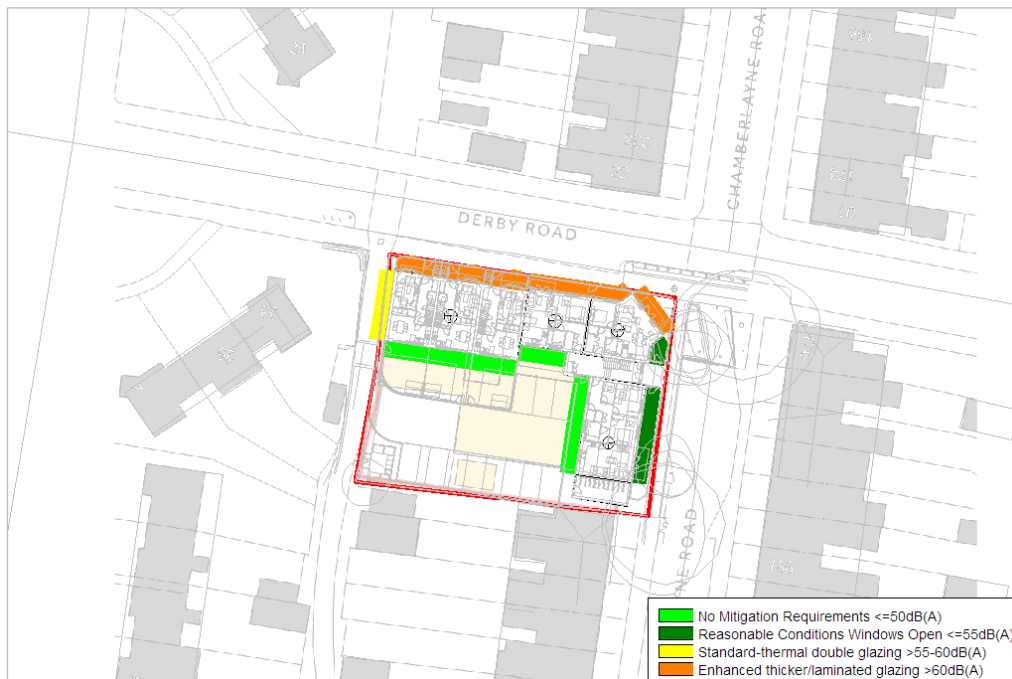


Figure 8: Night-Time Façade Noise Levels dB $L_{Aeq,16h}$ and Indicative Mitigation (Bedrooms)

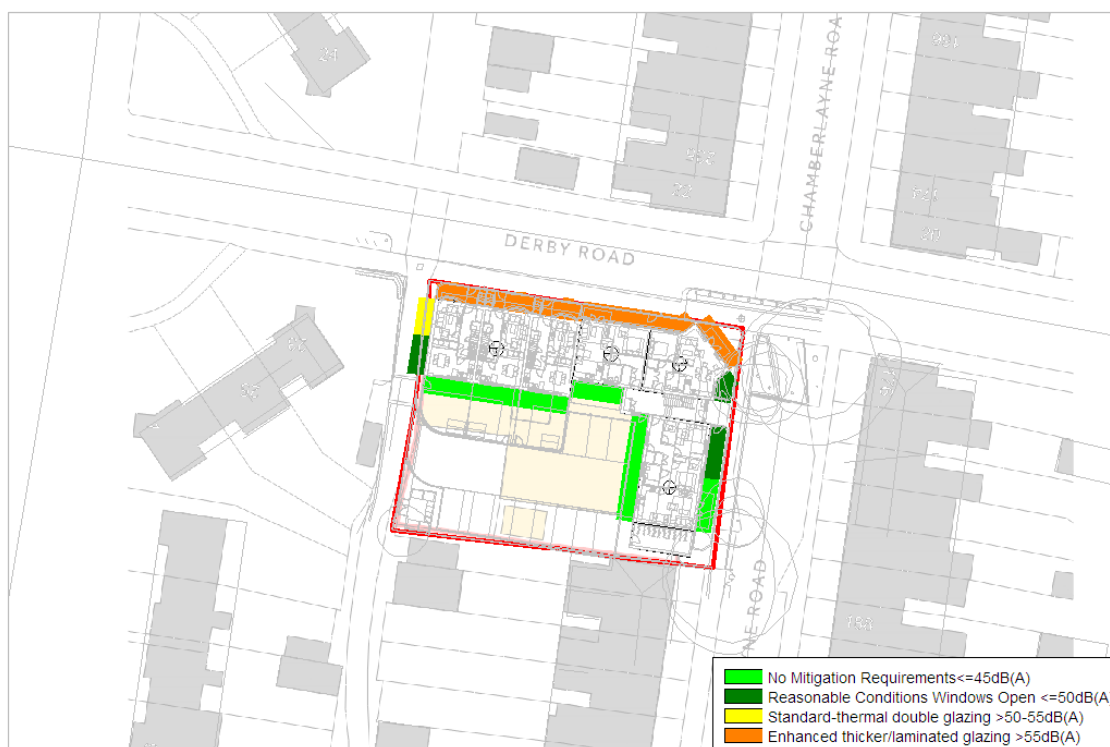


Table 4 presents preliminary glazing and ventilation sound insulation specification based on external noise levels. On the northern façade of the houses and apartments preliminary indication is glazing affording 33dB R_{w+Ctr} and ventilator affording 39dB $D_{n,e,w+Ctr}$ will be required to satisfy BS8233 guideline IANLs.

Table 4: Acoustic Specification for Glazing and Ventilation (*Transportation noise only*)

External Noise Level Not Exceeding		Acoustic Performance Requirement	
Day dB L_{Aeq}	Night dB L_{Aeq} (dB L_{AFmax})	Windows dB R_{w+Ctr}	Ventilators dB $D_{n,ew+Ctr}$
<50	<45 (<60)	No requirement	
57	52 (67)	26 (Standard Thermal Glazing)	32 (Standard Window Mounted Trickle Ventilator)
60	55 (70)		
63	58 (73)	29	35
66	61 (76)	32	38
69	64 (79)	35	41
72	67 (82)	38	44

6. Conclusions

The conclusions are as follows:

- The dominant noise source at the site is road traffic noise from Derby Road to the north. It exhibits diurnal variation with lower noise levels during the night-time period than the daytime period. The average ambient night-time level is approximately 5 to 7.5dB lower than the daytime level.
- ProPG initial site noise risk assessment indicates the site is predominantly medium risk in the northern area reducing to low-medium risk within the southern area.
- Guideline IANLs are predicted to be exceeded with windows open on the northern façade of the houses and apartments facing Derby Road. The predicted noise levels are such that enhanced glazing is recommended on the northern facades. Preliminary indication is glazing affording 33dB R_{w+Ctr} and ventilator affording 39dB $D_{n,e,w+Ctr}$ is likely to be required. At the southern (screened) facades of the houses and apartments predicted noise levels indicates no specific mitigation is required and reasonable IANLs would be achieved with windows open.
- Reasonable IANLs are predicted to be satisfied on the eastern façade of the apartments on Chamberlayne Road with windows open. At the western (screened) rear facades the predicted noise levels indicate no specific mitigation is required, with guideline IANLs being satisfied with windows open.
- Predicted daytime noise levels within the garden areas at the rear of the houses and apartments satisfy guideline values and are therefore suitable for external amenity with no specific mitigation. This is also applicable to balcony areas facing Chamberlayne Road. Noise levels within balcony areas facing Derby Road are predicted to slightly exceed 60dB $L_{Aeq,16h}$. Levels could be reduced further through provision of solid balustrades.

In summary, suitable residential amenity could be provided through provision of suitable glazing and ventilation. The predicted noise levels are such that although mitigation needs to be incorporated for the exposed facades, it would not make development unfeasible.

APPENDICES

A. Glossary of Acoustic Terminology

Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.																		
Assessment period	The period in a day over which assessments are made.																		
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.																		
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).																		
Broadband	Containing the full range of frequencies.																		
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds: <table> <tr> <td>Four engine jet aircraft at 100m</td><td>120 dB</td></tr> <tr> <td>Riveting of steel plate at 10m</td><td>105 dB</td></tr> <tr> <td>Pneumatic drill at 10m</td><td>90 dB</td></tr> <tr> <td>Circular wood saw at 10m</td><td>80 dB</td></tr> <tr> <td>Heavy road traffic at 10m</td><td>75 dB</td></tr> <tr> <td>Telephone bell at 10m</td><td>65 dB</td></tr> <tr> <td>Male speech, average at 10m</td><td>50 dB</td></tr> <tr> <td>Whisper at 10m</td><td>25 dB</td></tr> <tr> <td>Threshold of hearing, 1000 Hz</td><td>0 dB</td></tr> </table>	Four engine jet aircraft at 100m	120 dB	Riveting of steel plate at 10m	105 dB	Pneumatic drill at 10m	90 dB	Circular wood saw at 10m	80 dB	Heavy road traffic at 10m	75 dB	Telephone bell at 10m	65 dB	Male speech, average at 10m	50 dB	Whisper at 10m	25 dB	Threshold of hearing, 1000 Hz	0 dB
Four engine jet aircraft at 100m	120 dB																		
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Circular wood saw at 10m	80 dB																		
Heavy road traffic at 10m	75 dB																		
Telephone bell at 10m	65 dB																		
Male speech, average at 10m	50 dB																		
Whisper at 10m	25 dB																		
Threshold of hearing, 1000 Hz	0 dB																		
dB(A): A-weighted decibels	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.																		
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).																		
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.																		
L_{Amin} noise level	This is the lowest level during the measurement period.																		
$L_{Aeq,T}$ noise level	This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.																		

L_{A90} noise level	This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.
L_{A10} noise level	This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.
Sound Reduction Index (R)	The sound reduction index is a single-number rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.
Weighted Sound Reduction Index (R_w)	Single number rating used to describe the laboratory airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
C_{TR}	An adjustment to the R _w scale to take account of the lower performance against a typical spectrum of road traffic noise dominated by low frequencies.
D_{ne,W}	Weighted element normalised level difference.
VDV	This is the vibration dose value, a measure of vibration exposure; the fourth root of the integral, over the measurement period, of the fourth power of the frequency-weighted and time-varying acceleration.

B. Baseline Noise Survey

Table B1 presents the equipment detail used for the baseline noise survey.

Table B1: Equipment Detail

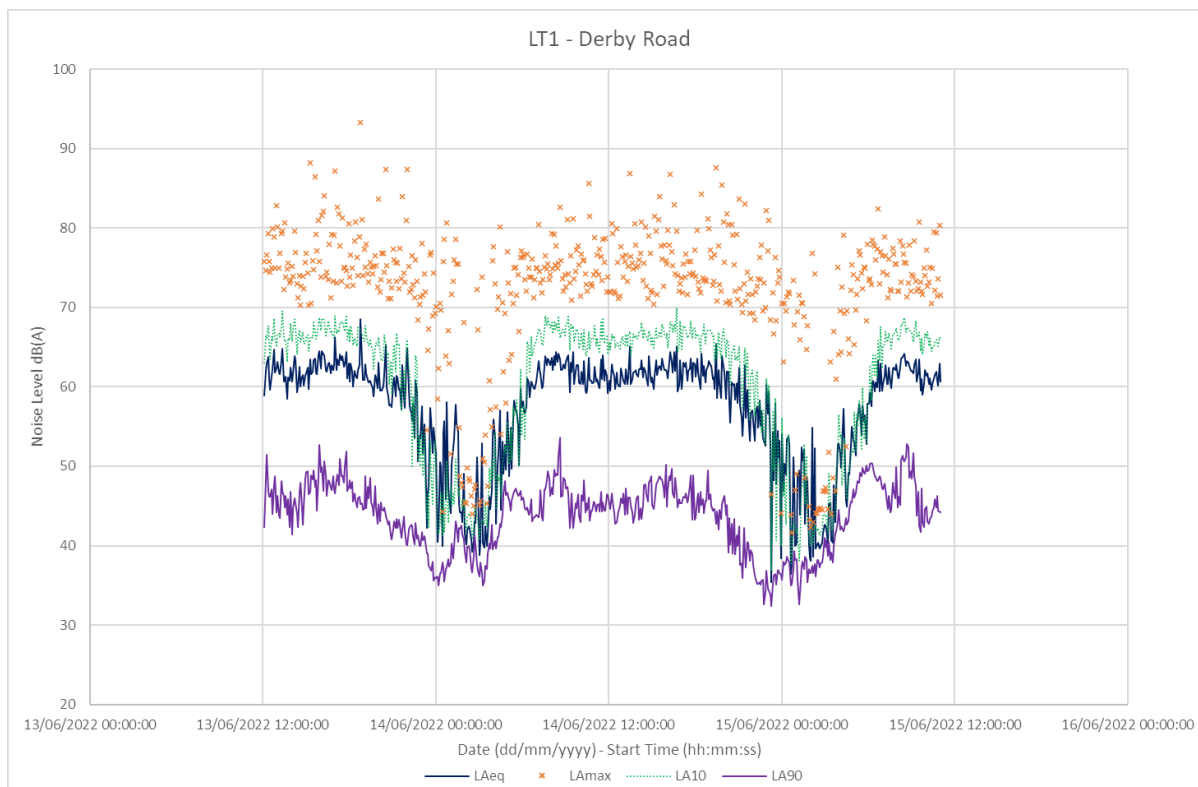
Location	Description	Serial Number	Date of Last Calibration
LT1 Derby Road	Rion NL-52 Type 1 Sound Level Meter	987349	18 th March 2021 Certificate Number 00001188-2
	Rion NH-25 Pre-amplifier	87555	
	Rion UC-59 Microphone	14063	
LT2 Chamberlayne Road	Rion NL-52 Type 1 Sound Level Meter	921231	25 th Feb 2022 Certificate Number 1502030-1
	Rion NH-25 Pre-amplifier	21273	
	Rion UC-59 Microphone	04266	
All	Acoustic Calibrator Rion NC-75	35270123	27 th July 2020 Certificate Number 14015742-4

The equipment was field calibrated at the beginning and end of the noise survey with no significant drift in calibration.

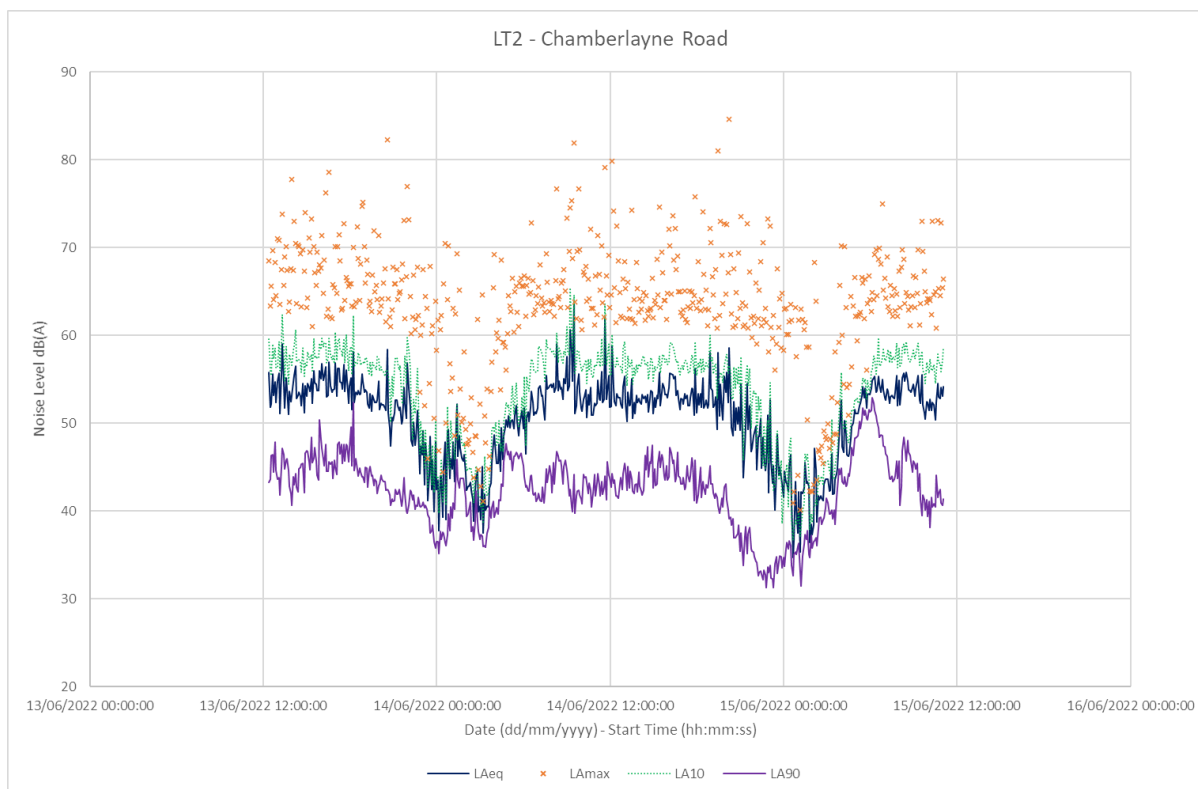
The weather during the survey was recorded as calm to less than 2 m/s, clear skies, sunny with average temperature of 16-18°C.

Graph 1 presents the time history plot of measured noise levels at monitoring location LT1 (Derby Road), which was approximately 2.6m above ground and 4 metres set back from the edge of Derby Road. **Graph 2** presents the time history plot of measured noise levels at monitoring location LT2 (Chamberlayne Road), which was approximately 2.6m above ground and 5 metres set back from Chamberlayne Road and 27 metres from the edge of Derby Road.

Graph 1: Time History Plot LT1 Derby Road



Graph 2: Time History Plot LT2 Chamberlayne Road



Appendices

Maple Place

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UK and Ireland Office Locations

