

Pinnacle 20 Tudor Road Reading

Environmental Noise Survey and Noise Impact Assessment Report

32522/NIA1

30 July 2025

For:
Atid Contractors Ltd
c/o
SRB Group Ltd
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Document Control

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Contents	Page
1.0 Introduction	1
2.0 Objectives	1
3.0 Acoustic Terminology	1
4.0 Site Description	2
5.0 Proposed Development	4
6.0 Planning Policies, Standards & Guidance	7
7.0 Baseline Noise Survey	10
8.0 Existing Commercial Plant Noise Impact	16
9.0 Conclusions	18

Attachments

Appendix A – Acoustic Terminology

Appendix B – Relevant Planning Policies and Guidance



1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by Atid Contractors Ltd to undertake a noise assessment for a site in Reading, as part of a Permitted Development Planning Application for the scheme.

The site, which is located on 20 Tudor Road, is being considered for residential development. The proposals are for the conversion of existing office spaces to provide circa 70no. new homes.

Permitted development rights allow certain changes to be made to a building without the need to apply for full planning permission. Notwithstanding, any noise from commercial premises near to the site needs to be considered, however, it is assumed that there is no mandatory requirement to consider noise from other sources (i.e. transport).

Hann Tucker has therefore been commissioned to undertake an environmental noise survey and noise impact assessment to assess potential noise impact from existing commercial premises on the occupiers of the development.

2.0 Objectives

To undertake attended noise level measurements at the nearest site boundary with nearby commercial/industrial/entertainment noise sources to assess potential noise impact from commercial premises on the occupiers of the proposed development.

Based on the results of the survey, to undertake a noise assessment to assess the suitability of the site for residential use in accordance with the Noise Policy Statement for England (NPSE), National Planning Policy Framework (NPPF), Planning Practice Guidance (ProPG), British Standard BS4142:2014 and Local Authority requirements.

If necessary, to discuss noise mitigation and acoustic design solutions to achieve acceptable noise levels in residential areas.

3.0 Acoustic Terminology

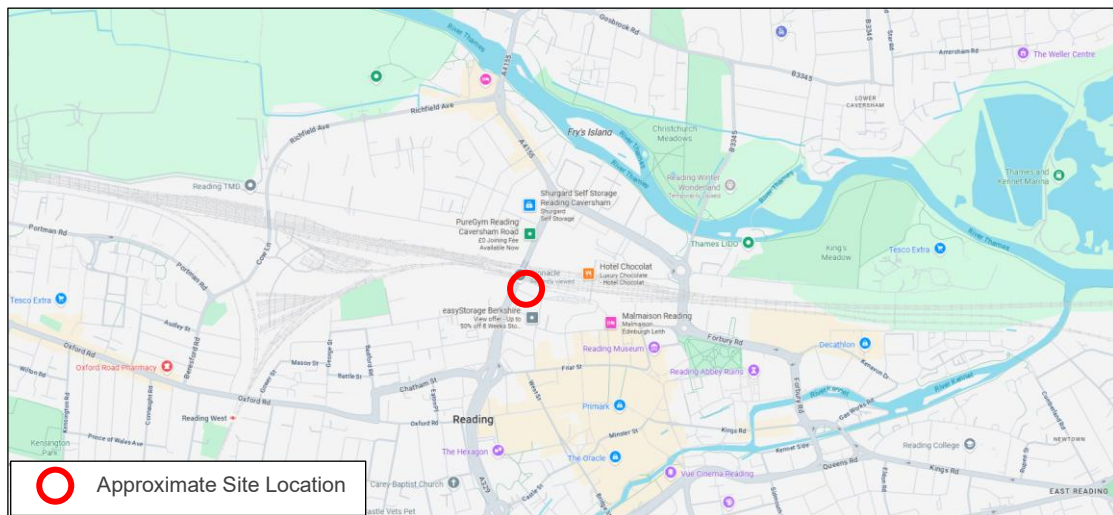
For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.



4.0 Site Description

4.1 Location

The site is located on 20 Tudor Road, Reading, RG1 1NH. The location is shown in the Location Map below.



Location Map (Map data ©2025 Google)

The site falls within the jurisdiction of Reading Borough Council (RBC).

4.2 Description

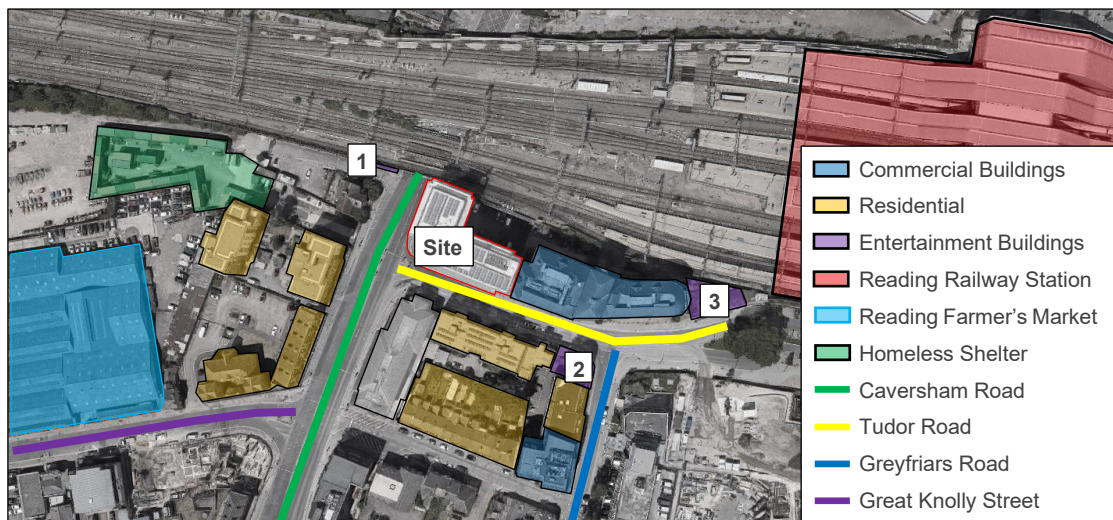
The site is currently a ground floor plus 5-storey office building, located on the corner of Caversham Road and Tudor Road.

The Site is bound by Tudor Road to the south, Caversham Road to the West, and elevated railway line leading to and from Reading Railway Station along the Northern elevation.

The adjoining development to the east is understood to be office building at a similar height to the Site. The development on 5-21 Tudor Road to the south of the site is a residential building.

As summarised above, the immediate surrounding development are a mixture office-use or residential use.

See site plan in relation to its surroundings overleaf.



Whilst the immediate surrounding area is generally that of residential premises with some offices, nearby commercial/industrial and entertainment premises have been identified.

Based on our onsite assessment, and given the screening provided by adjacent buildings, it has been concluded that any noise emitted from Reading Farmer's Market is unlikely to have adverse impact and/or be audible at the proposed site boundary.

In addition, other commercial buildings identified in Site Plan are known to be office buildings. As such, daytime commercial activities from such operations are not expected to have adverse impact at the proposed site boundary.

The details of relevant late-night entertainment premises have been obtained through desktop research and have been taken into consideration during our survey. The details including the type, name, opening time, and approximate distance to the proposed development are presented in the subsection below. In addition to these, there is also a Homeless Shelter, highlighted in green, located approximately 60m west of the site, across Caversham Road.

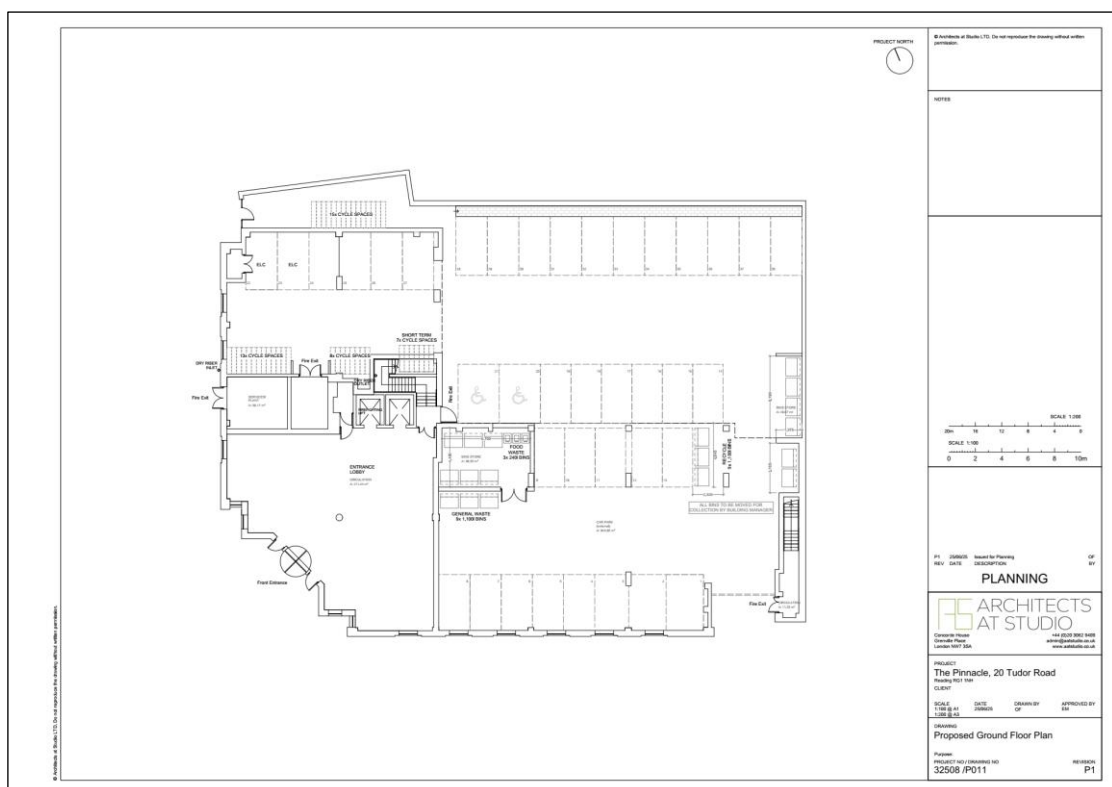
4.2.1 Nearby Entertainment Premises

The details of relevant commercial/industrial and entertainment premises have been obtained through desktop research and have been taken into consideration during our survey. The details including the type, name, opening time, and approximate distance to the proposed development are presented in the table below and should be read in conjunction with the site plan above.

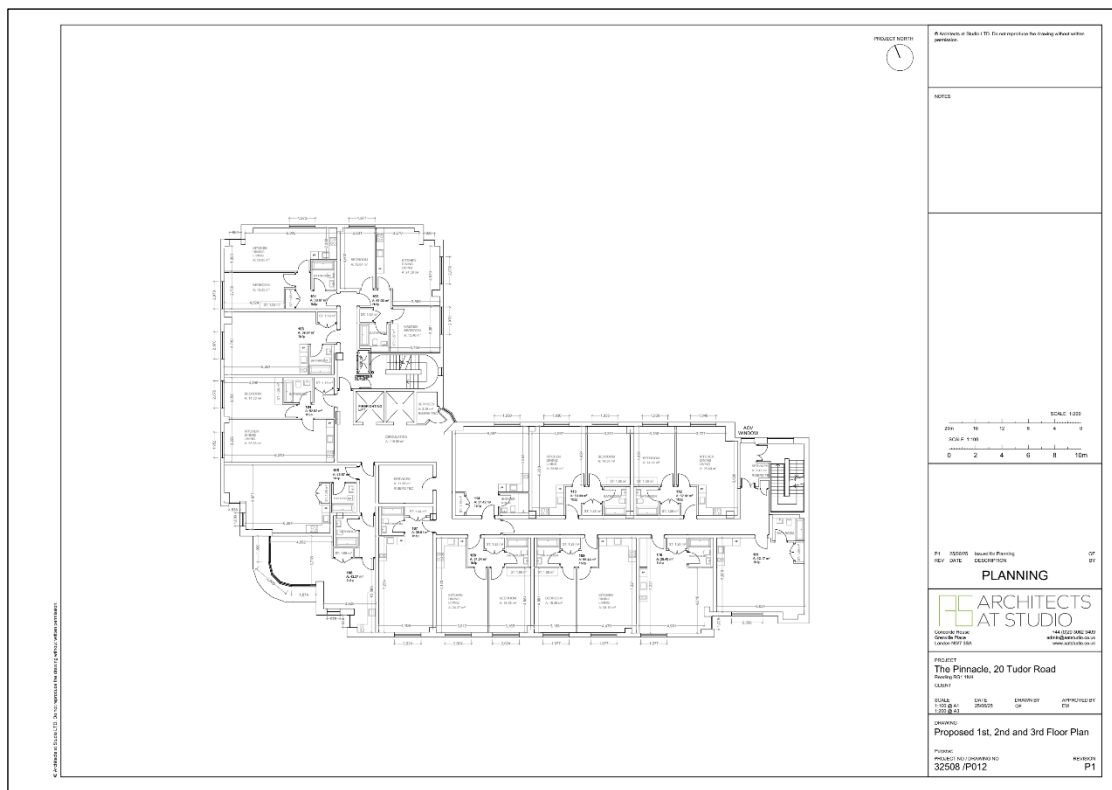
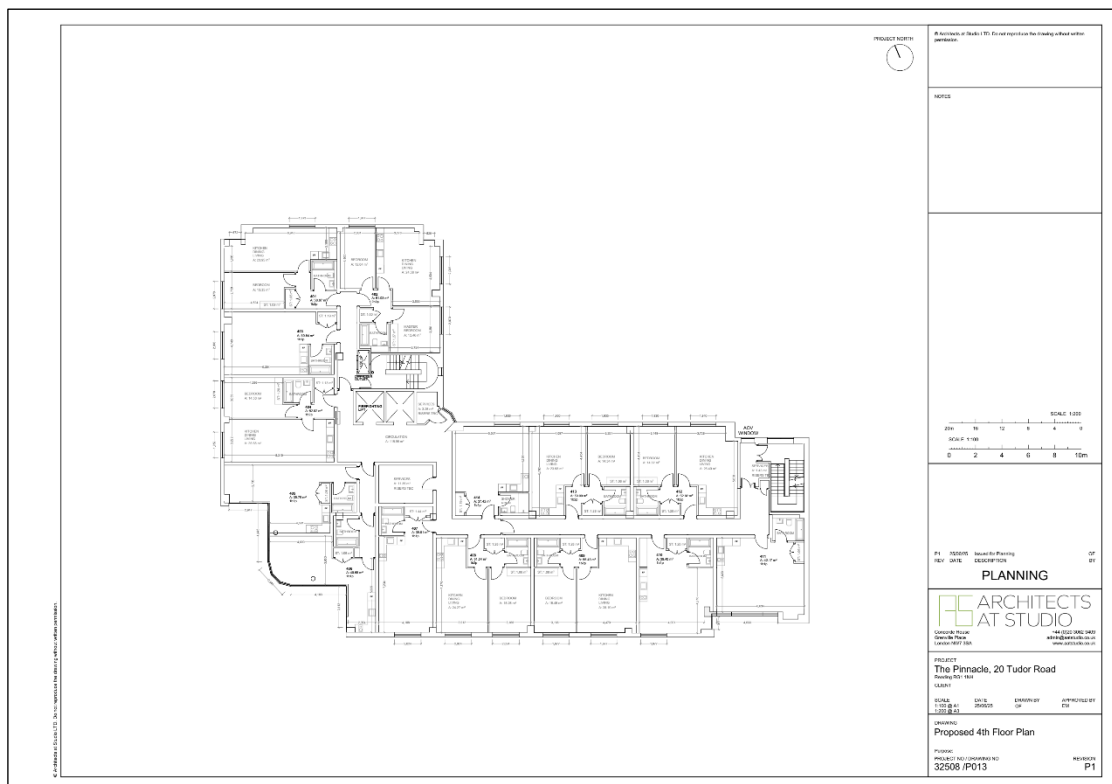
Number	Type	Name	Opening Hours	Approximate Distance to Site
1	Gentlemen's' Club	Medusa Bar & Lounge	Monday Closed Tuesday Closed Wednesday 22:00–05:00 Thursday 22:00–05:00 Friday 22:00–05:00 Saturday 22:00–05:00 Sunday Closed	20m
2	Pub	The Greyfriar	Monday 12:00–23:00 Tuesday 12:00–23:00 Wednesday 12:00–23:00 Thursday 12:00–23:00 Friday 12:00 - 00:00 Saturday 12:00 - 00:00 Sunday–Closed	43m
3	Pub	Reading Railway Pub	Monday–Closed Tuesday–Closed Wednesday–Closed Thursday 13:00–18:00 Friday 18:00 - 00:00 Saturday 15:00 - 00:00 Sunday–Closed	90m

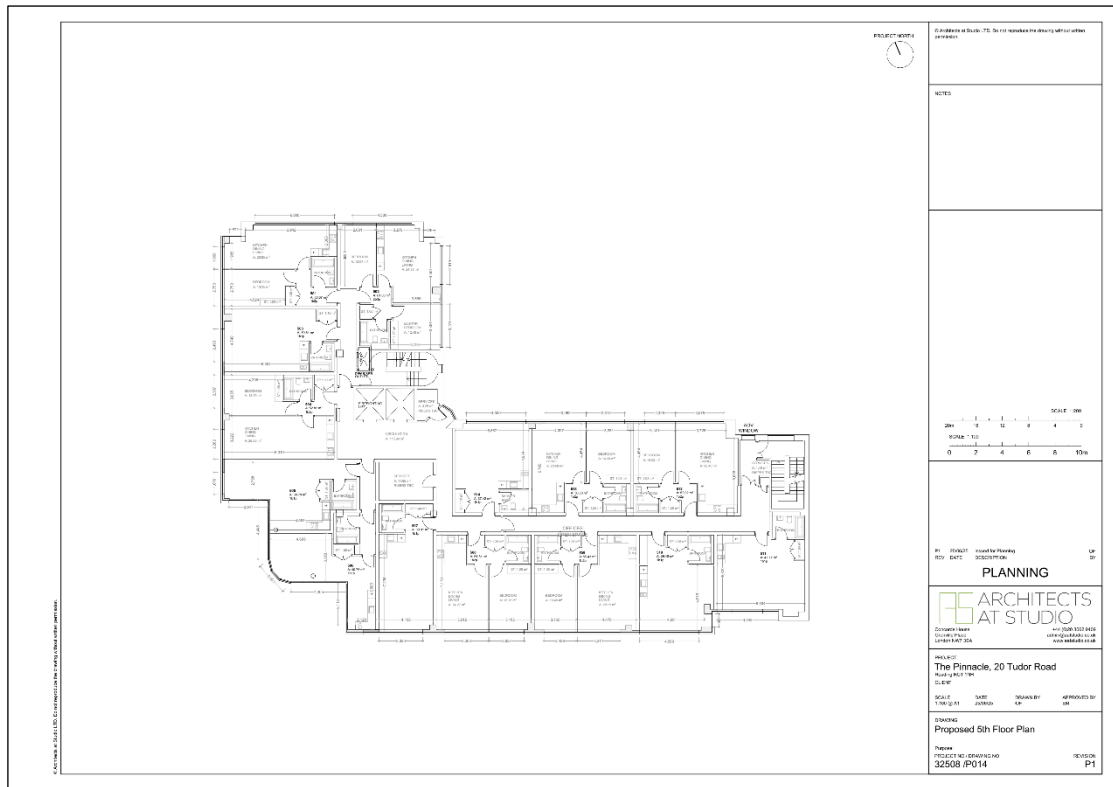
5.0 Proposed Development

The proposals are to convert current office spaces into residential dwellings. Current drawings indicate 70no. new residential dwellings are proposed within the existing building across 1st and 5th Floor. The site is shown in the Plans below for context.

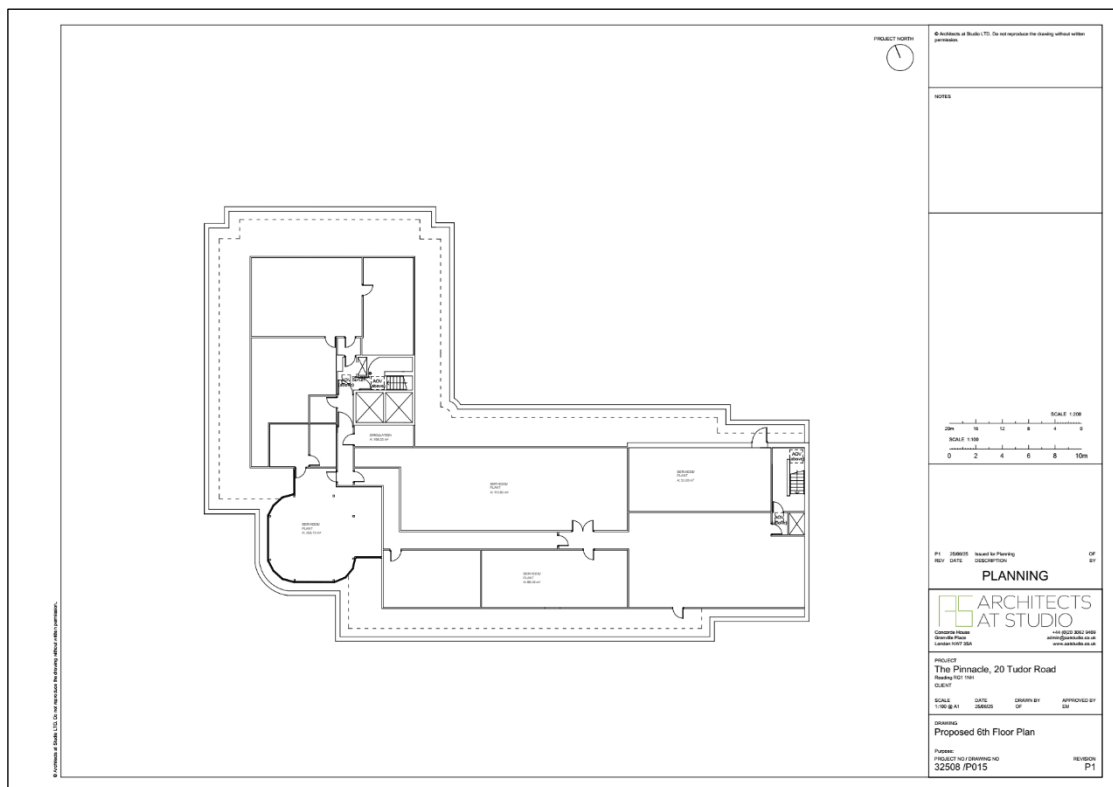


Proposed Ground Floor Plan (32508_P011_P1 Drawing by Architects At Studio Ltd)

Proposed 1st, 2nd and 3rd Floor Plan (32508_P012_P1 Drawing by Architects At Studio Ltd)Proposed 4th Floor Plan (32508_P013_P1 Drawing by Architects At Studio Ltd)



Proposed Fifth Floor Plan (32508_P014_P1 Drawing by Architects At Studio Ltd)



Propose 6th Floor Plan (32508_P015_P1 Drawing by Architects At Studio Ltd)



6.0 Planning Policies, Standards & Guidance

6.1 Permitted Development Rights

Permitted development rights allow certain changes to be made to a building without the need to apply for planning permission. These derive from a general planning permission granted by Parliament, rather than by the local planning authority, and are contained within the updated Town and Country Planning General Permitted Development (England) (Amendment) Order 2021 (GPDO).

Class MA in Part 3 of Schedule 2 relates to development consisting of a change of use of a building and any land within its curtilage from a use falling within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order to a use falling within Class C3 (dwellinghouses) of Schedule 1 to that Order.

“MA.2. — (1) states Development under Class MA is permitted subject to the following conditions... (d) impacts of noise from commercial premises on the intended occupiers of the development”.

As such, for this proposal noise from commercial premises needs to be considered, however, it is considered that there is no mandatory requirement to consider noise from other sources (i.e. transportation sources such as road/rail).

6.2 Policies & Guides

Regarding potential commercial noise impact, to provide a suitable assessment a number of national planning policies have been considered, including:

- The National Planning Policy Framework (NPPF), 2024
- The Noise Policy Statement for England (NPSE), 2010
- Planning Practice Guidance – Noise (PPGN), 2019

The above documents highlight the importance of considering the potential noise effects on any new residential development and provide a qualitative approach to assessment. However, each of the above does not provide any quantitative guidance. As such, all quantitative guidance used to form a noise impact assessment is taken from various other standards, guidance, and Local Authority requirements as summarised below:



- World Health Organisation: 2018
- British Standard BS8233: 2014
- ProPG : Planning & Noise: 2017
- British Standard 4142:2014 + A1:2019
- Local Planning Guidance

Detailed information for relevant planning policies and guidance can be found within Appendix B.

6.3 Specific Local Authority Criteria

Reading Borough Council (RBC) requirements relevant to noise impact assessment for this scheme, are paraphrased below and are outlined in RBC's Local Plan (November 2019).

“Policy EN16: Pollution and Water Resources

4.2.90 Exposure to high levels of noise can have a significant effect on human health. This policy deals with noise issues in general, whilst policy EN17 deals particularly with noise-generating equipment. It is worth noting that there is a Professional Practice Guide on Planning and Noise available which provides guidance on design of residential developments to take account of noise, and taking account of this from the early design stage will help to reduce noise effects on future residents.”

“Policy 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.”

“Policy CR4: Leisure, Culture and Tourism in Central Reading

5.3.17 Leisure, cultural and tourism development should not give rise to adverse impacts on the amenity of nearby residents and other town centre users, or to existing town centre spaces. Proposals will therefore be expected to mitigate any potential issues of noise disturbance (particularly night-time noise), traffic-related congestion, and anti-social behaviour and crime.”



“Policy H8: Residential Conversions

4.4.59 There are potential adverse effects from such conversions, particularly where there are concentrations. The significant loss of family housing can erode the character of an area through insensitive individual conversions and the cumulative impacts of physical changes to properties as a result of such use. Such streets are suffering from impacts such as significant car parking problems; clutter and untidiness; unsightly accumulation of satellite dishes; poor building maintenance; increased activity, noise and nuisance, etc. The quality of conversions, particularly where unregulated, can also be poor, with poor standards of accommodation and health and safety concerns.

“Policy RL6: Protection of Leisure Facilities and Public Houses

Existing leisure facilities or public houses will generally be retained, and there is a strong presumption in favour of retaining leisure facilities or public houses where they are the only facility of their type in a district, major local or local centre. Developments that would result in the loss of a leisure facility or a public house will not be permitted unless it can be clearly demonstrated that:

- a. There is no need for this type of facility in this area; or*
- b. The function of the facility can be adequately fulfilled by an existing facility, or a facility proposed as part of the development, where that facility would be at least as accessible to the same catchment; or*
- c. Unless the site is a sports or recreation facility, the impacts on amenity of residents or on crime and security of retaining the facility could not be dealt with through other measures, and would be so severe as to outweigh the benefits to the wider community of retaining the facility.”*

With exception of *Policy EN17: Noise Generating Equipment*, RBC Local Plan do not have any specific numerical criteria relating to noise impact assessment from commercial activities nor internal noise criteria for residential developments; however, we understand they refer to the guidance/recommendations given in PPG24.



7.0 Baseline Noise Survey

7.1 Procedure

Fully attended noise monitoring was undertaken by Kyungmin Kim PgDip, BMus(Hons) MIOA from approximately 17:30 hours on Friday 18 July 2025 to 02:30 hours on Saturday 19 July 2025 to:

1. subjectively assess the noise from train announcement system at Reading Station, incident at the site's rear façade and;
2. subjectively and by measurements, assess the potential noise levels at the site boundary due to operational entertainment premises.

Measurements were taken continuously of the A-weighted (dBA) and octave band L_{90} , L_{eq} , and L_{max} sound pressure levels in close proximity to the source premise where possible to minimise extraneous noise from other sources, as well as repeated at the nearest site boundaries of the proposed site to the commercial premises.

Measurements were made over 1-minute intervals.

7.2 Measurement Positions

The attended noise monitoring was undertaken at 11no. different positions at varying time periods, around the site boundary and near to entertainment premises where possible.

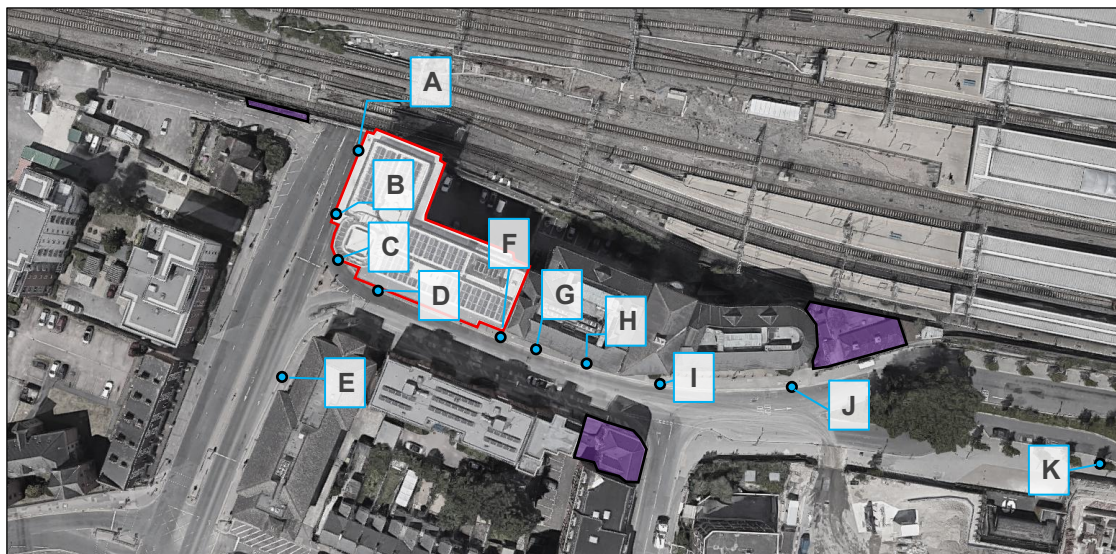
All measurements have been undertaken with Sound level meter (SLM) handheld at armlength approximately 1.6m above ground level.

The measurement locations are as illustrated in the table and figure below.

Positions	Description
A	SLM positioned at Site boundary, approximately 20m away from the entrance to Medusa Bar & Lounge, 1m from Caversham Road traffic, and 2m away from the Caversham Road underpass
B	SLM positioned at Site boundary, approximately 1m from Site façade overlooking Medusa Bar & Lounge and Caversham Road, 27m away from the entrance to Medusa Bar & Lounge, 1m from Caversham Road traffic, and 24m away from the Caversham Road underpass
C	SLM positioned at Site boundary near the entrance, approximately 35m away from the entrance to Medusa Bar & Lounge, 1m from Caversham Road traffic turning into Tudor Road, and 27m away from the Caversham Road underpass



Positions	Description
D	SLM positioned at Site boundary, approximately 1m from the Site façade overlooking Tudor Road, 1m from Tudor Road traffic, 65m from The Greyfriar, and 120m from Reading Railway Pub. Medusa Bar & Lounge located approximately 48m away but not visible at Measurement Position.
E	SLM positioned approximately 1m from Caversham Road traffic and 65m from Medusa Bar & Lounge.
F	SLM positioned at Site boundary, approximately 35m from The Greyfriar. Reading Railway Pub located approximately 90m away but not visible from Measurement Position.
G	SLM positioned next to adjacent office building car park, approximately 20m from The Greyfriar. Reading Railway Pub located approximately 65m away but not visible from Measurement Position.
H	SLM positioned 1.5m from a mechanical plant item serving the adjacent office building. Measurement position approximately 10m away from The Greyfriar. Reading Railway Pub located approximately 50m away with entrance partially visible from Measurement Position.
I	SLM positioned opposite the entrance into The Greyfriar at approximately 10m away. Reading Railway Pub located approximately 40m away.
J	SLM positioned around entrance to Reading Railway Pub at approximately 9m away. The Greyfriar located approximately 38m away.
K	SLM positioned near the entrance into Reading Railway Station at approximately 25m away. The Greyfriar located approximately 127m away and Reading Railway Pub located approximately 70m away.



Plan Showing Approximate Measurement Positions (A to K) (Map Data ©2025 Google)



7.3 Weather Conditions

For the duration of the survey, there were no periods of rainfall observed, and the road surfaces were dry. The skies were overcast with patchy cloud cover and the wind conditions were calm. The local weather report indicates temperatures ranged from 17°C (night) to 27°C (day) with wind speeds less than 5m/s from southeasterly directions.

7.4 Instrumentation

The instrumentation used during the survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Calibration
Preamp	SvanteK	SV12L	42465	Calibration on 04/02/2025
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	59147	Calibration on 04/02/2025
Type 1 Data Logging Sound Level Meter	SvanteK	977	36448	Calibration on 04/02/2025
Type 1 Calibrator	BrueL & Kjaer	4231	2610161	Calibration on 19/08/2024

The sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant change was found to have occurred (no more than 0.2 dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. The microphone was fitted with a windshield.

7.5 Subjective Observations

The following on-site observations were recorded, supplementary to our attended noise measurements described in Section 0.

Positions (A – K)	Subjective Observations/Description
A	21:17 to 21:30 Medusa preparing to open, noise associated with the venue subjectively imperceptible over the train noise, and road traffic noise on Caversham Road and the underpass. 23:25 to 23:50 Medusa open with very little activity. Noise associated with the venue subjectively imperceptible over the prevailing background noise. 00:30 to 01:00 One group of 4no. patrons observed to be arriving at the venue. With exception of small group of people outside conversing, which is barely perceptible, other noise associated with the venue was subjectively imperceptible over the prevailing background noise.



Positions (A – K)	Subjective Observations/Description
	01:30 to 02:00 One group of (2-3no.) patrons observed to conversing outside. Traffic on Caversham Road less busy but dominating when cars drive through the underpass. Noise associated with the venue subjectively imperceptible over the prevailing background noise. 02:10 to 02:15 No significant change observed to general activity noted above, other than, subjectively seeming to get less busy.
B	00:00 to 00:10 Dominant noise source noted to be road traffic on Caversham Road and Tudor Road. Occasional train passby clearly perceptible over prevailing background noise. Noise associated with the Medusa subjectively imperceptible over prevailing background noise. 00:50 to 01:00 no change to the above noise climate observed. 01:47 to 01:56 Less traffic observed, noise associated with the Medusa subjectively imperceptible over prevailing background noise with no cars passing by. 02:15 to 02:30 No significant change observed to general activity noted above, other than, subjectively seeming to get less busy.
C	21:30 to 21:40 Dominant noise sources noted to be road traffic on Caversham Road and train noise. Medusa opening. 21:50 to 22:10 Noise climate dominated by environmental noise sources. Medusa open but no noticeable activity noted. 22:55 to 23:00 Medusa open but no activity observed. Road traffic on Caversham Road dominating. 00:30 to 00:45 Less traffic observed, noise from people conversing across the road just perceptible over prevailing background noise. 01:40 to 01:45 Less traffic observed. Noise associated with the venue subjectively imperceptible over the prevailing background noise.
D	00:45 to 00:50 The Greyfriar and Reading Railway Pub closed. Less traffic on Tudor Road and Caversham Road. Prevailing background dominated by occasional road traffic on Caversham Road.
E	20:40 to 20:45 Road traffic noise on Caversham Road dominating. No commercial/entertainment noise perceptible over prevailing background noise.
F	21:35 to 22:05 Noise climate at the Site boundary on Tudor Road noted to be affected by mechanical plant noise from carpark of adjacent office building. The Greyfriar observed to be operating with amplified music inside, however was not audible at the Site boundary. 23:00 to 23:20 Less traffic on Tudor Road. Dominant noise sources noted to be road traffic noise from Tudor Road and Caversham Road. It was also noted that the mechanical plant noise from carpark of adjacent office building was just perceptible. Noise associated with The Greyfriar imperceptible over the prevailing background noise.
G	21:35 to 21:40 Dominant noise sources noted to be road traffic noise from Tudor Road and mechanical plant noise from carpark of adjacent office building. Noise associated with The Greyfriar barely perceptible over the prevailing background noise. 23:15 to 23:25 Less traffic on Tudor Road. Noise associated with The Greyfriar barely perceptible over the prevailing background noise. Dominant noise source noted to be mechanical plant noise from carpark of adjacent office building.
H	21:45 to 21:46 Observation made at approximately 1.5m from mechanical plant item serving the carpark of adjacent office building dominating. Noise from the plant to be dominating at this position. Plant item operating continuously with no notable acoustic characteristics observed.
I	22:45 to 22:52 General operation and amplified music noise from The Greyfriar just perceptible, due to entrance door left open. Noise associated with Reading Railway Pub not perceptible over the prevailing background noise. Noise from mechanical plant item serving the carpark of adjacent office building just perceptible.



Positions (A – K)	Subjective Observations/Description
J	01:57 to 02:00 No commercial/entertainment noise present. Both The Greyfriar and Reading Railway Pub closed. Prevailing background comprises occasional traffic noise from Taxi ranks and faint patron noise from Station Road / Friar Street.
K	20:35 to 20:40 Noise climate around Reading Station dominated by noise from Taxis and occasional train passbys. Train announcement system barely perceptible over background noise level.

7.6 Results

The following table summarises noise levels recorded during various time periods at the attended measurement positions A to K. Octave band data has been excluded in the interest of brevity, though is available upon request.

Position	Start time (hh:mm)	Sound Pressure Level (dB)		
		L _{Aeq}	L _{Amax}	L _{A90}
A	21:18	69	78	63
	21:23	72	83	65
	21:54	72	78	67
	23:24	71	85	55
	00:48	67	82	48
	01:45	71	79	58
	01:51	65	79	51
	02:15	61	73	52
	02:17	64	73	49
B	00:00	70	85	58
	00:55	66	79	55
	01:46	69	79	57
	01:50	65	79	51
	01:56	57	73	45
	02:18	64	76	50
C	21:30	72	75	69
	21:40	70	79	64
	21:51	67	76	60
	22:05	71	83	63
	22:55	68	86	59
	23:21	68	81	58
	00:35	65	75	54
	01:43	63	72	55



Position	Start time (hh:mm)	Sound Pressure Level (dB)		
		L_{Aeq}	L_{Amax}	L_{A90}
D	00:46	66	76	57
E	20:41	72	85	62
F	21:35	57	66	53
	21:49	65	75	53
	22:00	66	78	55
	23:01	66	77	53
G	21:36	64	72	57
	23:19	64	74	56
H	21:45	64	77	60
I	22:49	62	72	55
J	01:58	52	62	44
K	20:38	62	78	54

7.7 Discussion of Noise Climate

During our time on site, the prevailing noise climate was observed to be dominated by environmental noise sources namely: road traffic on Caversham Road; road traffic through Caversham Road underpass and; train noise from elevated railway line going to and from Reading Station.

Notwithstanding the above, with reference to Section 7.5 which summarises our subjective observations whilst on-site, our assessment/observation has noted that:

1. The train announcement system from Reading Station was subjectively not perceptible over prevailing background noise levels at the site boundary nor at the rear façade with windows open.
2. Daytime operation from The Greyfriar nor Reading Railway Pub were subjectively not perceptible over prevailing background noise levels at the site boundary.
3. Night-time operation from all identified nearby entertainment venues were not perceptible over prevailing background noise levels at respective site boundaries.
4. Mechanical plant noise from carpark of adjacent office building just perceptible over prevailing background noise levels at site's southeast boundary.

Considering all of the above, with exception of the mechanical plant noise mentioned in point 4 above, it is reasonable to conclude that all other commercial/entertainment noise emitted from nearby premises identified to have potential to affect the proposed development is unlikely to have discernible adverse impact to the future residential premises.

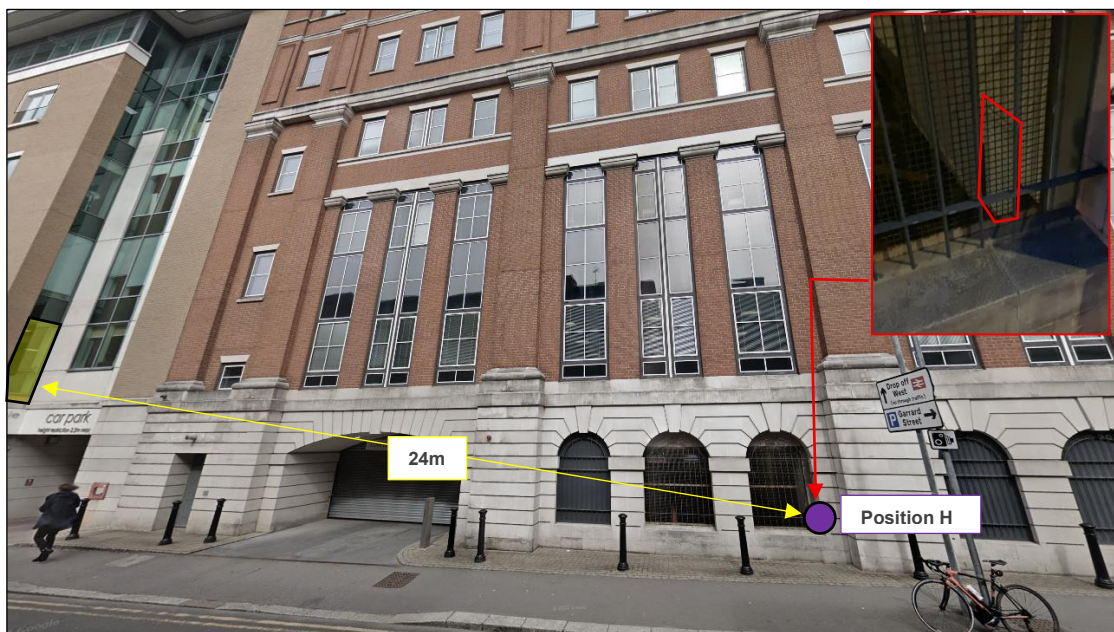


8.0 Existing Commercial Plant Noise Impact

With reference to Section 7.5 and 7.7, the existing plant item serving the carpark of adjacent office was observed to be just perceptible at the site boundary.

With reference to Section 0, noise level measurements were undertaken at Position H to ascertain the specific source noise level. It is reasonable to infer that the measured noise level represents the specific plant noise level at 1.5m with minimal contribution from extraneous noise sources.

Based on our onsite observations, the mechanical plant is likely to be operational 24 hours a day. The noise from plant item was observed to be emanating from a grille (approximately 500mm x 500mm in dimensions) located at low level behind an upstand to adjacent carpark. The nearest most affected window of proposed residential development is located approximately 24m away from Measurement Position H – see below for reference.



Google Streetview and Onsite Photo Indicating Locations of Existing Plant Item, Measurement Position H, and Future Residential Window

Based on all of the above, the incident noise level on the proposed development at Site's south eastern most boundary could be influenced by the aforementioned plant noise during night-time (23:00-07:00) hours.



As such, this section considers the potential noise impact due to existing plant item serving adjacent office building on potentially worst affected proposed residential window. Our assessment has been carried out based on plant operating during day and nighttime hours, with no notable acoustic characteristics based on our objective and subjective assessment in accordance with BS4142:2014 + A1:2019.

In the absence of long-term environmental noise survey data, the representative night-time background noise level at the site has adopted the L_{90} noise level of 57dBA, recorded at Position D which should be considered to have exclude the noise contribution from aforementioned plant item.

8.1 Assessment

Based on the proposal, measured data, and observations made on site, the table below provides an initial BS4142:2014 assessment to determine the specific sound level.

Results		Relevant Clause	Commentary
Measured Source Level at 1.5m	64 dB	7.3.2	Measured Noise Level with Specific sound source on.
Assessment made during the night-time so reference period is 15-min		7.2	
On-time Correction	0 dB	7.3.15	Correction for total on-time during assessment period. (ie $10\log(15/15)$)
Specific Sound Level	64dB	7.3.8 7.3.9 7.3.10	Specific level of source corrected for residual level and on-time.
Acoustic feature correction	0	9.2	No acoustic features were present
Distance Correction (24m)	-22		24m Distance loss ($20 \log(24/1.5)$)
Rating level	42dB	9.2	Calculated by adding acoustic feature corrections to the specific sound level.
Background sound level	54dB*	8.1.1 8.1.3 8.3	Background sound level measured at Measurement Position D, away from plant item, at 1m from proposed site's south facing façade during the night.
Excess of Rating over Background Sound Level			(42 – 54) = -12dB
BS4142 Noise Impact			No Observed Adverse Impact

* Corrected to free field level

Our night-time calculations indicate no observed adverse impact at the nearest noise sensitive residential receptor at proposed development from the existing plant item at the proposed development, in line with BS4142:2014+A1:2019.



9.0 Conclusions

A detailed and fully attended noise survey has been undertaken to establish the noise levels and potential for noise impact from nearby commercial/entertainment activities.

The noise impact upon the proposed dwellings has been considered and assessed in the context of national and local planning policies.

Noise emanating from commercial and entertainment units has been considered and it was found that these commercial/entertainment noise sources are not perceptible over the environmental noise sources at the proposed development site.

In conclusion, from an acoustics perspective it is considered that the conversion of the site should not fetter the operation of the existing nearby commercial/entertainment activities, and the assessment shows noise should not be a planning issue under the Permitted Development Planning Application for the scheme.

Appendix A

Acoustic Terminology

The acoustic terms used in this report are defined as follows:

dB	Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).
dBA	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.
L _{90,T}	L ₉₀ is the noise level exceeded for 90% of the period <i>T</i> (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.
L _{eq,T}	L _{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, <i>T</i> .
L _{max}	L _{max} is the maximum sound pressure level recorded over the period stated. L _{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L _{eq} noise level.
L _p	Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).
L _w	Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Appendix B

Planning Policies, Standards & Guidance

B.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is 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.”

That vision is supported by the following NPSE noise policy aims which are reflected in three of the four aims of planning policies and decisions in paragraph 123 of the NPPF (see paragraph 8.2 (b) below):

“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.”*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development.”* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

B.2 National Planning Policy Framework (NPPF)

The following paragraphs are from the NPPF (published December 2023):

191. 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; and
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

193. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities 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.”

Paragraph 185 also references the Noise Policy Statement for England (NPSE). This document does not refer to specific noise levels but instead sets out three aims:

- “Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

B.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	

Perception	Examples of Outcomes	Increasing effect level	Action
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

B.4 World Health Organisation

The current Environmental Noise Guidelines 2018 for the European Region (ENG) supersede the Guidelines for Community Noise from 1999 (CNG). Nevertheless, the ENG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) remain valid.

A summary of the guidance from the ENG and CNG is shown in the table below.

Source	CNG guideline indoors all sources	ENG guideline outdoors noise from specific source only
Road traffic noise	35 L _{Aeq} , 16h	53 dB L _{den}
	30 L _{Aeq} , 8h	45 dB L _{night}
Railway noise	35 L _{Aeq} , 16h	54 dB L _{den}
	30 L _{Aeq} , 8h	44 dB L _{night}
Aircraft noise	35 L _{Aeq} , 16h	45 dB L _{den}
	30 L _{Aeq} , 8h	40 dB L _{night}

With regard to single-event noise indicators, Section 2.2.2 of the WHO Environmental Noise Guidelines 2018 state:

“In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to

explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ($L_{A,max}$) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by $L_{A,max}$. Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.”

B.5 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

Internal Areas

BS8233:2014 Section 7.7.2 titled “Internal ambient noise levels for dwellings” states:

“In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Note 1 The above table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

Note 2 The levels shown in the above table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the above table.

Note 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.

Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and

number of events per night. Sporadic noise events could require separate values.

Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.

Note 6 Attention is drawn to the Building Regulations.

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

External Amenity Areas

BS8233:2014 Section 7.7.3.2 titled “Design criteria for external noise” states:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}^1$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space 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 55dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

B.6 ProPG : Planning & Noise : 2017

The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. It is applicable to noise

from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is “not dominant”.

This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- Element 1 – demonstrating a “Good Acoustic Design Process”;
- Element 2 – observing internal “Noise Level Guidelines”;
- Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
- Element 4 – consideration of “Other Relevant Issues”.

The ProPG considers suitable guidance on internal noise levels found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.

Activity	Location	07:00 – 23:00 Hours	23:00 – 07:00 Hours
Resting	Living Room	35dB $L_{Aeq,16hr}$	-
Dining	Dining Room / Area	40dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,16hr}$ 45dB $L_{Amax,F}$

NOTE 1 the Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources.

Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. 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. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be

required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10dB, they are likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (See Section 3.D).

B.7 British Standard 4142:2014 + A1:2019

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 “*Methods for rating and assessing industrial and commercial sound*”.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains “a tone, impulse or other characteristic” then various corrections can be added to the specific (source) noise level to obtain the “rating level”.

BS 4142 states that: “*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs*”. An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:

- “*Typically, the greater this difference, the greater the magnitude of the impact.*”
- “*A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*”
- “*A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*”
- “*The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*”

The determination of the “rating level” and the “background level” are both open to interpretation, depending on the context.