

Our ref: NIA/7007/16/6954/v2/Bierley

10th February 2017

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Dear Sirs,

**NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT
LAND AT CLIFF HOLLINS LANE, EAST BIERLEY, BRADFORD**

KIRKLEES COUNCIL PLANNING APPLICATION 2016/60/92664/E

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by ID Planning, on behalf of its client FMB Investments Limited, to carry out a noise impact assessment for a proposed residential development on land at Cliff Hollins Lane, East Bierley, Bradford (hereafter referred to as the application site).

1.02 An application for outline planning permission (2016/60/92664/E) has been submitted to Kirklees Council. The consultation response from Michael Pogson, Environmental Health Officer, Kirklees Council commented as follows:

I am concerned that the proposed development may be subject to elevated levels of noise from road traffic on the M606, the access road to the sewerage works for which a planning application has been submitted to develop for industrial use and the proposed M62 - M606 link road which may pass in close proximity to the site therefore, before determining the application, it is recommended that the applicant provides the Local Planning Authority (LPA) with an acoustic report by a suitably competent person (see note).

The report shall

- (i) Determine the existing noise climate*
- (ii) Predict the noise climate in gardens (daytime), bedrooms (night-time) and other habitable rooms of the development*
- (iii) Detail the proposed attenuation/design necessary to protect the amenity of the occupants of the new residences (including ventilation if required).*

If levels predicted in the report are unacceptable, it may be necessary to refuse the application. Otherwise, it may be necessary to specify attenuation measures as conditions of consent.

1.03 The objectives of the noise impact assessment were to:

- Determine the ambient noise climate at the application site.
- Assess the potential impact of the ambient noise climate on the proposed residential development with reference to the National Planning Policy Framework Planning Practice Guidance on Noise and other pertinent guidance.
- Provide recommendations for a scheme of sound attenuation works and boundary screening, as necessary, to ensure that the future occupants of the proposed residential development do not experience any unacceptable loss of amenity due to noise.

- 1.04 This report details the methodology and results of the assessment, and provides outline recommendations for the building envelope (fenestration and ventilation) and boundary screening. It has been prepared to accompany outline planning application 2016/60/92664/E submitted to Kirklees Council for the proposed residential development of the application site.
- 1.05 This report has been prepared for FMB Investments Limited 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 FMB Investments Limited (applicant), ID Planning (applicant's agent) and ENS as to the extent to which the findings may be appropriate for their use.
- 1.06 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 in a mixed-use setting to the south of Bierley village, near Bradford and currently comprises a number of stone and brick built buildings with a large rear yard.
- 2.02 Roughly rectangular in shape, the application site is bound by (see site location plan in Appendix 2):
- Cliff Hollins Lane (a lightly-trafficked road) to the west
 - Open land to the north and east.
 - Open land to the south, beyond which lies an access road and agricultural land earmarked for a proposed residential / commercial development (Planning Application Reference 2016/60/92298/E).
- 2.03 The proposed residential development (outline) consists of 19 no. total dwellings (including the retention of the existing stone building fronting Cliff Hollins Lane).
- 2.04 The principal noise source at the application site is road traffic on the M606 motorway, located circa 150 metres to the west. It is noteworthy that there are existing and proposed residential dwellings located significantly closer to the motorway than the application site.
- 2.05 Outline planning application (Ref: 2016/60/92298/E) is under consideration for the land parcel to the south of the application site (at the former North Bierley Waste Water Treatment Works). The proposed development consists of up to 101 residential dwellings and up to 9.94 hectares of employment land for commercial/industrial units (B1/B2/B8 use class).
- 2.06 The M62/M606 Chain Bar Interchange is a potential scheme to provide a slip road to provide a direct link from the M62 westbound to the M606 northbound. The potential scheme has not been worked up by Highways England (at the time of writing no recommendations have been submitted to the Secretary of State). The potential impact of the potential scheme (route alignment unknown) on the application site simply cannot be assessed. If the potential scheme was to proceed in the future (and there is no certainty that it will), it would be for Highways England to assess the potential impact of the scheme on existing and consented residential dwellings and, if necessary, apply mitigation measures in accordance with the Noise Insulation Regulations.

3.00 BASELINE NOISE SURVEY

- 3.01 In order to establish the ambient noise levels at the application site, a baseline noise survey was undertaken during the daytime and night time on Monday 7th November 2016 and during the night time (early hours) on Tuesday 8th November 2016.
- 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 at the western site boundary (on Cliff Hollins Lane), in line with the façade of the existing stone building at 4.5 metres above ground level (AGL).
- MP1A was located at the western site boundary (on Cliff Hollins Lane), in line with the façade of the existing stone building at 1.5 metres AGL.
- MP2 was located along the southern boundary of the application site, at circa 15 metres from the nearside kerb of Cliff Hollins Lane and at 4.5 metres AGL (to remove the influence of intermittent traffic on Cliff Hollins Lane).
- MP3 was located along the southern boundary of the application site, at circa 70 metres from the nearside kerb of Cliff Hollins Lane and at 4.5 metres AGL.
- MP4 was located along the northern boundary of the application site, at circa 40 metres from the nearside kerb of Cliff Hollins Lane and at 4.5 metres AGL.

3.03 Noise measurements were undertaken in a free field environment using a Bruel & Kjaer 2250 Type 1 integrating sound level meters. Windshields were 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 one-third octave band L_{eq} levels. Table 3.1 contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

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	07/11/16	1051–1151	59	56	61	68	Constant motorway traffic on M606 dominant, very intermittent road traffic on Cliff Hollins Lane (circa 60 vehicles/hour during the daytime), maximum noise levels up to 75 dB L_{AFMax}
MP1	07/11/16	1151–1251	60	56	60	70	
MP1	07/11/16	1251–1351	59	55	60	69	
MP1	07/11/16	1051–1151	58	56	60	62	Constant motorway traffic on M606 dominant, intermittent road traffic on Cliff Hollins Lane removed from measurements
MP1	07/11/16	1151–1251	58	56	59	62	
MP1	07/11/16	1251–1351	57	55	59	61	
MP1	07/11/16	2354–0010	52	47	54	58	Constant motorway traffic on M606 dominant, no vehicle passes on Cliff Hollins Lane
MP1	07/11/16	0045–0100	49	46	52	55	
Daytime ambient noise level 57 dB L_{Aeq} (0700–2300) based on CRTN methodology (Cliff Hollins Lane traffic included) Daytime ambient noise level 56 dB L_{Aeq} (0700–2300) based on CRTN methodology (Cliff Hollins Lane traffic excluded) Night time ambient noise level circa 5 decibels lower than daytime Worst case daytime noise levels 70 dB L_{A1} (15 mins) and 75 dB L_{AFMax} adopted for night time period							
MP1A	07/11/16	1109–1124	60	56	61	69	Constant motorway traffic on M606 dominant, very intermittent road traffic on Cliff Hollins Lane (circa 60 vehicles/hour during the daytime)
Comparison of noise levels at MP1 (4.5m AGL) and MP1A (1.5m AGL) demonstrates negligible difference due to height.							
MP2	07/11/16	1126–1140	58	55	60	62	Constant motorway traffic on M606 dominant
MP2	07/11/16	1324–1339	57	53	59	62	
Daytime ambient noise level circa 57–58 dB $L_{Aeq, T}$.							
MP3	07/11/16	1146–1210	56	54	58	60	Constant motorway traffic on M606 dominant
MP3	07/11/16	1248–1306	55	53	56	59	
MP3	08/11/16	0011–0026	47	44	49	52	
MP3	08/11/16	0101–0116	47	43	49	51	
Daytime and night time ambient noise levels circa 55–56 dB $L_{Aeq, T}$ and circa 47 dB $L_{Aeq, T}$ respectively.							
MP4	07/11/16	1357–1412	55	52	57	60	Constant motorway traffic on M606 dominant
MP4	08/11/16	0130–0140	47	42	49	53	
Daytime and night time ambient noise levels circa 55 dB $L_{Aeq, T}$ and circa 47 dB $L_{Aeq, T}$ respectively.							

3.05 As expected, noise levels across the application site were due to road traffic on the M606 motorway.

3.06 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 $L_{A10(3\text{ hour})}$ as the arithmetic mean of the three consecutive values of hourly L_{A10} , the $L_{A10(18\text{ hour})}$ can be calculated from the equation:

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

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

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

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

3.09 Based on the above formula, the daytime ambient noise levels are measured / calculated as follows:

- **57 dB $L_{Aeq(0700-2300)}$ at MP1 (with Cliff Hollins Lane traffic included)**
- **56 dB $L_{Aeq(0700-2300)}$ at MP1 (with Cliff Hollins Lane traffic excluded, M606 only)**

3.10 The night ambient noise levels are measured at circa 5 decibels lower than the daytime ambient noise levels (note: based on experience this is consistent with long-term measurements of noise levels associated with the strategic road network).

3.11 Worst case noise levels of 70 dB $L_{A1(15\text{ min})}$ and 75 dB L_{AFMax} , associated with very intermittent car passes on Cliff Hollins Lane, were measured at MP1 during the daytime. These levels are robustly adopted for the night time period.

3.12 Ambient noise levels throughout the remainder of the application site decreased with increasing distance from the M606.

4.00 NOISE IMPACT ASSESSMENT CRITERIA

4.01 Kirklees Council's Noise Design Advice Appendix 1 provides acceptable internal noise levels generally in accordance with levels given in BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS 8233). These levels are reproduced in Table 4.1 below.

Table 4.1 – Indoor Ambient Noise Levels in Dwellings

Room/Area	07:00 – 23:00	23:00 – 07:00	23:00 – 07:00	23:00 – 07:00
Living Rooms/Studies	35 dB $L_{Aeq,16\text{hour}}$	-	-	-
Bedrooms	-	30 dB $L_{Aeq,8\text{hour}}$	45 dB $L_{A1,15\text{min}}$	55 dB L_{AFMax}

4.02 The application site falls within former PPG 24 Noise Exposure Category B under which Kirklees Council's Noise Design Advice requires internal levels to be met with windows closed and trickle ventilators open.

4.03 Further, BS 8233, Table 4, Note 5 states '*If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.*'

- 4.04 Building Regulations Approved Document F 'Ventilation' (2010 version incorporating 2013 amendments) states '*For mainly naturally ventilated buildings, it is common to use a combination of ventilators (e. g. for dwellings it is common to use intermittent extract fans for **extract ventilation**, trickle ventilators for **whole dwelling ventilation** and windows for **purge ventilation**). ... Purge ventilation throughout the building to aid the removal of high concentrations pollutants and water vapour released from occasional activities such as painting and decorating and or accidental releases such as smoke and burnt food or spillage of water. Purge ventilation is intermittent i.e. required only when such activities occur. Purge ventilation provisions may also be used to improve thermal comfort, although this is **not controlled** under Building Regulations*'.
- 4.05 It is therefore evident that whilst ventilation may also provide a means to control thermal comfort this is not controlled under Building Regulations. Part L addresses minimising energy use due to the effects of solar gain in summer.
- 4.06 It is noteworthy that modern dwellings in the UK are well insulated. Insulation acts as a barrier to heat loss and heat gain. This makes a dwelling warmer in winter and cooler in summer. In a warm summer, the temperature outside a well insulated dwelling is higher than that inside the dwelling. Rather than providing thermal comfort, opening a window, simply lets warm air in thus raising the internal ambient temperature. In such a situation, the most effective means of thermal comfort is to keep windows shut.
- 4.07 It is therefore evident that trickle ventilation is considered an alternative means of ventilation under Building Regulations Approved Document F 'Ventilation' (2010 version incorporating 2013 amendments).
- 4.08 With respect to garden amenity, BS8233 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.*'
- 4.09 On the basis of the above, for residential development, the following criteria (internal criteria taken with windows closed and trickle vents open) are considered appropriate:
- 35 dB L_{Aeq} (0700-2300) in living rooms and bedrooms during the daytime
 - 30 dB L_{Aeq} (2300-0700) in bedrooms at night
 - 45 dB L_{A1} (2300-0700, 15 min) in bedrooms at night
 - 55 dB L_{AFMax} (2300-0700) not normally exceeded in bedrooms at night
 - Circa 55 dB L_{Aeq} (0700-2300) in gardens

5.00 SCHEME OF SOUND ATTENUATION

- 5.01 For the purpose of the assessment, the following noise levels are adopted throughout the application site:
- ≤ 57 dB L_{Aeq} (0700–2300) during the daytime
 - ≤ 52 dB L_{Aeq} (2300–0700) during the night time
 - ≤ 70 dB L_{A1} (15 min) during the night time
 - ≤ 75 dB L_{AFMax} during the night time

- 5.02 Based on external and internal noise measurements undertaken by ENS at other sites, it is considered that a standard double glazed window with standard trickle vents in a building façade will provide 30 dB(A) sound insulation (from external to internal) to road traffic. This statement is also corroborated by Annex 6 of the now superseded Planning Policy Guidance 24 'Planning and Noise' (PPG 24).
- 5.03 On this basis, standard double glazed windows and standard trickle vents are appropriate throughout the application site, as demonstrated below.

Table 5.1 – Resultant Sound Attenuation at MP1 (Cliff Hollins Lane kerb)

External Noise Level	Façade Insulation	Internal Noise Level	Internal Criteria
≤ 57 dB L _{Aeq} (0700–2300)	– 30 dB(A)	≤ 27 dB L _{Aeq} (0700–2300)	≤ 35 dB L _{Aeq} (0700–2300)
≤ 52 dB L _{Aeq} (2300–0700)		≤ 22 dB L _{Aeq} (2300–0700)	≤ 30 dB L _{Aeq} (2300–0700)
≤ 70 dB L _{A1} (15 mins)		≤ 40 dB L _{A1} (15 mins)	≤ 45 dB L _{A1} (15 mins)
≤ 75 dB L _{AFMax} (2300–0700)		≤ 45 dB L _{AFMax} (2300–0700)	≤ 55 dB L _{AFMax} (2300–0700)

- 5.04 Daytime noise levels along the western and southern boundary are measured/predicted at circa 56 to 57 dB L_{Aeq} (0700–2300) and are associated with the M606 motorway. It is recommended that a circa 1.8 metre high close-boarded fences be installed to gardens backing onto the M606 motorway.
- 5.05 The fence should have a superficial mass of at least 10 kg/m², the panels should be rigidly mounted, and there should be no gaps between adjacent panels, or the barrier and the ground. The fence should be designed (e.g. through the use of cover strips) so that gaps do not develop between abutting panels through warping or shrinking.

Noise Associated with Adjacent Proposed Employment Area

- 5.06 The proposed employment area within Outline Planning Application 2016/60/92298/E is located circa 300 metres to the south of the application site.
- 5.07 An environmental statement submitted in support of the proposed development determined that the cumulative noise rating levels from the proposed employment area would be circa **32 dB L_{Ar}, 1 hour** during the daytime and **31 dB L_{Ar}, 15 min** during the night time, at existing dwellings along Mill Carr Hill Road/Cliff Hollins Lane.
- 5.08 For reference, the separation distance used in these calculations was 300 metres and these levels are therefore considered representative of expected noise levels at the application site associated with the proposed employment area.
- 5.09 Such levels are significantly below existing daytime and night time ambient and background noise levels at the application site and therefore noise associated with the proposed adjacent employment area is considered to be negligible.

6.00 CONCLUSIONS

- 6.01 A noise impact assessment has been undertaken for a proposed (outline) residential development on land at Cliff Hollins Lane, East Bierley, Bradford.
- 6.02 The ambient noise climate is due to road traffic on the M606 motorway, with very localised contributions from intermittent road traffic on Cliff Hollins Lane.
- 6.03 An outline scheme of sound attenuation works and boundary treatment has been developed to protect the proposed residential development from the ambient noise climate. As a consequence, the ambient noise climate is not considered to represent 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,

A handwritten signature in black ink, appearing to read 'T. Crabb', written in a cursive style.

Thomas Crabb
MIOA, Diploma in Acoustics and Noise Control, BSc (Hons)
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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
Site Location and Approximate Measurement Positions



Appendix 2 Preliminary Site Layout and Approximate Measurement Positions

