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Environmental Noise Survey

Prepared: 26th June 2024

Report No	22704B-1
Client	Globe Projects Ltd
Site	33 High Street Wrexham LL13 8LD

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1. Quality Management

Report Number	22704B - 1
Issue	Issue 1
Prepared	26 th June 2024
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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a proposed residential development at 33 High Street, Wrexham, LL13 8LD ("Proposed Development").

3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003¹ and BS7445-2:1991².

3.3. Scope

- 3.3.1. This report covers all aspects of the noise survey, including:
- the identification of acoustic design criteria;
 - an objective sound pressure level survey of the existing site;
 - analysis of the data; and,
 - the design of any mitigation to meet the required internal noise criteria.

3.4. Conclusions Summary

- 3.4.1. The predictions show that provided the sound reduction values of the ground floor glazed elements given in Paragraph 10.1.3 are met, the Local Authority criteria regarding $L_{Aeq,5min}$ and 63Hz $L_{eq,5min}$ will be achieved.
- 3.4.2. Upgrade to primary glazing and/or secondary glazing noise mitigation options have been provided to allow the proposed first floor residential dwellings to achieve the 'Good' internal criteria from BS8233:2014.

¹ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"

² BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

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5. Background

5.1. Noise Policy Statement for England

- 5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy 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”*.
- 5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life;
 - Where possible, contribute to the improvement of health and quality of life.
- 5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

- 5.2.1. The National Planning Policy Framework (NPPF) was published on the 27th of March 2012 and was most recently updated on the 20th July 2021; it sets out the Government’s planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

“preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability”.

- 5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:
1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
 2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
 3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.
- 5.2.3. Existing businesses near to proposed development 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.

5.3. National Planning Practice Guidance

- 5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was published on the 29th November 2016 and is regularly updated to reflect the changes made to the NPPF and make it more accessible.³

³ <http://planningguidance.communities.gov.uk/>

- 5.3.2. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

Perception	Examples of outcomes	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 (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
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. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
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 intrusive	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 harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 1 – Noise exposure hierarchy

- 5.3.3. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

6. Introduction

6.1.1. An environmental noise survey has been carried out for a proposed residential development at 33 High Street, Wrexham, LL13 8LD.

6.2. Proposed Development

6.2.1. An image showing the location of the Proposed Development is given in Figure 1.



Figure 1 - Plan showing the location of the Proposed Development

6.3. Noise Climate

6.3.1. The general noise climate in the area was noted to be dominated by transient road traffic noise.

7. Assessment Criteria

7.1. Guideline Values

BS8233:2014 Internal Ambient Noise Criteria

7.1.1. BS8233:2014 draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their function. The standard provides guideline internal values for dwellings for steady external noise sources. These have been summarised in Table 2.

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

Table 2 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

7.1.2. The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year’s Eve.

7.2. Local Planning Authority Criteria

7.2.1. The local planning authority has provided specific noise-related planning requirements for the Proposed Development. The noise-related requirements have been reproduced in Figure 2.

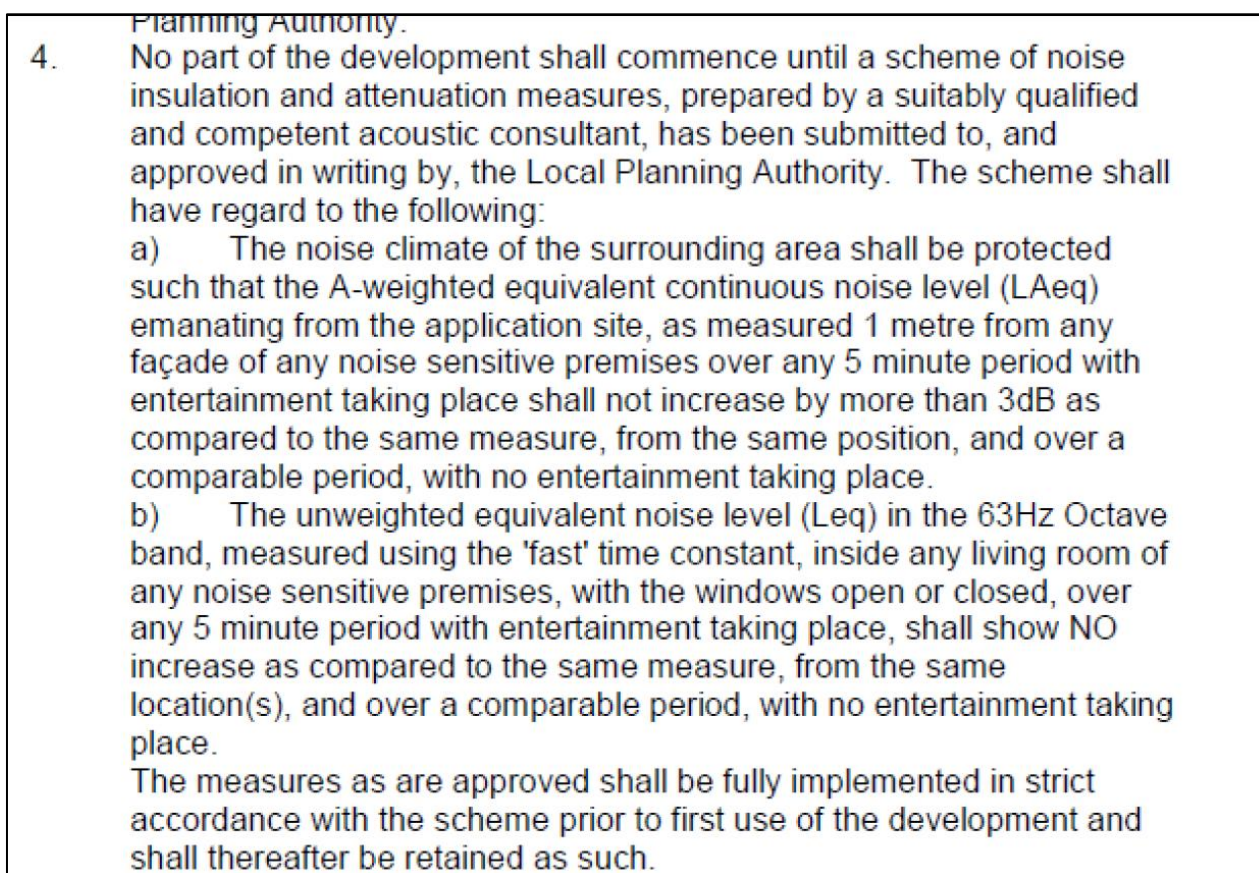


Figure 2 – Noise related planning requirements provided by the local planning authority

8. Survey

8.1. Measurement Locations

- 8.1.1. Fixed position monitoring took place at two positions to determine the existing ambient sound levels. One of the monitoring positions was located inside the first floor of the building and the other position was located externally on the façade of the building. The monitoring positions are shown in Figure 3.

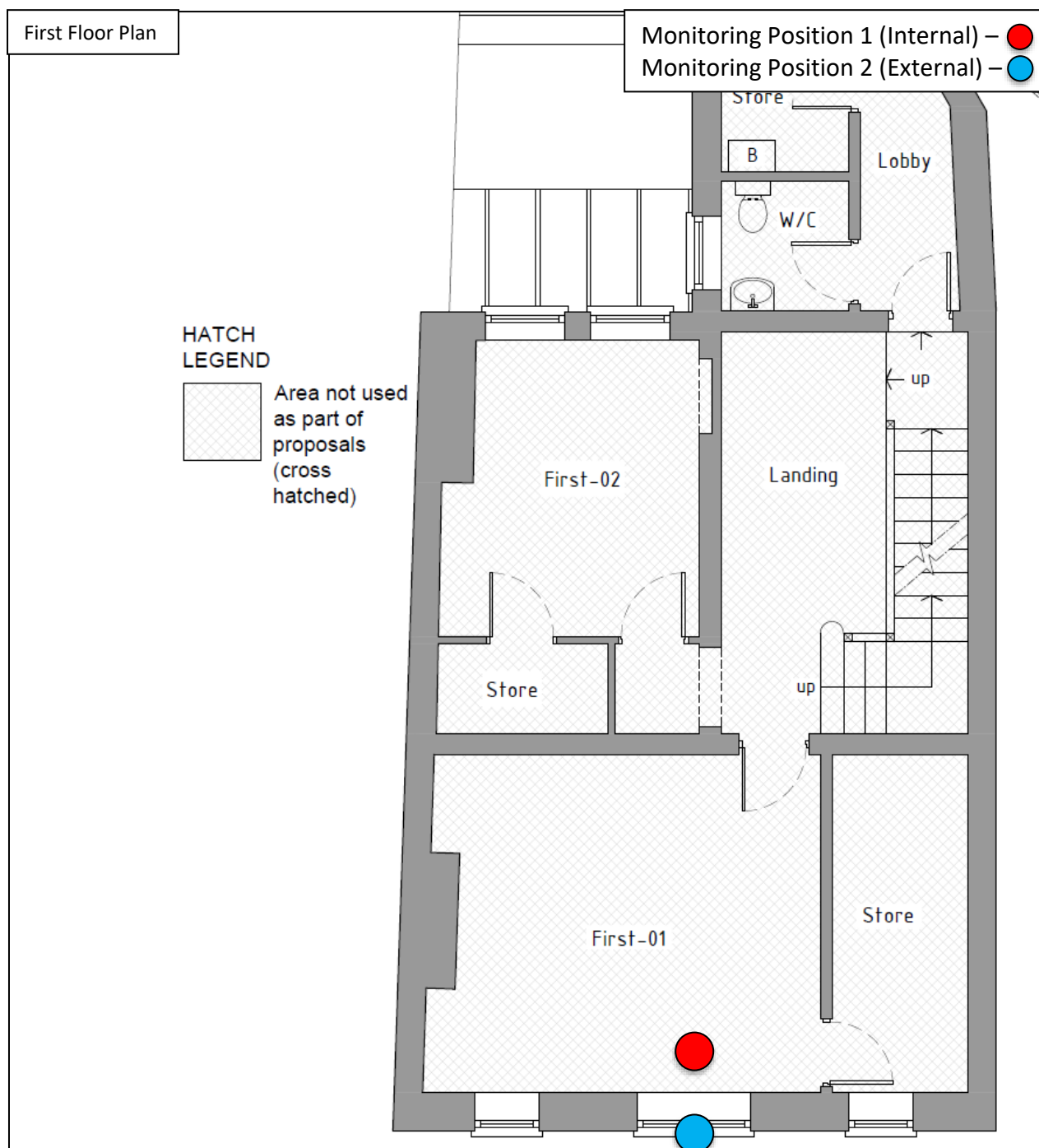


Figure 3 - Noise monitoring locations on site

- 8.1.2. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003⁴ before and after the surveys. The calibration details are also detailed in the appendix.

⁴ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"

8.2. Meteorology

8.2.1. During the survey the weather information was noted. This is summarised in Table 3.

	14 th June 2024	15 th June 2024	16 th June 2024	17 th June 2024	18 th June 2024
Roads(Wet/Dry)	Dry	Dry	Dry	Dry	Wet
Wind Speed (ms ⁻¹)/Direction	5 / W	2 / S	5 / W	4 / W	4 / W

Table 3 - Meteorological data noted during the survey

8.3. Measurement and Timescale

8.3.1. Unattended monitoring was carried out between 14th June 2024 and 18th June 2024. The measurements that have been made are summarised in Table 4.

Monitoring position	Date	Type	Quantity
1 - Internal	14 th June 2024 – 18 th June 2024	Fixed/unattended	L _{Aeq,5min} / L _{eq,5min} (63Hz)
2 - External	14 th June 2024 – 16 th June 2024	Fixed/unattended	L _{Aeq,5min}

Table 4 – Measurements made at the site of the Proposed Development

8.3.2. Sound pressure measurements were subsequently averaged into hourly, daytime and night-time periods. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2⁵. All sound pressure levels are in dB (re 20μPa). The worst case L_{Aeq,16hour} and L_{Aeq,8hour} values from the entire duration of the survey have been reported.

9. Results Summary

9.1. Measured Sound Pressure Levels

9.1.1. The measured internal sound pressure levels for each daytime and night-time period are given in Table 5

Date	Daytime dB, L _{Aeq,16hr}	Night-time dB, L _{Aeq,8hr}
14 th June 2024	43.0	39.3
15 th June 2024	51.4	43.4
16 th June 2024	42.7	27.8
17 th June 2024	35.6	26.6
18 th June 2024	32.7	N/A

Table 5 - Summary of the internal sound pressure levels measured

9.1.2. The worst case fixed position measurement results are summarised in Table 6.

Measurement location	Daytime dB, L _{Aeq,16hr}	Night-time dB, L _{Aeq,8hr}
1 - Internal	51.4	43.4
2 - External	66.1	62.0

Table 6 - Summary of the worst case internal and external sound pressure levels measured

9.1.3. The internal measurements show that the property fails to achieve the 'Good' internal guideline value from BS8233:2014.

9.1.4. The Local Authority requirements refer to the unweighted 63Hz band internal sound pressure levels not increasing at any time when entertainment in the proposed ground floor bar is taking place. This is onerous, as there may be other noise sources (potentially even within the proposed dwelling) that would increase the 63Hz sound pressure levels during these times, unrelated to the ground floor bar, especially with the windows open. However the predictions below show that it is achievable with an upgrade to the ground floor glazing.

⁵ BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

- 9.1.5. In this case, the lowest measured internal 5-minute 63Hz internal and L_{eq} between assumed operating hours on the 15th June 2024 of the ground floor bar (16:00-23:00) is provided below. The 5-minute 63Hz external L_{eq} for the same time period is also provided, which will be used for the purpose of this assessment. The measured external $L_{Aeq,5min}$ during this period has also been reported.

Monitoring Position	Time	63Hz Leq,5min
1 – Internal	15 th June 2024 17:24	33.6
2 – External		64.3
		L _{Aeq,5min}
		58.3

Table 7 - Lowest measured internal 63Hz $L_{eq,5min}$ between 16:00-23:00

- 9.1.6. Note that the above internal 63Hz value when A weighting is applied would be 7.6dB(A). This would be below the threshold of human hearing.⁶

⁶ BS ISO 226:2003 – Acoustics – Normal equal-loudness-level contours

10. 3D Noise Model

- 10.1.1. A 3D noise model has been constructed using SoundPLAN™ in order to predict the propagation of sound across the site of the Proposed Development. The calculation procedure has been used from ISO9613-2:1996⁷ to predict the propagation of sound from source to receiver, taking into account distance, screening, and atmospheric and ground conditions.
- 10.1.2. The source noise within the bar has been based on the 'Discotheques' sound pressure level library entry in SoundPLAN. This has then been set to an internal sound pressure level of 80dB(A), which is likely to be a worst case assessment. The SoundPLAN library entry for 'Double door system' has been used for the sound reduction of the door.
- 10.1.3. Saint Gobain manufacturer's data has been used for the sound reduction of the glazed elements of the ground floor bar, the specific configuration that has been selected is 6(12)4, which has a stated sound reduction at 63Hz of 30dB and a stated overall sound reduction value of 33dB R(-1 : -4)⁸ which could be applied to the ground floor windows as an upgrade to reduce noise breakout.
- 10.1.4. The nearest sensitive receiver has been identified as the proposed first floor flat.
- 10.1.5. The results of the model have been illustrated in noise contour map in Figure 4.



Figure 4 – Noise contour plot showing the propagations of sound from the internal bar to the external facade during the daytime with ground floor windows closed

- 10.1.6. The predicted unweighted octave band sound pressure levels at the receiver position are given below:

	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Unweighted Sound Pressure Level, dB	58.4	51.4	44.6	34.8	20.9	21.7	19.1

Table 8 - Predicted unweighted noise breakout from bar at facade of nearest sensitive receiver GREEN = Below 63Hz external background sound pressure level

⁷ ISO9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation"

⁸ Saint Gobain Test Number TNO 2003182

11. Mitigation

11.1. Proposed Ground Floor Bar

- 11.1.1. In this case, it is understood that the client intends to replace the glazed elements in the ground floor bar area. The new glazed elements should achieve the specification given in paragraph 10.1.3.
- 11.1.2. In that case, the current specification should be checked to ensure that they achieve the values given in Paragraph 10.1.3.

11.2. Proposed First Floor Residential

- 11.2.1. For the proposed residential above, an upgrade to the existing glazing will be required based on the measured internal sound pressure level. It is understood that the client intends to install a secondary glazed inner panel. Based on the results of the internal noise survey, the performance of the glazed element should be increased by 16.4dB(A).
- 11.2.2. Based on the measured external sound pressure levels, the overall performance of the glazed elements of the proposed residential properties should achieve 32dB $R_w + C_{tr}$. This would be expected to be achieved with the inclusion of a secondary inner panel to the glazed unit. Example performance data has been taken from Selectaglaze and the performance values for a 6mm primary glazed unit with a 50mm cavity between the primary and secondary glazing are given below:

Glazing	4T	6T	6.4	6.4A	6.8	6.8A	7.5	8T	8.8	8.8A	9.5	10T	10.8A	10.8	11.5	12T
S10 HS	39	39	39	40	40	40	-	-	-	-	-	-	-	-	-	-
S80 HS	-	40	40	41	41	41	41	41	41	41	41	41	43	43	43	43
S85 HS	-	-	-	-	-	-	-	-	-	-	41	-	-	-	42	-
S20 VS	39	39	39	40	40	40	-	-	-	-	-	-	-	-	-	-
S60 TVS	40	40	40	41	41	41	-	-	-	-	-	-	-	-	-	-
S90 VS	-	40	40	41	41	41	40	42	42	42	42	42	42	42	43	42
S95 VS	-	-	-	-	-	-	40	-	-	-	41	-	-	-	42	-
S41 SHC	-	41	41	42	42	42	42	43	43	43	43	43	44	44	44	44
S41 DSH	-	39	39	40	40	40	40	41	41	41	41	41	42	42	42	42
S45 SHC	41	41	41	42	42	42	-	-	-	-	-	-	-	-	-	-
S45 DSH	39	39	39	40	40	40	-	-	-	-	-	-	-	-	-	-
S50 SHC	-	40	-	-	-	-	41	-	-	42	42	-	43	43	43	-
S41 LO	-	41	41	42	42	42	42	43	43	43	43	43	44	44	44	44
S45 LO	41	41	41	42	42	42	-	-	-	-	-	-	-	-	-	-
S50 LO	-	40	-	-	-	-	41	-	-	42	42	-	43	43	43	-
S40 FL	41	41	41	42	42	42	42	43	43	43	43	43	44	44	44	44
S46 FL	-	41	-	-	-	-	-	-	-	-	43	-	-	-	44	-
S55 DFL	-	-	-	-	-	-	40	-	-	-	41	-	-	-	42	-

Figure 5 - Selectaglaze performance data for 6mm primary glazing and 50mm cavity between primary and secondary glazing

- 11.2.3. Provided the selected secondary glazing can provide an overall sound reduction performance of 32dB $D_{nT,w} + C_{tr}$, this is predicted to allow the proposed residential dwellings to achieve the 'Good' internal criteria from BS8233:2014 during the day and night-time period.

12. Conclusions

- 12.1.1. An environmental noise survey has been carried out at the site of a proposed residential and commercial development at 33 High Street, Wrexham, LL13 8LD to determine typical ambient sound levels.
- 12.1.2. The predictions show that provided the sound reduction values of the ground floor glazed elements given in Paragraph 10.1.3 are met, the Local Authority criteria regarding $L_{Aeq,5min}$ and 63Hz $L_{eq,5min}$ will be achieved.
- 12.1.3. Upgrade to primary glazing and/or secondary glazing noise mitigation options have been provided to allow the proposed first floor residential dwellings to achieve the 'Good' internal criteria from BS8233:2014.
- 12.1.4. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

13. Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991	BS 8233:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Globe Projects Ltd	
D	Full site address	33 High Street Wrexham LL13 8LD	
E	Date of surveys	Survey Date: 1 st November 2023 – 2 nd November 2023	
F	Description & identification of Proposed Development	It is proposed to develop the site for residential use.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

13.1.1. Measurements were made using the following equipment:

Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	Norsonic 140 (1407446)	Norsonic 1251 (33826)
2	SoftdB Piccolo 2 (PO221070104)	BSWA CA114 (590010)

13.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
Norsonic 140 (1407446)	114.0 dB	114.0 dB
SoftdB Piccolo 2 (PO221070104)	94.0 dB	94.0 dB

13.1.3. There was no adverse deviation.