

Arun Serviced Apartments Ltd

136-137 FRIAR STREET, READING

Environmental Noise Assessment

Report No. 23-0051-0 R01.1





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Date: 26 July 2023

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1 INTRODUCTION

Arun Serviced Apartments Ltd is planning a redevelopment scheme for the building at 136-137 Friar Street, Reading. The proposed scheme comprises the demolition of the rear part of the building, retention of front façade and roof plane; and construction of five storey rear extension and dormer windows to retained front roof plane; to accommodate a Class C1 hotel use and ground floor Class E commercial, business, and service use.

Sustainable Acoustics Ltd has undertaken an environmental noise survey for the site to assess the level of environmental noise that may impact the future occupiers of the proposed development, understand the existing residual background noise level and recommend mitigation as necessary.

2 SITE CONTEXT

The site is located in the busy town centre of Reading. It is a largely commercial area containing a multitude of high street shops, as well as some residential apartments above some of the retail units. The existing building is three storeys in height with a pitched roof and chimneys. Ground floor use is currently a convenience store with ancillary storage space above. There is a courtyard at the rear of the building which is hard landscaped and is enclosed by a garden wall.

Road traffic on Friar Street is the dominating source of noise at the front of the building. The rear of the site is significantly screened from road traffic noise and continuous quieter noise from building plant is the dominant source in that location.

Figure 1 below shows the proposed development area in context.



Figure 1 – Satellite view of the site

Figure 2 and Figure 3 provide context of the site location.



Figure 2 – Street View of the front of the existing building



Figure 3 – View facing south, from rear of the existing building

Figure 4 and Figure 5 provide an external sketch of the development and an example floor



Figure 4 – Proposed scheme in existing context

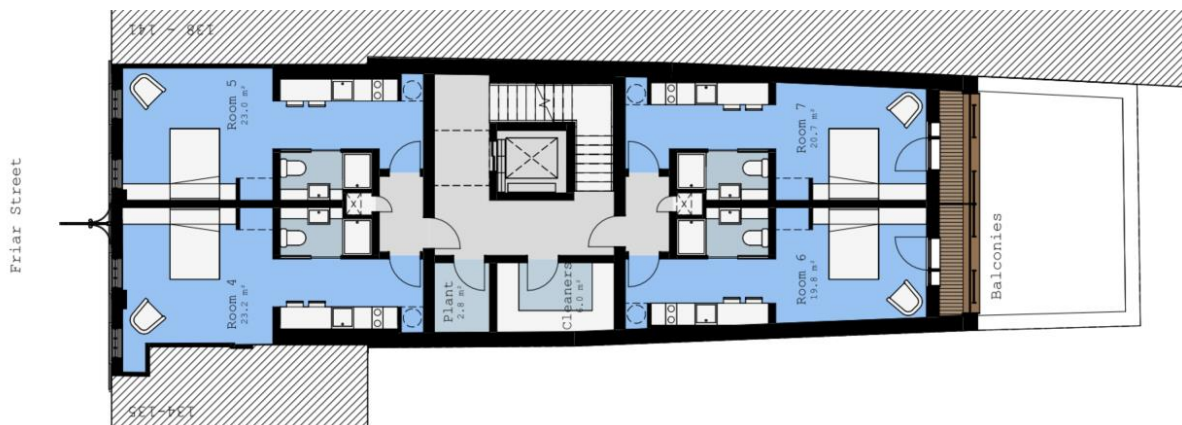


Figure 5 – Typical proposed room layout, 2nd Floor (1st Floor and 3rd Floor are similar)



3 POLICY AND GUIDANCE ON NOISE

3.1 National Planning Policy

National planning policy is provided in the National Planning Policy Framework (NPPF), last updated in July 2021, which supports a presumption in favour of development. The policy on noise is to *avoid* significant adverse impacts on health and quality of life, *mitigate* and reduce other adverse impacts and to *recognise* the need for development. This is further qualified in the Noise Policy Statement for England (NPSE). Further advice on the interpretation of government policy is given in Planning Policy Guidance on Noise (PPG: Noise), which considers context and significance effects.

The Professional Practice Guidance on Planning & Noise (ProPG) provides recognised advice and an appropriate assessment process for new residential development; although the proposal is for a hotel, the advice is considered relevant.

Design criteria for internal and external noise levels, based on the recommendations of the World Health Organisation are provided in the British Standard BS 8233: 2014. ProPG expands on these criteria.

Further detailed information on the national policy and guidance is provided in Appendix 1 of this report.

3.2 Local Planning Policy

3.2.1 Local Plan

The Reading Borough Council (RBC) Local Plan, adopted on 4th November 2019, contains several relevant policies pertaining to noise impact on residential properties, copied below.

CC8: SAFEGUARDING AMENITY

“Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

- *Privacy and overlooking;*
- *Access to sunlight and daylight;*
- *Visual dominance and overbearing effects of a development;*
- *Harm to outlook;*
- *Noise and disturbance;*
- *Artificial lighting;*
- *Vibration;*
- *Dust and fumes;*
- *Smell;*
- *Crime and safety; or*
- *Wind, where the proposals involve new development of more than 8 storeys.*

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.



As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes."

EN17: NOISE GENERATING EQUIPMENT

"Where noise generating equipment is proposed, the noise source specific level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor".

It should be noted that Policy EN17 requires assessment of the specific sound level of noise generating equipment, not the rating noise level.

H8: RESIDENTIAL CONVERSIONS

"Proposals to convert buildings into self-contained flats or for multiple occupation will be assessed against the impact on the amenity and character of the surrounding area, particularly in terms of intensification of activity, loss of privacy, loss of external amenity space, the provision and location of adequate on-site car parking and the treatment of bin storage areas and other related servicing. Proposals to convert properties into self-contained flats or for multiple occupation will only be acceptable where:

- *The proposal respects the physical character of the area in terms of scale, location, materials and design, the arrangement of doors, windows and other principal architectural features;*
- *The proposal would not, either individually or cumulatively, unduly dilute or harm an existing mixed and sustainable community through the significant loss of single family housing;*
- *There are no unacceptable adverse impacts to residents of the scheme or surrounding properties arising from noise and disturbance in terms of the number and layout of units proposed and the proximity to other properties;*
- *There is no inappropriate stacking and location of rooms between units;*
- *Bin and cycle storage is of an appropriate size and standard for the units proposed and should be located at ground floor level with easy access; and*
- *The resulting property or properties would provide adequate internal floorspace and headroom for residents."*

CR6: LIVING IN CENTRAL READING

"Proposals for residential development within the central area will be assessed against the following criteria: ...

- ii. *Proposals for new residential development within the central area will be required to demonstrate how the issue of potential noise disturbance from neighbouring land uses and other sources, and air quality implications of residential development, have been considered and if necessary, mitigated. New residential development should not be located next to existing town centre uses where those uses would give rise to*



unacceptable levels of noise and disturbance to the occupiers of the new scheme, unless this can be mitigated.”

3.2.2 Liaison with Environmental Health

Liaison with Rebecca Moon from the Environmental Health Department at RBC via e-mail on the 22nd May 2023 has given insight into the following areas:

External noise

“No development shall commence on site until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014 and that the individual noise events do not exceed 45 dB $L_{A,max,F}$ more than 10 times a night. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS 8233 internal levels being exceeded.”

Internal noise mixed use

“No development shall commence on site until a detailed scheme for protecting the dwellings from noise emissions from the commercial use hereby approved and informed by an assessment of the likely noise emissions from the approved commercial use, has been submitted to and approved in writing by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the separating floor/ceiling between the uses achieves a minimum airborne sound insulation performance of greater than or equal to 55 dB ($D_{nt,w} + C_{tr}$) and ensures that the noise levels within the property do not exceed the values specified in BS 8233:2014 with appropriate penalties and adjustments for the character of the noise. The scheme shall make suitable provision for insulation from structure borne noise”.

4 AMBIENT NOISE SURVEY

Measurements of existing ambient, background, and maximum noise levels were taken in 15-minute intervals between the 10th and 17th May 2023 at two long-term measurement locations as indicated on Figure 6 below.



Figure 6 – Unattended monitoring Locations

The monitoring locations were chosen to capture worst-case receiver conditions close to the major noise source of Friar Street, as well as quieter background levels at a location at the rear, which is significantly screened from road traffic noise and representative of the quietest typical background noise levels other receivers are experiencing.

4.1 Acoustic Environment

The front of the site was dominated by road traffic noise. Frequent bus movements yielded high, brief maximum events. People were busily talking and moving in the street throughout the noise survey. Some cars had music noise at amplified levels.

The rear of the site was subjectively quieter than the front during the noise survey. Continuous noise from air conditioning plant associated with the commercial building opposite could be heard throughout the attended observations. The noise was subjectively quiet compared to the front, without any particularly tonal character observable against the residual environment of attenuated traffic noise.



4.2 Weather Conditions

Weather conditions fluctuated during the survey, although they were generally dry and calm. ¹

Temperatures were mild during the survey, ranging from 8 to 18 °C during the daytime and between 4 to 10 °C during the night-time periods. Wind direction was variable, but was generally south-westerly; though this is not thought to have any significant effect on traffic noise at the distances considered. Wind speed was generally below 5 m/s throughout the survey, other than on the afternoon of the 15th May where it was marginally higher (up to 7m/s). Some periods of precipitation occurred on the 12th May, however, calculations of overall levels have not been affected by these periods of marginally adverse weather.

4.3 Instrumentation

The equipment used for is provided in the table below.

Equipment	Type	Serial Number	Calibration	
			Date	Certificate no
Monitor at front of site				
Svantek Class 1 Sound Level Meter	971	60684	16/07/21	1500361-1
Preamplifier	SV18	62752	16/07/21	1500361-1
Microphone	7052E	66699	16/07/21	1500361-1
Monitor at rear of site				
Svantek Class 1 Sound and Vibration Analyser	958A	34551	25/01/23	1504378-2S
Microphone	7052E	55952	25/01/23	1504378-2S
Preamplifier	SV 12L	33537	25/01/23	1504378-2S
Calibrator				
Svantek SV33	SV33	58228	11/08/22	1503139-1

Table 1 – Noise survey instrumentation

Prior to and on completion of the survey the calibration of the microphones and sound level meters was checked with the field calibrator with no significant change in the field calibration level occurring. Calibration and conformance certificates for all equipment are available upon request.

¹ www.metoffice.gov.uk

5 RESULTS

Figure 7 below gives the variation in free-field acoustic parameters as monitored at the unattended location at the **front façade** throughout the survey, from 10th to 17th May 2023.

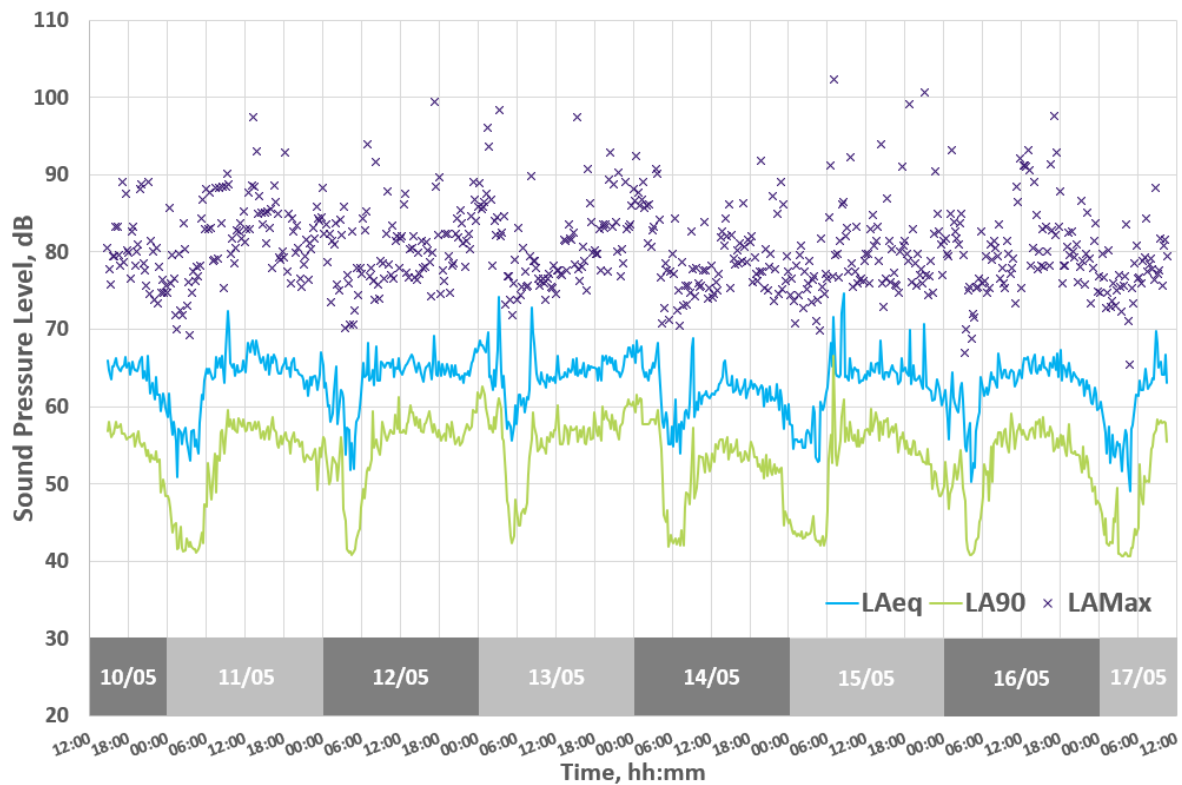


Figure 7 – Acoustic parameters measured at the front of the site (façade corrected)

Table 2 below summarises these parameters over the duration of the survey, showing the overall daytime and night-time noise levels measured at the long-term monitor. Also included is the typical $L_{Amax,F}$ level exceeded more than 10 times per night, based on a 1-minute logging period.

	$L_{Aeq, 15min}$		$L_{A90, 15min}$		$L_{Amax,F}$		Level exceeded > 10 times /night
	Range (15min)	Average	Range (15min)	Modal	Range (15min)	Modal	
0700 – 2300 16hr daytime period	54 – 75	65	42 – 61	57	70 – 101	78	-
2300 - 0700 8hr night-time period	49 - 74	63	41 – 67	42	66 – 102	78	84

Table 2 – Overall Acoustic Parameters at monitor during the survey – front of site

Figure 8 shows the variation in acoustic parameters for **both front and rear** positions simultaneously. Parameters at the rear are shown in monochrome, for comparison with those at the front.

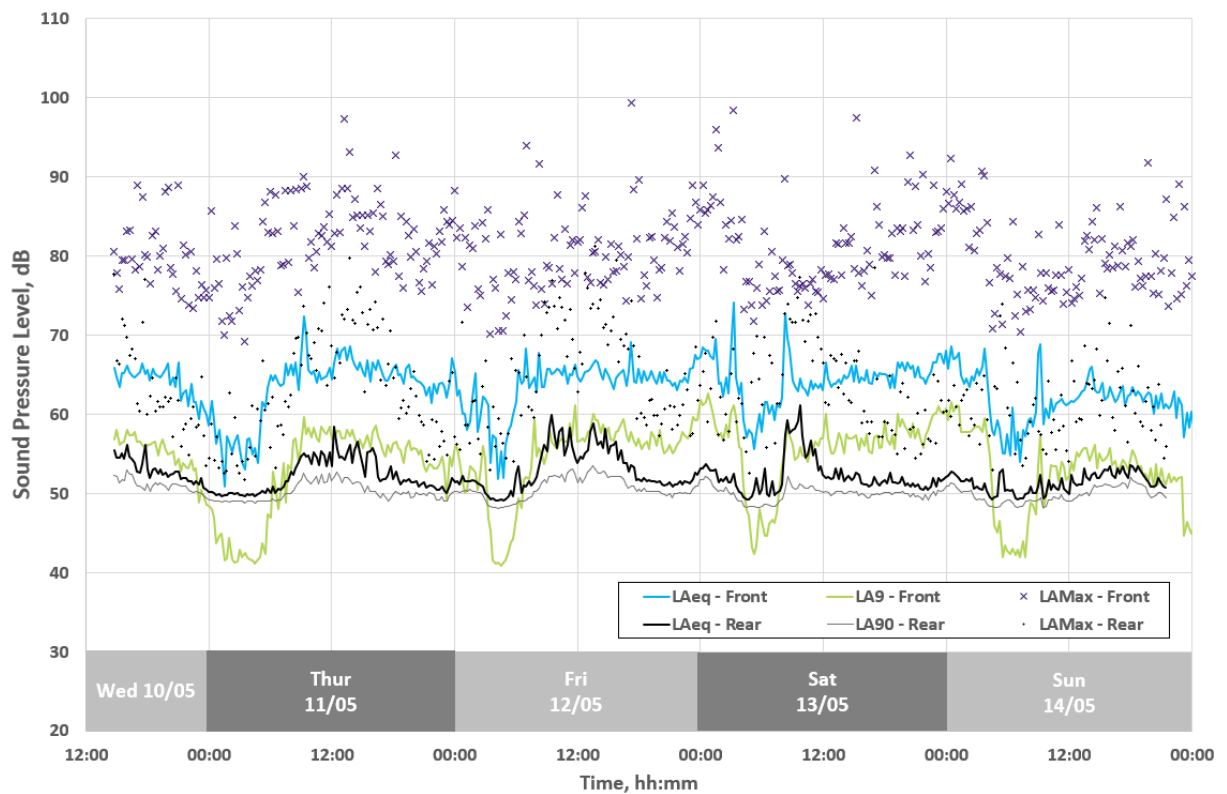


Figure 8 - Variation in all acoustic parameters at both locations throughout the survey

Table 3 shows the overall acoustic parameters at the rear position.

	$L_{Aeq, T}$		$L_{A90, T}$		$L_{Amax, F}$		Level exceeded > 10 times /night
	Range (15min)	Average	Range (15min)	Modal	Range (15min)	Modal	
0700 – 2300 16hr daytime period	49 – 61	54	48 – 54	50	54 – 81	59	-
2300 - 0700 8hr night-time period	49 – 54	51	48 – 52	49	52 – 74	60	64

Table 3 – Overall Acoustic Parameters at monitor during the survey – rear of site

Figure 8 indicates that the background noise level at the front is greater than that at the rear during daytimes, but lower than the background level at the rear during night-times. This is most likely attributed to continuous noise from plant units, as observed at the rear of the site. At the front of the site, the activity from vehicles and commercial generates a high background noise during the daytime, but this drops significantly at night-time.



6 ASSESSMENT

6.1 Environmental Noise

Following the guidance from BS 8233:2014 and the RBC Local Plan, it is considered that the development should ensure that internal levels do not exceed **35 dB $L_{Aeq,16hour}$** in bedrooms and living rooms during the daytime, nor **30 dB $L_{Aeq,8hour}$** in bedrooms during the night-time. In Annex G, Section G.1 of the BS 8233, it is indicated that a level difference through a window partially open for ventilation would typically offer a reduction of 15 dB. Thus, external levels during the daytime of below **50 dB $L_{Aeq,16hour}$** would allow the required standard in living rooms and bedrooms to be met, whereas for the night-time period, the target would be **45 dB $L_{Aeq,8hour}$** , in order to allow internal levels of to be met inside bedrooms.

Considering maximum noise levels, individual internal noise should not normally exceed **45 dB $L_{Amax,F}$** more than 10 times a night, as per ProPG guidance, which allows for a level of **60 dB $L_{Amax,F}$** externally.

6.1.1 Front Façade

The long-term monitoring location at the front of the site indicates that $L_{Aeq,16hour}$ daytime levels are over **65 dB**, and 8-hour L_{Aeq} night-time levels are **63 dB** (dominated by early morning traffic noise).

30 dB attenuation is required to achieve desirable internal daytime noise levels, and 33 dB attenuation is required to achieve desirable internal night-time noise levels, therefore noise mitigation is required.

Individual maximum noise levels are caused by individual road traffic vehicles, as observed and measured on site. Typical maximum noise levels for this site are well over 60 dB, exceeding 83 dB $L_{Amax,F}$ more than 10 times a night at the front location, meaning **38 dB** attenuation is recommended at the front of the building, therefore the maximum noise levels drive the need for mitigation at the front of the building.

6.1.2 Rear Façade

The results of the long-term monitoring location at the rear of the site indicate that $L_{Aeq,16hour}$ daytime levels are over **54 dB**, and $L_{Aeq,8hr}$ night-time levels are **51 dB**. Maximum levels exceeded **64 dB** 10 times a night.

Noise mitigation is therefore also necessary for habitable rooms at the rear of the site, though a far less significant package can be used to yield suitable results, with only **24 dB** being necessary, driven by night-time noise levels.

6.2 Internal Noise Transmission

If the ground floor of the building is to remain as retail, then appropriate sound insulation measures will need to be taken in the form of an enhanced, high-performing partition. The recommended level of sound insulation is 55 dB $D_{nT,w} + C_{tr}$, which allows for somewhat raised noise levels from commercial operation; levels expected from convenience store operation are not anticipated to be abnormally loud.

It is also considered that the performance of separating walls and floors should exceed the minimum requirements as documented in Building Regulations Approved Document E to minimise the risk of any adverse impact of noise between patrons of the apart-hotel. Appendix H of BS 8233 suggests the



levels of sound insulation in Building Regulations Table 1 as a minimum requirement for hotels; impact sound insulation of no more than 62 dB $L'_{nT,w}$, and airborne sound insulation of no less than 45 dB $D_{nT,w}$.

No sound insulation measurements of the existing floor have been undertaken during this scope of works; design advice and possible testing is recommended at a subsequent stage of the development.

6.3 Building Plant – Noise Incident on Existing Residents

RBC suggests that noise levels from building plant should not exceed a level that is 10 dB below the residual background sound level.

Figure 9 shows the distribution of background noise levels measured during night-times at the rear of the site (as they are lower than those measured at the front of the site).

The representative background sound level at the rear of the site is deemed to be 48 dB $L_{A90,15min}$, and it is therefore recommended that plant noise levels do not exceed **38 dB L_{Aeq}** at the closest residents.

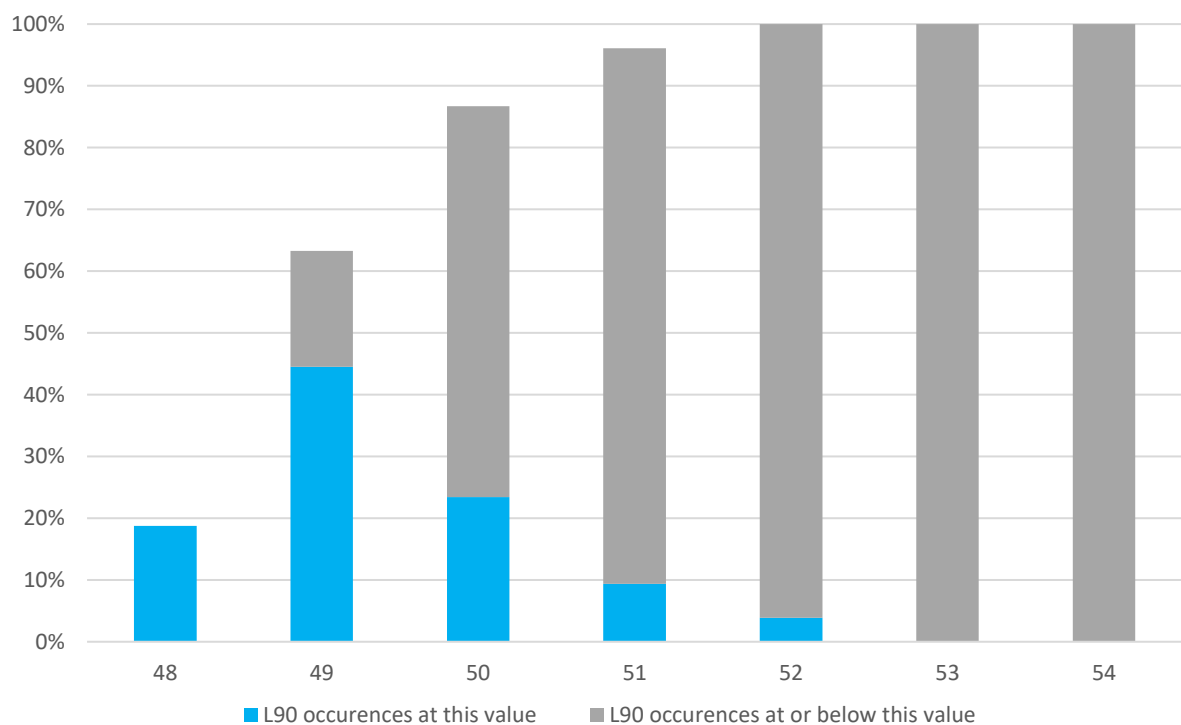


Figure 9 – Background noise distribution at the rear of site

It is understood that the closest noise sensitive receivers are likely to be those immediately adjacent to the site at 134 Friar Street. As specific plant specification is yet to be chosen, it cannot be determined if this criterion will be met at the closest receivers using propagation calculations alone.

For typical condenser units that might be expected for similar developments, achieving a level of 38 dB at this degree of separation would be expected to be achievable with some mitigation measures such as screening or enclosures.



7 NOISE MITIGATION

7.1 Approach

It is considered that the necessary mitigation strategy is to ensure suitable levels within amenity spaces of the development is the improvement of the building envelope to increase noise insulation, which may require use of an alternate ventilation system to reduce the need for open windows, and an improvement to the sound insulation of glazing used in construction.

The guidelines for internal ambient noise levels only apply to habitable spaces (living rooms, dining rooms and bedrooms), and so it is usually worth, initially, considering the option of orienting the rooms, so rooms such as corridors and WCs face on to the worst-affected facades, and other rooms benefit from higher levels of screening; however, this is not considered viable at this site due to windows being necessary at the front façade, as per Figure 5.

Windows will be the weakest element of the building envelope and will need to be specified to achieve sufficient sound reduction. In order to achieve sufficient sound insulation of the building envelope, it is recommended that a suitable ventilation system is designed to enable windows to be kept closed.

7.2 Enhanced Glazing and Ventilation Specification

Windows will need to be closed in order to achieve sufficient sound insulation of the building envelope, and suitable internal ambient noise levels. In order for this to be feasible, an alternative ventilation strategy will be required.

The strategy could either comprise of a hybrid system that uses a combination of passive supply (natural ventilation through ventilators) and mechanical extract, or a Mechanical Ventilation with Heat Recovery (MVHR) solution.

Table 4 provides typical glazing solutions for various external daytime noise levels in order to yield suitable internal levels at the development. Where hybrid ventilation is considered, an allowance for one ventilator per window has been used in the calculations.

Mechanical extract should be reviewed prior to installation to ensure levels emitted are appropriate to ensure internal noise targets are still being met.



Required Reduction (dBA)	Hybrid Solution		MVHR
	Typical Glazing R_w required (dB)	Typical Passive Ventilator $D_{ne,w}$ (dB)	Typical Glazing R_w required (dB)
≤ 15	<i>(Suitable for open window natural ventilation)</i>		
15 – 25	31 - 33	33	31 – 33
25 - 30	35	36	31 – 33
30 – 35	38	43	35
35 - 40	<i>Not recommended</i>		38

Table 4 – Sound reduction required by windows

Standard thermal double glazing typically provides a weighted sound reduction value of 31-33 dB R_w . Table 5 provides typical minimum requirement for the glazing specification.

Glazing Specification	Minimum required Sound Reduction Index (in dB) at each Octave centre band frequency, Hz						
	R_w (in dB)	125	250	500	1k	2k	4k
4mm pane/ 12mm air gap/ 4mm pane	31	20	20	25	35	38	35
6mm pane / 12mm air gap /8mm pane	35	23	23	30	39	36	43
10mm pane / 12mm air gap / 6mm pane	38	26	27	34	40	38	46

Table 5 – Example Glazing specification

Based on the comments from RBC, an MVHR system will be necessary. If a hybrid system can be approved, the ventilators will need to have sufficient equivalent open area to achieve the ventilation requirements (generally this wouldn't be expected to exceed 5000 mm² for each habitable room). If more than two vents are used to make up the required open area, the sound insulation performance of each vent will need to be greater.

The ventilation scheme should be selected to meet the requirements of Part F and L of the Building Regulations and the extract designed such that it does not compromise the sound insulation of the building envelope. The units should also be selected and located to ensure that their operating noise level in habitable areas is less than the internal noise level criteria to be met.



8 CONCLUSION

An environmental noise assessment has been undertaken to assess the impact of environmental noise for the proposed hotel development at 136-137 Friar Street, Reading.

Road traffic on Friar Street is the dominant source of noise at the site, and the results show that the noise levels affecting the front of the site are significant during both daytime and night-time periods, with noise mitigation measures being necessary in order to achieve the desirable internal ambient noise levels set out in BS 8233:2014.

The noise mitigation measures suggested consist of installing thermal double glazing for windows on all facades of habitable spaces with a fully mechanical MVHR system for all hotel rooms. Less stringent requirements at the rear allow would allow for a hybrid ventilation system to be employed to reach desirable night-time noise levels, though it should be noted that RBC advise for a MVHR approach.

An MVHR system should be reviewed to ensure noise from the operation of the system itself does not yield higher levels of noise internally.

In conclusion, it is considered that with mitigation, the proposed development will not cause a detrimental impact on the living environment of future occupiers or nearby existing residents in line with the requirements of the NPPF and RBC development plan policies.



APPENDIX 1 Policy and Guidance on Noise



A1.1 National Planning Policy Framework

Current planning policy is based on the National Planning Policy Framework (NPPF), revised in July 2021, which supports a presumption in favour of sustainable development, unless the adverse impacts of that development would outweigh the benefits when assessed against the policies in the Framework, taken as a whole.

The noise implications of development are recognised at paragraph 185, where it is stated that planning policies and decisions should:

- *“mitigate and reduce to a minimum potential adverse impacts from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life²”*
- *“identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason”*

The Government’s objective is to significantly boost the supply of homes, but puts in place protections for existing business in paragraph 187:

“Planning policies and decisions should ensure that new development can be “integrated effectively with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs)”. Existing businesses should not have “unreasonable restrictions placed on them as a result of development permitted after they were established”. 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.”

A1.2 Noise Policy Statement for England

Paragraph 185 of the NPPF refers to advice on adverse effects of noise given in the Noise Policy Statement for England³ (NPSE). This document sets out a policy vision to

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”.

To achieve this vision the Statement sets the following three aims:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *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.”*

² See Explanatory Note to the Noise Policy Statement for England.

³ Department for Environment, Food and Rural Affairs, *Noise Policy Statement for England*, London, 2010



A1.3 The National Planning Policy Guidance on Noise (July 2019)

The newly refreshed guidance states that *“Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset”*.

It also states that noise can override other planning concerns, where justified, *“although it is important to look at noise in the context of the wider characteristics of a development proposal”*.

It makes clear that *“As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy”*.

It also says that as exposure *“crosses the ‘lowest observed adverse effect’ level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)”*. This indicates that below the Lowest Observable Adverse Effect Level upper threshold (LOAEL) would be considered acceptable. The noise exposure hierarchy is set out in a table which suggest that at a LOAEL that is “present and intrusive” that the action should be to mitigate and reduce to a minimum.

Above this is considered to be an Observable Adverse Effect (OAE). It makes clear that when the effect becomes significant (SOAEL) that it should be avoided. This guidance is consistent with the policy within NPSE.

It also talks of a positive soundscape “where natural sounds” are more prominent than background noise from manmade sources. The guidance indicates that this can be considered to be tranquillity in terms of identifying areas that justify being protected or improved.

A1.4 ProPG

Professional Practice Guidance on Planning & Noise: New Residential Development, published May 2017 by a Working Group of the Institute of Acoustics, Association of Noise Consultants and Chartered Institute of Environmental Health to provide guidance on the approach to the management of noise within the planning system in England. Whilst it is not an official government code of practice, it is endorsed by the appropriate professional bodies and reflects the NPSE, NPPF and Planning Practice Guidance. It is restricted primarily to the consideration of new residential development that will be exposed to transportation noise sources.

ProPG advocates consideration of noise at an early stage and good acoustic design to produce sustainable development. It uses a two stage approach; an initial risk assessment and, where there is more than a negligible risk of adverse noise effects, an Acoustic Design Statement (ADS) should be produced with considers four key elements:

1. Good Acoustic Design Process
2. Observe internal Noise Level Guidelines
3. External Amenity Area Noise Assessment
4. Other Relevant Issues

Design target noise levels are based on BS 8233: 2014 with additional guidance on individual noise events at night, how windows and ventilation should be assessed and how the assessment should be



considered where target noise levels may be difficult to achieve. Guidance is also given on how provision or access to quiet external amenity should be assessed.

The principle 'Other Relevant Issues' to be considered a ProPG Stage 2: Element 4 are:

- 4(i) Compliance with relevant national and local policy
- 4(ii) Magnitude and extent of compliance with ProPG
- 4(iii) Likely occupants of the development
- 4(iv) Acoustic design vs unintended adverse consequences
- 4(v) Acoustic design vs wider planning objectives

The outcome of the assessment will result in one of four recommendations to the decision maker:

- A. Planning consent may be granted without any need for noise conditions;
- B. Planning consent may be granted subject to the inclusion of suitable noise conditions;
- C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects ("avoid"); or
- D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects ("prevent").

The criteria for the ProPG Stage 1: Initial Site Risk Assessment are reproduced below:

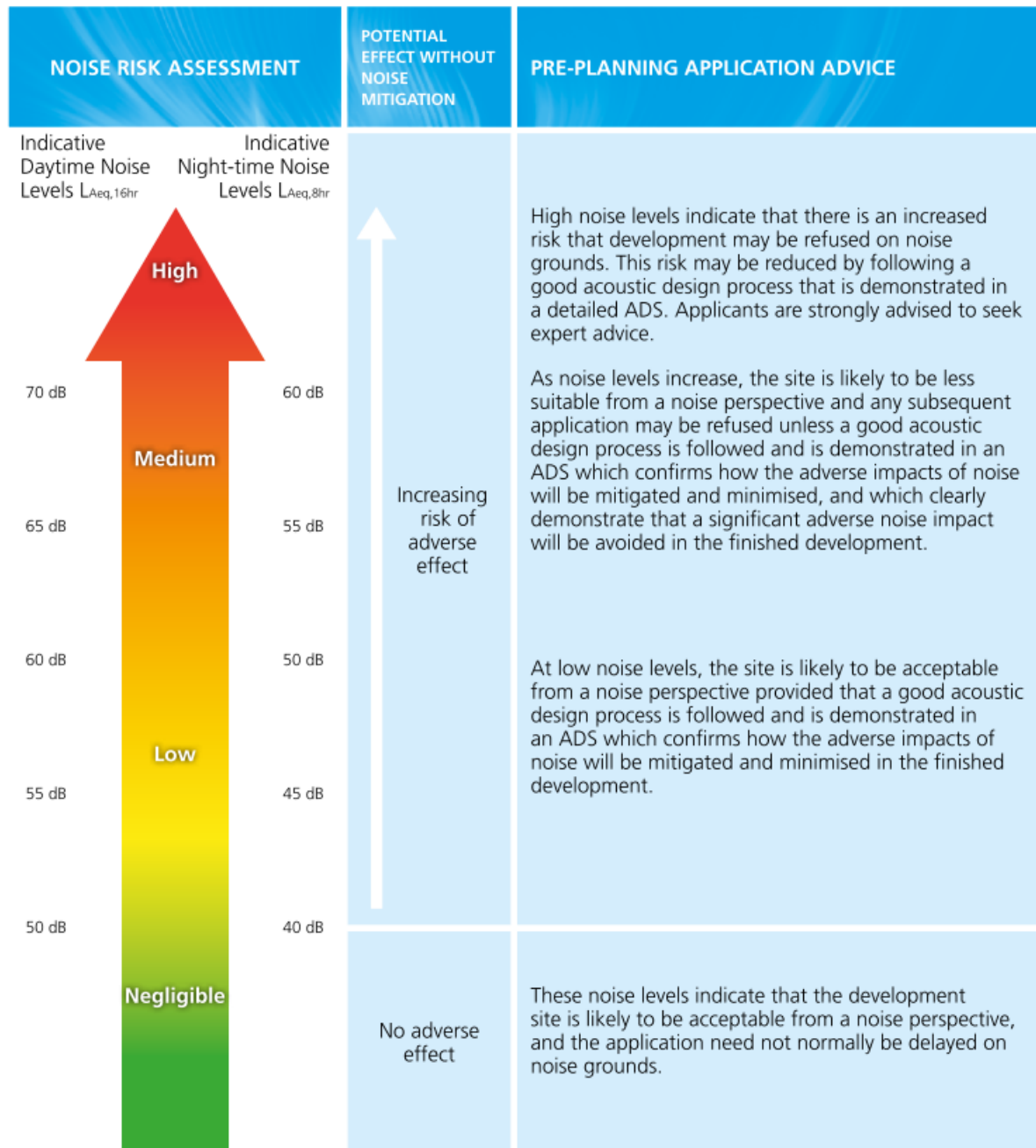


Figure 1 Notes:

- 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".
- $L_{Aeq,16hr}$ 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 $L_{Amax,f} > 60$ dB means the site should not be regarded as negligible risk.

Figure 1. Stage 1– Initial Site Noise Risk Assessment

Note also that Appendix A para A.19: "A site should be regarded as high risk where the $L_{Amax,f}$ exceeds or is likely to exceed 80 dB more than 20 times per night."



As an additional note to the final comment at the bottom of Figure 1; NOTE 4 in Figure 2 with ProPG guidance gives the following advice in relation to maximum noise levels: *“In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night.”*

A1.5 BS 8233: 2014

The British Standard BS 8233: 2014, *Guidance on Sound insulation and noise reduction for buildings* provides additional guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organisation. The criteria desirable levels of steady state noise “without a specific character” in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated in Table 6

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq, 16 \text{ hour}}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16 \text{ hour}}$	30 dB $L_{Aeq, 8 \text{ hour}}$

Table 6 – Internal ambient noise level criteria

BS 8233 states that regular individual noise events can cause sleep disturbance and that a guideline value in terms of SEL or $L_{Amax, F}$ may be set depending on the character and number of events. *ProPG adds to these criteria with the advice that good acoustic design should aim limit individual events to not more than 45 dB $L_{Amax, F}$ more than 10 times per night (inside bedrooms).*

Where development is considered necessary or desirable, despite external noise level above WHO guidelines, it is noted in BS 8233 that the above target levels may be relaxed by up to 5 dB. *ProPG expands on this stating that the more often internal noise levels exceed the target by more than 5 dB, the more likely they are to be regarded as unreasonable and it should be demonstrated how these will be kept to a minimum. Where internal target levels are exceeded by more than 10 dB they are highly likely to be regarded as unacceptable and should be prevented.*

A1.6 Building Regulation Approved Document E

Section 0.8 of Approved Document E (ADE) states:

“The performance standards set out in Tables 1a and 1b are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required and, if so, to determine the appropriate level”

The performances in Tables 1b concern rooms for residential purposes, and is duplicated in



	Airborne sound insulation $D_{nT,w} + C_{tr}$ dB (minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Purpose Built rooms for residential purposes		
Walls	43	-
Floors and Stairs	45	62
Rooms for residential purposes formed by change of use		
Walls	43	-
Floors and Stairs	43	64

Table 7 – Approved Document E performance standards



APPENDIX 2 Acoustic Terminology



Environmental Noise

Environmental noise is normally described in terms of the single figure A-weighted sound pressure level, in decibels (dB). The A-weighting corresponds to the frequency sensitivity of the ear and, therefore, provides an approximation to the subjective response to sound at different frequencies. When a sound level is expressed in this way, the units can be denoted dB(A).

When sound is time varying, it is convenient to express the sound level using an indicator, or descriptor that takes account of this variation. Two types of indicator are in common use, the equivalent continuous sound level and the statistical indicators.

Equivalent continuous sound level

$L_{Aeq, T}$: This indicator provides the overall noise exposure to time varying sound and is the energy average of the sound over a specified time period. It is the notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound over the same period. It is denoted $L_{eq, T}$, or, if A-weighted, $L_{Aeq, T}$, where T is the time period of interest.

Statistical indicators

The statistical indicators are also single figure descriptors, but provide additional information on the temporal variation of the noise level with time. The indicators are expressed as the sound level exceeded for a specified percentage of the time period of interest and the most commonly used are described below:

$L_{A90, T}$: the A-weighted noise level exceeded for 90% of the time period T. This indicator is representative of the noise level occurring in the absence of short-term events and is used in the UK to represent the background noise level.

$L_{Amax, T}$: the maximum A-weighted noise level that occurred during the time period T. It usually includes an additional subscript, slow (s) or fast (f), ie $L_{Amax, slow, T}$ or $L_{Amax, fast, T}$ which denotes the response time used in the analysis algorithm. The fast response tracks the maximum level of a rapidly changing sound more accurately than the slow response and the value is generally higher for impulsive or transient sounds.

Sound Insulation

When specifying the level of sound insulation required for a given building element the following descriptors may be used:

R_w : the 'weighted sound reduction index'. This represents the level of sound reduction measured in a laboratory for a given building element. The w denotes 'weighting' and takes account of the deviations in sound reduction at a range of frequency bands when compared with a reference curve to determine the single figure value. Note this does not represent the in-situ performance of an installed element. Manufacturers should quote the R_w performance for their products.

$D_{nT,w}$: the 'weighted standardised level difference'. This single number value of the airborne sound insulation between room, used to characterize the sound insulation between rooms in



buildings. On site results will include flanking sound so the test is for the total transmission between the rooms, not just the partition.

...+ C_{tr} : a single quantity which characterises the airborne sound insulation between rooms using the C_{tr} : spectrum adaption term defined in BS EN ISO 717.