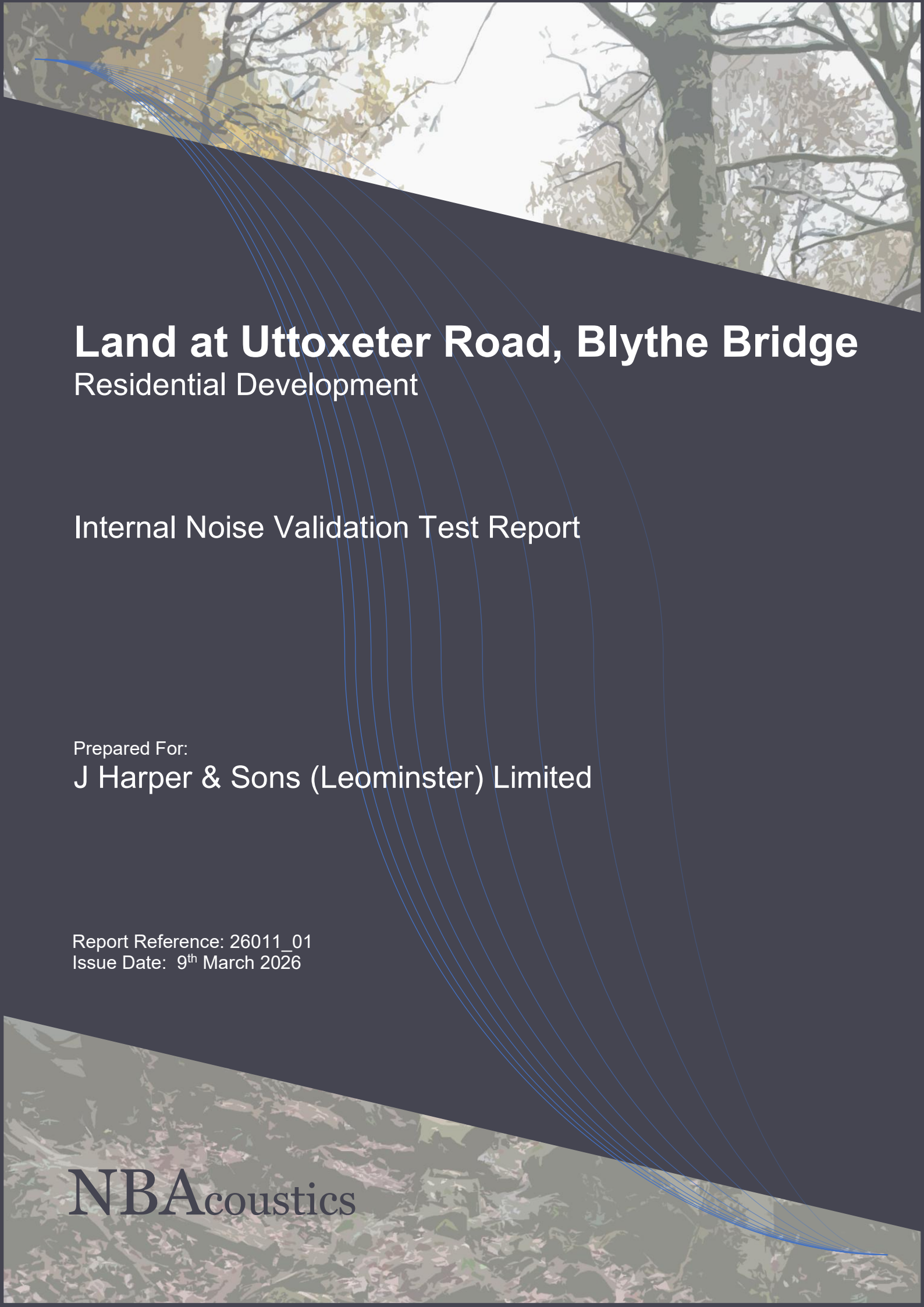




Land at Uttoxeter Road, Blythe Bridge

Residential Development

Internal Noise Validation Test Report

Prepared For:
J Harper & Sons (Leominster) Limited

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Revision History

Revision	Revision Date	Revision Details
00	9 th Mar 2026	First Issue

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1 Introduction

NB Acoustics Limited (NBA) have been instructed by J Harper & Sons (Leominster) Limited (The Client) to carry out an internal noise validation test and prepare a test report with respect to the requirements set out in Condition 13 of the planning permission for application SMD/2023/0368. The development is a new build two storey residential building containing 12 No. one bedroomed flats.

This report presents the noise validation tests details as required in Condition 13 and compares the results to the indoor ambient noise levels criteria set out in the noise assessment report prepared by AEC Ltd Report Reference ref. P4667/R01b/WJK dated 13th July 2022.

A brief summary of noise theory and terms used within this report is provided in Appendix A.

2 Relevant Planning Policy, Guidance and Criteria

2.1 Planning Permission SMD/2023/0368

The applicable planning condition 13 from decision notice SMD/2023/0368 is copied below:

Condition 13: “ *Prior to each phase of the development first being occupied pre-completion tests shall be carried out to verify compliance with the submitted Noise Assessment prepared by AEC Ltd Report Reference ref. P4667/R01b/WJK dated 13th July 2022. The raw data, calculations and results from the pre completion tests shall be submitted to the Local Planning Authority for its written approval before any of the units hereby approved are occupied. Each phase of the development shall be implemented in accordance with the approved details of that phase.*

Reason: *To protect occupiers from noise and safeguard their residential amenities. “*

The relevant section from the Noise Assessment prepared by AEC Ltd Report Reference ref. P4667/R01b/WJK dated 13th July 2022 which sets out the criteria for internal ambient noise levels is copied below.

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 $L_{Aeq,16h}$	Night-time 2300 – 0700h	
			$L_{Aeq,8h}$	$L_{Amax,F}$
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 45dB L_{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 45dB $L_{Amax,F}$ 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.

2.2 ProPG: Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential

The ProPG¹ was produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. It encourages good acoustic design for new residential development and aims to protect people from the harmful effects of noise.

ProPG provides guidance for internal noise levels which are typically used in England as assessment criteria in planning applications for new residential developments. When achieved either by prediction or measurement, this is used to demonstrate to a Local Planning Authority that acceptable residential amenity would be provided for residents of residential developments. These criteria are copied and presented in Figure 1.

Figure 1: ProPG Internal noise level guidelines (ProPG Figure 2)

ACTIVITY	LOCATION	07:00 – 23:00 HRS	23:00 – 07:00 HRS
Resting	Living room	35 dB $L_{Aeq,16\text{ hr}}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\text{ hr}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hr}}$	30 dB $L_{Aeq,8\text{ hr}}$ 45 dB $L_{Amax,F}$ (Note 4)

ProPG Figure 2 Note 7 states:

“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 5 dB and reasonable internal conditions still achieved.”

With regards to individual noise events such as vehicle passes or bangs from commercial activities, Figure 2 Note 4 of ProPG provides the following guidance with respect to regular noise events.

“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).”

The guidance levels set out in ProPG are in line with the criteria stipulated in Condition 5.

¹ ProPG: Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development, May 2017

3 Noise Validation Test

3.1 Test Details

NBA carried out long term sound level monitoring inside the bedroom of 1st floor flat Plot 10 which has windows that face towards Uttoxeter Road. Monitoring in this room was from 10:55 4th March to 12:25 on the 5th March 2026.

A short-term measurement was also undertaken in the Kitchen Lounge of 1st floor flat Plot 10 on the 5th March 2026.

All measurements included one microphone location at 1.2m above floor level and at least 1m from any room boundary walls.

All measurements were undertaken over varying durations at 1 second resolution and continuous audio was also recorded to assist with sound source identification. The meter was set to record all relevant parameters including L_{Aeq} and L_{AFmax} parameters and at linear octave band centre frequencies.

There was two number trickle ventilators installed in the frame of all windows which were fully opened during the test.

Where noise associated with construction activities on the site was audible during the measurement, these events have been removed from the survey results.

All test rooms were unfurnished. Therefore, the reverberation time was measured (using the BS EN ISO 354) in order to account for changes in ambient levels that will results after furnishings are added into the rooms when occupied. Typically furnished rooms can be assumed to have an average reverberation time of 0.5s.

The 1st floor plan showing the noise monitoring locations (LT1 and ST2) is shown in Figure 2 with photos of the monitoring positions shown in Figure 3 and Figure 4.

Figure 2: Monitoring Positions - Long term (LT1) and Short Term (ST2)

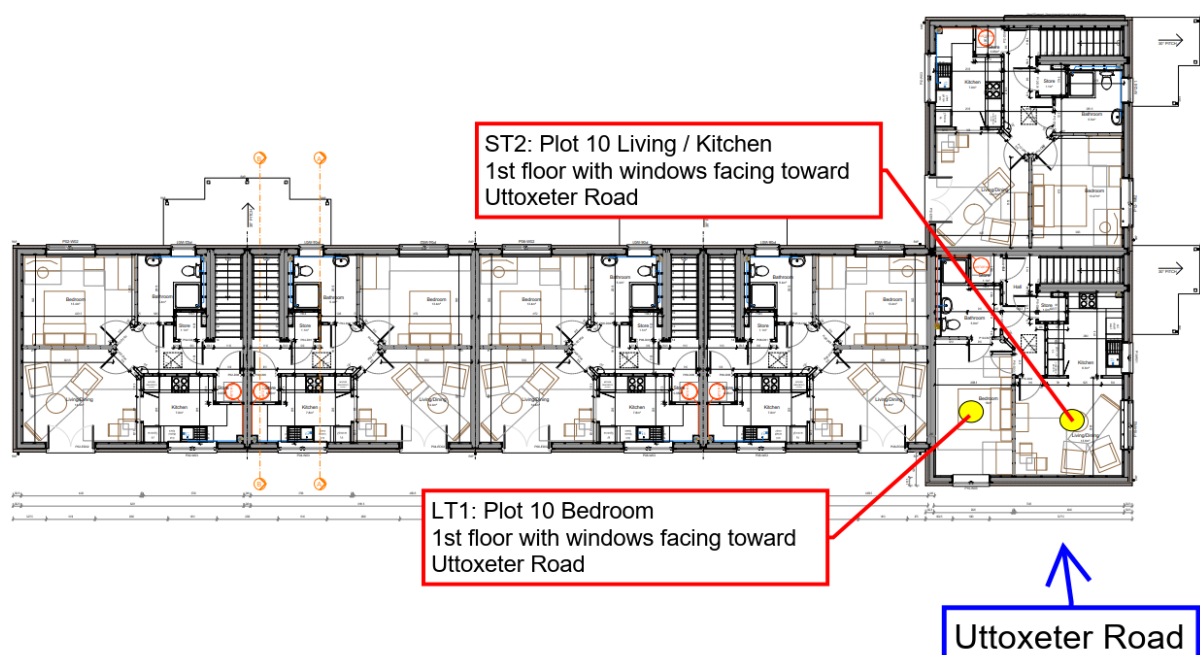


Figure 3: Photos of LT1



Figure 4: Photos of ST2



3.2 Survey Results

3.2.1 Plot 10 Bedroom

The survey results from the Bedroom (LT1) are presented in Table 1.

There was some audible noise from construction activities during the daytime, this included voices of workers, mobile plant machinery and general use of tools. As these noise events were not part of the external environmental noise sources being tested, these periods have been removed from the test results.

Appendix B includes a chart of the survey results from LT1 with the removed construction noise periods shown in Green.

Table 1: LT1 Survey results – Plot 10 Bedroom (unfurnished)

Time Period	Date (dd/mm/yy) / Start Time (hh:mm)	Measurement Duration (T) (hh:mm)	Ambient Sound Level $L_{Aeq,T}$ (dB)	Maximum Sound Level L_{AFmax} (dB)
Daytime	04/03/2026 10:55	09:36 ^[1]	33.1	na
	05/03/2026 07:00	00:51 ^[1]	37.3	
		10:27 ^[1]	33.8 ^[2]	
Night-time	04/03/2026 23:00	08:00	30.0	60.9 / 48.8 ^[3]

^[1] The measurement duration noted does not include the time periods where construction sound was audible.

^[2] Logarithmic average of all measurement periods within the two daytime measurement durations

^[3] 1st / 10th highest measured L_{AFmax} value

The reverberation time in the Bedroom was measured to be 1.14 seconds. By assuming a reverberation time of 0.5 seconds once furnished, sound levels in the bedroom are calculated to reduce by -3.6 dB using the following equation:

$$\text{Reduction (dB)} = 10 \log (1.14s / 0.5s) = 3.6 \text{ dB}$$

The test results have been reduced by -3.6 dB and compared to the criteria in Table 2.

Table 2: Comparison of Bedroom results with criteria

Time Period	Corrected Sound Levels (dB)	Criteria	Comparison with Criteria
Daytime	30 $L_{Aeq,16\text{hour}}$	$\leq 35 L_{Aeq,16\text{hour}}$	Pass
	26 $L_{Aeq,8\text{hour}}$	$\leq 30 L_{Aeq,8\text{hour}}$	Pass
Night-time	45 ^[1] L_{AFmax}	$\leq 45 L_{AFmax}$ (no more than 10 times per night [ProPG])	Pass

^[1] 10th highest measured L_{AFmax} value from Wednesday night 04/03/2026

Table 2 shows that with an allowance for furniture the internal sound level is below the applicable criteria for a Bedroom and would therefore satisfy the condition 13 requirements.

3.2.2 Plot 10 Kitchen Lounge

The survey results from the Kitchen Lounge (ST2) are presented in Table 3. There was some audible noise from construction activities during the measurement which have been removed from the test result.

Table 3: ST2 Survey results – Plot 10 Kitchen Lounge (unfurnished)

Time Period	Date (dd/mm/yy) / Start Time (hh:mm)	Measurement Duration (T) (hh:mm)	Ambient Sound Level $L_{Aeq,T}$ (dB)	Maximum Sound Level L_{AFmax} (dB)
Daytime	09/03/2026 12:39	00:16	35.7	na

[1] Logarithmic average of all measurement durations within the two daytime measurement periods.

[2] 1st / 10th highest measured L_{AFmax} value

The reverberation time in the kitchen Lounge was measured to be 0.98 seconds. By assuming a reverberation time of 0.5 seconds once fully furnished, the sound level in the kitchen lounge is calculated to reduce by -2.9 dB using the following equation:

$$\text{Reduction (dB)} = 10 \log (0.98s / 0.5s) = 2.9 \text{ dB}$$

The survey results from the kitchen Lounge (ST2) have been reduced by -2.9 dB and compared to the criteria in Table 4.

Table 4: Comparison of Kitchen Lounge result with criteria

Time Period	Corrected Sound Levels (dB)	Criteria	Comparison with Criteria
Daytime	33 $L_{Aeq,T}$	$\leq 35 L_{Aeq,16\text{hour}}$	Pass

Table 5 shows that with an allowance for furniture the internal sound level is below the applicable criteria for a Living Room and would therefore satisfy the condition 13 requirements.

It should be noted that the measurement duration at ST2 Kitchen Lounge was shorter than the 16 hour criteria reference time. However it is considered unlikely that the 16 hour result would vary more than +/- 2 dB which would mean the result would still satisfy the criteria.

3.3 Meteorological Conditions

Weather conditions over the monitoring period were calm and dry throughout the long-term monitoring period.

The weather conditions during the survey period were considered suitable for environmental sound level measurements.

3.4 Survey Instrumentation

All measurements were undertaken using a class 1 sound level meter. Details of the instrumentation used to undertake the sound measurements are provided in Table 5.

Table 5: Sound measurement equipment

Location	Manufacturer	Equipment Type	Model	Serial Number	Calibration Due
All positions	NTi	Sound level meter	XL2-TA (Type 1)	A2A-18413-E0	26/11/2026
	Larson Davies	Field Calibrator	CAL200	17894	28/11/2026

The calibration of the equipment was checked prior to and after the monitoring periods. No significant drift was noted. Copies of equipment calibration certificates can be provided on request.

4 Conclusion

A survey of indoor ambient sound levels inside a newly completed 1st floor flat the site known as Land off Uttoxeter Road, Blythe Bridge has been carried out and the results compared to the criteria set out Condition 13 of the decision notice.

A long-term unattended sound level survey has been completed over a 24 hour period from Wednesday 4th to Thursday 5th March 2026 inside the bedroom of 1st floor flat Plot 10.

A shorter measurement was undertaken in the kitchen lounge room of the same flat. The results of this shorter period are considered to be representative of the indoor ambient noise levels over the longer 16 hour daytime reference duration.

A correction to the measured sound levels in both rooms has been made to allow for the sound reduction that will occur once the rooms are fully furnished.

Comparison of the survey results in 1st floor flat Plot 10 bedroom with the criteria showed that the measured levels were all below the applicable daytime and night-time criteria with windows closed and trickle ventilators open.

Comparison of the survey results in 1st floor flat Plot 10 kitchen lounge with the criterion showed that the measured levels were all below the applicable daytime criterion with windows closed and trickle ventilators open.

NBA considered that these validation test results demonstrate that the Condition 13 requirements have been satisfied by the building envelope construction and the installed glazing and whole house ventilation scheme.

Appendix A Perception and Terminology

Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal, Pa). Because of this wide range a noise level scale based on logarithms is used in noise measurement called the decibel (dB) scale. Audibility of sound covers a range of approximately 0 to 140 dB.

The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure noise is weighted to represent the performance of the ear. This is known as the 'A weighting' and annotated as dB(A).

Table 6 lists the sound pressure level in dB(A) for common situations.

Table 6: Noise Levels for Common Situation

Typical Noise Level dB(A)	Example
0	Threshold of hearing
30	Rural area at night, still air
40	Public library, refrigerator humming at 2m
50	Quiet office, no machinery
60	Normal conversation
70	Telephone ringing at 2m
80	General factory noise level
90	Powered lawn motor, operators ear
100	Pneumatic drill at 5m
120	Discotheque – 1m in front of loudspeaker

The noise levels at a measurement point are rarely steady, even in rural areas, and vary over a range dependant upon the effects of local noise sources. Close to a busy motorway, the noise levels may vary over a range of 5 dB(A), whereas in a suburban area this may increase up to 40 dB(A) and more due to the multitude of noise sources in such areas (cars, dogs, aircraft etc.) and their variable operation. Furthermore, the range of night-time noise levels will often be smaller and the levels significantly reduced compared with daytime levels. When considering environmental noise, it is necessary to consider how to quantify the existing noise (the ambient noise) to account for these second to second variations.

Human subjects are generally only capable of noticing changes in steady levels of no less than 3 dB(A). It is generally accepted that a change of 10 dB(A) in an overall, steady noise level is perceived to the human ear as a doubling (or halving) of the noise level. (These findings do not necessarily apply to transient or non-steady noise sources such as changes in noise due to change in road traffic flow, or intermittent noise sources).

Most environmental noise measurements and assessments are undertaken for 'free-field', away from any existing reflecting surfaces (other than the ground). However, it is sometimes necessary to measure noise levels immediately external to a façade when considering the impact on residents inside properties and this requires the correction of 3 dB(A) to the measured (or predicted) facade level due to sound reflection from the façade. The assessment of road traffic noise, for example, is based on predicted (or measured) façade noise level (using the L_{A10} statistical parameter).

L_p The instantaneous sound pressure level (L_p)

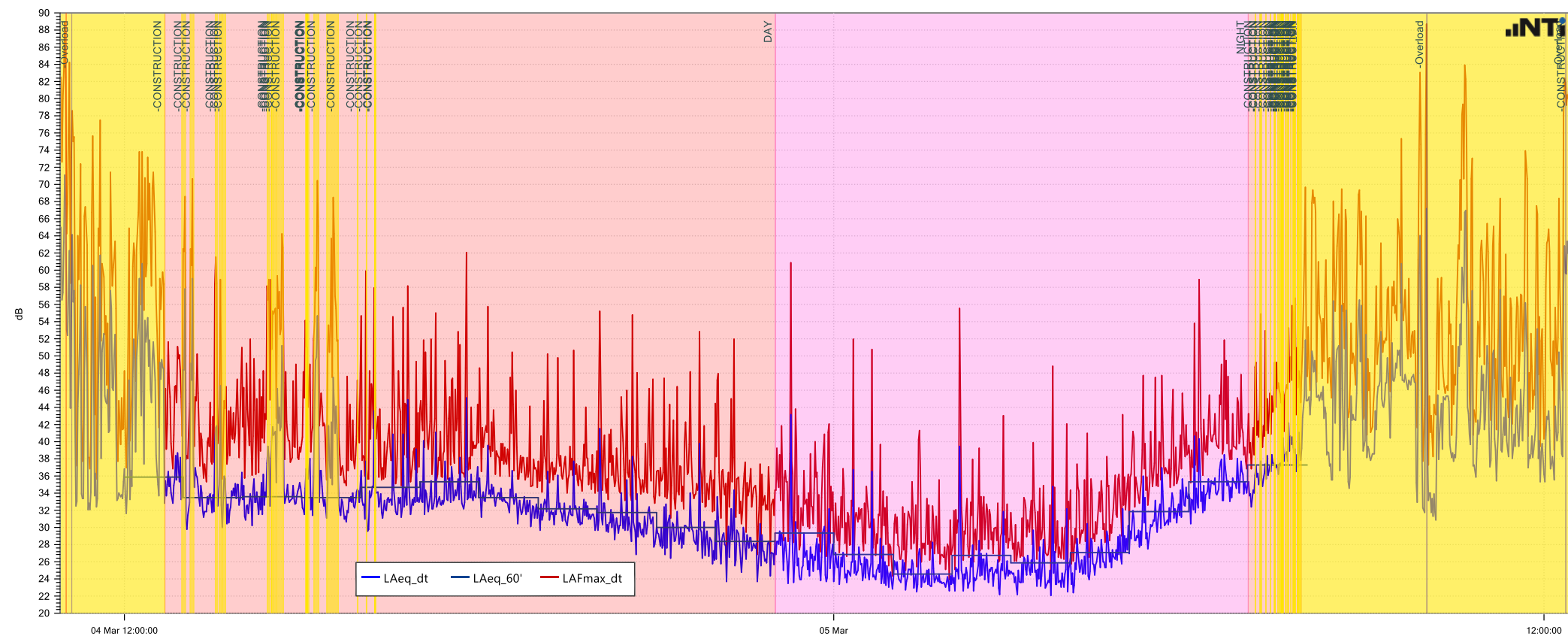
L_{pA} (or L_A) The A-weighted instantaneous sound pressure level (L_{pAp} or L_A)

This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125 s (FAST time constant) or the previous 1 s (SLOW time constant).

L_{AF}, L_{AS}	The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them.
L_{max}	The maximum instantaneous sound pressure level (L_{max}),
L_{Amax}	The A-weighted maximum instantaneous sound pressure level (L_{Amax})
L_{AFmax}	The A-weighted maximum instantaneous sound pressure level with a FAST time constant (L_{AFmax}).
	This is the highest instantaneous sound pressure level reached during a measurement period. The opposite of the L_{max} is the minimum instantaneous sound pressure level or L_{min} etc.
L_{min}, L_{Fmin}	It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
$L_{N,T}$	The percentage exceedence sound pressure level ($L_{N,T}$),
$L_{AN,T}, L_{AFN,T}$	The A-weighted percentage exceedence sound pressure level ($L_{AN,T}$), the A-weighted percentage exceedence sound pressure level with a FAST time constant ($L_{AFN,T}$).
$N = \text{percentage value, 0-100}$	This is the sound pressure level exceeded for $N\%$ of time period T . E.g. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as $L_{A10,1hr} = x$ dB.
$T = \text{measurement time}$	L_{A0} (the level exceeded for 0 % of the time) is equivalent to the L_{Amax} and L_{A100} (the level exceeded for 100 % of the time) is equivalent to the L_{Amin} .
e.g. $L_{A90}, L_{A10}, L_{AF90}, 5 \text{ min}$	It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
$L_{eq,T}$	The equivalent continuous sound pressure level over period T ($L_{eq,T}$),
$L_{Aeq,T}$	The A-weighted equivalent continuous sound pressure level over period T ($L_{Aeq,T}$).
$T = \text{measurement time}$	This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the L_{eq} is not a simple arithmetic mean value.
e.g. $L_{Aeq,5min}$	The L_{eq} is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation
L_n	The normalised impact sound pressure level
(NB. different from L_N see above)	The value is a measure of the performance of a floor system and its ability to attenuate foot fall or impact noise under laboratory conditions. The L_n is the level of noise produced by a standard tapping machine measured in the room below the floor being tested. The <u>lower</u> the L_n the better the impact isolation achieved. L_n values are measured and quoted in third-octaves between 100 Hz and 3.15 kHz
L'_{nT}	The standardized impact sound pressure level
	The value is a measure of the performance of an in situ floor system and its ability to attenuate foot fall or impact noise. The value takes into account the quantity of acoustic absorption within the receiving room. The <u>lower</u> the L'_{nT} the better the impact isolation achieved. L_{nT} values are quoted in third-octaves between 100 Hz and 3.15 kHz
$L'_{nT,w}$	The normalised weighted impact sound pressure level
	A single value of the L'_{nT} derived from the third octave values using the method described in BS EN ISO 717-2.
D	The level difference
	The difference between two measured sound pressure levels. In building acoustics this is usually the difference between the levels in two adjacent rooms measured to determine the sound insulation performance of the partition between them. In this context D values are usually quoted in third-octave bands between 100 and 3150 Hz.
R	The sound reduction index
	This is a measure of the sound insulation performance of a material or construction measured under laboratory conditions in accordance with BS EN ISO 140-3. R differs from D in that it takes account of the area of the construction under test as well as the absorption in the receiving room, both of these factors influence the measured D . Taking into account these factors allows the R for different constructions to be compared on a like for like basis. R values are quoted in third-octaves between 100 Hz and 3150 Hz
R_w	The weighted sound reduction index
	A single value of the R derived from the third octave values of R using the method described in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.
DnT	The standardised level difference
	There are occasions when neither D nor R' are the most appropriate descriptors for in situ measurements. An alternative is the DnT , which is D corrected to allow for the reverberation time within the receiving room. Measurements are made in accordance with BS EN ISO 140-4.

<i>DnTw</i>	The weighted standardised level difference A single value of the DnT derived from the third octave values using the method described in BS EN ISO 717-1.
<i>Absorption Coefficient</i> <i>α</i>	The ratio of the sound absorbed by a surface to the sound incident upon it. A value of 0 means that no sound is absorbed and a value of 1 means that all sound is absorbed. The sound absorption of a surface is frequency dependent so it is usual to quote values of α in octave or third-octave bands
<i>Reverberation Time T</i> <i>T60, T30, T20</i> <i>RT</i>	The length of time in seconds it takes for the sound pressure level to decay by 60 dB in an enclosed space after the source has stopped. It is not always possible to measure a full 60 dB sound decay, so reverberation time is often measured by multiplying the times taken to decay by 20 dB or 30 dB to give the equivalent of 60 dB decay time (these are often called T20 and T30 values). The longer the reverberation time the more reverberant the space. Different types of spaces have different ideal reverberation times.
<i>Tmf</i>	The reverberation time is frequency dependant and is usually presented in octave or third-octave bands. On some occasions it is useful average the level in several frequency bands. The mid frequency reverberation time is the arithmetical average of the T60 values in the 500, 1000 and 2000 Hz octave bands.

Appendix B LT1 Chart of Survey Results



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