



ASPIRE HOUSING DEVELOPMENTS

FORMER POLICE STATION, BLYTHE BRIDGE

NOISE ASSESSMENT FOR PLANNING

13 July 2022

AEC REPORT: P4667/R01b/WJK

Acoustic & Engineering Consultants Limited

Suite 316, 3rd Floor, Broadstone Mill, Broadstone Road, Stockport, SK5 7DL
Telephone 0161 449 5900 mail@aecltd.co.uk www.aecltd.co.uk

CONTENTS

	Page
1.0 INTRODUCTION	3
2.0 SITE AND PROPOSED DEVELOPMENT	3
3.0 BASIS OF ASSESSMENT	4
4.0 BASELINE NOISE LEVELS	8
5.0 ASSESSMENT OF PROPOSED DEVELOPMENT	10
6.0 SUMMARY AND CONCLUSION	12
APPENDIX A – Acoustic Terminology in Brief	13
APPENDIX B – Noise Survey Details	15

DOCUMENT STATUS

Prepared by:  Warren King BSc (Hons) MIOA

Revision	Date	Document Details	Author	Checked By
-	13 July 2022	Original Document	WSK	PSK
a	14 April 2023	Updated to include new site plan	WSK	-
b	16 May 2023	Updated to include new site plan	WSK	-

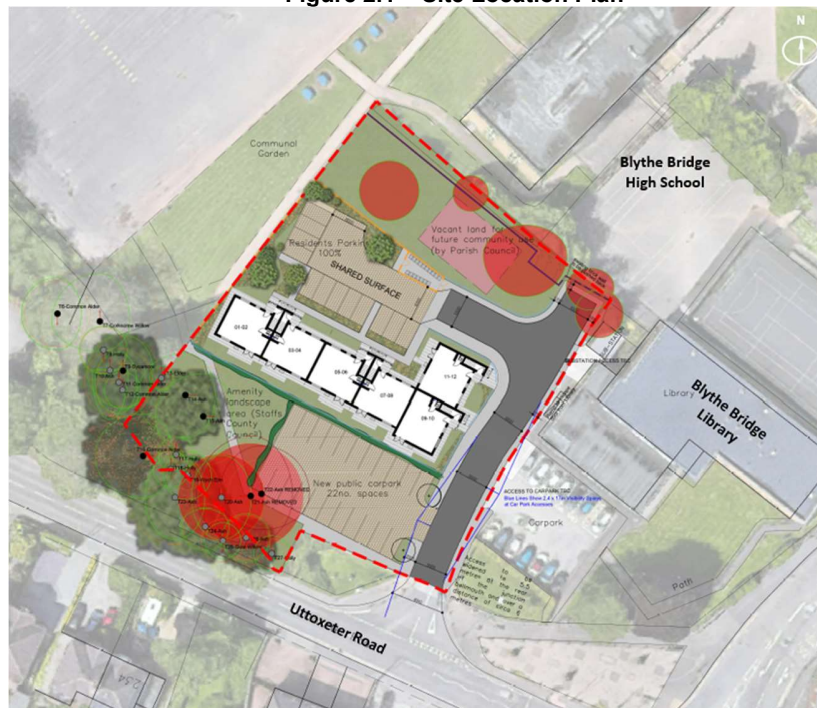
1.0 INTRODUCTION

- 1.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Aspire Housing Developments to undertake a noise assessment for the proposed residential development on the site of the former police station, Blythe Bridge, Stoke on Trent. This noise assessment is required as part of the associated planning application for the development.
- 1.2 This report details the noise levels measured onsite, the assessment criteria and details of the assessment undertaken regarding the implications of the noise levels on the acoustic design of the proposed dwellings. It includes the glazing performance and ventilation strategy required to meet appropriate internal noise level limits.
- 1.3 Acoustic terminology used throughout the report is described in brief in Appendix A.

2.0 SITE AND PROPOSED DEVELOPMENT

- 2.1 The development site is a former police station located on Uttoxeter Road, Blythe Bridge. Uttoxeter Road runs directly to the south of the proposed development. The site is bound to the north, north-west and north-east by buildings and playgrounds associated with Blythe Bridge High School. Blythe Bridge Library is located directly to the east of the proposed development.
- 2.2 The proposed scheme incorporates the demolition of the former police station and construction of 12 residential units with associated parking and communal gardens.
- 2.3 A location plan showing the proposed development is provided in the following Figure 2.1

Figure 2.1 – Site Location Plan



3.0 BASIS OF ASSESSMENT

National Planning Policy Framework

- 3.1 Current national planning policies are set out in the National Planning Policy Framework (NPPF) published by the Department for Communities and Local Government and dated March 2012 and revised in February 2019.
- 3.2 The planning policies which relate specifically to noise, were updated in July 2021, and are presented in paragraphs 174, 185 and 187 which are reproduced below:

“174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

- (e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.*

185. 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.*

187. 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.”

- 3.3 Further to the above, the Governments Planning Practice Guidance (PPG) published on 6 March 2014 and updated on 22 July 2019 states:

‘Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. 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.’

- 3.4 In addition to the above, the guidance indicates that, whilst noise can override other planning concerns, it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect as to whether or not noise is likely to pose a concern.

Internal Noise Levels

- 3.5 Based on previous schemes assessed by AEC, it is anticipated that Staffordshire Council requires that internal noise levels in new residential properties should comply with guidance presented in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' and The Association of Noise Consultants (ANC) document Professional Practice Guidance (ProPG) on Planning and Noise '*New Residential Development*' (2017).
- 3.6 Based on the guidance presented in these documents proposed daytime and night-time noise limit levels to be achieved in habitable rooms due to transportation noise sources are presented in Table 3.1, below.

Table 3.1 – Internal Noise Level Limits within Habitable Rooms

Activity	Location	Noise Limit, dB		
		Daytime 0700 – 2300h	Night-time 2300 – 0700h	
		$L_{Aeq,16h}$	$L_{Aeq,8h}$	$L_{Amax,F}$
Resting	Living Room	35	-	-
Dining	Dining Room/Area	40	-	-
Sleeping (daytime resting)	Bedroom	35	30	45

- 3.7 In relation to maximum noise levels in bedrooms during the night-time period, Note 4 of ProPG states that "*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. 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 $45dBL_{Amax}$ more than 10 times a night.*"
- 3.8 Based on this, it is proposed that the façade is designed so that maximum noise levels in bedrooms do not typically exceed $45dBL_{Amax,F}$ during the night-time period 2300h to 0700h and any non-typical events such as a one-off emergency siren or noisy motorbike pass-by will be excluded from the assessment.
- 3.9 In addition to the above, ProPG also notes that the attenuation of external to internal noise levels provided by a window partially open for whole dwelling (background) ventilation is no more than 15dB.
- 3.10 Therefore, for rooms to have whole dwelling ventilation via a partially open window, external noise levels outside habitable rooms should not exceed $50dBL_{Aeq,16h}$ during the daytime, and $45dBL_{Aeq,8h}$ and $60dBL_{Amax,F}$ at night.

Ventilation and Control of Overheating

- 3.4 The ventilation specifications presented in BS8233 and ProPG are based on achieving the requirements of Approved Document F (ADF) '*Ventilation*' (2010) of the Building Regulations only.
- 3.5 ADF requires that continuous whole dwelling ventilation is provided to limit the accumulation of moisture and other pollutants originating within a building. This is typically achieved either via a partially opened window, or by a whole building ventilation system through the provision of trickle ventilators or mechanical ventilators. ADF states that '*The ventilation provisions will not necessarily meet cooling needs*'.
- 3.6 In relation to purge ventilation, ProPG suggests that as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food), the desired internal noise levels are not generally applicable. Therefore, internal noise levels due to windows being opened for purge ventilation has not been discussed further.
- 3.7 AEC has not been presented with a thermal assessment for this development and cannot provide a comment on which rooms may be adversely affected by excessive or prolonged internal high temperatures (overheating). Therefore, the indicative overheating assessment presented in this report is only based on the noise levels measured on-site and would only apply to the dwelling(s) at risk of overheating which would be determined by others.
- 3.8 In order provide guidance on the relationship between internal noise levels and the control of overheating in residential properties, the ANC issued '*Acoustic ventilation and Overheating – Residential Design Guide*' (AVO) in January 2020. This is a design guide only and not a statutory document and the Local Authority may have their own requirements.
- 3.9 AEC understands that there are no specific Local Authority requirements in relation to acceptable internal noise level limits in habitable rooms with windows open to aid with the control of overheating. Therefore, this indicative assessment is based on the guidance presented in AVO.
- 3.10 Table 3.3 of AVO presents guidance for allowable noise from transportation sources whilst windows are open for the control of overheating. With reference to this document AEC would propose that windows can be utilised in the control of overheating provided that the resultant internal ambient noise levels are below approximately 50dBL_{Aeq, 16h} during the daytime, and 42dBL_{Aeq, 8h} and 62dBL_{Amax} during the night-time.
- 3.11 These internal noise levels are the upper end of the medium risk category for adverse effects. Where these internal noise levels would be exceeded, AVO states that "*noise causes a material change in behaviour (e.g. having to keep windows most of the time)*". In this situation, AEC would suggest alternative means for the control of overheating are considered.
- 3.12 AVO states that where transportation is the main source of noise, "*it is assumed that a partially open window will provide an outside-to-inside level difference of 13dB and is considered representative of typical domestic rooms with simple façade openings of around 2% of the floor area*".
- 3.13 Considering the above, it is considered acceptable to control summertime heating via opening windows where external free-field noise levels are no greater than those presented in the following Table 3.2. This is based on simple façade openings to around 2% of the floor area.

Table 3.2 – External Free-Field Noise Level Limits for the Control of Overheating via Openable Windows

Activity	Location	Noise Level Limit, dB		
		Daytime 0700 – 2300h $L_{Aeq,16h}$	Night-Time 2300 – 0700h	
			$L_{Aeq,8h}$	$L_{Amax,F}$
Resting	Living Room	63	-	-
Dining	Dining Room/Area	63	-	-
Sleeping (daytime resting)	Bedroom	63	55	75

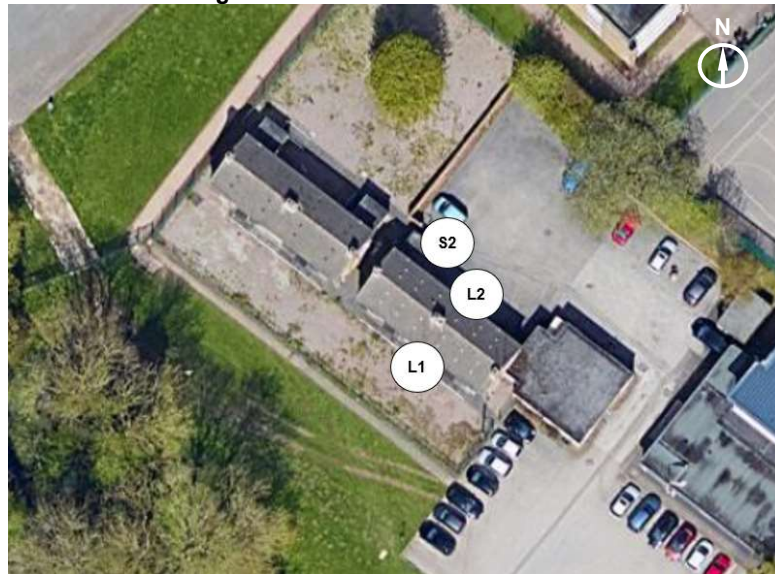
Noise Levels in External Areas

- 3.14 For traditional external areas that are used as an amenity space, such as gardens and patios, BS8223 states that it is desirable that ambient noise levels should be not exceed $50dB_{LAeq,16h}$ during the daytime, with an upper limit of $55dB_{LAeq,16h}$.
- 3.15 The World Health Organisation (WHO) 'Guidelines for Community Noise' (1999) guidance also provides a limit of $55dB_{LAeq,16h}$ to stop the majority of people from being "seriously annoyed most of the time".

4.0 BASELINE NOISE LEVELS

- 4.1 An unattended baseline noise survey was undertaken by AEC on the southern and northern facades of the existing police station buildings at first floor level from 1200h on Tuesday 5 July to 1345h on Thursday 7 July 2022. The measurement locations are shown as L1 and L2 on Figure 4.1 below.
- 4.2 Additional short-term noise measurements were undertaken at ground floor on the north elevation on Thursday 7 July, shown as S1 on Figure 4.1.

Figure 4.1 – Measurement Locations



Long Term Noise Measurements

- 4.3 The long-term noise measurements were carried out under façade conditions and in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures.*'
- 4.4 Full details of the noise surveys are provided in Appendix B with the measured noise data presented in Table B1 and Graphs B1 and B2. A summary of the measured short-term daytime noise levels is presented in Table 4.1 below.
- 4.5 In order to provide a realistic assessment of the typical maximum noise levels, the 90th percentile of the measured maximum noise levels logged every 15 minutes during the night-time period has been used to exclude irregular and unrepresentative noise events.

Table 4.1 –Summary of Long Term Measured Noise Levels

Date	Location	Noise Level, dB		
		Daytime 0700-2300, $L_{Aeq,T}$	Night-Time	
			2300-0700h, $L_{Aeq, 8h}$	Typical Maximum, $L_{Amax,F}$
Tuesday 5 July	L1	57*	53	74
	L2	52*	45	68
Wednesday 6 July	L1	58	54	72
	L2	53	49	70
Thursday 7 July	L1	58*	-	-
	L2	54*	-	-

*Shortened measurement period when equipment was installed and collected

- 4.6 At location L1, the dominant noise source was observed to be road traffic on Uttoxeter Road. There was also occasional noise from the playground area to the west of the monitoring location.
- 4.7 At location L2, the dominant noise source was from pupils in external areas of the school with some contribution from road traffic along Uttoxeter Road.
- 4.8 The short-term measurements taken at ground-floor level at location S2 are provided in the following Table 4.2. The dominant noise source was observed to be children leaving school.

Table 4.2 –Short Term Measured Noise Levels

Location	Time	dB $L_{Aeq,15min}$
S1	14:15	48.6
	14:30	47.2
	14:45	47.5
	15:00	48.8

- 4.9 Noise levels at this time were around 6dB lower at ground floor level compared with those measured at first floor level. This was due to the differences between the façade and free-field measurement positions and the screening provided by the existing wall along the boundary of the car park at the rear of the site.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

External Noise Levels

- 5.1 The long-term noise measurements were undertaken under façade conditions. Therefore, in order to convert the measured levels to free-field noise levels a correction of -3dB has been applied to the measured levels as per guidance in BS7445-2: 1991 '*Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*'.
- 5.2 For the purpose of this assessment, the average ambient daytime and night-time noise levels and typical maximum noise levels have been used for the glazing and ventilation break-in noise calculations.
- 5.3 Based on the measured noise levels discussed above, Table 5.1 below shows the daytime ambient and night-time ambient and maximum noise levels, including a -3dB façade correction applied to determine the free-field noise level on each facade.

Table 5.1 – Free-Field Daytime and Night-time Assessment Noise Levels

Location	Noise Level, dB		
	Daytime 0700-2300, L _{Aeq,T}	Night-Time	
		2300-0700h, L _{Aeq, 8h}	Maximum, L _{Amax}
L1	55	51	71
L2	50	44	67

Glazing and Ventilation Requirements

- 5.4 The maximum allowable external noise levels for properties to have whole building ventilation provided via a partially open window, is 50dB L_{Aeq,16h} during the daytime and 45dB L_{Aeq,8h} and 60dB L_{Amax,F} at night.
- 5.5 A comparison of the external noise levels presented in Table 5.1 above with the allowable external noise levels demonstrates that whole dwelling ventilation can be provided to lounges / living rooms on the north-east and north-west elevations of the development via partially opened windows. All other habitable rooms will need to be provided with alternative means of background ventilation in order that the requirements of BS8233 and ProPG can be achieved with windows closed.
- 5.6 Noise break-in calculations have been carried out to determine the acoustic requirements of the glazing and ventilation necessary to achieve appropriate internal noise levels. Calculations are based on the measured noise spectrum on each facade and assumed room and glazing sizes (33%). The minimum required glazing and ventilator performances and an example glazing build-up are provided in Table 5.2, below.

Table 5.2 –Minimum Glazing and Ventilation Sound Insulation Requirements

Façade	Room	Glazing Requirement	Example Construction	Ventilator
South-east / South-west	Lounge	31dBR _w and 25dBR _w + C _{tr}	4mm Glass /TC/ 4mm Glass (Standard Double Glazing)	26dB D _{n,e,w}
	Bedroom	31dBR _w and 25dBR _w + C _{tr}		33dB D _{n,e,w}
North-east / North-west	Bedroom	31dBR _w and 25dBR _w + C _{tr}		26dB D _{n,e,w}

- 5.7 Specific product test data should be obtained, and checked by an acoustician for compliance with the specification in Table 5.2, prior to procurement and installation.
- 5.8 All ventilation requirements have been based on the use of a single ventilator per room. If more than one unit is required, such as may be required to satisfy Building Control requirements, the performance of each unit would need to be increased.
- 5.9 Windows can be openable provided that they are effectively acoustically sealed when closed and it is important that any frames and seals do not downgrade the sound insulation performance of the glazing.

Control of Overheating

- 5.10 If it is determined by others that there is a need to control overheating within the development, based on a comparison between the noise levels presented in Table 5.1 and Table 3.2, this could be supplied by opening windows on all elevations during the daytime and night-time periods.

Noise Levels in External Areas

- 5.11 The determined free-field noise levels provided in Table 5.1 above demonstrate that ambient noise levels in external areas would not exceed the limit of 55dBL_{Aeq,16h} to stop the majority of people from being “*seriously annoyed most of the time*”.

6.0 SUMMARY AND CONCLUSION

- 6.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Aspire Housing Developments to undertake a noise assessment to accompany a planning application for the proposed residential development for the proposed residential development on the site of the former police station, Blythe Bridge, Stoke on Trent.
- 6.2 Based on previous noise assessments, it is anticipated that Staffordshire Council require that internal noise levels in new residential properties should comply with guidance presented in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' and The Association of Noise Consultants (ANC) document Professional Practice Guidance (ProPG) on Planning and Noise '*New Residential Development*' (2017)).
- 6.3 A baseline noise survey was undertaken by AEC on the front and rear facades of the existing police buildings at first floor level from 1200h on Tuesday 5 July to 1345h on Thursday 7 July 2022. Additional short-term noise measurements were undertaken at ground floor on the north elevation on Thursday 7 July.
- 6.4 The dominant noise sources were observed to be road traffic on Uttoxeter Road on the southern elevations and noise from the school on the northern elevations of the existing buildings.
- 6.5 Based on the noise assessment, mitigation measures are required to control internal noise levels to meet the levels provided in BS8233 and ProPG in all habitable rooms during both the daytime and night-time periods with the exception of lounges / living rooms on the north-east and north-west elevations of the proposed development. The mitigation measures are in the form of acoustic ventilators and enhanced acoustic glazing as presented in Section 5 of this report.
- 6.6 Ambient noise levels in external areas would not exceed the limit of 55dBL_{Aeq,16h} to stop the majority of people from being "*seriously annoyed most of the time*".
- 6.7 The assessment demonstrates that appropriate planning conditions can be applied to the proposed development so that appropriate internal noise levels are achieved.

APPENDIX A – Acoustic Terminology in Brief

Sound Description

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most sound is made up of many different frequencies.

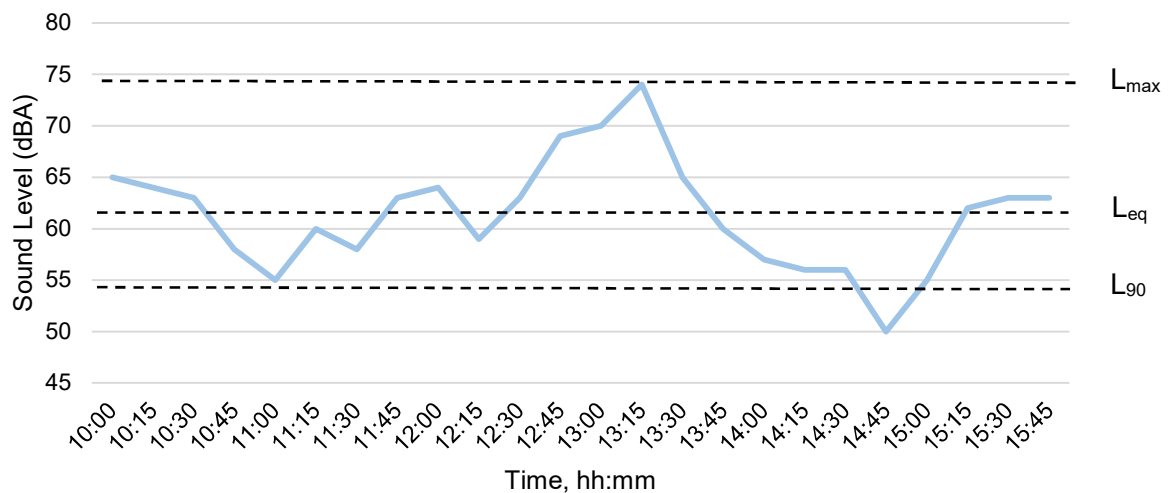
The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The dBA weighting emphasises or reduces the importance of certain frequencies within the audible range.

Sound Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as fifteen minutes or one hour, the statistically determined results being used to quantify various aspects of the sound.

The figure below shows an example of sound level varying with time. Because of this time variation, the same period of sound can be described by several different levels. The most common of these are described below. It should be noted that in many instances in the main body of text, the unit will be preceded by a dB descriptor in the report e.g., $L_{Aeq,T}$ could be written $dBL_{Aeq,T}$.

Example of Sound Varying with Time

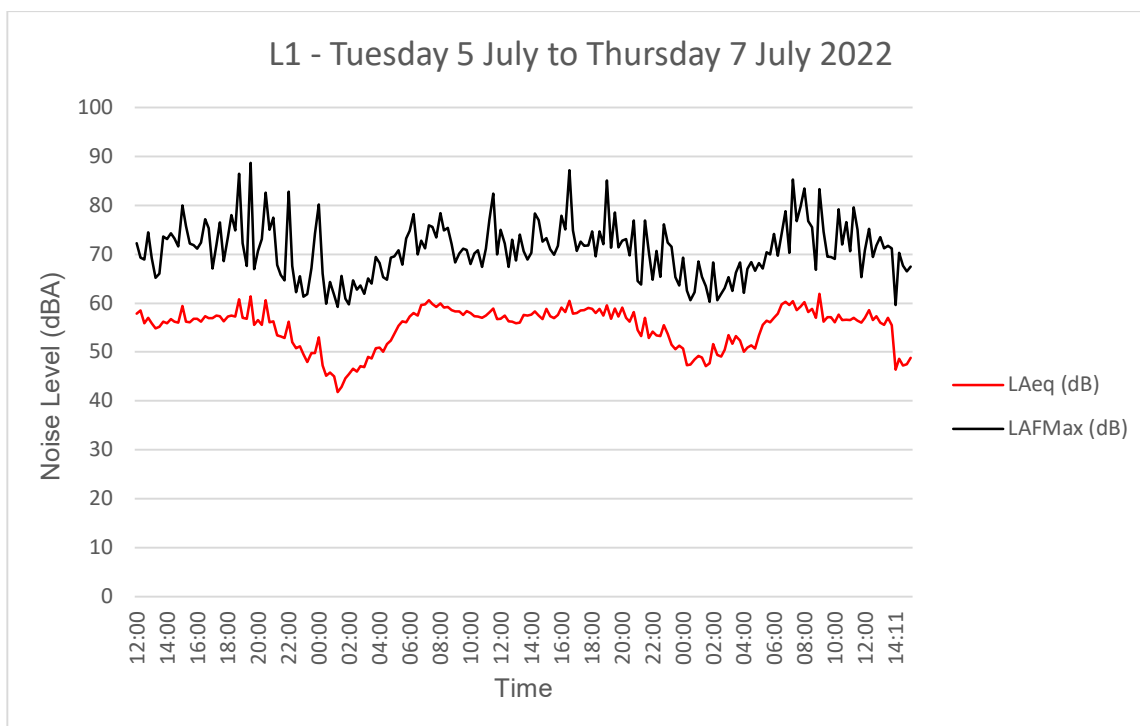


Unit Type	Acoustic Unit	Description
Ambient Sound Level	$L_{Aeq, T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the “average” sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the “ambient” noise level.
Percentile Level	L_{A10}	The (A-weighted) sound level exceeded for 10% of a measurement period. It is the value often used to describe traffic noise.
	L_{A90}	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe background noise.
Maximum Sound level	L_{Amax}	The maximum (A-weighted) sound level measured during a given time. ‘Fast’ or ‘Slow’ meter response should be cited.
Free-field Level	-	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	-	This refers to the sound level measured outside, at 1m from a hard-reflecting surface, typically 3dB greater than the free-field level.
Sound reduction index	R_w	Single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
A road traffic spectrum adaptation term	C_{tr}	Referenced to demonstrate the to the low frequency sound insulation performance of building elements. Makes reference to the A-weighted urban traffic noise spectrum.
Element normalized level difference	$D_{n,e,w}$	Single number rating used to describe the sound insulation performance of small elements.

APPENDIX B – Noise Survey Details

Date & Time of Survey:	Unattended: 1200h, Tuesday 5 July to 1345h, Thursday 7 July 2022. Attended: Thursday 7 July 2022, 1415 to 1515h.					
Personnel:	Warren King (AEC).					
Equipment Used:	Attended & Unattended: Cirrus CR:171B Real Time Analyser (AEC Kits 3 and 5)					
Calibration:	The sound level analysers, which conform to BS EN 61672-1: 2013 ' <i>Electroacoustics – Sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Avg Temp°C	Wind Direction	Cloud Cover
	05/07/2022	Day/Night	Light rain / Dry	16°C	Westerly	80%
	06/07/2022	Day/Night	Dry	17°C	Westerly	50%
	07/07/2022	Day/Night	Dry	16°C	North-westerly	50%
Measurement Locations:	Measurements were undertaken at three locations around the development site. Identified as L1, L2 and S1 on Figure 4.1 and described below. L1 – 1m from the south-west façade of existing building at first floor level. L2 – 1m from the north-east façade of existing building at first floor level. S1 – Along the rear elevation of existing building at ground floor level					
Measurement Details:	Measurements were undertaken over 15-minute periods in terms of and L_{eq} , L_{90} and, L_{max} .					
Façade / Free-Field:	L1 and L2 - Façade S1 – Free-field					
Measured Data:	Full results for the unattended measurements are shown in Graphs B1 and B2. Full octave band centre frequency data was obtained for all measurements.					

GRAPH B1 – Measured Noise Levels – Location L1



GRAPH B2 – Measured Noise Levels – Location L2

