Our ref: NIA/5591/14/5348/v2/Kendray Hotel Site

28th November 2014

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NOISE IMPACT ASSESSMENT FOR PROPOSED MIXED USED DEVELOPMENT, THE KENDRAY, BIRK AVENUE, BARNSLEY

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited has been commissioned to carry out a noise impact assessment for a proposed mixed use development (consisting of 9 new build residential dwellings and 2 new build retail units at the Kendray, Birk Avenue, Barnsley (hereafter referred to as the application site)).

1.02 The objectives of the noise impact assessment were to:

- Determine the ambient noise climate at the application site
- Assess the potential noise impact with reference to the National Planning Policy Framework and other pertinent guidance
- Provide recommendations for a scheme of noise attenuation works, as necessary, to ensure that current and future residents do not experience any unacceptable loss of amenity due to noise

1.03 This report details the methodology and results of the assessment. It has been prepared to accompany a planning application to be submitted to Barnsley Metropolitan Borough Council (BMBC).

1.04 This report has been prepared for Commercial Development Projects 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 Commercial Development Projects Limited (applicant), Knight Frank LLP (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 MIXED USE DEVELOPMENT

2.01 The application site was previously occupied by The Kendray (a public house). It is located in a residential setting and is bound by:

- Existing residential dwellings to the north, east and west
- Birk Avenue (a lightly trafficked residential road) to the south

2.02 The proposed mixed use development consists of:

- 9 new build residential dwellings in the northern part of the site
- 2 new build retail units in the southern part of the site with 12 customer car parking bays and 2 staff car parking bays (note: Retail Unit 1 is Use Class A1 Shops whilst Unit 2 is Use Class A2 Financial and Professional Services (Betting Office))

2.03 An indicative layout plan is contained in Appendix 2 for reference.

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3.00 BASELINE NOISE SURVEY

3.01 In order to establish the ambient and background noise levels at the application site, baseline noise surveys were undertaken on Wednesday 22nd October 2014.

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 approximately 35 metres north of the nearside kerb of Birk Avenue, to the side of the Kendray (note: MP1 representative of surrounding existing gardens)

- MP2 was located approximately 65 metres north of the nearside kerb of Birk Avenue, behind the Kendray (note: MP2 representative of proposed residential dwellings)

3.03 Noise measurements were undertaken using a Bruel & Kjaer 2260 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.

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.

Table 3.1 – Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{A1} (dB)	Comment
MP1	22/10/2014	09:59–10:29	49	43	51	56	Birk Avenue traffic dominant (circa 270 v/hr)
MP1	22/10/2014	11:02–11:32	48	43	50	56	
MP1	22/10/2014	12:05–12:35	49	43	50	57	
MP1	23/10/2014	00:31–01:01	43	33	41	51	Distant traffic, chiller at adjacent store
Daytime ambient noise level 48–49 dB $L_{Aeq, T}$; night time ambient noise level 43 dB $L_{Aeq, T}$ Daytime background noise level 43 dB $L_{A90, T}$; night time background noise level 33 dB $L_{A90, T}$							
MP2	22/10/2014	10:30–11:00	47	42	48	52	Distant traffic
MP2	22/10/2014	11:34–12:04	48	44	50	55	
MP2	22/10/2014	12:38–13:08	45	42	46	51	
MP2	23/10/2014	23:56–00:26	36	33	38	42	Distant traffic, chiller at adjacent store
Daytime ambient noise level 45–48 dB $L_{Aeq, T}$; night time ambient noise level 36 dB $L_{Aeq, T}$ Daytime background noise level 42–44 dB $L_{A90, T}$; night time background noise level 33 dB $L_{A90, T}$							

3.05 The ambient noise climate across the application site is attributable to road traffic noise.

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4.00 NOISE IMPACT ASSESSMENT CRITERIA

4.01 The National Planning Policy Framework (NPPF), came into force on 27 March 2012 and is a material consideration in planning decisions. At the heart of the NPPF is a presumption in favour of sustainable development, and the policies in Paragraphs 18 to 219 of the NPPF, taken as a whole, constitute the Government's view on what sustainable development in England means in practice for the planning system.

4.02 The NPPF states that there are three dimensions to sustainable development, which include an economic role (contributing to building a strong, responsive and competitive economy), a social role (providing the supply of housing required to meet the needs of present and future generations) and an environmental role (which includes minimising waste and pollution).

4.03 The NPPF supersedes Planning Policy Guidance Note 24 (PPG 24). The main policy statement in relation to noise is Paragraph 123 of the NPPF, which states planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*

- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*

- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*

- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

4.04 In relation to 'adverse impacts', the NPPF refers to the Explanatory Note to the Noise Policy Statement for England (NPSE) for guidance.

4.05 The Noise Policy Statement for England (NPSE) and associated Explanatory Note were published by DEFRA in 2010 and set out the Government's noise management strategy to enable noise management decisions to be made within the wider context (i.e. guiding principles of sustainable development), in a cost-effective manner and in a timely fashion.

4.06 Fundamental to this approach is *'there is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors'*.

4.07 The noise policy aims of NPSE are to (i) avoid significant adverse impact on health and quality of life, (ii) mitigate and minimise adverse impacts on health and quality of life, and (iii) where possible, contribute to the improvement of health and quality of life. The policy aims are always to be considered within the context of the Government's policy on sustainable development.

4.08 In relation to the mitigation and minimisation of adverse impacts, NPSE considers that '*in reality, although not always stated, the aim has tended to be to minimise noise 'as far as is reasonably practical'*. This is reinforced in Paragraph 2.24 of the Explanatory Note, which requires that '*all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur'*.

4.09 Planning Practice Guidance specifically dealing with noise was uploaded to the Government's Planning Portal in March 2014. This guidance is summarised herein.

4.10 The guidance states that noise needs to be considered when new developments may create additional noise. Whilst noise can override other planning concerns, neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement for England) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development.

4.11 In order to determine noise impact, local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- 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; and
- Whether or not a good standard of amenity can be achieved.

4.12 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

4.13 In terms of Observed Effect Levels:

- No Observed Adverse Effect Level (NOAEL) – This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

- Lowest Observed Adverse Effect Level (LOAEL) – This is the level of noise exposure above which adverse effects on health and quality of life can be detected.

- Significant Observed Adverse Effect Level (SOAEL) – This is the level of noise exposure above which significant adverse effects on health and quality of life occur.

4.14 At the lowest extreme, when noise is not noticeable, there is by definition no effect. As the noise exposure increases, it will cross the no observed effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. The noise can slightly affect the acoustic character of an area but not to the extent there is a perceived change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

4.15 As the exposure increases further, it crosses the lowest observed adverse effect level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

4.16 Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.

4.17 At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.

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4.18 This following table summarises the noise exposure hierarchy.

Table 4.1 – Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing 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	No specific measures required
		Lowest Observed Adverse Effect Level	
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	
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 disruptive	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

4.19 No specific criteria are presented in the NPSE, to provide the necessary policy flexibility until further evidence and suitable guidance is available. In lieu of specific criteria, for residential development, ENS makes reference to existing guideline documents, which are summarised in the following paragraph(s).

4.20 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) defines a range of internal noise level criteria for dwellings as follows which represent good living conditions.

Table 4.2 – Indoor Ambient Noise Levels as Recommended in BS 8233

Activity	Location	0700 to 2300 hours	2300 to 0700 hours
Resting	Living room	35 dB $L_{Aeq\ (16\ hour)}$	-
Dining	Kitchen / dining room	40 dB $L_{Aeq\ (16\ hour)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (16\ hour)}$	30 dB $L_{Aeq\ (8\ hour)}$

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4.21 The internal noise level criteria are based on average annual data and do not have to be achieved in all circumstances. It is normal to exclude occasional events.

4.22 The internal noise level criteria may be relaxed by up to 5 decibels and reasonable living conditions will still be achieved.

4.23 British Standard 8233:2014 '*Guidance on Sound Insulation and Noise Reduction for Buildings' 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*.'

4.24 Based on the above guidance, the following noise level criteria are considered appropriate for the proposed residential development.

- 55 dB $L_{Aeq\ (0700–2300\ hours)}$ in gardens
- 35 dB $L_{Aeq\ (0700–2300\ hours)}$ in habitable rooms
- 30 dB $L_{Aeq\ (2300–0700\ hours)}$ in bedrooms

5.00 SOUND ATTENUATION SCHEME FOR PROPOSED RESIDENTIAL DEVELOPMENT

5.01 Based on measurements taken at numerous sites, a typical standard double glazed window with trickle vents in a building façade provides circa 30 dB(A) sound insulation (from external to internal) to road traffic noise.

5.02 The insulation of an open window has been generally accepted as being 10 to 15 dB(A) although its precision and affect on opening style, open area and window size, are not readily available. A programme of laboratory measurements have been undertaken by the Building Performance Centre at Napier University on behalf of the Department for Environment, Food and Rural Affairs, in order to quantify the sound insulation provided by a variety of window types, opening styles, areas of opening and ventilator devices (NANR116: 'Open / Closed Window Research Sound Insulation Through Ventilated Domestic Windows).

5.03 The test regime measured the sound insulation provided by seven separate windows, with a combination of twelve different opening styles. The variation in weighted level difference, D_w, across the different opening styles for approximately equivalent area openings has been consistently measured as between 4 and 6 dB. The range of measured insulation ratings, for window with a free open area of 0.05 m^2 is 14 to 20 dB D_w. This translates to the following dB(A) level differences, due to variations in the source noise characteristics:

- Road Traffic Noise 12 to 18 dB(A)
- Railway Noise 12 to 18 dB(A)
- Aircraft Noise 14 to 19 dB(A)
- Amplified Music 15 to 20 dB(A)

5.04 The window results do not show any one opening style which provides significantly better insulating characteristics.

5.05 It is therefore considered that good living conditions will be achieved at the application site, even with partially open windows.

5.06 Furthermore, there is no issue with respect garden amenity.

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6.00 SOUND ATTENUATION SCHEME FOR PROPOSED RETAIL DEVELOPMENT

6.01 Under the development proposals, there are two retail units proposed in the southern half of the application site. At the time of writing, given the indicative nature of the development proposals, the exact details (occupancy, times of operation, etc.) of the retail uses are not known.

6.02 Notwithstanding this, Retail Unit 1 is to be Use Class A1 Shop and is likely to require air condensing plant and/or refrigeration plant. The potential impact of noise from these uses on adjacent noise sensitive development can be minimized / prevented by judicious building placement and boundary screening, as well as by the careful selection and siting of external fixed plant. This can be controlled by a suitably worded planning condition such as:

The cumulative noise level from any air conditioning plant and/or refrigeration plant must be designed, installed and maintained such so as not to exceed the background noise level measured at the nearest existing and/or proposed residential dwelling.

6.03 The opening / servicing hours of the proposed retail units can also be controlled by a suitably worded planning condition.

7.00 CONCLUSIONS

7.01 A noise impact assessment has been undertaken for the proposed mixed use development at the Kendray, Birk Avenue, Barnsley.

7.02 The existing daytime and night time ambient noise climate was attributable to road traffic.

7.03 The existing daytime and night time ambient noise climate should not lead to any loss of amenity at the proposed residential development.

7.04 The noise associated with any air condensing plant and/or refrigeration plant at the proposed retail units is amenable to control by a suitably worded planning condition. The opening / servicing hours of the proposed retail units are also amenable to control by a suitably worded planning condition.

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,

T. Crabb

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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 Plan and Measurement Locations