
Our ref: NIA/8490/19/8392/v1/ 2 Nelson Road

2nd May 2019

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Dear Sir

**NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL CONVERSION,
2 NELSON STREET, BIRSTALL, BATLEY**

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by Casa Gate Ltd to carry out a noise impact assessment for a proposed residential conversion at 2 Nelson Street, Birstall, Batley (hereafter referred to as the application site).

1.02 The objectives of the noise impact assessment were to:

- Determine the external noise level at the application site
- Assess the potential impact of the external noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed residential development from a loss of amenity due to noise

1.03 This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation). It has been prepared to accompany a planning application to be submitted to the local planning authority.

1.04 This report has been prepared for Casa Gate Ltd for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Casa Gate Ltd (applicant), Andrew Bailey Architect (applicants' agent) and ENS as to the extent to which the findings may be appropriate for their use.

1.05 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

2.01 The application site is located within Birstall town centre. Roughly rectangular in shape, it is located within a mixed use setting and is bound by:

- The A643 Nelson Street to the south with existing retail units and businesses opposite.
- Existing car park area to the rear of the application site (north) with existing residential dwelling beyond.
- Existing residential dwelling attached to the east of the application site.
- Existing retail units on Nelson Street to the west.

2.02 The noise environment at the application site is characterised by road traffic on the A643 Nelson Street, with no other significant noise sources noted.

2.03 The proposals are to convert the existing office building into 7 no. residential dwelling apartments.

3.00 BASELINE NOISE SURVEY

- 3.01 In order to establish external noise levels at the application site, a baseline noise survey was undertaken between Tuesday 23rd April and Thursday 25th April 2019.
- 3.02 For the purpose of the assessment, the following noise monitoring positions were adopted (the approximate location of the noise monitoring positions is contained in Appendix 2 for reference):
- MP1 was located on the southern façade of the development (first floor level at 1 metre from the existing building façade) overlooking Nelson Street.
 - MP1A was located on the southern façade of the development (ground floor level at 1 metre from the existing building façade) overlooking Nelson Street.
 - MP2 was located on the northern façade (rear) of the development (ground floor level at 1 metre from the existing building façade).
- 3.03 Noise measurements were made using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. A windshield was fitted for all measurements. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the survey were appropriate for monitoring.
- 3.04 Measurements consisted of A-weighted broadband parameters, together with linear octave band L_{eq} levels. The following table contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.
- 3.05 As measurements were made at 1 metre from the existing building façade, a –3 decibel façade enhancement correction has been applied in order to establish the free field noise levels.
- 3.06 Noise levels throughout the site were due to road traffic on Nelson Street with no other significant sources noted.

Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{A1} (dB)	Comment
MP1	23/04/19	1330-2300	63	51	65	71	Road Traffic Noise on Nelson Street
		2300-0700	57	36	60	67	
	24/04/19	0700-2300	64	54	66	71	
		2300-0700	56	32	61	67	
	25/04/19	0700-1108	63	57	66	70	
<p style="text-align: center;">Daytime noise level 64 dB L_{Aeq} (0700-2300) Night time noise level 57 dB L_{Aeq} (2300-0700) Maximum noise level 73 dB L_{AFMax}</p>							
MP1A	23/04/19	1230-1241	60	52	63	68	Road Traffic Noise on Nelson Street
		1300-1310	61	54	64	71	
<p style="text-align: center;">Daytime ambient noise levels circa 61 dB L_{Aeq} (0700-2300)</p>							
MP2	23/04/19	1241-1251	51	47	53	57	Distant Road Traffic Noise.
	25/04/19	1122-1134	52	47	54	59	
<p style="text-align: center;">Daytime ambient noise level circa 52 dB L_{Aeq} (0700-2300)</p>							

3.07 At the front of the building, it was possible to acquire a full 8-hr data set of unmanned, continuous night-time noise monitoring (MP1). Analysis of the data measured at this position has determined that the 11th highest LAF_{max,1min} event was 73 dB which is considered to be a more appropriate / representative peak noise event. This approach is in accordance with ProPG guidance and avoids over-specification of façade elements that could occur if the scheme was designed to mitigate atypical events.

4.00 NATIONAL PLANNING POLICY FRAMEWORK AND OTHER RELEVANT GUIDANCE

National Planning Policy Framework

4.01 The National Planning Policy Framework (NPPF) was updated in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

4.02 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 170 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of.....noise pollution'.

4.03 Paragraph 180 advises that:

'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.....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'.

4.04 With regard to extant community noise sources and the potential to affect proposed new developments, Paragraph 182 states that:

'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.'

4.05 The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF

Noise Policy Statement for England

4.06 The Noise Policy Statement for England (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- 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.

4.07 NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL – Lowest Observed 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.

Planning Practice Guidance – Noise

4.08 In December 2014, Planning Practice Guidance (PPG) was updated online which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- Whether or not a significant adverse effect is occurring or likely to occur.
- Whether or not an adverse effect is occurring or likely to occur.
- Whether or not a good standard of amenity can be achieved.

4.09 In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

‘...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation’.

4.10 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority’s administrative boundary, although it states that:

‘Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed’.

ProPG Planning and Noise: New Residential Development

4.11 ProPG Planning and Noise: New Residential Development (ProPG) was published in May 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

4.12 Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (BS 8233) (see table below).

Table 4.1 – Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB L_{Aeq} (0700–2300)	-
Dining	Dining Room/Area	40 dB L_{Aeq} (0700–2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L_{Aeq} (0700–2300)	30 dB L_{Aeq} (2300–0700) 45 dB L_{AFMax} (2300–0700)

4.13 Note 4 to the above table states: “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.’

- 4.14 Note 5 to the above table states: *‘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’.*
- 4.15 This is consistent with the guidance contained within the PPG, which states that:
- ‘... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations’.*
- 4.16 On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the proposed residential development and considered to represent good resting and sleeping conditions:
- ≤ 35 dB L_{Aeq} (0700-2300) during the daytime.
 - ≤ 30 dB L_{Aeq} (2300-0700) and 45 dB L_{AFMax} not regularly exceeded during the night time.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

- 5.01 It has been established that the existing single glazed windows are in a bad state of repair and currently there is no method of existing ventilation. It is therefore recommended to replace the glazing throughout the entire application site with new double-glazed units with fitted trickle ventilation.
- 5.02 In order to calculate the sound insulation requirements of the new glazing, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233 (see Appendix 3 for calculation spreadsheets). The spreadsheet allows input of external noise levels, room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFMax} in this case).
- 5.03 The scheme of sound insulation is set out in the following table (see Appendix 3 for BRE Calculation Spreadsheets).

Table 5.2 – Scheme of Sound Insulation Works

Location	Noise Level	Internal Criteria	Glazing and Ventilation
Habitable Rooms fronting onto Nelson Street (MP1) including gable ended windows and roof windows.	≤ 64 dB $L_{Aeq, day}$ ≤ 57 dB $L_{Aeq, night}$ ≤ 73 dB L_{AFMax}	≤ 35 dB L_{Aeq} (0700-2300) ≤ 30 dB L_{Aeq} (2300-0700) ≤ 45 dB L_{AFMax} (2300-0700)	Standard double glazing i.e. 4 / 12 / 4 and Acoustic trickle vents*
Remaining habitable rooms across the application site (Rear Façade)	Standard double glazing and standard trickle vents		

* Acoustic trickle vents rated at least 38 dB $D_{n,e,w}$ per 5000 mm² EA in open position, note: 1 no. required per habitable room) – ventilation requirements to be confirmed by developer.

- 5.04 Internal noise levels within proposed living rooms and bedrooms have been calculated with closed windows. Calculations have incorporated:
- The measured/calculated external noise level data acquired on site.
 - The noise ingress calculation methodology outlined in Annex G.2 of BS8233:2014.
 - Dimensions of proposed rooms, façades and glazing areas determined from the supplied plan and elevation drawings.
 - An assumed typical masonry external wall construction (e.g. 250mm – 300mm solid masonry or 100mm brick / 100mm cavity / 100mm block).
 - An assumed typical roof / ceiling construction (e.g. tiled/slate roof, 2 no. layers of 12.5mm plasterboard in ceiling, mineral wool insulation in the ceiling void).
 - An assumed reverberation time of 0.5 seconds for living rooms and bedrooms.
- 5.05 In order to satisfy the requirements of BS8233 and ProPG it is necessary to incorporate mitigation measures at the development in the form of appropriate glazing and background ventilation with the minimum specifications presented in Table 5.2.

6.00 CONCLUSIONS

- 6.01 A noise impact assessment has been undertaken for a proposed residential conversion at 2 Nelson Street, Birstall, Batley, Leeds.
- 6.02 The noise environment at the application site is characterised by road traffic on Nelson Street, with no other significant noise sources noted.
- 6.03 A scheme of sound insulation works has been developed to protect the proposed residential development from the ambient noise climate.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely



Richard Whitaker
AMIOA, Diploma in Acoustics & Noise Control
For Environmental Noise Solutions Limited

cc File

Appendix 1 Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2
Drawings (Site Plan / Noise Monitoring Positions (Phase 1A))



Appendix 3 – BRE Calculation Spreadsheets

Nelson Street (MP1) – Bedrooms Ambient Noise Level – Daytime

BRE	Building Envelope Insulation <div style="float: right; border: 1px solid black; padding: 2px;">Switch to Reverberation Time Calculation</div> <p>2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th></th> <th style="text-align: right;">Surface area OR number of vents</th> </tr> </thead> <tbody> <tr> <td>Wall 1</td> <td>Brick/block cavity</td> <td style="text-align: right;">8.8 m²</td> </tr> <tr> <td>Wall 2</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Window 1</td> <td>4/12/4 double glazing</td> <td style="text-align: right;">2.9 m²</td> </tr> <tr> <td>Window 2</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Door</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Roof/Ceiling</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Vent 1</td> <td>Acoustic trickle vent (4000mm²)</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Vent 2</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> </tbody> </table>			Surface area OR number of vents	Wall 1	Brick/block cavity	8.8 m ²	Wall 2	None	m ²	Window 1	4/12/4 double glazing	2.9 m ²	Window 2	None	m ²	Door	None	m ²	Roof/Ceiling	None	m ²	Vent 1	Acoustic trickle vent (4000mm ²)	2	Vent 2	None	m ²	<p>4) Select exterior sound level type</p> <p>Option (A) <input checked="" type="radio"/> User defined spectrum</p> <p style="text-align: right;">64 Laeq Day</p> <p style="text-align: right;">View/Edit Data</p> <p>Option (B) <input type="radio"/> Spectrum shape</p> <p>Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz)</p> <p style="text-align: right;">L_{Aeq} 46 dB</p> <p style="text-align: right;">ISO 717 - 1 (C)</p> <p style="text-align: right;">View Data</p>
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<p>3) Enter reverberation time of the room.</p> <p style="text-align: center;">0.5 seconds</p>	<p>Internal sound level</p> <p style="font-size: 1.2em;">L_{Aeq} 31.3 dB</p>																												

Nelson Street (MP1) – Bedrooms Ambient Noise Level – Night Time

BRE	Building Envelope Insulation <div style="float: right; border: 1px solid black; padding: 2px;">Switch to Reverberation Time Calculation</div> <p>2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th></th> <th style="text-align: right;">Surface area OR number of vents</th> </tr> </thead> <tbody> <tr> <td>Wall 1</td> <td>Brick/block cavity</td> <td style="text-align: right;">8.8 m²</td> </tr> <tr> <td>Wall 2</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Window 1</td> <td>4/12/4 double glazing</td> <td style="text-align: right;">2.9 m²</td> </tr> <tr> <td>Window 2</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Door</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Roof/Ceiling</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> <tr> <td>Vent 1</td> <td>Acoustic trickle vent (4000mm²)</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Vent 2</td> <td>None</td> <td style="text-align: right;">m²</td> </tr> </tbody> </table>			Surface area OR number of vents	Wall 1	Brick/block cavity	8.8 m ²	Wall 2	None	m ²	Window 1	4/12/4 double glazing	2.9 m ²	Window 2	None	m ²	Door	None	m ²	Roof/Ceiling	None	m ²	Vent 1	Acoustic trickle vent (4000mm ²)	2	Vent 2	None	m ²	<p>4) Select exterior sound level type</p> <p>Option (A) <input checked="" type="radio"/> User defined spectrum</p> <p style="text-align: right;">57 Laeq night</p> <p style="text-align: right;">View/Edit Data</p> <p>Option (B) <input type="radio"/> Spectrum shape</p> <p>Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz)</p> <p style="text-align: right;">L_{Aeq} 46 dB</p> <p style="text-align: right;">ISO 717 - 1 (C)</p> <p style="text-align: right;">View Data</p>
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<p>3) Enter reverberation time of the room.</p> <p style="text-align: center;">0.5 seconds</p>	<p>Internal sound level</p> <p style="font-size: 1.2em;">L_{Aeq} 24.9 dB</p>																												

Nelson Street (MP1) – Bedrooms Maximum Noise Level

BRE

Switch to Reverberation Time Calculation

Building Envelope Insulation

2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents.

		Surface area OR number of vents
Wall 1	Brick/block cavity	8.8 m ²
Wall 2	None	m ²
Window 1	4/ 12/ 4 double glazing	2.9 m ²
Window 2	None	m ²
Door	None	m ²
Roof/ Ceiling	None	m ²
Vent 1	Acoustic trickle vent (4000mm ²)	2
Vent 2	None	m ²

[View/Edit Data](#)

4) Select exterior sound level type

Option (A) User defined spectrum

73 max (tues)

[View/Edit Data](#)

Option (B) Spectrum shape

Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz)

L_{Aeq} 46 dB

ISO 717 - 1 (C)

[View Data](#)

Use dimensions

x m

y m

z m

Volume m³

OR

Use volume

75 m³

3) Enter reverberation time of the room.

0.5 seconds

Internal sound level

L_{Aeq} 41.2 dB

Nelson Street (MP1) – Living Rooms Ambient Noise Level

BRE

Switch to Reverberation Time Calculation

Building Envelope Insulation

2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents.

		Surface area OR number of vents
Wall 1	Brick/block cavity	7.2 m ²
Wall 2	None	m ²
Window 1	4/ 12/ 4 double glazing	2 m ²
Window 2	None	m ²
Door	None	m ²
Roof/ Ceiling	None	m ²
Vent 1	Acoustic trickle vent (4000mm ²)	2
Vent 2	None	m ²

[View/Edit Data](#)

4) Select exterior sound level type

Option (A) User defined spectrum

64 Laeq Day

[View/Edit Data](#)

Option (B) Spectrum shape

Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz)

L_{Aeq} 46 dB

ISO 717 - 1 (C)

[View Data](#)

Use dimensions

x m

y m

z m

Volume m³

OR

Use volume

49 m³

3) Enter reverberation time of the room.

0.5 seconds

Internal sound level

L_{Aeq} 32.6 dB