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Subject:	Phase 8, Normandy Fields, Hinckley – Site Appraisal

INTRODUCTION

Stantec UK Ltd. has been commissioned by Jelson Limited to undertake a site appraisal to support a reserved matters application for the discharge of planning Condition 33 relating to Phase 8 of the Normandy Fields development, Hinckley.

The wider development was granted outline planning permission in May 2018 (planning reference No. 15/00188/OUT). Condition 33 requires a scheme for protecting the proposed dwellings from noise associated with road traffic and the proposed convenience store to be submitted to and approved by the Local Authority.

This note outlines the results of an acoustic appraisal of the site and provides a general overview of sound levels on the site.

SITE LOCATION AND DESCRIPTION

The proposed development is located on Phase 8 of the Normandy Fields development located on land to the northeast of Triumph Motorcycles Ltd, Dodwells Road, Hinckley, approximately 1.85 km to the north-west of Hinckley town centre. The site falls within the jurisdiction of Hinckley and Bosworth Borough Council (HBBC).

The site currently consists of open grassland. The A47 (Normandy Way) lies approximately 300 m to the east of the site. Open grassland borders the site to the north and west. A school is proposed to the east of the site. The proposed site access road lies to the south. The location of the proposed site is detailed in **Figure 1**.

Figure 1: Site Location



Courtesy of Define

PLANNING CONDITION 33

Condition 33 relates to a scheme for protecting the proposed dwellings from noise associated with road traffic and the proposed convenience store. It states:

"No development shall commence, in any phase, unless and until such time as a scheme for protecting the proposed dwellings and/or school and for that phase from noise associated with road traffic and the proposed convenience retail has been submitted to and approved by the Local Planning Authority; and all works which form part of the scheme shall be completed before any of the permitted dwellings are first occupied."

LOCAL AUTHORITY CONSULTATION

The Environmental Health Department (EHD) at Hinckley and Bosworth Borough Council (HBBC) was contacted to determine their requirements for the application. It was agreed that:

- A high-level acoustic appraisal of the site would be appropriate given the distance between the development and the A47, which is considered to be the dominant noise source influencing the acoustic climate the proposed site.
- The high-level appraisal would consider previously measured sound levels on other phases of the wider development and comment on the anticipated noise levels at the Phase 8 site boundaries.
- Potential sources of noise at the nearby farm site would be reviewed to determine if this requires further consideration¹.

STANDARDS AND GUIDANCE

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

BS 8233:2014, in relation to this development, sets out guideline values in habitable rooms, such as living rooms and bedrooms which should not be exceeded.

The guideline values relate to steady external noise without a specific character, previously termed 'anonymous noise'. According to the standard, noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate. Examples of noise with a character may include tonal/intermittent plant noise emissions, music playback, and workshop noise. Examples of external steady noise sources may include environmental noise sources such as busy road traffic.

The guideline internal ambient noise levels for dwellings are presented in **Table 1**.

Table 1: BS 8233 Desirable Internal Ambient Noise Levels for Dwellings

Activity	Location	Internal Ambient Noise Level	
		07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB L _{Aeq,16h}	-
Dining	Dining room/area	40 dB L _{Aeq,16h}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,16h}	30 dB L _{Aeq,8h}
^{*Note 4} Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. 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.			
^{Note 5} If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
^{Note 7} Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.			
*A selection of the available notes			

The standard also provides advice in relation to sound levels for external noise. It states that:

¹ Email correspondence with Simon Smith, Senior Environmental Health Officer at Hinckley and Bosworth Borough Council, dated 01 December 2023.

“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.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate.

Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation.

In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

Professional Practice Guidance on Planning and Noise

The Professional Practice Guidance on Planning and Noise (ProPG) was jointly published in 2017 by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants and provides guidance on a recommended approach to the management of noise within the planning system in England.

The scope of ProPG is limited to new residential development that will be predominantly exposed to airborne noise from transport sources.

The guidance is mostly focused on new flats and houses, although there is some relevant content in regard to other types of residential units, such as care homes and residential institutions.

Noise sources other than airborne transport (i.e., industrial, commercial, entertainment, etc.) and ground-borne noise and vibration fall outside of the scope of ProPG.

ProPG recommends that noise levels set out in BS 8233 are used for residential development. However, an additional criterion is proposed by ProPG for night-time L_{Amax} levels.

ProPG recommends a criterion of 45 dB $L_{Amax,F}$ between the hours of 23:00 – 07:00 stating:

“[...] 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 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.”

Draft Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O

The draft version of the Guide to Demonstrate Compliance with the Noise Requirements of Approved Document O was jointly published by the Association of Noise Consultants and Institute of Acoustics in July 2022. This guide provides clarity for practitioners and regulators so that assessments can be carried out consistently, and the outcome is repeatable and reliable.

While the requirements of Approved Document O are succinct, there is some ambiguity regarding important details, some of which are addressed within the guide.

The guide makes the following clarifications:

- The noise requirements apply only to bedrooms at night.
- Natural sound sources (e.g., meteorological sounds, sounds from animals and water) should be excluded from contributing to the assessed noise level.

The guidance document provides anticipated level differences through window openings which are necessary to satisfy the 'simplified method' of Approved Document O, based on typical assumptions. For 'high' risk locations (as described as areas in London and Manchester in Approved Document O) this is 4 dB, and for 'medium' risk locations (as described as other areas outside London and Manchester in England and Wales in Approved Document O) this is 9 dB.

Paragraph 4.1.9 states that if external sound levels exceed the limiting external free-field levels outlined in **Table 2** the 'simplified method' cannot be used, and 'dynamic thermal modelling' should be used to demonstrate compliance:

Table 2: External Noise Levels Above Which the Simplified Method Cannot be Used

Parameter	High Risk Location	Moderate Risk Location
L _{Aeq,8hr} averaged over 8 hours (between 11pm and 7am)	44 dB	49 dB
L _{Afmax} more than 10 times a night (between 11pm and 7am)	59 dB	64 dB
Note: Several assumptions have been used to determine the outside-to-inside level difference. There are: 2.4 m bedroom height, 0.5s bedroom RT, simple hole in the façade of area sufficient to provide the required equivalent area, no sound transmission other than via the opening. Calculation according to Equation G.1 of BS 8233:2014		

Paragraph 6.1.2 of the guide states:

"Given the uncertainty of measuring noise levels internally and the complexity of remedial work to adapt a completed building to remove excess heat by means other than opening a window, it is recommended that determination of compliance with AD-O is completed pre-construction."

SOUND AND VIBRATION CLIMATE

To establish the likely sound and vibration climate at the site, the following data sources have been reviewed:

- Environmental sound survey data obtained for other phases of the development; and
- Strategic noise mapping data.

Environmental Sound Survey Data

Environmental sound survey data was obtained by Stantec UK Ltd. in June/July 2022 to support an application relating to Phase 7 of the wider development. Whilst no subsequent noise impact assessment report has been submitted to HBBC, it is considered that the results of this survey can be used to support the assessment of Phase 8.

An unattended environmental sound survey was undertaken between approximately 15:00 hours on Thursday 30 June 2022 and approximately 15:00 hours on Friday 1 July 2022 to determine the existing sound climate at the site in a location considered representative of transportation noise sources incident on the proposed development.

The survey was undertaken over a 24-hour period. Measurements were logged in 15-minute periods of the L_{Aeq} , L_{A90} and L_{AFMax} sound levels.

The sound level meter was located in an environmental case. The microphone was connected to the meter via an extension cable and fitted with the manufacturer's windshield.

The instrumentation used in the survey (including calibration information) is listed in **Table 3**. Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

Table 3: Environmental Sound Survey Instrumentation

Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date*
Sound Level Meter	Brüel & Kjær	2250	2626232	25/11/2021
½" Pre-polarised microphone		4189	3148083	25/11/2021
Pre-amplifier		ZC0032	31157	25/11/2021
Sound Calibrator	Brüel & Kjær	4231	2619374	06/10/2021

* Calibration dates correct at time of undertaking environmental sound survey.

Sound measurements were undertaken in a single position, selected to be representative of the proposed development. The measurement location is detailed in **Figure 2**.

Figure 2: Measurement Location



Courtesy of BRP Architects.

The microphone was positioned in free field conditions, at a height of 2 m above ground level, approximately 460 m to the west of the A47.

Due to the nature of the survey (i.e., unattended), it is not possible to comment on the weather conditions for the entire duration of the survey. However, based on site observations at the beginning and end of the survey period, the weather conditions are detailed in **Table 4**.

Table 4: Meteorological Conditions

Description	Thursday 30 June 2022	Friday 01 July 2022
Temperature (°C)	20	19
Precipitation (mm)	0	0
Approximate Cloud Cover (%)	95	80
Wind Speed (m/s)	1	1
Wind Direction	E	ENE

A review of publicly available weather data indicated that no precipitation occurred during the survey period. These conditions are therefore considered suitable for obtaining representative sound level measurements.

Due to the nature of the survey (i.e., unattended) it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, it was noted that the dominant noise source at the beginning and end of the survey was considered to be vehicular movements on the A47 Normandy Way.

The results of the environmental sound survey are summarised in **Table 5**.

Table 5: Environmental Sound Survey Data Results

Period, T	Environmental Sound Levels		
	dB L _{Aeq,T}	Typical dB L _{AFMax} *	Typical dB L _{A90} **
Daytime (07:00 to 23:00)	45	-	37
Night-time (23:00 to 07:00)	41	61	35

* Based on the 10th highest measured L_{AFmax} level.
 ** Calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019.

Additionally, a computer acoustic model was produced for Phase 3 of the wider development to support a similar application. This model was verified with the results of the surveys undertaken at the site. The results of this can be used to approximate the likely on-site sound levels at the proposed development.

Strategic Noise Mapping

Strategic noise mapping data produced by Defra has also been reviewed to advise on the likely environmental sound climate. The mapping is based on historic road and rail flows rather than future forecasts and includes contributions from major transportation noise sources such as the A47 Normandy Way. Defra noise mapping only takes into account major roads or railways, and therefore does not cover industrial noise sources.

The strategic noise maps of England are produced under the Environmental Noise (England) Regulations, 2006. The Regulation has three core objectives; to produce strategic noise maps, to produce noise action plans, and to make information available to the public.

The strategic noise maps are required to be produced every five years. They must be produced for agglomerations with a population of more than 100 000 people; for major roads with more than 3 000 000 vehicle passages per year, and for major railways with more than 30 000 train movements per year.

Based on the strategic noise mapping data, daytime ambient sound levels are likely to fall below 55 dB L_{Aeq,16hours} during the daytime and 50 dB L_{Aeq,8hours} during the night-time. This correlates well with the environmental sound survey data presented in **Table 5** above.

Commercial/Industrial Sound Sources

A farm site lies adjacent to the site, around 100 m to the northwest of the western site boundary. Whilst undertaking the environmental sound survey, it was noted by the on-site engineer that the dominant noise source at the site was associated with vehicular movements on the A47 Normandy Way. Noise associated with other sources, including the adjacent farm site, were not considered to be audible over and above noise levels associated with road traffic. As such, this source of noise has not been considered further.

ACOUSTIC APPRAISAL

Based on the environmental sound survey data obtained for other phases of the development, strategic noise mapping data and computer acoustic modelling undertaken for other phases, the calculated incident sound levels used to inform the site appraisal are outlined in **Table 6**.

Table 6: Environmental Sound Survey Data Results

Location	Calculated Incident Sound Levels (dB)		
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	L _{Aeq,16h}	L _{Aeq,8h}	Typical L _{AFMax}
Eastern Site Boundary	50	46	64
Western Site Boundary	45	41	61

External Sound Levels

Calculations indicate that noise levels in the proposed external amenity areas associated with operational road traffic noise are likely to be below 55 dB L_{Aeq,16hours} during the daytime period across the entire site.

It should be noted that the above calculated incident sound levels are based on an undeveloped site. It is likely that, following the completion of the development, the proposed dwellings located at both Phase 8 and the neighbouring phases are likely to provide screening to external sound levels. Therefore, noise levels in external amenity areas are anticipated to fall further below 55 dB L_{Aeq,16hours} during the daytime period.

Internal Sound Levels – Windows Closed

The calculated incident sound levels have been used to determine the likely internal sound levels within dwellings at the proposed development. Based on a composite façade reduction of around 30 dB R_w, which considers the use of conventional double glazing and whole dwelling ventilation through the use of trickle ventilators, the expected internal noise levels with windows closed are outlined in **Table 7**.

Table 7: Calculated Internal Noise Levels – Windows Closed

Location	Calculated Internal Noise Levels (dB)		
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	L _{Aeq,16h}	L _{Aeq,8h}	Typical L _{AFMax}
Eastern Site Boundary	20	16	34
Western Site Boundary	15	11	31

The above indicates that standard external constructions should be capable of providing sufficient sound insulation to achieve suitable internal ambient noise levels, below the guideline levels of BS 8233:2014 across the entire site.

Internal Sound Levels – Windows Open

Based on the measured survey data, external night-time sound levels are anticipated to be below 49 dB L_{Aeq,8hours} and 64 dB L_{Amax,f} across the development indicating that with respect to Approved Document O, the use of opening windows to control overheating is likely to be suitable, based on the ventilation requirements of the 'simplified method' in Approved Document O.

Internal sound levels within dwellings should be considered during the detailed planning and design stage of the development, to ensure the target criteria are complied with.

SUMMARY AND CONCLUSIONS

Stantec UK Ltd. has been commissioned by Jelson Limited to undertake a site appraisal to support a reserved matters application for the discharge of planning condition 33 relating to Phase 8 of Normandy Fields, Hinckley.

The wider development was granted outline planning permission in May 2018. The development was granted outline planning permission in May 2018 (planning reference No. 15/00188/OUT). Following the granting of planning permission, Condition 33 imposed on the development requires a scheme for protecting the proposed dwellings from noise associated with road traffic and the proposed convenience store to be submitted to and approved by the Local Authority.

On-site environmental sound levels are considered to be dominated by vehicular movements on the A47 Normandy Way. Noise levels associated with other sources, including the adjacent farm site, were not considered to be audible over and above noise levels associated with road traffic. As such, this source of noise has not been considered further.

Noise levels in the proposed external amenity areas associated with operational road traffic noise are likely to be below 55 dB $L_{Aeq,16hours}$ during the daytime period across the entire site. It should be noted that this has been based on an undeveloped site. It is likely that, following the completion of the development, the proposed dwellings located at both Phase 8 and the neighbouring phases are likely to provide screening to external sound levels. Therefore, noise levels in external amenity areas are anticipated to fall further below 55 dB $L_{Aeq,16hours}$ during the daytime period.

Calculations indicate that standard external constructions should be capable of providing sufficient sound insulation to achieve suitable internal ambient noise levels, below the guideline levels of BS 8233:2014 across the entire site.

External night-time sound levels are anticipated to be below 49 dB $L_{Aeq,8hours}$ and be 64 dB $L_{Amax,f}$ across the development indicating that with respect to Approved Document O, the use of opening windows to control overheating is likely to be suitable, based on the ventilation requirements of the 'simplified method' in Approved Document O.

Based on the results of the site appraisal undertaken, internal and external noise levels are likely to achieve the relevant guideline values and as such, the site appraisal is considered suitable to support the discharge of planning Condition 33.