Land East of Newgate Lane East, Fareham

Noise Assessment

784-B032118

January 2022

Miller Homes Ltd. & Bargate Homes Ltd.

tetratecheurope.com

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report presents the findings of a noise assessment for a proposed residential development at Land East of Newgate Lane East, Fareham. This assessment has been undertaken and the results used to determine the noise exposure on future users of the proposed development.

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise. The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and a set of location plans, noise contour plots relevant to the assessment are presented throughout the document.

1.2 LEGISLATIVE CONTEXT

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published in July 2021. With regard to noise and planning, the NPPF contains the following statement at paragraph 174:

"174 Planning policies and decisions should contribute to and enhance the natural and local environment by:

> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans…"*

"185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"*

"187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

188. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England, is to, *'identify whether the overall effect of 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.'*

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated as follows:

Table 1.1 NPPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No Specific Measures Required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			

Perception	Examples of Outcomes	Increasing Effect Level	Action
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The NPPF, NSPE and PPG: Noise do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including the 'World Health Organisation Community Noise Guidelines' (1999) and 'BS 8233 – Guidance on Sound Insulation and Noise Reduction for Buildings' (2014), Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG: Noise also states that "*neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.*"

Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was launched on 22nd June 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). The publication provides practitioners with guidance on the management of noise within the planning system in England.

The guidance is specifically for 'new residential development that would be exposed predominantly to noise from existing transport sources' and reflects the Government's overarching Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF), and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance.

The guidance provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Promote appropriate noise exposure standards; and

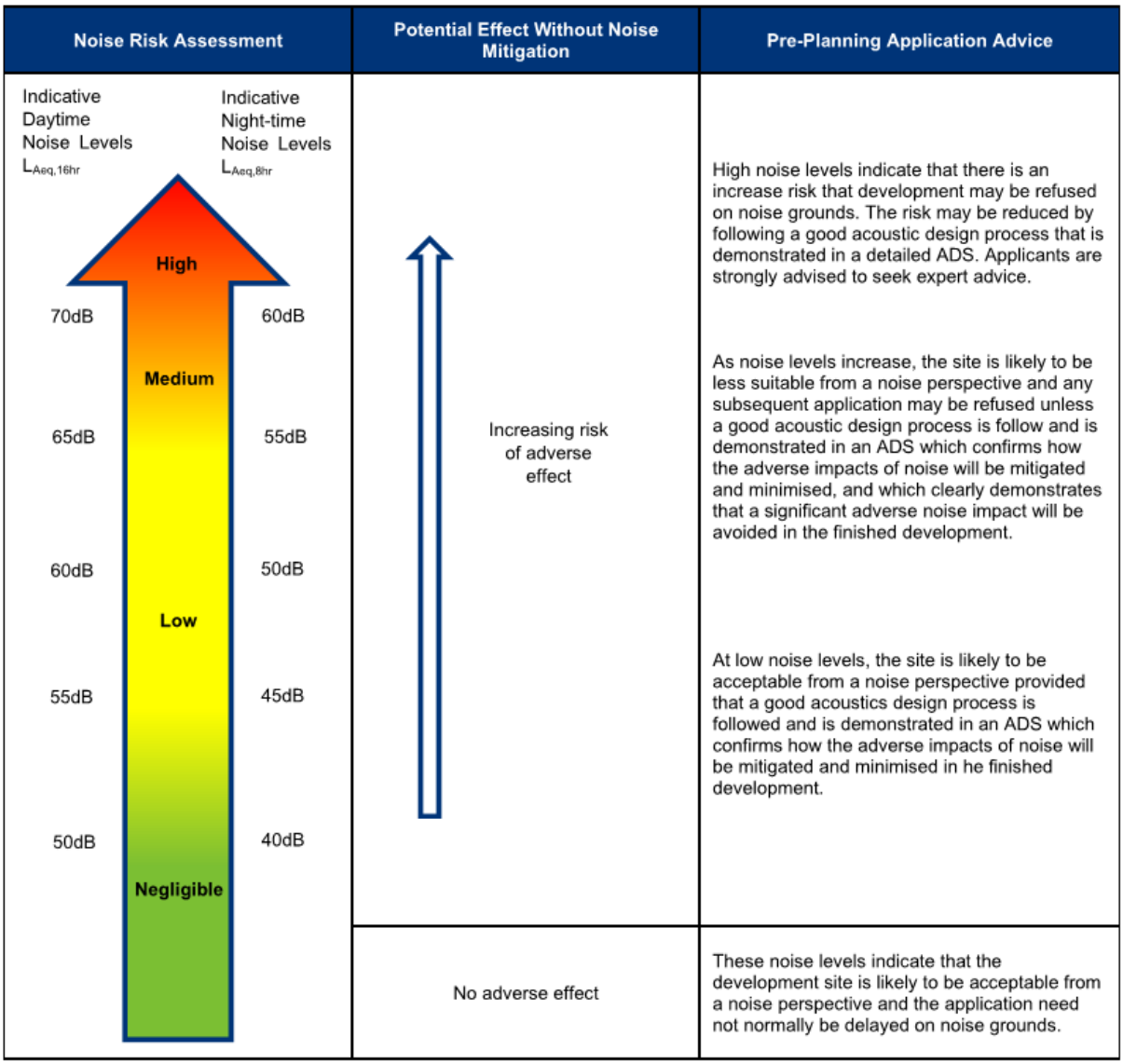
- Assist the delivery of sustainable development.

There are two stages of the overall approach outlined in the ProPG:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of 4 key elements which is underpinned by an Acoustic Design Statement.

With regards to Stage 1, ProPG provides guidance to produce an initial site risk assessment, pre-mitigation, with regards to noise based on the prevailing daytime and night time noise levels across the site, from which the site (or areas thereof) can be allocated a Noise Risk as shown in Figure 1.1 below, together with their corresponding sound levels as referred to in the ProPG.

Figure 1.1 ProPG Stage 1, Noise Risk Assessment



An Acoustic Design Statement is then produced which addresses issues found in Stages 1 & 2 of the ProPG approach including recommendations for mitigation.

1.3 ACOUSTIC CONSULTANTS' QUALIFICATIONS AND PROFESSIONAL MEMBERSHIPS

The lead project Acoustic Consultant is David Fink. The report has been checked by Ashley Shepherd and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised below.

Table 1.2 Acoustic Consultants' Qualifications & Experience

Name	Job Title	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
David Fink	Environmental Technician	BENg 2016	Mar 2017	Jun 2017	-
Ashley Shepherd	Principal Consultant	Bsc 2013	Feb 2014	Feb 2014	Nov 2017
Nigel Mann	Director	BSc 1997 MSc 1999	Nov 2001	Nov 1998	Nov 2001

2.0 ASSESSMENT CRITERIA

2.1 NOISE ASSESSMENT CRITERIA

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from the following standards and design guidance:

- BS 8233:2014 *'Guidance on Sound insulation and noise reduction for buildings'*
- *World Health Organisation (WHO) 'Guidelines for Community Noise'*

Table 2.1 Noise Level Criteria and Actions

Effect Level	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level (NOAEL)	Noise levels are below: Bedrooms: 30 dB $L_{Aeq,8hours}$/45 dB L_{Amax} Living Rooms: 35 dB $L_{Aeq,16hours}$	Within BS8233 / WHO guideline criteria
Lowest Observed Adverse Effect Level (LOAEL)	Noise levels are at: Bedrooms: 30 dB $L_{Aeq,8hours}$/45 dB L_{Amax} Living Rooms: 35 dB $L_{Aeq,16hours}$	Within BS8233 / WHO guideline criteria
Significant Observed Adverse Effect Level (SOAEL)	Noise levels are exceeded: Bedrooms: 35 dB $L_{Aeq,8hours}$/50 dB L_{Amax} Living Rooms: 40 dB $L_{Aeq,16hours}$	Mitigate and reduce to achieve: Bedrooms: 30 dB $L_{Aeq,8hours}$/45 dB L_{Amax} Living Rooms: 35 dB $L_{Aeq,16hours}$
Unacceptable Observed Adverse Effect Level (UOAEL)	Noise levels with mitigation exceed: Bedrooms – 35 dB $L_{Aeq,8hours}$ Living Rooms – 40 dB $L_{Aeq,16hours}$	Prevent

For the purposes of this assessment, the maximum external noise level from the source under consideration will be 45 dBA during the daytime, and 40 dB(A) during the night-time to ensure a maximum daytime L_{Aeq} of 35 dB, and a maximum night-time L_{Aeq} of 30 dB within habitable rooms are achieved. Similarly, outdoor levels of 60 dB L_{Amax} for open windows at night or internal levels of 45 dB L_{Amax} no more than 10 times a night will be considered.

3.0 ASSESSMENT METHODOLOGY

3.1 NOISE MODELLING METHODOLOGY

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict L_{Aeq} and L_{Amax} noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used (as shown in Figure 3.1). This model is based on the Department of Transport Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically.

Figure 3.1 CADNA Noise Modelling

The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Ground levels – other areas	Site Observations and Ordnance Survey	OS 1:25,000 contours and OS 1:10,000 spot heights.
Traffic data, main surrounding roads	Tetra Tech	Traffic flows for local roads based on verification of measured noise levels, Tetra Tech observations and experience.

Parameter	Source	Details
Building heights – around site	Tetra Tech	8 m height for two storey residential properties, 12m height for three storey properties, and 4 m for Bungalows.
Barrier heights	Tetra Tech	Existing barriers have been modelled at varying heights observed during the attended survey and assessment
Receptor positions	Tetra Tech	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties with ground floor with a further increase of 4.0m per storey.
Proposed Layout	Pegasus Design	Title: Newgate Lane East Concept Masterplan Drawing Number: P20-3154_02 Dated: 20/09/2021

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 MODEL INPUT DATA

Existing Ambient Noise Climate

Noise sources affecting the Site including Newgate Lane East to the west and all other roads expected to make a significant contribution, have been used within this assessment. Noise emissions from existing road traffic flows have been derived from verification of the measured noise levels, along with observations made during the site survey and/or Tetra Tech experience of similar road systems. Similarly, noise sources at the Speedfields Park Shopping Centre/Sports Club to the north have been observed during the site survey and included within the noise model.

Model Verification

The models were verified by modelling the monitoring locations for the 'existing' scenario, including contributions from the surrounding road network. The verified noise model created using the 2021 noise survey has been supplemented using existing survey data from a previous 2018 survey, as further discussed within Section 4.0. Worst-case daytime and night-time L_{Aeq} and night-time L_{Amax} scenarios have been verified. The comparison between the monitoring and modelling results are shown in Tables 3.2 – 3.4 below.

Table 3.2 Modelled vs. Monitored Results (2021) $L_{Aeq;\ daytime\ 07:00 – 23:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	72.9	72.0	-0.9

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

Table 3.3 Modelled vs. Monitored Results (2021) $L_{Aeq;\ night\text{-}time\ 23:00–\ 07:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	66.3	65.2	-1.1

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

Table 3.4 Modelled vs. Monitored Results (2021) $L_{Amax;\ night\text{-}time\ 23:00–\ 07:00}$

Location	Monitored L_{Amax}	Modelled L_{Amax}	Difference between Monitored and Modelled Results
LT1	83.1	81.3	-1.8

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

Table 3.5 Modelled vs. Monitored Results (2018) $L_{Aeq;\ daytime\ 07:00\ –\ 23:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT2	54.9	52.4	-2.5
LT3	54.3	51.9	-2.4
ST1	73.0	72.0	-1.0
ST2	65.6	65.6	0.0
ST3	64.6	63.8	-0.8

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

Table 3.6 Modelled vs. Monitored Results (2018) $L_{Aeq;\ night\text{-}time\ 23:00–\ 07:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT2	45.1	44.2	-0.9
LT3	52.4	52.4	0.0
ST1	69.3	66.8	-2.5
ST2	51.3	52.9	1.6
ST3	61.2	60.2	-1.0

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

Within the verification exercise, greater weight and confidence has been given to the long-term measurements due to a longer exposure time representing noise around the site. The verification points show a divergence between monitored and modelled results of no more than +/- 3 dB during both the daytime and night-time L_{Aeq} and L_{Amax} scenarios for all long-term measurement locations.

Specific Noise Sources

HGV Delivery Event Noise Data – Speedfields Park Shopping Centre

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 3 m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same store have been recorded to vary by as much as 14 dB.

As such, the following worst-case calculations have been based on measurements of refrigerated, articulated HGVs delivering consumables at Speedfields Park Shopping Centre. All measurements were undertaken in free-field conditions. In addition to noise from the unloading process, the levels used in the assessment include noise from the vehicle pulling up to the unloading bay, manoeuvring into position and then pulling away once unloading/loading is complete, together with other sources such as trolleys and reversing alarms. The calculations are based on a maximum of one event per hour.

Delivery Vehicle Docking and Unloading

3 minutes at L_p 75 dB at 3 m distance (vehicle arriving and manoeuvring)
30 minutes at L_p 70 dB at 3 m distance (vehicle unloading)
2 minutes at L_p 72 dB at 3 m distance (vehicle leaving)
23 minutes of quiet (associated with documentation and waiting with engine off)

$$L_{Aeq(60\ mins)} = 10\log(1/60)(3\text{mins} \times 10^{0.1 \times 75dB} + 30\text{mins} \times 10^{0.1 \times 70dB} + 2\text{mins} \times 10^{0.1 \times 72dB})$$
$$= 68.5 \text{ dB at 3 m distance}$$

Delivery Vehicle Arriving/Exiting along service yard access road

The following calculations have been used to represent this as a line source in the model.

1 x 10 seconds L_p = 74.3 dB at 3 m distance (vehicle arriving and leaving)

$$L_{Aeq(60\ mins)} = 10\log(1/60\text{mins})(10\ \text{sec} \times 10^{0.1 \times 74.3\ dB} + 10\ \text{sec} \times 10^{0.1 \times 74.3\ dB})$$
$$= 51.7 \text{ dB at 3 m distance}$$

Car Park Noise Data – Speedfields Park Shopping Centre

Noise levels from the car parking areas of the Speedfields Park Shopping Centre to the north have been determined based upon observations within existing large retail car parks during busy daytime periods and on-site measurements. L_{Aeq} noise levels, as follows, are modelled as area sources across the entire car park.

Daytime $L_{Aeq,1hr}$ Noise Level = 54.2 dB at 1.5m height

Sports Club Noise Data

Noise levels from the sports club playing fields to the north of the site have been determined based upon observations within existing similar sites. L_{Aeq} noise levels, as follows, are modelled as area sources across the two floodlit football pitches with an assumption made that they will be used during the daytime and evening periods.

Daytime $L_{Aeq,1hr}$ Noise Level = 62.1 dB at 1.5m height

3.3 SENSITIVE RECEPTORS

Existing noise levels have been assessed on all facades of the proposed development. The locations of the proposed residential and amenity receptors are shown in Figures 3.3 and 3.4 respectively.

Figure 3.3 Proposed Sensitive Receptor Locations

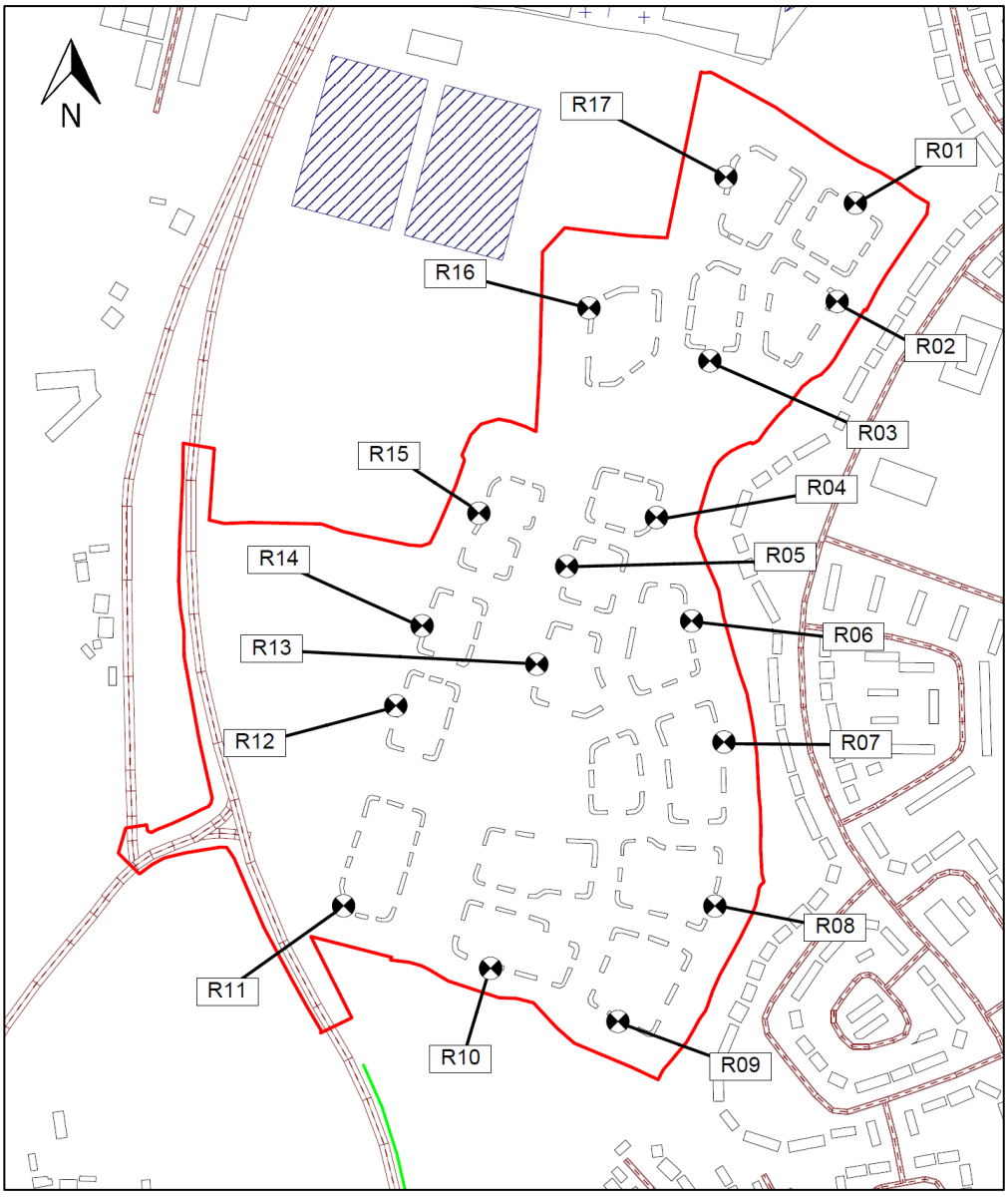


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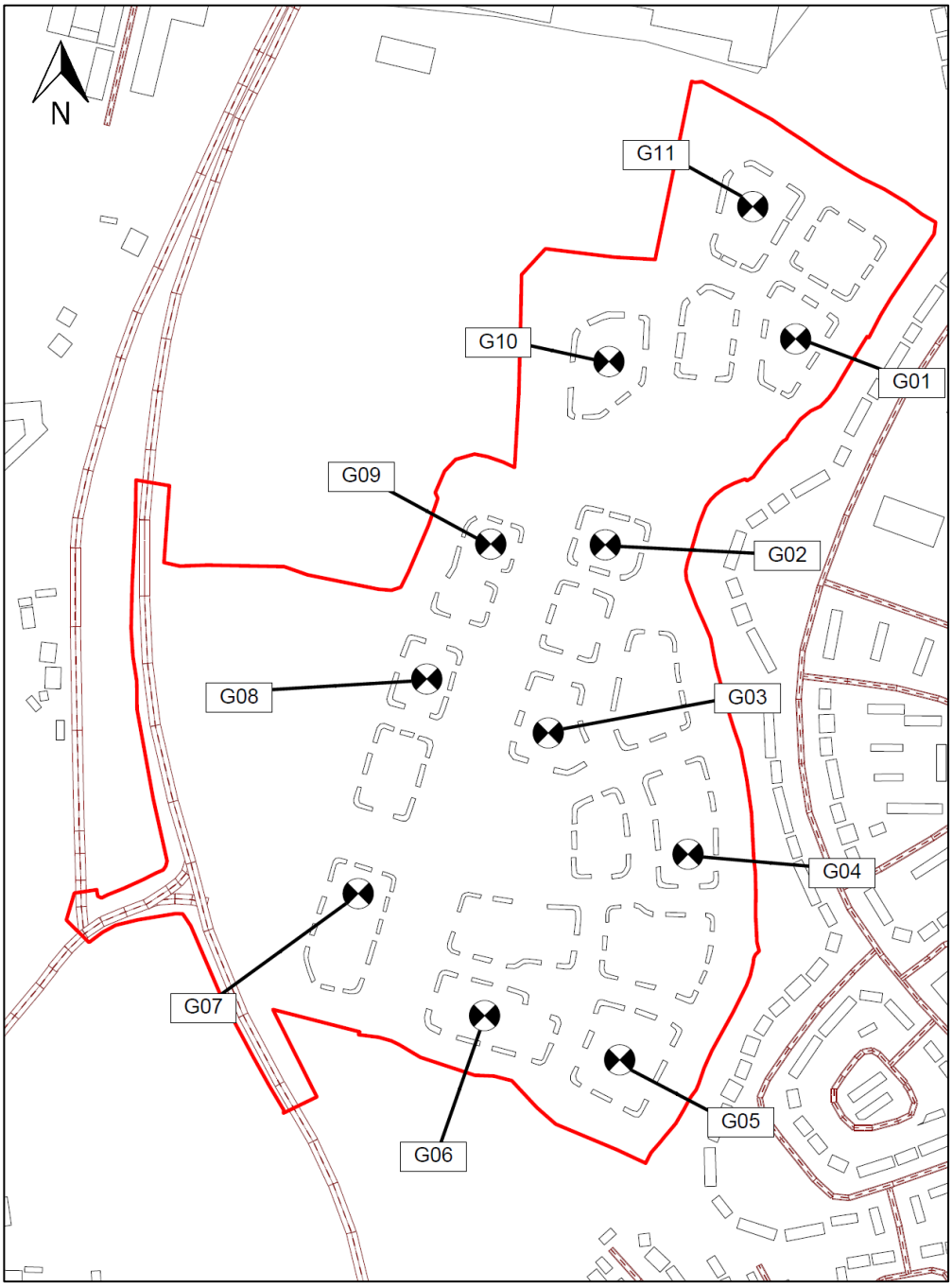
Figure 3.4 External Amenity Receptor Locations



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4.0 NOISE SURVEY

4.1 NOISE SURVEY METHODOLOGY

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. The results of this survey have been supplemented by an existing noise survey undertaken in June 2018, the results of which are presented within Table 4.4.

Equipment used during the survey included:

Rion NL-52	*Environmental Noise Analyser (WYG19)*	*s/n*	*253701*
Rion NL-52	*Environmental Noise Analyser (WYG20)*	*s/n*	*253702*
Rion NC-75	*Sound Calibrator*	*s/n*	*35270131*

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of +0.1 dB was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at six locations (as specified in the following table and shown in Figure 4.1) from Monday 4th October 2021 to Wednesday 13th October 2021. Attended short term measurements were undertaken at four locations during day, evening and night-time periods with two additional locations being measured unattended over a 216-hour period. The raw data collected from the long-term monitoring is available upon request.

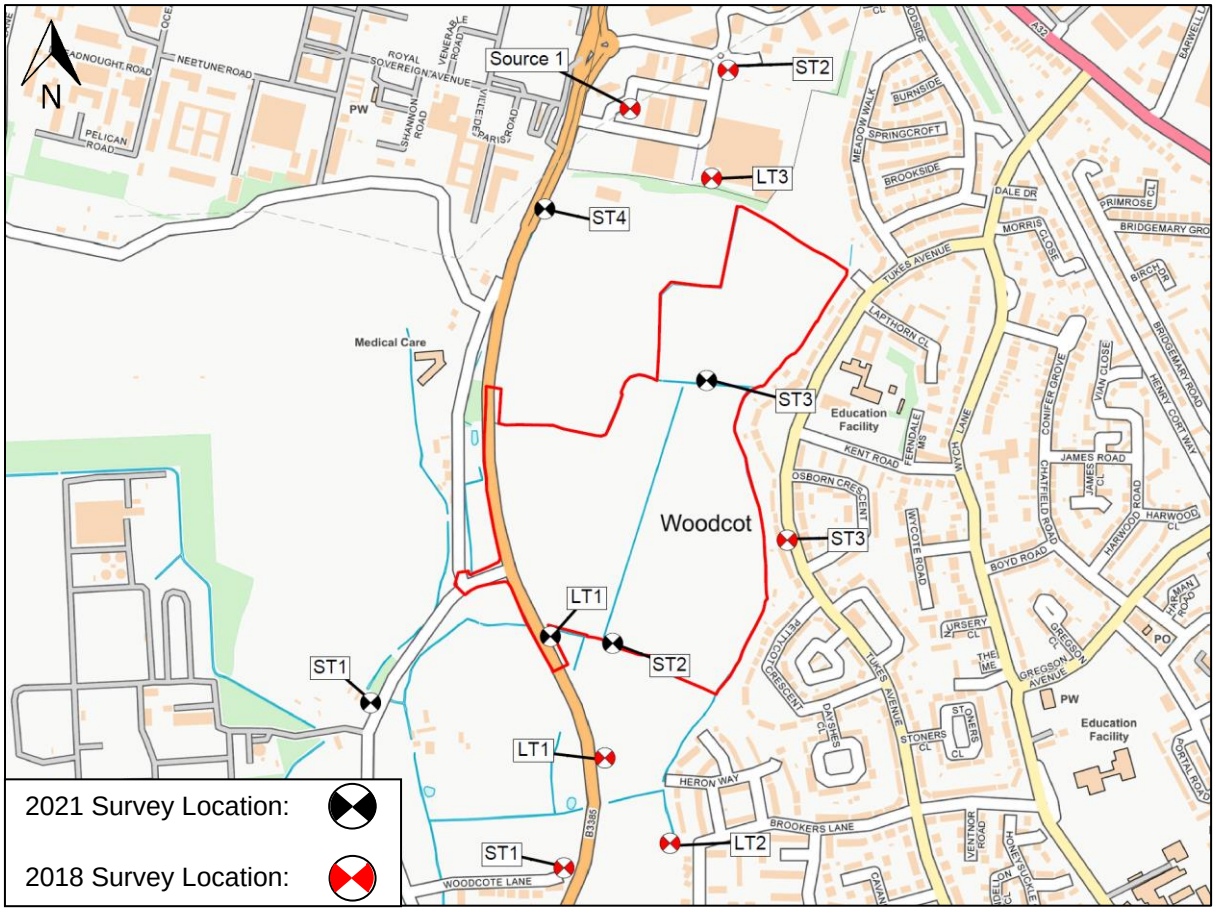
Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being mostly dry with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant southerly wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Survey Year	Description
LT1	2021	Eastern site boundary, facing Newgate Lane East
ST1		East of Traveller's Site, on Newgate Lane
ST2		Field to the east of Newgate Lane East
ST3		Field to the east of Newgate Lane East
ST4		Northern end of Newgate Lane East
LT1	2018	South-west boundary of site along Newgate Lane East
LT2		South-east corner of the site near Brookers Lane

Ref	Survey Year	Description
LT3		North boundary of site to rear of the Fareham Asda delivery yard
ST1		At the intersection of Brookers Lane and Newgate Lane East
ST2		Beside roundabout at entrance to Asda car park, Speedfields Park
ST3		125 Tukes Avenue

Figure 4.1 Noise Monitoring Locations



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4.2 NOISE SURVEY RESULTS

The dominant noise source in the area was road traffic noise from Newgate Lane East. Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.2 Meteorological Conditions during the Survey - 2021

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	05/10/2021 10:49	13	4	W	6	Road traffic noise.
Day ST2	05/10/2021 11:43	13	4	W	6	Road traffic noise.
Day ST3	05/10/2021 11:27	13	4	W	6	Road traffic noise.
Day ST4	05/10/2021 11:07	13	4	W	6	Road traffic noise.
Evening ST1	04/10/2021 21:23	15	2	S	4	Road traffic noise.
Evening ST2	04/10/2021 22:03	15	2	S	4	Road traffic noise.
Evening ST3	04/10/2021 22:19	15	2	S	4	Road traffic noise.
Evening ST4	04/10/2021 21:42	15	2	S	4	Road traffic noise.
Night ST1	04/10/2021 23:03	12	3	SW	5	Road traffic noise.
Night ST2	04/10/2021 23:40	12	3	SW	5	Road traffic noise.
Night ST3	04/10/2021 23:56	12	3	SW	5	Road traffic noise.
Night ST4	04/10/2021 23:20	12	3	SW	5	Road traffic noise.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels) - 2021

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	112 Hours	04/10/2021 – 13/10/2021 07:00 - 23:00	LT1	72.9	106.7	33.7	75.2	70.0
Weekday Night-time 23:00 – 07:00	56 Hours	04/10/2021 – 13/10/2021 23:00 - 07:00		66.3	92.5	22.1	65.7	34.0
Weekend Daytime 07:00 - 23:00	32 Hours	09/10/2021 – 10/10/2021 07:00 - 23:00		71.8	96.7	36.3	74.4	69.0
Weekend Night-time 23:00 – 07:00	16 Hours	09/10/2021 – 10/10/2021 23:00 - 07:00		63.9	85.3	28.2	66.3	34.0
Daytime 07:00 - 19:00	15 Mins	05/10/2021 10:49	ST1	58.3	76.7	43.2	60.1	45.2
	15 Mins	05/10/2021 11:43	ST2	62.1	69.4	55.1	64.2	59.1
	15 Mins	05/10/2021 11:27	ST3	61.4	70.1	52.7	64.4	55.6
	15 Mins	05/10/2021 11:07	ST4	76.0	84.0	57.8	79.0	67.2
Evening 19:00 - 23:00	15 Mins	04/10/2021 21:23	ST1	53.0	76.3	39.2	49.7	43.4
	15 Mins	04/10/2021 22:03	ST2	55.8	65.4	42.5	58.7	49.9
	15 Mins	04/10/2021 22:19	ST3	54.3	65.0	40.0	57.2	47.6
	15 Mins	04/10/2021 21:42	ST4	74.3	84.9	53.0	78.7	62.0
Night-time	15 Mins	04/10/2021 23:03	ST1	58.1	82.6	42.6	53.2	45.8

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
23:00 - 07:00	15 Mins	04/10/2021 23:40	ST2	54.0	65.4	40.3	57.7	45.7
	15 Mins	04/10/2021 23:56	ST3	55.1	66.6	42.7	58.4	48.2
	15 Mins	04/10/2021 23:20	ST4	69.8	85.6	45.1	74.7	51.8

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels) - 2018

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	66 Hours	14/06/2018 – 20/06/2018 07:00 - 23:00	LT1	68.2	101.2	36.0	71.4	60.0
Weekday Night-time 23:00 – 07:00	32 Hours	14/06/2018 – 20/06/2018 23:00 - 07:00		62.3	84.5	24.7	59.5	36.0
Weekend Daytime 07:00 - 23:00	32 Hours	16/06/2018 – 17/06/2018 07:00 - 23:00		68.0	99.6	35.3	71.4	61.0
Weekend Night-time 23:00 – 07:00	16 hours	16/06/2018 – 17/06/2018 07:00 - 23:0023:00 - 07:00		60.9	84.6	27.5	61.1	37.0
Weekday Daytime 07:00 - 23:00	66 Hours	14/06/2018 – 20/06/2018 07:00 - 23:00	LT2	54.0	88.9	35.3	53.5	48.0
Weekday Night-time 23:00 – 07:00	32 Hours	14/06/2018 – 20/06/2018 23:00 - 07:00		43.8	64.6	21.8	44.7	32.0
Weekend Daytime 07:00 - 23:00	32 Hours	16/06/2018 – 17/06/2018 07:00 - 23:00		54.9	90.2	34.6	53.6	50.0
Weekend Night-time 23:00 – 07:00	16 hours	16/06/2018 – 17/06/2018 07:00 - 23:0023:00 - 07:00		45.1	69.3	25.5	47.2	44.0
Weekday Daytime 07:00 - 23:00	57 Hours	14/06/2018 – 20/06/2018 07:00 - 23:00	LT3	53.8	86.7	36.1	54.1	48.0
Weekday Night-time 23:00 – 07:00	24 Hours	14/06/2018 – 20/06/2018 23:00 - 07:00		51.3	84.3	29.7	50.2	38.0
Weekend Daytime 07:00 - 23:00	32 Hours	16/06/2018 – 17/06/2018 07:00 - 23:00		54.3	86.8	37.8	54.8	50.0
Weekend Night-time 23:00 – 07:00	16 hours	16/06/2018 – 17/06/2018 07:00 - 23:0023:00 - 07:00		52.4	85.4	30.9	50.4	40.0
Daytime 07:00 – 19:00	15 Mins	15/06/2018 10:54	ST1	73.0	84.0	55.0	75.6	66.7
	15 Mins	14/06/2018 16:45	ST2	65.6	77.6	50.5	69.4	58.4
	15 Mins	14/06/2018 16:11	ST3	64.6	81.7	42.0	70.4	45.4
Evening 19:00 - 23:00	15 Mins	14/06/2018 21:27	ST1	69.1	81.4	43.2	73.3	50.6
	15 Mins	14/06/2018 21:55	ST2	64.1	86.9	41.0	62.1	49.4
	15 Mins	14/06/2018 21:02	ST3	63.6	87.5	37.6	62.6	42.1
Night-time 23:00 – 07:00	15 Mins	14/06/2018 23:23	ST1	69.3	89.7	34.6	73.1	43.2
	15 Mins	14/06/2018 23:43	ST2	51.3	69.3	36.1	54.7	39.7
	15 Mins	14/06/2018 23:01	ST3	61.2	82.5	34.1	60.0	37.5

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

5.0 ASSESSMENT OF KEY EFFECTS

5.2 PROPG STAGE 1 ASSESSMENT

Based on the verified L_{Aeq} noise models, noise levels at the site are within 'Negligible' to 'High' Noise Risk Categories during both the daytime and night-time periods, shown illustratively on Figure 5.1 and 5.2 below. As such, these noise levels indicate that a good acoustic design process should be followed and an Acoustic Design Statement showing how adverse impacts of noise will be minimised through mitigation which is detailed in Section 6.0.

Figure 5.1 ProPG Stage 1 Noise Risk Contour Plot Daytime $L_{Aeq,16hr}$ (Grid Height 1.5m)

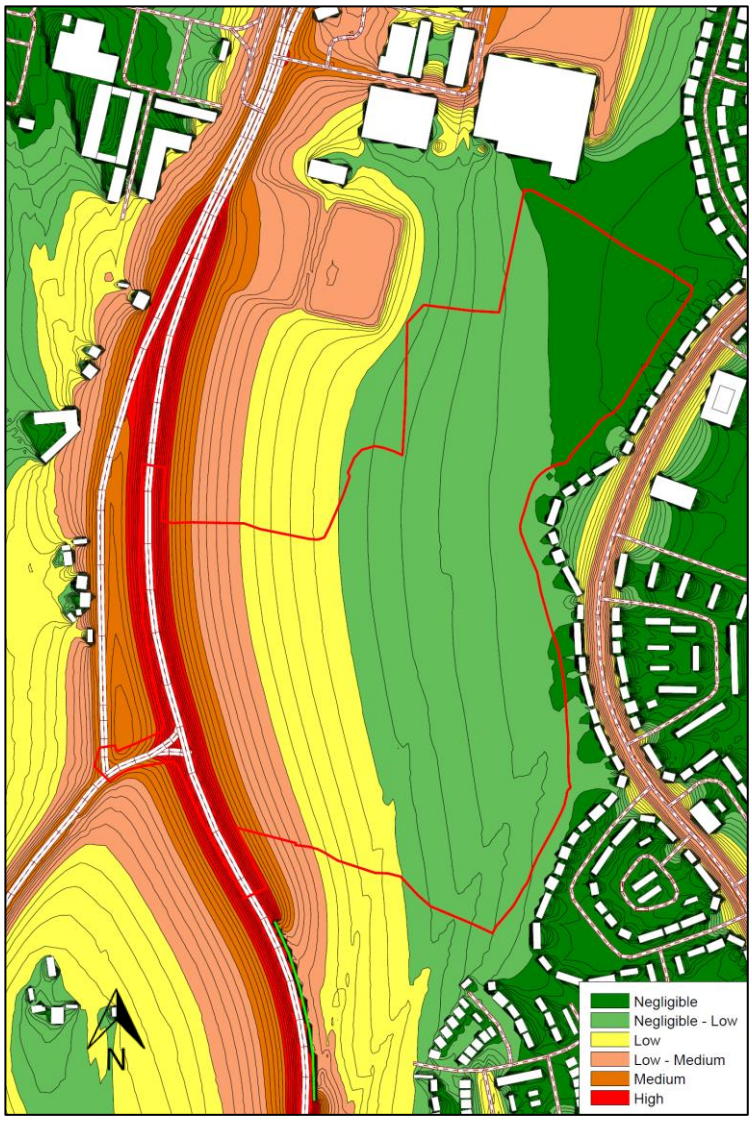

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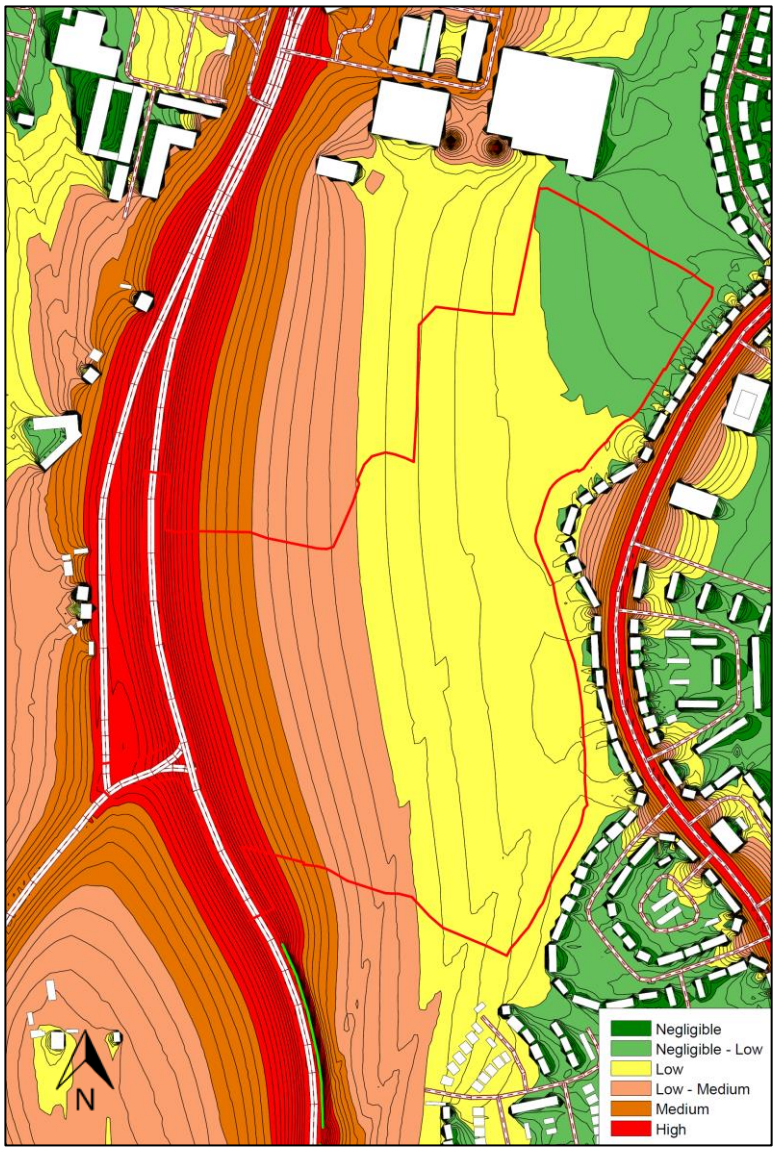
Figure 5.2 ProPG Stage 1 Noise Risk Contour Plot Night-time $L_{Aeq,8hr}$ (Grid Height 4.0m)



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5.1 PROPG STAGE 2 (NOISE INTRUSION) ASSESSMENT

Modelling and assessment has been undertaken for proposed sensitive properties across the site using an indicative building layout. Internal noise levels within proposed properties have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of glazing with specification Rw+Ctr 30 dB (e.g. 6/12/8mm double glazing or equivalent) has been used. The results presented in Tables 5.1 – 5.3 below, show the predicted noise intrusion levels at properties across the site.

Table 5.1 Daytime Noise Intrusion Levels $L_{Aeq\ 16\ hour}$

Location	Height (m)	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	1.5	42.1	32.1	12.1	35
R02	1.5	41.6	31.6	11.6	35
R03	1.5	47.8	37.8	17.8	35
R04	1.5	41.3	31.3	11.3	35
R05	1.5	48.8	38.8	18.8	35
R06	1.5	41.7	31.7	11.7	35
R07	1.5	49.5	39.5	19.5	35
R08	1.5	40.4	30.4	10.4	35
R09	1.5	40.2	30.2	10.2	35
R10	1.5	51.5	41.5	21.5	35
R11	1.5	54.8	44.8	24.8	35
R12	1.5	63.7	53.7	33.7	35
R13	1.5	56.9	46.9	26.9	35
R14	1.5	55.6	45.6	25.6	35
R15	1.5	53.7	43.7	23.7	35
R16	1.5	52.5	42.5	22.5	35
R17	1.5	49.3	39.3	19.3	35

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

Figure 5.3 Noise Contour Plot Daytime LAeq,16hour (Grid Height 1.5m)

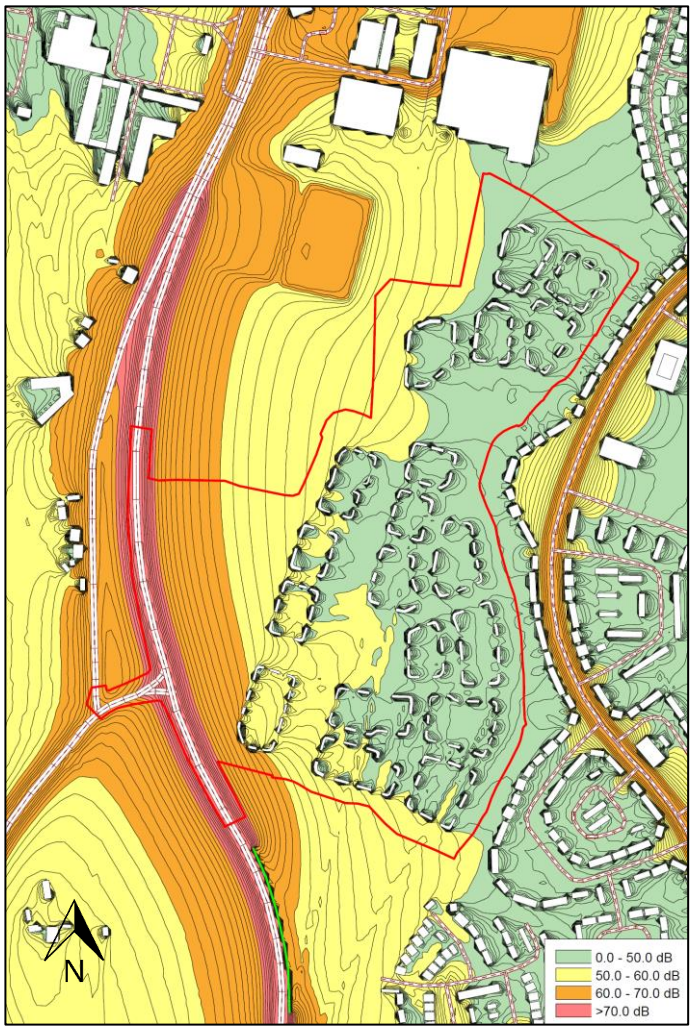

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Table 5.2 Night-time Noise Intrusion Levels $L_{Aeq\ 8\ hour}$

Location	Height (m)	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	4.0	35.0	25.0	5.0	30
R02	4.0	36.8	26.8	6.8	30
R03	4.0	41.3	31.3	11.3	30
R04	4.0	36.0	26.0	6.0	30
R05	4.0	41.8	31.8	11.8	30
R06	4.0	37.5	27.5	7.5	30
R07	4.0	42.8	32.8	12.8	30
R08	4.0	36.1	26.1	6.1	30
R09	4.0	35.2	25.2	5.2	30
R10	4.0	44.8	34.8	14.8	30

Location	Height (m)	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R11	4.0	48.0	38.0	18.0	30
R12	4.0	56.9	46.9	26.9	30
R13	4.0	50.2	40.2	20.2	30
R14	4.0	48.8	38.8	18.8	30
R15	4.0	46.9	36.9	16.9	30
R16	4.0	44.7	34.7	14.7	30
R17	4.0	41.8	31.8	11.8	30

All values are sound pressure levels in dB re: 2x 10^{-5} Pa.

Figure 5.4 Noise Contour Plot Night-time $L_{Aeq,8hour}$ (Grid Height 4.0m)

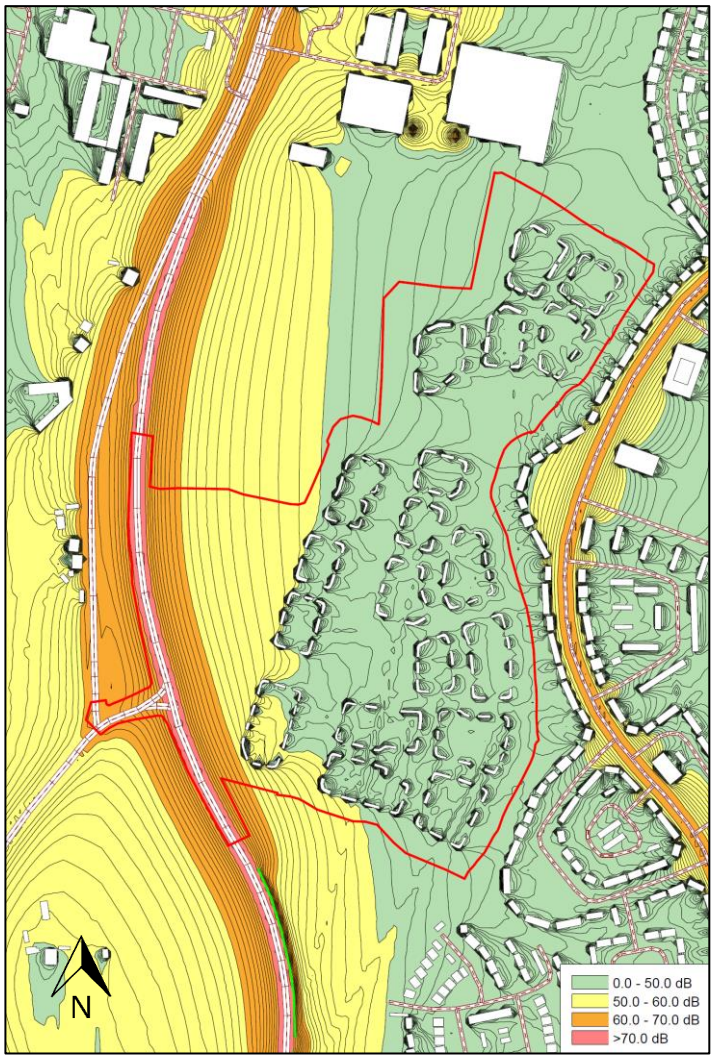

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Table 5.3 Night-time Noise Intrusion Levels L_{max}

Location	Height (m)	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	4.0	56.9	46.9	26.9	45
R02	4.0	48.4	38.4	18.4	45
R03	4.0	56.7	46.7	26.7	45
R04	4.0	49.0	39.0	19.0	45
R05	4.0	57.9	47.9	27.9	45
R06	4.0	51.1	41.1	21.1	45
R07	4.0	58.8	48.8	28.8	45
R08	4.0	50.4	40.4	20.4	45
R09	4.0	47.3	37.3	17.3	45
R10	4.0	60.6	50.6	30.6	45
R11	4.0	63.9	53.9	33.9	45
R12	4.0	72.9	62.9	42.9	45
R13	4.0	65.8	55.8	35.8	45
R14	4.0	64.5	54.5	34.5	45
R15	4.0	62.6	52.6	32.6	45
R16	4.0	61.4	51.4	31.4	45
R17	4.0	61.7	51.7	31.7	45

All values are sound pressure levels in dB re: 2x 10^{-5} Pa.

The recommended WHO/BS 8233 internal noise levels are predicted to be exceeded at a number of receptors across the development site. As such, additional mitigation is outlined within Section 6.0.

5.2 EXTERNAL AMENITY AREAS

Predicted daytime noise levels within proposed garden areas are presented in Table 5.4. Predictions are made without any external mitigation and no assumed noise barriers or fences

Table 5.4 Communal External Amenity Area Assessment

Reference	Modelled Noise Level (L_{Aeq})	Criteria External (L_{Aeq})	Within Criteria?
G01	45.0	55	**YES**
G02	46.5	55	**YES**
G03	48.3	55	**YES**
G04	45.4	55	**YES**
G05	47.7	55	**YES**
G06	50.5	55	**YES**
G07	54.9	55	**YES**
G08	50.4	55	**YES**
G09	49.3	55	**YES**
G10	48.6	55	**YES**
G11	45.6	55	**YES**

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

As demonstrated in the table above, noise limits for external amenity areas outlined in BS 8233 are met across the site with no mitigation in place, and no further measures are required.

6.0 ADDITIONAL MITIGATION

Internal noise level targets outlined in BS8233 are exceeded at a number of receptors across the site with windows open, therefore alternative ventilation with sound reduction equivalent to glazing will be required at a number of locations across the site. Ventilation can be provided in several ways from acoustic trickle vents (which need to have a minimum sound reduction equal to or greater than the glazing), other passive ventilation systems or mechanical ventilations systems. Figures 6.1 & 6.2 present the glazing strategy for living rooms and bedrooms across the site.

Figure 6.1 Living Room Glazing Strategy

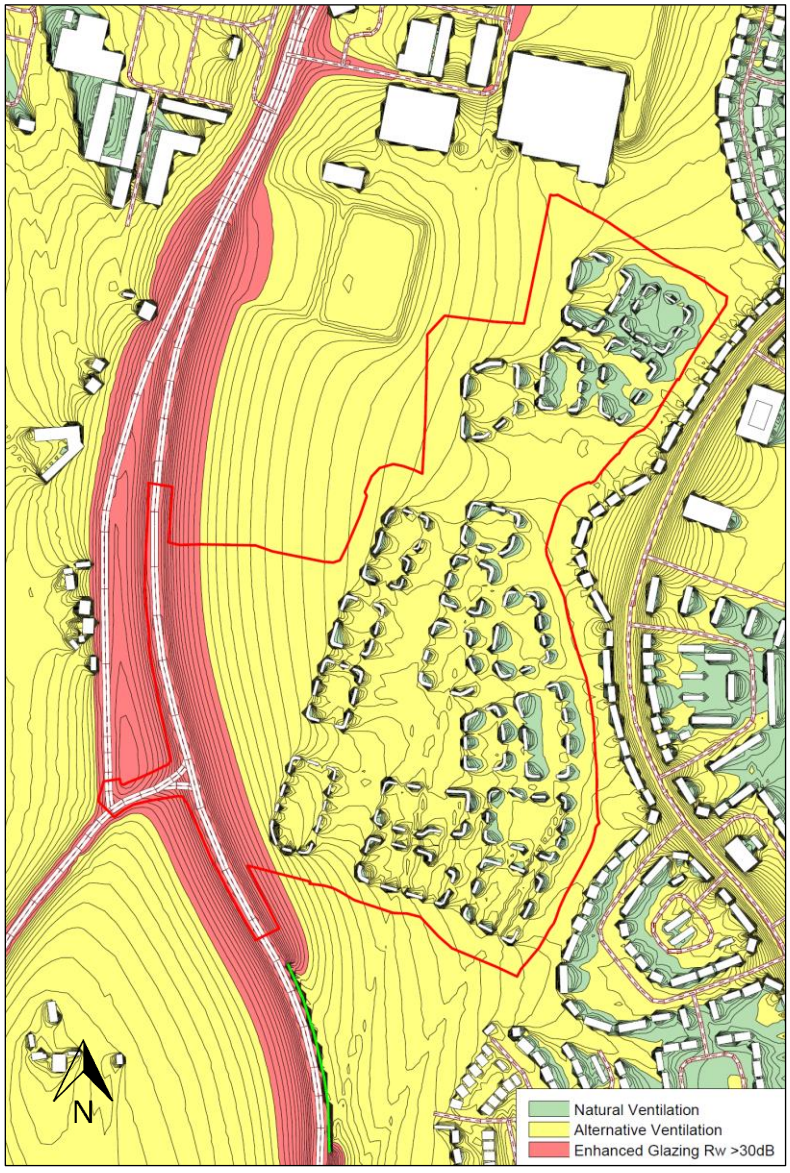

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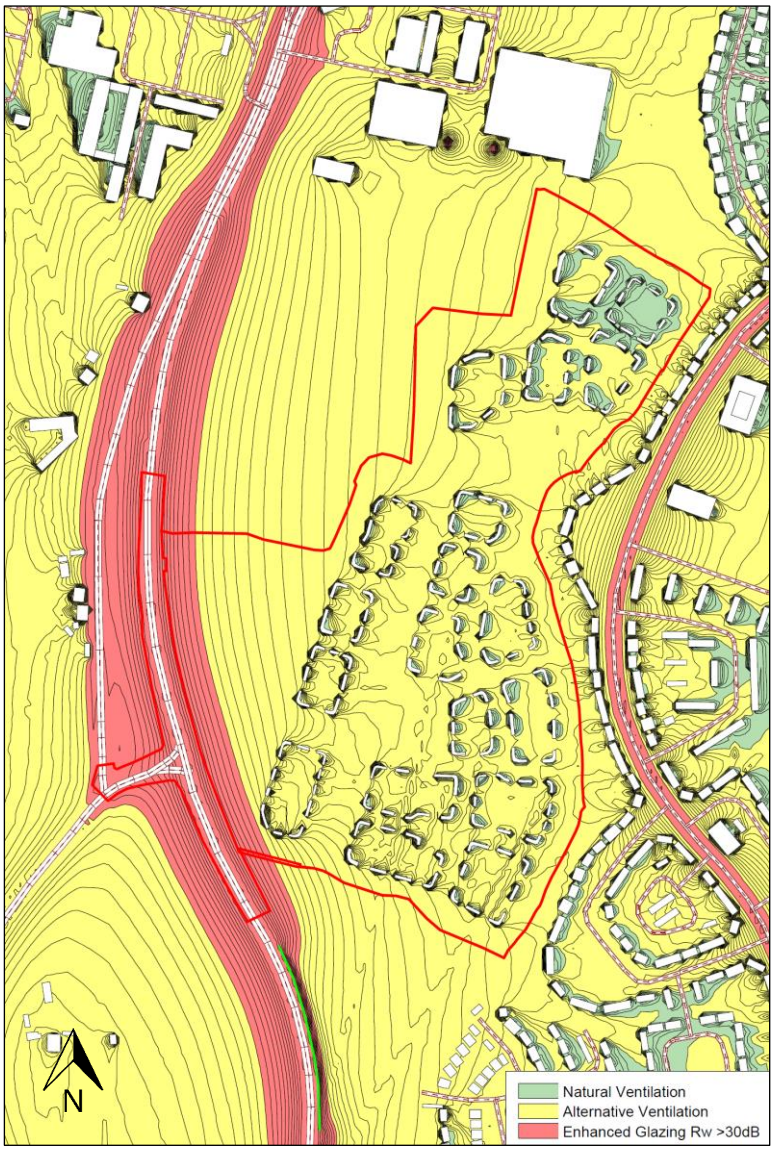
Figure 6.2 Bedroom Glazing Strategy



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As presented above, all indicative residential spaces will benefit from standard double glazing with a sound reduction of $R_w + C_{tr}$ 30 dB as a minimum, along with an alternative means of ventilation across the majority of facades. Should residential spaces be positioned within 30m of Newgate Lane East, these will require enhanced glazing with an alternative means of ventilation which matches the performance of the glazing.

Due to the speculative nature of the scheme layout, consideration will be given to the orientation of proposed dwellings and the associated internal layout. To provide further protection to future residents from noise associated with road traffic noise along Newgate Lane East, the internal layout of these dwellings should be arranged to ensure that non-sensitive rooms (such as kitchens, bathrooms, etc)

are positioned on the outer façades (closest to the road/school), with more sensitive rooms (living rooms and bedrooms) located on the sheltered façades of dwellings.

7.0 CONCLUSIONS

This report has been prepared for a proposed residential development at Land East of Newgate Lane East, Fareham.

The NPPF provides test points against which the proposed development has been assessed. Considering these points, the following conclusions can be drawn:

NPPF paragraphs 174 (e) and 185 (a)

In considering the NPPF test in section 174 (e), the proposed development is not expected to have an 'adverse impact' on health or quality of life. Similarly, with regard to proposed residential receptors, it is considered that all 'adverse impacts on health and quality of life' (relating to noise) are mitigated by the use of an appropriate glazing strategy with alternative means of ventilation which is compliant with Building Regulations. The suggested glazing and ventilation specifications will be achievable.

NPPF 185 (b), 187 and 188

It is considered that the mitigation measures outlined within this report are suitable to reduce any noticeable and intrusive noise from the surrounding environment within proposed sensitive spaces and therefore it is considered that existing businesses would not be restricted by the proposed development.

Planning Practice Guidance: Noise

The noise mitigation outlined within this report is sufficient to reduce the effects of identified sources of noise being currently emitted from the surrounding environment to prevent the adopted thresholds (within the context of BS 8233) and avoid the Significant Observed Adverse Effect Level (SOAEL). As such, with regards to noise, the development is considered acceptable.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

Acoustic Terminology

dB — Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) — Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} — Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\ –\ 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00\ –\ 23:00}$.

L_{Amin} — The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} — The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n — Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w — The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

PPG – Planning Practice Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

APPENDIX B – REPORT CONDITIONS

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The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

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