Our ref: NIA/9188/20/9208/v1/ 236 Leeds Road

15th July 2020

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Dear Sir

NOISE IMPACT ASSESSMENT FOR A PROPOSED (OUTLINE) NEW RESIDENTIAL DEVELOPMENT, LAND AT 236 LEEDS ROAD, CLOUGH HOUSE, BIRSTALL, WF17 0HW

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by Martin Walsh Architectural to carry out a noise impact assessment for a proposed (outline) new build residential development at 236 Leeds Road, Clough House, Birstall, WF17 0HW (hereafter referred to as the application site).

1.02 The objectives of the noise impact assessment were to:

- Determine external noise levels at the application site.
- Assess the potential impact of the ambient noise climate on the proposed (outline) residential development with reference to the National Planning Policy Framework Planning Practice Guidance on Noise and other pertinent guidelines.
- Provide outline recommendations for noise mitigation measures (be it layout, enhanced building envelope and/or boundary treatments) to avoid any unacceptable loss of amenity due to noise.

1.03 This report details the methodology and results of the assessment and provides outline recommendations for layout considerations, building envelope (fenestration and ventilation) and boundary treatments. It has been prepared to accompany an application for outline planning permission which is to be submitted to the local planning authority.

1.04 This report has been prepared for Martin Walsh Architectural 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 Martin Walsh Architectural 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 the village of Birstall. Rectangular in shape (see Appendix 2 for a site layout) the application site is bound by:

- Leeds Road (A643) to the south.
- Clough Drive (residential housing estate) to the east.
- Moat Hill Farm Drive / Jason Terrace (residential housing estates) to the west.
- Open field to the north with Pennine View industrial estate further beyond.

2.02 Outline planning permission is sought for the proposed residential development. As a consequence, a detailed layout is not available at this stage. Notwithstanding this, the objective of the noise impact assessment is to assess whether the ambient noise climate represents a constraint to the proposed residential development.

3.00 NOISE SURVEY

3.01 In order to establish external noise levels at the application site, a noise survey was undertaken on Thursday 9th July 2020 and the early hours of Friday 10th July 2020.

3.02 The following noise monitoring positions were adopted (the approximate locations of the noise monitoring positions are shown in Appendix 2 for reference):

- MP1 was located on the southern boundary of the application site at circa 6 metres from the near side kerb of Leeds Road at 4 metres above ground level (AGL).
- MP1A was located the same as MP1 at a height of 1.5 metres AGL.
- MP2 was located at circa 13 metres from the nearside kerb of Leeds Road at 1.5 metres AGL.
- MP3 was located at circa 26 metres from the nearside kerb of the Leeds Road at 1.5 metres AGL.
- MP4 was located on the northern boundary at 4 metres AGL.

3.03 Noise measurements were made in a free field environment using two Bruel & Kjaer 2250 Type 1 integrating sound level meters. A windshield was fitted for all measurements. The calibration of each measurement system was verified immediately before and after the survey 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. Table 3.1 presents a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

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Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comment
MP1	09/07/20	1057-1157	64	51	68	Dominated by road traffic noise on the A643 Leeds Road
		1157-1257	64	52	69	
		1257-1357	65	55	69	
		2300-0000	53	33	53	
	10/07/20	0001-0100	54	32	49	
Daytime noise level 66 dB $L_{Aeq\ (0700\text{-}2300)}$ based on CRTN methodology Night time noise level circa 58 dB $L_{Aeq\ (2300\text{-}0700)}$ based on TRL methodology Maximum noise level of passing vehicles measured up to 73 dB L_{AFMax}						
MP1A	09/07/20	1407-1442	63	52	66	Dominated by road traffic noise on the A643 Leeds Road
Daytime noise level circa 63 dB $L_{Aeq,\ T}$						
MP2	09/07/20	1110-1125	58	49	62	Dominated by road traffic noise on the A643 Leeds Road
		1408-1423	59	50	62	
Daytime noise level circa 58-59 dB $L_{Aeq,\ T}$						
MP3	09/07/20	1126-1148	56	50	60	Dominated by road traffic noise on the A643 Leeds Road
		1424-1440	57	51	60	
Daytime noise level circa 56-57 dB $L_{Aeq,\ T}$						
MP4	09/07/20	1226-1256	50	49	51	Distant road traffic noise from the A643 Leeds Road
		1256-1326	51	50	52	Construction noise from the north-west (new build residential development)
		1326-1356	51	50	52	
		2300-0000	37	30	39	Distant road traffic noise from the A643 Leeds Road
	10/07/20	0000-0057	34	30	36	
Daytime noise level circa 50-51 dB $L_{Aeq,\ T}$ Night time noise level circa 34-37 dB $L_{Aeq\ (2300\text{-}0700)}$ Maximum noise level measured up to 59 dB L_{AFMax} at night						

3.05 For the prediction of daytime road traffic noise, the Department of Transport's Memorandum on the Calculation of Road Traffic Noise (CRTN) explains that the following shortened measurement procedure may be used. Measurements of L_{A10} are made over any three consecutive hours between 10:00 and 17:00 hours. Using $L_{A10\ (3\ hour)}$ as the arithmetic mean of the three consecutive values of hourly L_{A10}, the $L_{A10\ (18\ hour)}$ can be calculated from the equation:

(i) $L_{A10\ (18\ hour)} = L_{A10\ (3\ hour)} - 1$ dB

(ii) $L_{Aeq\ (0700–2300)} \approx L_{A10\ (0600–0000)} - 2$ dB

3.06 Substituting (ii) into (i) gives the following approximation:

(iii) $L_{Aeq\ (0700–2300)} \approx L_{A10\ (3\ hour)} - 3$ dB

3.07 Based on the above formula, the daytime ambient noise level at MP1 is measured / calculated at **66 dB $L_{Aeq\ (0700–2300)}$.**

3.08 A study prepared by TRL Limited on behalf of the Department for Environment, Food and Rural Affairs (DEFRA) entitled 'Converting the UK Traffic Noise Index $L_{A10\ (18\ hour)}$ to EU Noise Indices for Noise Mapping' presents a methodology for calculating night time road traffic noise levels based on daytime road traffic noise level based on the following formula:

(iv) $L_{Aeq\ (2300–0700)} \approx 0.90 * L_{A10\ (18\ hour)} – 3.77$ (for non-motorways)

3.09 Based on the above formula, the night time ambient noise level at MP1 is measured / calculated at **58 dB $L_{Aeq\ (2300–0700)}$.**

3.10 The noise environment at the application site was observed to be dominated by road traffic on the A643 Leeds Road to the south, with no other significant noise sources noted during the survey.

3.11 With reference to the industrial estate to the north on Pennine view, it is understood that the units operate during daytime only hours. No significant noise associated with the units was noted during the course of the noise survey (day or night). There is also a substantial buffer zone of circa 40 metres between the northern boundary of the application site and the units. Therefore, the industry to the north does not pose any constraints on the proposed outline residential development.

3.12 During March 2020 the UK Government announced measures to stem the coronavirus pandemic, including restrictions on non-essential travel. Although initially traffic volumes were initially reduced to circa 40 % of typical flows, the most recent traffic data from the closest relevant count point to the application site indicated that traffic flows by the end of May 2020 were circa 65 % of typical traffic volumes and rising[1].

3.13 This trend is consistent with data produced by the AA in June 2020, which indicated that traffic volumes had recovered to circa 75 % of typical traffic volumes. Using the methodology in the Calculation of Road Traffic Noise (CRTN), a 25 % reduction in traffic volumes equates to a 1 dB reduction in noise levels – this correction is robustly applied to measured road traffic noise levels.

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 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'.

1 Highways England WEBtris ref: 30361365 (M606 southbound between J3 and J2) indicates circa 38000 vehicles/day during w/c 02/03/20 and circa 25000 veh/day during w/c 25/05/20

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

Noise Policy Statement for England

4.05 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.

4.06 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

4.07 Planning Practice Guidance (PPG) is an online resource (last updated 2019) 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.

4.08 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'.

4.09 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

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

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4.11 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 $L_{AFMax\ (2300–0700)}$

4.12 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.'

4.13 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'.

4.14 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'.

4.15 Note 7 to the above table states:

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

ENS note: It is evident that BS 8233 considers that reasonable resting and sleeping conditions are achieved with indoor ambient noise levels of ≤ 40 dB $L_{Aeq\ (0700–2300)}$ and ≤ 35 dB $L_{Aeq\ (2300–0700)}$.

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.

4.17 With regard to external amenity, BS 8233 states:

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

5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 Outline planning permission is sought for the proposed residential development and, as a consequence, detailed plans / elevations are not available at this stage. Notwithstanding this, it is assumed that the development footprint will 'front onto' the surrounding road network with dwellings facades circa 6 to 10 metres to the nearside kerb of the A643 Leeds Road (i.e. consistent with existing residential dwellings in the locality).

5.02 The daytime and night time ambient noise levels at MP1 (6 metres to the nearside kerb of the A643 Leeds Road) have been measured / calculated at (including the adjustment for traffic flows in paragraph 3.13) 67 dB $L_{Aeq\ (0700\text{-}2300)}$ and 59 dB $L_{Aeq\ (2300\text{-}0700)}$, respectively (with maximum noise levels of 73 dB L_{AFMax} during the night time).

5.03 Comparisons made between MP1A and MP2 show a reduction in level of circa 5 dB with an increased distance from the A643 Leeds Road of circa 13 metres from the near side kerb. Therefore, applying this correction to the calculated levels at MP1, the design noise levels for dwellings set back circa 13 metres from the A643 Leeds Road have been calculated at 62 dB $L_{Aeq\ (0700\text{-}2300)}$ and 54 dB $L_{Aeq\ (2300\text{-}0700)}$, respectively (with maximum noise levels of 68 dB L_{AFMax} during the night time).

5.04 The daytime and night time ambient noise levels at MP4 (on the northern boundary) have been measured / calculated at (including the adjustment for traffic flows in paragraph 3.13) 52 dB $L_{Aeq\ (0700\text{-}2300)}$ and 38 dB $L_{Aeq\ (2300\text{-}0700)}$, respectively (with maximum noise levels of 59 dB L_{AFMax} during the night time).

5.05 In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. 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} in this case).

5.06 Internal noise levels within proposed habitable rooms 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.
- An assumed room volume of 50 m^3 with a glazing area of 3 m^2 for living rooms.
- An assumed room volume of 25 m^3 with a glazing area of 1.5 m^2 for bedrooms.
- An assumed typical masonry external wall construction (e.g. 250mm – 300mm solid masonry or 100mm brick / 100mm cavity / 100mm block).
- An assumed reverberation time of 0.5 seconds for living rooms and bedrooms.

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5.07 The scheme of sound insulation for the application site is set out in the following table.

Table 5.1 – Scheme of Sound Insulation Works

Location	Noise Level	Internal Criteria	Glazing and Ventilation
Habitable rooms fronting onto A643 Leeds Road (circa 6 metres from A643 Leeds Road)	67 dB $L_{Aeq\ (0700–2300)}$ 59 dB $L_{Aeq\ (2300–0700)}$ 73 dB $L_{AFMax\ (2300–0700)}$	≤ 35 dB $L_{Aeq\ (0700–2300)}$ ≤ 30 dB $L_{Aeq\ (2300–0700)}$ ≤ 45 dB $L_{AFMax\ (2300–0700)}$	Enhanced double glazing rated at ≥ 38 dB R_w i.e. 6/(6-20)/6.8 Optiphon and acoustic trickle vents *
Habitable rooms set back circa 13 metres from the A643 Leeds Road	62 dB $L_{Aeq\ (0700–2300)}$ 54 dB $L_{Aeq\ (2300–0700)}$ 68 dB $L_{AFMax\ (2300–0700)}$	≤ 35 dB $L_{Aeq\ (0700–2300)}$ ≤ 30 dB $L_{Aeq\ (2300–0700)}$ ≤ 45 dB $L_{AFMax\ (2300–0700)}$	Standard double glazing rated at ≥ 29 dB R_w i.e. 4/(6-20)/4 and acoustic trickle vents *
Remaining habitable rooms set back/screened from the A643 Leeds Road			Standard double glazing rated at ≥ 29 dB R_w i.e. 4/(6-20)/4 and standard trickle vents **.

* Acoustic trickle vents rated at least 39 dB $D_{n,e,w}$ (vent open), such as the Greenwood 5000EAW.AC1 (note: 1 no. required per habitable room) – ventilation requirements to be confirmed by developer.

** Standard trickle vents rated at least 32 dB $D_{n,e,w}$ + C per 5000 mm² EA in open position, (note: 1 no. required per habitable room) – ventilation requirements to be confirmed by developer.

5.08 As an alternative to the ventilation recommendations outlined above, a form of mechanical ventilation may be appropriate, such as: MVHR, dMEV, MEV and PIV. Ventilation to be confirmed by the developer.

5.09 A detailed building envelope specification can be provided when the detailed layout is determined (as part of a Reserved Matters application). The ambient noise climate does not pose a constraint to the proposed residential development.

5.10 In order to protect garden amenity at the proposed residential development:

- Dwellings are positioned between the gardens and Leeds Road, or
- Gardens are positioned between the dwellings and Leeds Road and are shielded from road traffic noise using a circa 1800 mm high acoustic barrier (e.g. solid masonry wall or close boarded timber fence with a mass per unit area ≥ 10 kg/m^2).

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed (outline) residential development for at 236 Leeds Road, Clough House, Birstall, WF17 0HW.

6.02 The ambient noise climate throughout the application site is attributable to road traffic on the A643 Leeds Road.

6.03 An outline scheme of sound attenuation works (fenestration and ventilation), boundary treatment and layout considerations has been developed to protect the proposed residential development from the ambient noise climate in accordance with pertinent guidelines. On this basis, the ambient noise climate does not pose a constraint to the proposed residential development.

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

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Richard Whitaker BSc (Hons)
MIOA, Diploma in Acoustics & Noise Control
For Environmental Noise Solutions Limited

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 - Noise Monitoring Positions

Appendix 3 – Outline Drawings