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Proposed Residential Development
The Old Stable Yard, Winthorpe Road, Newark

Technical Review

For:
Newark and Sherwood District Council

11th December 2023

Ref: NIA-10951-23-11131-v1 Winthorpe Road, Newark
Issue: Final
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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Newark and Sherwood District Council (NSDC) to undertake a review of a Noise Impact Assessment (NIA) produced by SLR Consulting Limited, comments received from NSDC's Environmental Health department, and comments made by the Planning Inspectorate in relation to the material change of use of land to residential occupation at land Winthorpe Road, Newark (hereafter referred to as 'the site').

The report has been prepared for NSDC for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult NSDC and ENS as to the extent to which the findings may be appropriate for their use.

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

1.2 Site Description

The site is located on land between Newark and Winthorpe, to the south of the A1, as shown (highlighted in red) in Figure 1.1.

Figure 1.1: Location of Proposed Development

The site is bound by:

- Bridge House Boarding Kennels to the north
- Winthorpe Road (no-through road) to the east
- Open agricultural land to the west and south

The ambient noise climate at the site is characterised by road traffic noise on the A1 (circa 60 metres to the north-east) and A46 (circa 175 metres to the south-west), as well as intermittent noise associated with the adjacent kennels.

Noise mapping prepared by Defra (replicated in Figure 1.2 and 1.3) indicates that the site is subject to daytime and night-time ambient noise levels of circa **65 dB $L_{Aeq\ (0700\text{-}2300)}$** and **57 dB $L_{Aeq\ (2300\text{-}0700)}$** respectively.

Figure 1.2: DEFRA Daytime Road Traffic Noise Levels

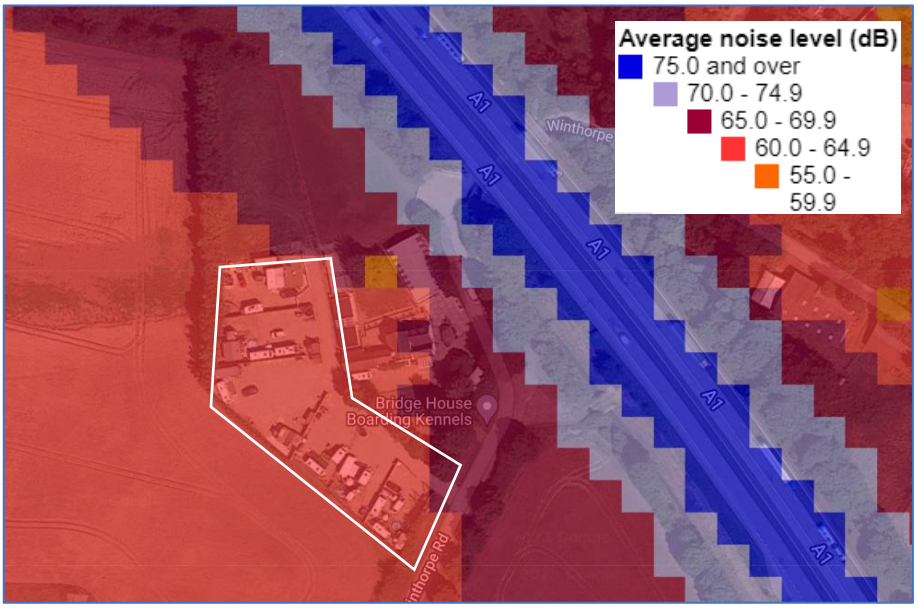
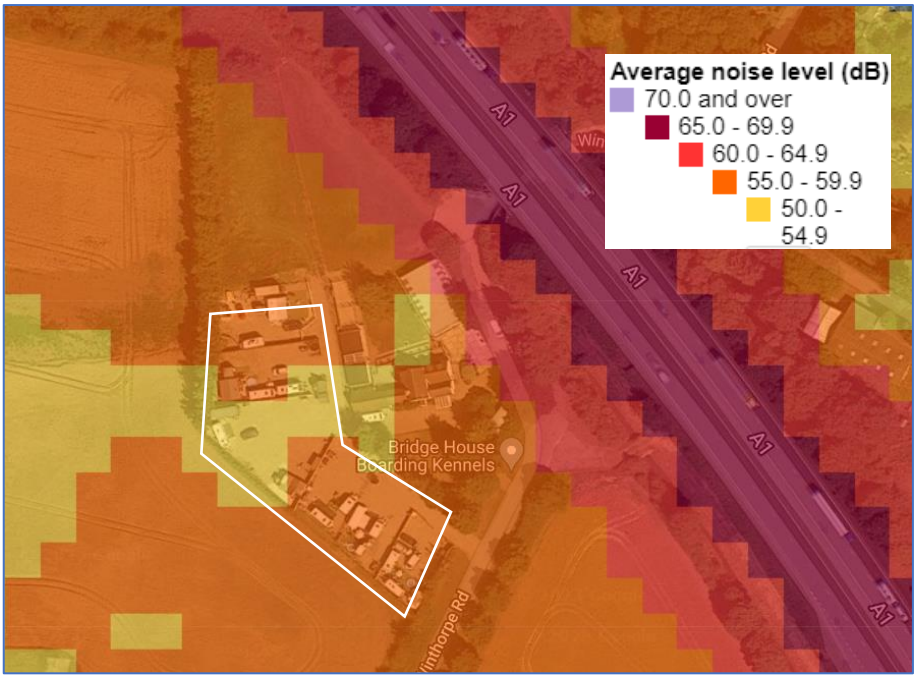


Figure 1.3: DEFRA Night-Time Road Traffic Noise Levels



1.3 Planning History and Development Proposals

It is understood that the land is already in residential use comprising 6 no. static caravans/pitches.

Enforcement notices were subsequently issued for the following breaches of planning control:

- Without planning permission, the material change of use of land to residential occupation including the stationing of caravans and the erection of a structure.

- Without planning permission, undertaking operational development consisting of the carrying out of works to the land including, but not limited to the laying of materials to create hardstanding, the erection of a building and associated concrete base (marked X on the attached Plan A) and the burying of utility cables, pipes, containers and associated infrastructure.

The notices were appealed under Planning Appeal ref: APP/B3030/C/18/3196972 (change of use) and APP/B3030/C/18/3217010 (operational development).

The appeals were accompanied by an NIA (report ref: 403.08181.00002, dated February 2019) prepared by SLR Consulting Limited.

The appeals were dismissed by the Planning Inspectorate in June 2022.

1.4 A46 Newark Bypass

In relation to other relevant schemes in the immediate vicinity, it is noted that National Highways are in the process of compiling a consultation report for the proposed A46 Newark Bypass.

The scheme will include the widening of the existing A46 to dual carriageway, the realignment of the road as it passes by south of the site, and a new flyover where the A46 meets the A1 (see Figure 1.4 for proposed route).

Figure 1.4: Proposed Route of A46 Newark Bypass

2 NIA by SLR Consulting Limited

2.1 Introduction

An NIA (report ref: 403.08181.00002, dated February 2019) was prepared by SLR Consulting Limited in support of Planning Appeal ref: APP/B3030/C/18/3196972 and APP/B3030/C/18/3217010. The report was produced in order to determine the suitability of the site for residential use.

2.2 Methodology

The NIA was carried out in accordance with the National Planning Policy Framework (NPPF), The Noise Policy Statement for England (NPSE), British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233), World Health Organisation (WHO) guidelines, ProPG Planning and Noise: New Residential Development (ProPG) and South Holland District Council's Supplementary Planning Guidance '*Location of Premises for the Boarding and Breeding of Dogs and Other Animals – Noise Issues*'.

2.3 Baseline Noise Survey and Modelling

In order to establish the noise levels at the site, a baseline noise survey was carried out on Tuesday 12th through to Thursday 14th February 2019. However, the report notes that the A46 was closed on the night of the 12th–13th February, with traffic being diverted onto the A1, and this data was therefore disregarded as unrepresentative.

The approximate locations of the noise measurement locations are shown in Figure 2.1 below.

Figure 2.1: Location of SLR Measurement Locations

Noise measurements were undertaken in free field conditions at 1.5 metres above ground level using Cirrus CR:171B and Norsonic 140 Type 1 integrating sound level meters.

Table 2.1 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 2.1: Summary of Noise Measurement Data

Location	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AFMax} (dB)
1	13/02/2019	0700–2300	64	61	65	87
	13-14/02/2019	2300–0700	61	54	62	72
2	13/02/2019	0700–2300	63	61	64	81
	13-14/02/2019	2300–0700	60	55	61	70

The noise environment was dominated by road traffic noise on the A1 and A46. Whilst intermittent barking associated with the adjacent kennels was noted on two occasions at Location 1, these instances did not contribute to the overall daytime noise level.

A noise model of the site was then created using CadnaA. The model was calibrated to the ambient noise levels measured at Locations 1 and 2 and were noted to be within 0.3 dB of the measured levels.

Figure 6-1 of the NIA contains a daytime noise level map in the absence of mitigation, and shows external noise levels of > 60 dB $L_{Aeq\ (0700\text{-}2300)}$.

Figure 6-2 of the NIA contains a daytime noise level map including a 2.4-metre-high close-boarded timber fence along the northern site boundary, indicating the external noise levels would be reduced to 55–60 dB $L_{Aeq\ (0700\text{-}2300)}$ across the site.

A further spot measurement was undertaken at Location 3 (in the vicinity of the kennels and unscreened from the yard) in order to determine the ambient and maximum noise levels associated with dogs barking.

The source measurements were used to create a further CadnaA model for noise associated with the kennels and predicted worst-case ambient and maximum noise levels of **44 dB $L_{Aeq\ (1\ hour)}$** and **68 dB L_{AFMax}** respectively.

2.4 Assessment

With the provision of the acoustic fence as specified, worst-case daytime and night-time traffic noise levels at the caravan façades were predicted as **59 dB $L_{Aeq\ (0700\text{-}2300)}$** and **57 dB $L_{Aeq\ (2300\text{-}0700)}$** respectively, with a representative maximum noise level of up to **64 dB L_{AFMax}**, based on the 90th percentile.

The worst-case ambient and maximum noise levels associated with the kennels were predicted at **44 dB $L_{Aeq\ (1\ hour)}$** and **68 dB L_{AFMax}** respectively.

The worst-case external noise levels were then compared to the target internal noise levels contained in BS 8233 and ProPG, as summarised in Table 2.2 below.

Table 2.2: External to Internal Noise Assessment

External Noise Level	Internal Noise Criteria	Required Sound Reduction of Building Envelope
≤ 59 dB $L_{Aeq\ (0700\text{-}2300)}$	35 dB $L_{Aeq\ (0700\text{-}2300)}$	24 dB R_w
≤ 57 dB $L_{Aeq\ (2300\text{-}0700)}$	30 dB $L_{Aeq\ (2300\text{-}0700)}$	27 dB R_w
≤ 68 dB $L_{AFMax\ (2300\text{-}0700)}$	45 dB $L_{AFMax\ (2300\text{-}0700)}$	23 dB R_w

As evidenced above, the assessment determined that the maximum sound reduction required at the site is 27 dB R_w.

The NIA then makes reference to British Standard BS 3632:2015 'Residential park homes – Specification', which states:

> **4.9.4 Sound insulation**
>
> In order to minimize the transmission of airborne noise, the external walls (excluding doors and windows) shall have a sound reduction index (*R*) of 35 dB over a frequency range of 125 Hz to 4 000 Hz.

Whilst not specifically defined within the NIA, the report concludes that the type of caravans to be installed at the site can be conditioned, presumably to meet the sound reduction target contained in BS 3632:2015.

3 NSDC Comments

3.1 Introduction

A consultation response to the submitted NIA was received from NSDC's Environmental Health department on 22nd February 2019. The following contains a technical review of the comments within the response.

3.2 Technical Review of Consultation Response

Baseline Noise Survey

Point 2 of the response states that the monitoring period was very short and may have been impacted by school half term, and queries whether the data is representative. Point 3 questions whether the monitoring location was screened from surrounding noise sources.

The ambient noise climate across the site was dominated by road traffic on the A1.

Highways England traffic flow data for the closest count points (WEBtris ref: *TAME Site 30360804 on link A1* (northbound) and *TAME Site 30360803 on link A1* (southbound)) indicates a 24-hour flow of **48246** vehicles on 13-14th February (day of the baseline survey)

For comparison, the average 24-hour flow for the entirety of 2019 was **48700** vehicles (a 1% increase). Using the methodology in the Calculation of Road Traffic Noise (CRTN), a 1 % increase in traffic volumes equates to an imperceptible (0.04 dB) increase in noise levels.

Further to this, the average 24-hour flow for 2023 to date is **43096** vehicles (a 12% *decrease*). Using the methodology in the CRTN, a 12 % decrease in traffic volumes equates to 0.5 dB reduction in noise levels.

The measured daytime level at Position 1 (**64 dB $L_{Aeq\ (0700\text{-}2300)}$**) also correlates closely with the noise levels produced by Defra (circa **65 dB $L_{Aeq\ (0700\text{-}2300)}$** at the northern site boundary).

It is evident that the levels measured during the baseline survey are representative.

Noise Barrier

Point 4 of the response states that the proposed 2.4-metre-high barrier should be regarded as a substantial structure and queries the impact on the neighbours. The response states that no account has been taken of reflection between the proposed and existing fence.

In relation to the noise impact of the fence, the noise contours contained in Figure 6-1 (no acoustic fence) and Figure 6-2 (including acoustic fence) do not appear to show any increase in noise on the northern side of the fence and it is therefore assumed that reflected noise from the fence would not contribute to existing noise levels impacting the property.

The relevance of the reflected noise between the proposed and existing fences is not clear, but the noise modelling would have taken into account reflections from all structures. To reiterate, the noise levels on the northern side of the proposed 2.4-metre-high fence do not appear to be affected by reflections from the proposed fence.

The visual impact of the fence is beyond the scope of this review, but it is noted that the boundary between the site and the neighbour comprises a combination of metal mesh fencing, solid fencing, and outbuildings associated with the kennels.

In any case, a fence exceeding 2 metres in height would typically require planning permission, and the impacts of the fence could be considered as part of a planning application.

Sound Reduction of Caravan Building Envelope

Point 5 of the response notes that the NIA does not consider that the internal noise levels with open windows, nor that the sound insulation of a touring caravan may be worse than that of a static home.

Firstly, it should be noted that the 35 dB sound reduction index (SRI) quoted in BS 3632:2015 for static homes only relates to the performance of the external walls, and not to the doors or windows. BS 3632:2015 also stipulates minimum ventilation requirements for static homes, and specifies minimum 4000 mm^2 EA trickle vents for bedrooms.

In reality, the attenuation from outside to inside is dependent on the composite reduction of the entire building envelope, as well as the habitable room dimensions, and is therefore likely to be lower than 35 dB unless provided with enhanced glazing and acoustic vents.

The response also quotes a sound reduction of 16.5 dB for a touring caravan with windows closed. The origin of this sound reduction performance is unknown, but appears low when compared against the WHO Guidelines for Community Noise (1999) statement: '*the noise reduction from outside to inside with the window partly open is 15 decibels.*'

In any case, the most accurate way to determine the sound reduction of touring caravans at the site is to arrange to undertake simultaneous internal/external measurements.

With regards to whether noise should be considered with open windows, useful context is found in BS 8233, as follows:

'If relying on closed windows to meet the guide values, there needs to be an 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.'

ProPG provides further clarification on this, as follows:

'Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide "whole dwelling ventilation" in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2).'

It is evident that internal noise levels can be assessed with windows closed, providing there are good standards of acoustics, ventilation and thermal comfort.

Further contextual guidance is contained in 'Acoustics Ventilation and Overheating – Residential Design Guide' (AVO), which is intended to be used in conjunction with ProPG. The document states that noise is likely to cause a material change in behaviour once internal levels exceed the following criteria during the overheating condition (i.e. with windows open):

- 50 dB $L_{Aeq\ (0700\text{-}2300)}$ during the daytime
- 42 dB $L_{Aeq\ (2300\text{-}0700)}$ during the night-time
- 65 dB L_{AFMax} normally exceeded during the night-time

For reference, AVO assumes a noise reduction of circa 13 dB for an open window.

On this basis, the resultant internal noise levels with open windows are set out in the table below.

Table 3.1: External Noise Levels and Resultant Internal Noise Levels with Open Windows

External Noise Level	Reduction	Resultant Internal Level	Target Internal Level
≤ 59 dB $L_{Aeq\ (0700\text{-}2300)}$	–13 dB	≤ 46 dB $L_{Aeq\ (0700\text{-}2300)}$	50 dB $L_{Aeq\ (0700\text{-}2300)}$
≤ 57 dB $L_{Aeq\ (2300\text{-}0700)}$		≤ 44 dB $L_{Aeq\ (2300\text{-}0700)}$	42 dB $L_{Aeq\ (2300\text{-}0700)}$
≤ 68 dB $L_{AFMax\ (2300\text{-}0700)}$		≤ 55 dB $L_{AFMax\ (2300\text{-}0700)}$	65 dB $L_{AFMax\ (2300\text{-}0700)}$

As evidenced above, the windows of bedrooms of some pitches are likely to be closed during sleeping hours (2300 to 0700 hours) unless night-time external levels can be reduced further.

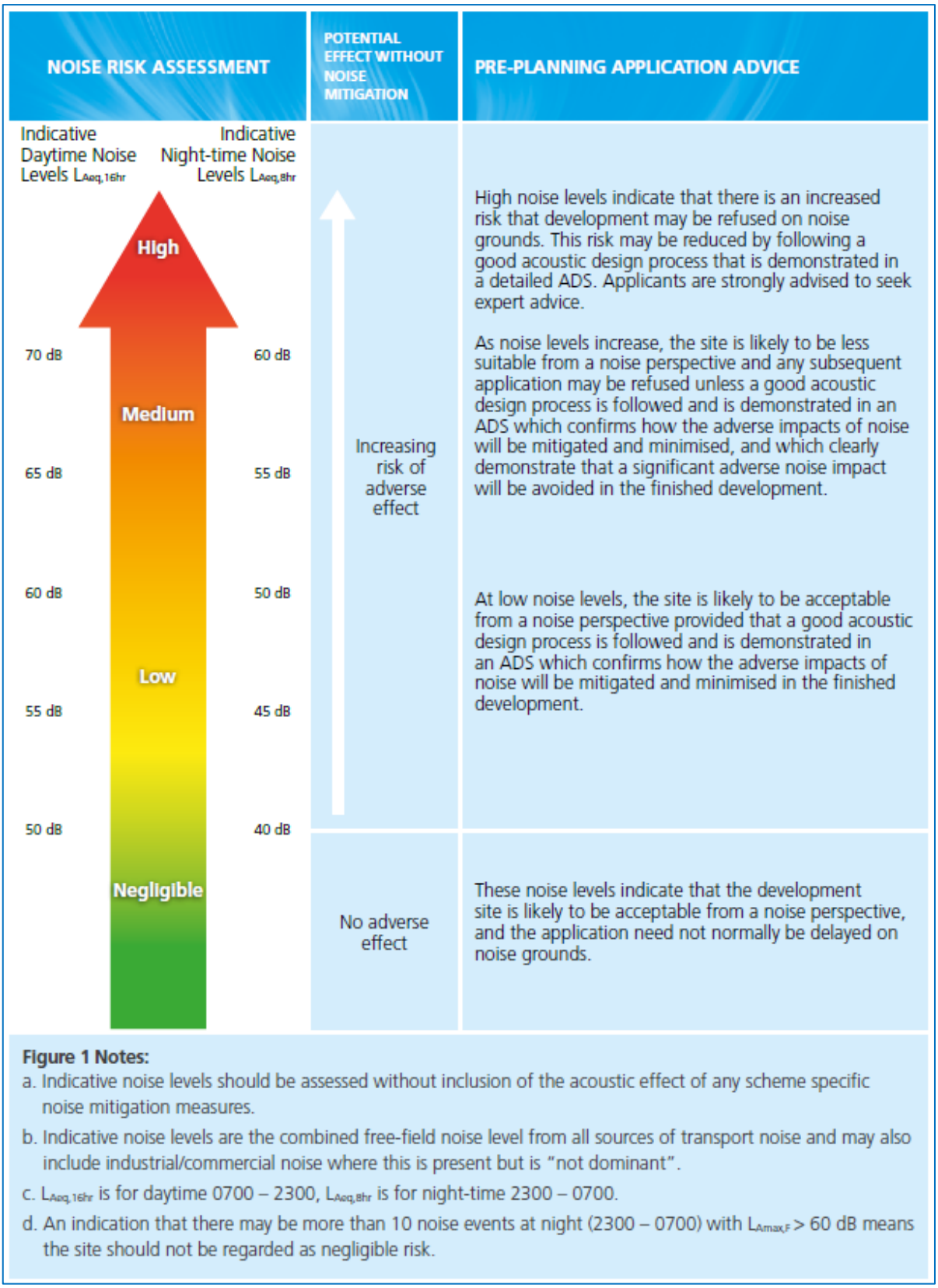
Use of ProPG Planning and Noise: New Residential Development

Point 6 of the response states that ProPG has been selectively quoted, and that the report does not address 'good acoustic design'.

Firstly, it appears that the principal reason for quoting ProPG within the NIA is to establish maximum noise level criteria (which is not covered in BS 8233). This approach is commonplace within noise assessments.

Stage 1 of ProPG consists of an initial noise risk assessment, as summarised in Figure 1 of ProPG (reproduced overleaf for reference). To put the noise levels at the site in context, with the provision of the proposed screening, the site would constitute a 'medium' risk in terms of ProPG.

Figure 3.1: ProPG Initial Site Noise Risk Assessment



Paragraph 2.23 of ProPG provides a checklist of 7 aspects which should be considered with regard to good acoustic design. These aspects are listed below, along with preliminary considerations with respect to the site.

Table 3.2: ProPG Good Acoustic Design Aspects

Aspect	Preliminary Considerations
Check the feasibility of relocating, or reducing noise levels from relevant sources.	The dominant noise source is the A1, which cannot be relocated. Noise barriers have been considered to reduce the noise at source.
Consider options for planning the site or building layout.	There is no opportunity to rearrange the pitches within the site. Orientation of the caravans within individual pitches is unlikely to have a significant impact upon noise levels.
Consider the orientation of proposed building(s).	
Select construction types and methods for meeting building performance requirements.	The sound insulation of the caravan building envelope should be determined.
Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.	Typical noise control measures (e.g. boundary screening) are usually acceptable in terms of ventilation, fire regulation, health & safety, cost and CDM.
Assess the viability of alternative solutions.	No relevant alternative solutions.
Assess external amenity area noise.	External amenity is considered in further detail below.

In summary, due to the nature of the site and development, the options for implementing 'good acoustic design' are limited.

BS 8233 comment on External Noise Levels

With reference to external noise levels exceeding 55 dB $L_{Aeq\ (0700\text{-}2300)}$, the NIA references Paragraph 7.7.3.2 of BS 8233, which is reproduced below:

'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.'

Point 7 of the response is as follows:

'The mention of BS8233:2014 in para 6.1 is misleading. I consider that the quote is intended for areas close to substantial infrastructure, for example a brown field site that, where the possible relaxation of noise criteria can be weighed in the mix along with all the other relevant planning criteria.'

There is nothing within the quoted section of BS 8233 which suggests it should only be applied to areas close to substantial infrastructure.

As the development constitutes an efficient use of land resources to meet a planning need, and is situated adjacent to the strategic transport network (i.e. the A1), in our opinion the site readily meets the requirements for a relaxation of garden levels.

4 Planning Inspectorate Comments

4.1 Introduction

As stated, the enforcement notices placed on the site were appealed under Planning Appeal ref: APP/B3030/C/18/3196972 (change of use) and APP/B3030/C/18/3217010 (operational development).

The original appeal decisions were reheard and redetermined by the Planning Inspectorate in June 2022. Subject to minor corrections and variations, the appeals were dismissed and the enforcement notices were upheld.

In relation to noise, the inspector noted that the site was located within an "Important Noise Area" due to its proximity to the A1 and the A46.

Following a site visit, the inspector stated that road traffic noise was noticeable and likely to be disruptive, with potential for sleep disturbance, and that adverse effects at the site cannot be adequately mitigated.

The inspector also notes that no consideration has been given to the noise impacts of the proposed expansion and re-routing of the A46.

Finally, the inspector notes that it may not be feasible to apply the minimum standards described in BS 3632:2005 to mobile homes, and that occupants may have windows and doors open during warmer weather.

4.2 Technical Review of Appeal Comments

Whilst the site is subject to noise from the surrounding road network, it has not been demonstrated objectively that the noise levels would be disruptive or result in sleep disturbance. The acceptability of the site from a noise perspective hinges on:

- Whether external noise levels in excess of BS 8233 target criteria are justified based on other factors;
- Whether the internal noise level targets contained in BS 8233 can be met within caravans with windows closed without compromising ventilation or thermal comfort; and
- If windows have to be open to aid thermal comfort, whether the internal noise level targets contained in the AVO guidance be met within caravans with windows open.

With respect to the A46 Newark Bypass, it is noted that the planned route will reduce the separation distance between the A46 and the site from circa 175 metres to circa 90 metres.

Preliminary noise level predictions provided by the contractor indicate daytime and night-time ambient noise levels of **66 dB $L_{Aeq\ (0700\text{-}2300)}$** and **58 dB $L_{Aeq\ (2300\text{-}0700)}$** respectively at Position 1, and **65 dB $L_{Aeq\ (0700\text{-}2300)}$** and **56 dB $L_{Aeq\ (2300\text{-}0700)}$** respectively at Position 2. This indicates that the A1 is still the dominant noise source at both positions.

Daytime noise levels are 2 dB higher than the levels measured within the NIA, and 1 dB higher than the noise levels produced by Defra. Whilst it should be confirmed whether the increase is due to greater contribution from the realigned A46 or variations in the modelling of noise from the A1, it should be noted that the change in noise levels is not significant and would be unlikely to alter the conclusions.

5 Conclusions and Recommendations

5.1 Conclusions

Daytime and night-time ambient noise levels across the site are due to road traffic noise on the A1 and (to a lesser extent) the A46. Highest discrete event maxima at the site are due to noise from the adjacent dog kennels, however, this has no bearing on the assessment as it is the control of night-time ambient noise levels from road traffic which governs the sound insulation requirements at night.

Based on traffic flow data produced by Highways England and noise maps produced by Defra, it is considered that the ambient noise levels measured during the baseline survey are representative. On the basis of preliminary noise level predictions provided by the contractor, ambient noise levels are not expected to increase significantly as a result of the proposed A46 Newark Bypass.

Whilst daytime external noise levels are predicted to exceed the target levels contained in BS 8233, this may be acceptable if the development is deemed to constitute an efficient use of land resources to meet a planning need.

The NIA concludes that target internal noise levels will be met within caravans at the site, providing the building envelope meets the 35 dB SRI quoted in BS 3632:2015 for static homes. However, this does not take into account the sound reduction performance of the doors or glazing, and the report does not comment on the provision of background ventilation. It is also unclear whether BS 3632:2015 applies to touring caravans.

A consultation response from NSDC's Environmental Health department quotes a sound reduction of 16.5 dB for a touring caravan building envelope with windows closed.

With regards to thermal comfort, based on the guidance contained in the AVO guide, the windows of bedrooms of some pitches are likely to be closed during sleeping hours (2300 to 0700 hours) unless night-time external levels can be reduced further.

Due to the nature of the site and development, the options for implementing 'good acoustic design' in accordance with ProPG are limited, however, 2.4-metre-high boundary screening has been proposed within the NIA.

NSDC's Environmental Health department have queried the construction of the proposed screening and its impact on existing neighbours, but it is considered that this can be addressed as part of a planning application for the fencing.

5.2 Recommendations

The sound reduction of touring caravans at the site should be determined by undertaking simultaneous internal/external measurements (both with windows open and closed).

The internal noise levels within touring caravans at the site should then be calculated using the measured sound reduction.

The influence of the A46 Newark Bypass should be factored into any revised predictions, but it should be confirmed whether the predicted increases are due to greater contribution from the realigned A46 or variations in the modelling of noise from the A1, as this will inform any mitigation measures.

If internal noise levels are in excess of the target criteria described above, then it may be necessary to test the viability of increased boundary screening to further reduce external noise levels.

Appendix 1 – Abbreviations and Definitions

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:

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

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

A-weighting
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.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. 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).