

Moorhill Road, West End Southampton

Noise Assessment

784-B029375



Noise Assessment for Proposed Care Home

October 2022

Prepared on behalf of Highwood Homes Limited

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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 70-bed care home at a site off Moorhill Road, Southampton. A noise survey 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 revised National Planning Policy Framework (NPPF), published on 20th July 2021. Section 15, Conserving and enhancing the natural environment of the National Planning Policy Framework (NPPF 2021) provides the following guidance in relation to noise impacts.

“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 (NPSE), 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			
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.*

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 'Guidelines for community noise' 1999

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 $L_{Aeq,16hours}$ External Amenity Space (daytime) – 50 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 $L_{Aeq,16hours}$ External Amenity Space (daytime) – 55 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 $L_{Aeq,16hours}$ External Amenity Space (daytime) – 60 dB $L_{Aeq,16hours}$	Mitigate and reduce to achieve: Bedrooms: 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms: 35 dB $L_{Aeq,16hours}$ External Amenity Space – 60 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

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 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 ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken.

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.
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.
Receptor positions	Tetra Tech	1 m from façade, height of 4 m for first floor properties. 1.5 m height for daytime and 4.0 m night-time model grids and monitoring locations for validation.
Proposed Layout	Harris Irwin Architects	Title: Proposed Site Plan Drawing No.: 3127-HIA-01-ZZ-DR-A-0101 Rev P11 Dated: 03/10/2022

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 Moorhill Road to the west 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.

Model Verification

The models were verified by modelling the monitoring locations for the 'existing' scenario, including contributions from the surrounding road network. 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 L_{Aeq} ; daytime 07:00 – 23:00

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	65.0	65.0	0.0
LT2**	49.8	49.6	-0.2
ST1	70.8	70.7	-0.1
ST2	70.1	70.9	0.8
ST3	49.6	52.6	3.0
ST4	51.3	52.3	1.0

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

*10th Highest L_{Amax} values

**Excluding noise values associated with dawn chorus

Table 3.3 Modelled vs. Monitored Results L_{Aeq} ; night-time 23:00– 07:00

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	59.2	59.2	0.0
LT2**	42.8	43.9	1.1
ST1	64.3	65.0	0.7
ST2	65.7	65.0	-0.7
ST3	42.3	46.9	4.6
ST4	43.9	46.5	2.6

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

*10th Highest L_{Amax} values

**Excluding noise values associated with dawn chorus

Table 3.4 Modelled vs. Monitored Results L_{Amax} ; night-time 23:00– 07:00

Location	Monitored L_{Amax}	Modelled L_{Amax}	Difference between Monitored and Modelled Results
LT1*	79.9	79.9	0.0
LT2**	64.5	64.5	0.0
ST1	81.8	84.7	2.9
ST2	83.1	85.8	2.7
ST3	66.1	67.5	1.4
ST4	67.6	67.1	-0.5

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

*10th Highest L_{Amax} values

**Excluding noise values associated with dawn chorus

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 +/- 1.1 dB during both the daytime and night-time L_{Aeq} and L_{Amax} scenarios for all long-term locations.

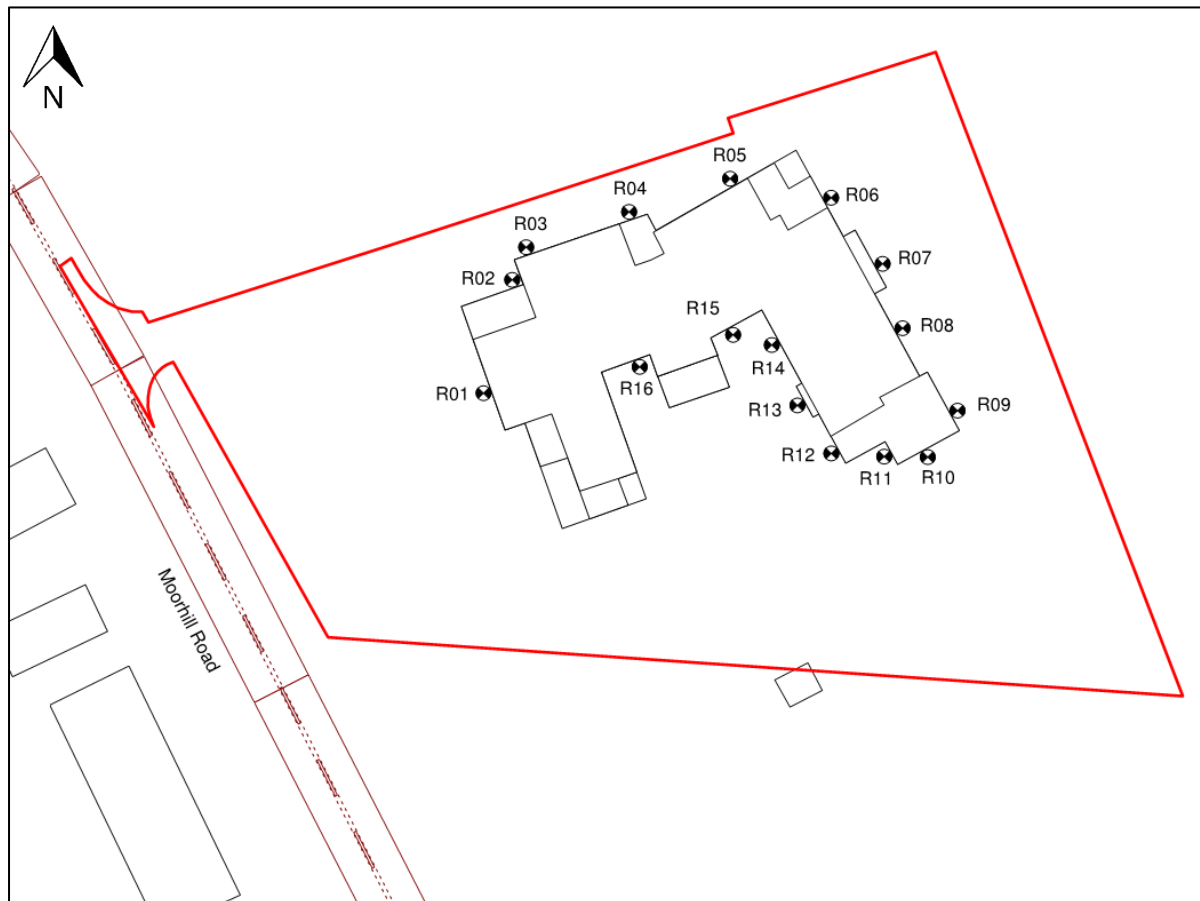
For the night-time L_{Aeq} scenario all short-term verification points show a divergence of no more than +/- 2.6 dB other than ST3 where the noise model is predicting higher noise levels than those measured.

This is considered to be attributable to the lower frequency of passing vehicles during the short-term 15-minute measurement period than occurred over the entire long-term monitoring period. Therefore, the models are considered to be suitably verified.

3.3 SENSITIVE RECEPTORS

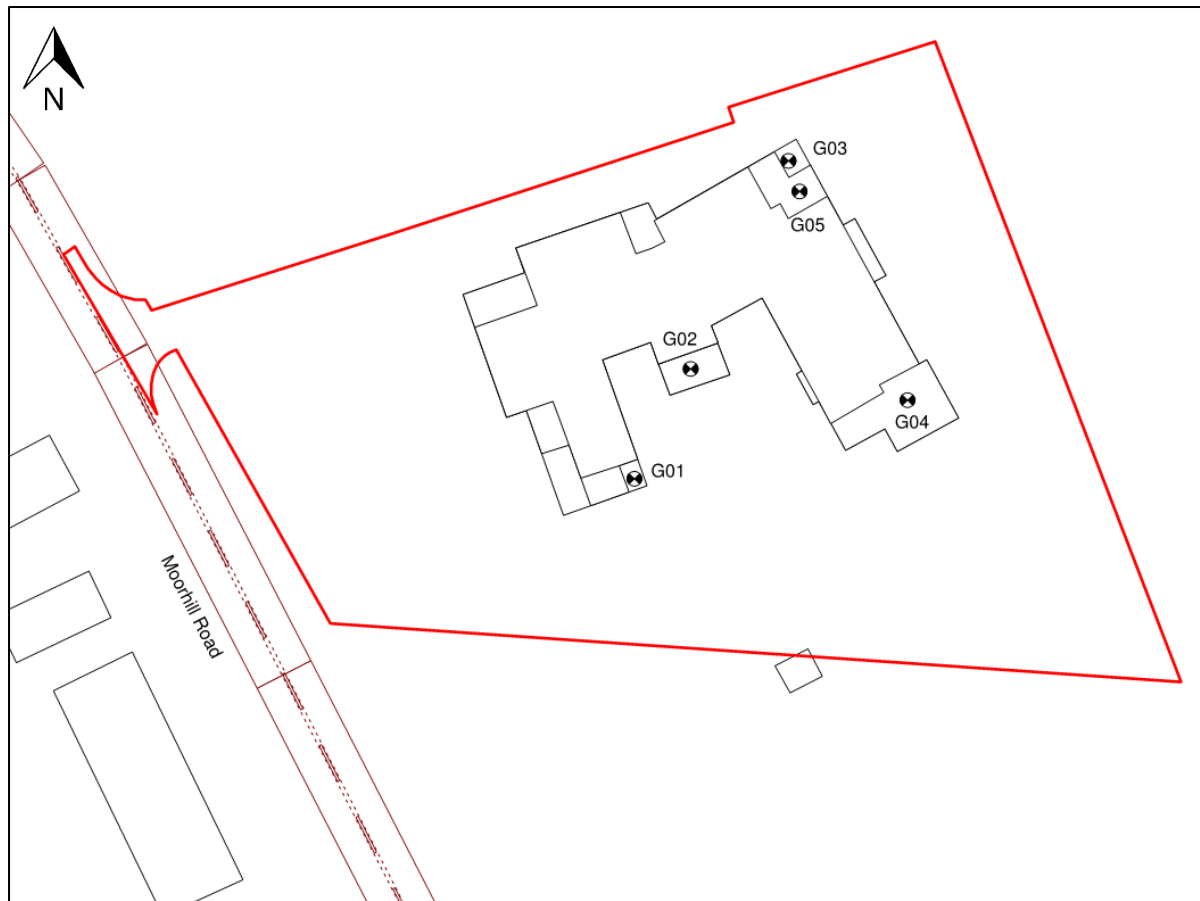
Existing noise levels have been assessed on all facades of the proposed development. The locations of the proposed receptors are shown in Figures 3.2 to 3.3 below.

Figure 3.2 Proposed Sensitive Receptor Locations



Not to scale
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Figure 3.3 Proposed Amenity Receptor Locations



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3.4 TRANQUILLITY RATING

An assessment of the existing tranquillity level of the site has been based on the mapping data published by the CPRE, the countryside charity. This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most).

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. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser (WYG13)	s/n	1221575
Rion NL-52	Environmental Noise Analyser (WYG33)	s/n	843173
Rion NL-52	Environmental Noise Analyser (WYG33)	s/n	710471
Rion NC-74	Sound Calibrator	s/n	34313029

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 0.0 dB was observed Short Term Meter s/n 710471, 0.1 dB drift on LT1 s/n 1221575 and 0.1 dB drift on LT2 s/n 843173. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

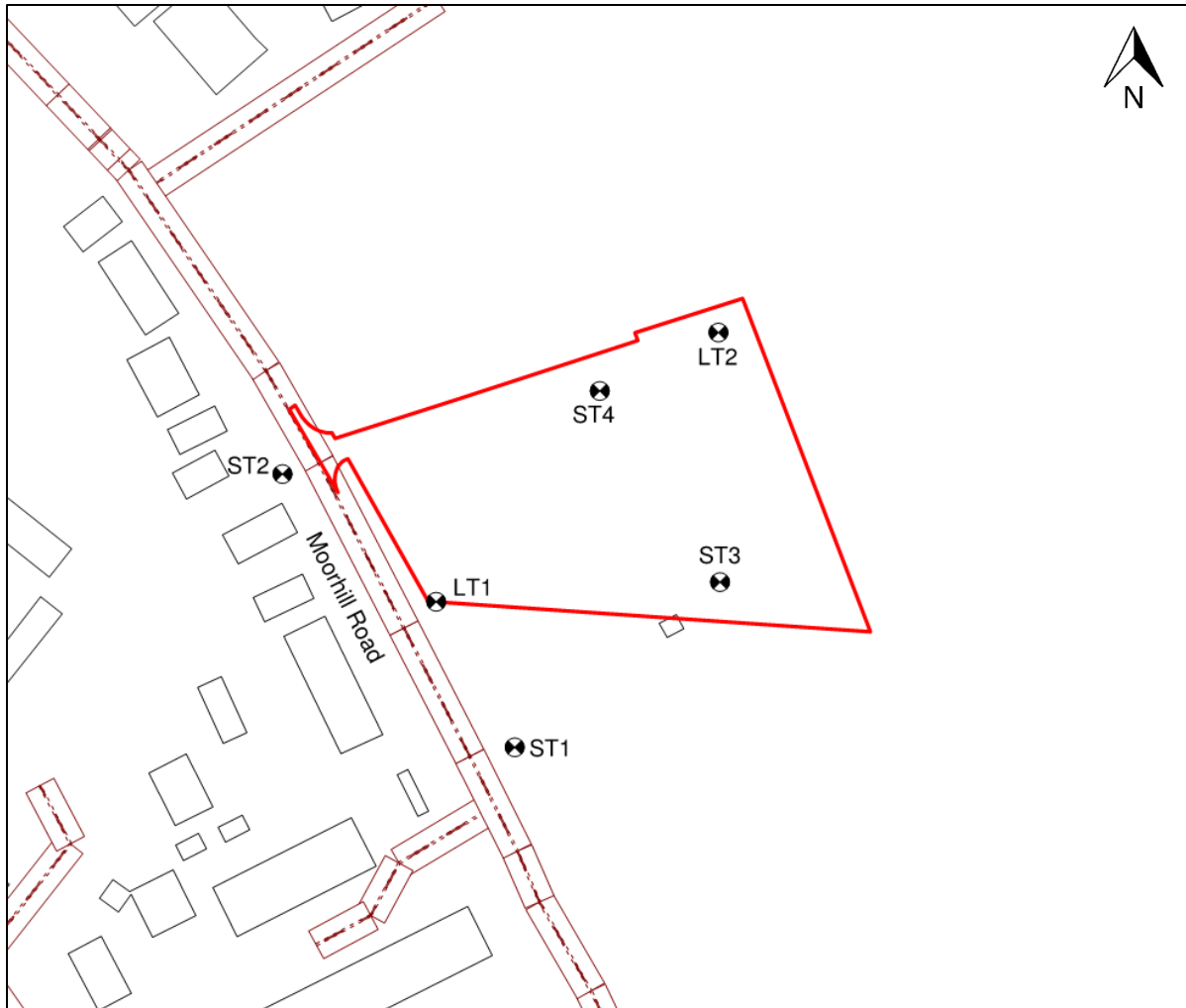
A baseline monitoring survey was undertaken at six locations (as specified in the following table and shown in Figure 4.1) from Thursday 12th May 2022 to Thursday 19th May 2022. Attended short term (ST) measurements were undertaken at four locations during day, evening and night-time periods with two additional long-term (LT) locations being measured unattended over a 165-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 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 Northern wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	Close to inside wall of Western site boundary. East of 'Hill Crest'.
LT2	North-eastern corner of site, East of 'Ashdene'. South of 'Reservoir (covered)'.
ST1	Next to road junction, East of 'Little Oak Cottage'. South-western corner of site.
ST2	On street opposite Western part of site. Lies East of 'Nainital'.
ST3	South-eastern corner of site boundary, North-east of 'Reservoir (covered)'.
ST4	Towards the centre of the Northern site boundary line, South of 'Reservoir (covered)'.

Figure 4.1 Noise Monitoring Locations



Not to scale
OS Licence No. AL553611

4.2 NOISE SURVEY RESULTS

The ambient noise climate found in the area includes road traffic noise from Moorhill Road along with Telegraph Road. Additional contributions to the ambient noise climate include a faint generator noise across the street towards south-western corner of the site boundary in Haselfoot Gardens.

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

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	19/05/2022 11:28:09	17	0-1	N	2	Road traffic noise along Moorhill Road. Constant generator noise from across street.
Day ST2	19/05/2022 12:11:38	18	0-1	N	3	Road traffic noise from Moorhill Road. Occasional noise from Telegraph Road.
Day ST3	19/05/2022 11:47:17	18	0-1	N	2	Distant road traffic noise from Moorhill Road.
Day ST4	19/05/2022 12:30:06	18	0-1	NE	3	Distant road traffic noise from Moorhill Road.
Evening ST1	18/05/2022 20:56:05	16	0-1	N	6	Road traffic noise on Moorhill Road. Generator noise across street.
Evening ST2	18/05/2022 21:14:42	16	0-1	NE	6	Road traffic noise on Moorhill Road.
Evening ST3	18/05/2022 21:54:38	16	0-1	N	7	Distant road traffic noise from Moorhill Road.
Evening ST4	18/05/2022 21:36:24	16	0-1	N	7	Distant road traffic noise on Moorhill Road.
Night ST1	18/05/2022 23:46:04	16	0-1	N	7	Road traffic noise on Moorhill Road. Generator noise across street.
Night ST2	18/05/2022 23:22:34	16	0-1	N	7	Road traffic noise on Moorhill Road.
Night ST3	19/05/2022 00:34:43	14	0-1	N	4	Road traffic noise on Moorhill Road.
Night ST4	19/05/2022 00:15:32	14	0-1	N	5	Distant road traffic noise from Moorhill Road.

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: 2×10^{-5} Pa).

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

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	77 Hours	12/05/2022 – 19/05/2022 13:51 – 12:51	LT1	64.4	100.4	32.6	66.1	58.0
Weekday Night-time 23:00 – 07:00	40 Hours	12/05/2022 – 19/05/2022 23:00 - 07:00		59.2	88.7	28.7	58.8	36.0
Weekend Daytime 07:00 - 23:00	32 Hours	14/05/2022 – 15/05/2022 07:00 - 23:00		65.0	97.6	38.8	67.5	58.0
Weekend Night-time 23:00 – 07:00	16 Hours	14/05/2022 – 15/05/2022 23:00 - 07:00		57.5	80.9	29.5	59.7	42.0
Weekday Daytime 07:00 - 23:00	76 Hours	12/05/2022 – 19/05/2022 13:04:35 - 13:09:35	LT2	53.8	91.0	32.9	52.2	48.0
Weekday Night-time 23:00 – 07:00	40 Hours	12/05/2022 – 19/05/2022 23:00 - 07:00		48.3	81.1	26.1	46.3	36.0

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)
Weekend Daytime 07:00 - 23:00	32 Hours	14/05/2022 – 15/05/2022 07:00 - 23:00		55.5	84.8	35.8	53.0	46.0
Weekend Night-time 23:00 – 07:00	16 hours	14/05/2022 – 15/05/2022 23:00 - 07:00		49.4	77.5	29.4	47.1	40.0
Daytime 07:00 - 19:00	15 Mins	19/05/2022 11:28:09	ST1	70.8	82.0	48.8	75.2	52.9
	15 Mins	19/05/2022 12:11:38	ST2	70.1	82.6	45.5	74.2	55.7
	15 Mins	19/05/2022 11:47:17	ST3	49.6	66.3	39.4	53.1	44.3
	15 Mins	19/05/2022 12:30:06	ST4	51.3	67.4	43.9	52.9	47.7
Evening 19:00 - 23:00	15 Mins	18/05/2022 20:56:05	ST1	70.2	94.8	49.6	73.1	52.8
	15 Mins	18/05/2022 21:14:42	ST2	67.6	80.2	43.1	72.7	49.5
	15 Mins	18/05/2022 21:54:38	ST3	47.7	71.4	41.9	49.4	44.4
	15 Mins	18/05/2022 21:36:24	ST4	48.8	67.4	41.4	51.5	44.6
Night-time 23:00 - 07:00	15 Mins	18/05/2022 23:46:04	ST1	64.3	81.8	38.3	67.0	40.5
	15 Mins	18/05/2022 23:22:34	ST2	65.7	83.1	34.6	69.0	40.5
	15 Mins	19/05/2022 00:34:43	ST3	42.3	66.1	33.1	45.8	35.3
	15 Mins	19/05/2022 00:15:32	ST4	44.8	75.7	33.3	48.4	35.5
Plant or Sources								
Generator Noise	30 Seconds	19/05/2022 13:32:35	10m Distance	69.2	74.8	58.0	72.3	62.4

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

5.0 ASSESSMENT OF KEY EFFECTS

5.1 NOISE INTRUSION ASSESSMENT

Internal noise levels within the proposed development have been assessed with windows open, where a reduction from a partially open window of 10dB has been used and with windows-closed where an assumption of glazing with a minimum specification R_w+C_{tr} 30 dB (e.g. 6/12/6mm double glazing or equivalent) has been used.

The results presented in Tables 5.1 – 5.3 below, show the predicted noise intrusion levels across the site. Figure 5.1 below shows the noise contour plot for the daytime noise levels and Figure 5.2 below shows the noise contour plot for the night-time levels.

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

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	64.3	54.3	34.3	35
R02	58.5	48.5	28.5	35
R03	59.1	49.1	29.1	35
R04	55.5	45.5	25.5	35
R05	51.3	41.3	21.3	35
R06	37.5	27.5	7.5	35
R07	36.3	26.3	6.3	35
R08	35.4	25.4	5.4	35
R09	42.1	32.1	12.1	35
R10	55.5	45.5	25.5	35
R11	56.1	46.1	26.1	35
R12	56.7	46.7	26.7	35
R13	56.6	46.6	26.6	35
R14	54.2	44.2	24.2	35
R15	52.8	42.8	22.8	35
R16	44.5	34.5	14.5	35

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

Figure 5.1 Noise Contour Plot Daytime $L_{Aeq,16\text{hour}}$ (Grid Height 4.0m)

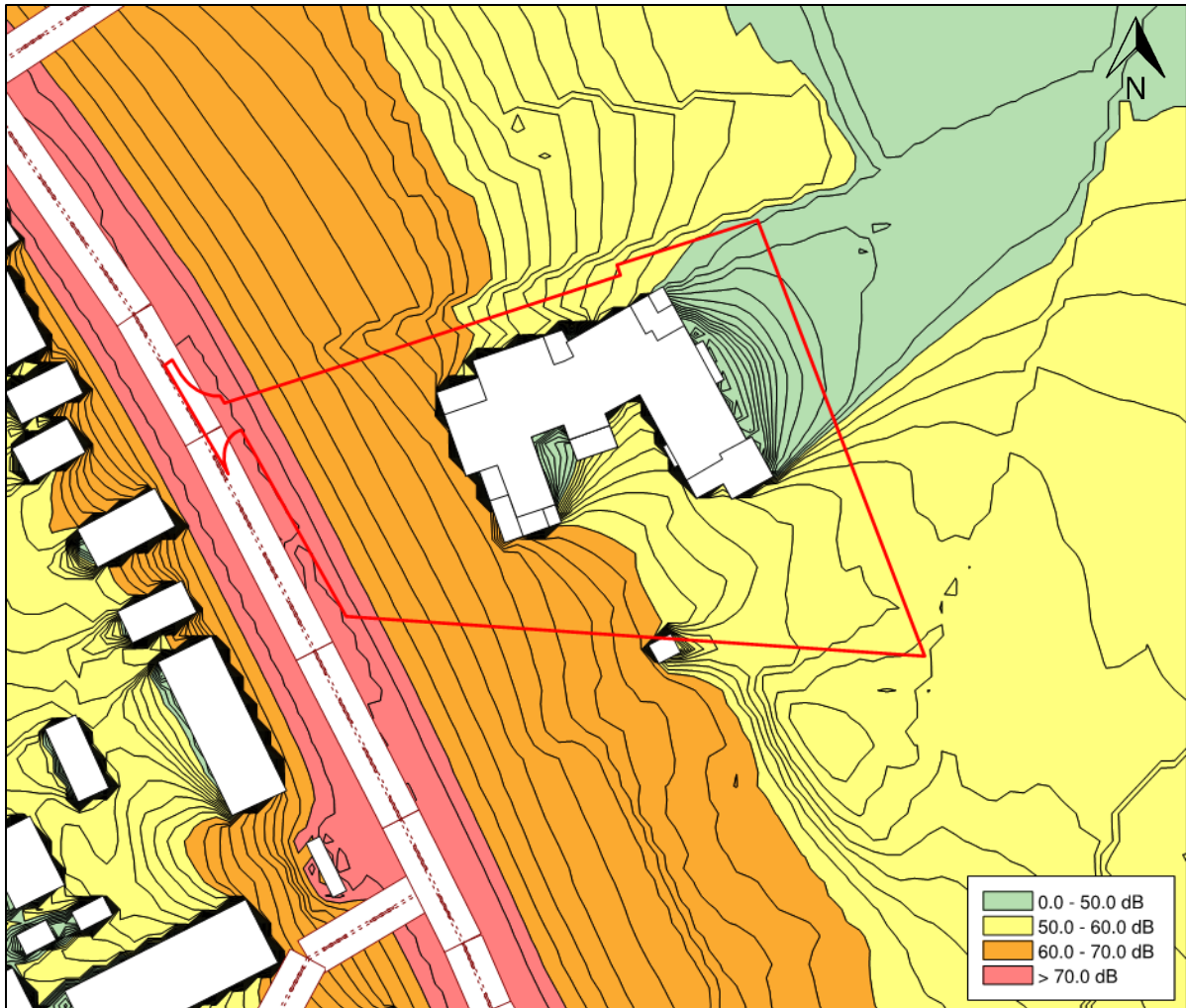


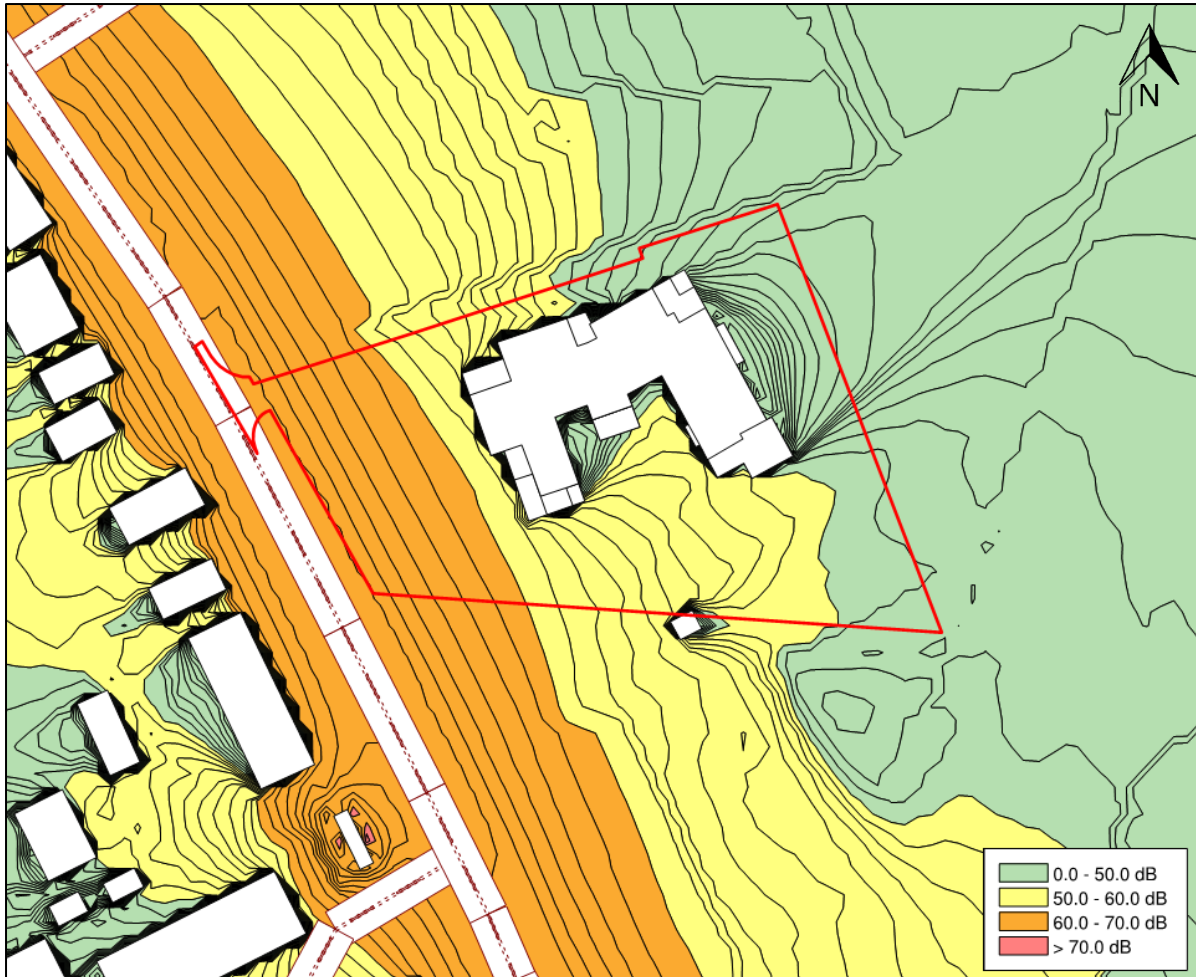
Table 5.2 Night-time Noise Intrusion Levels L_{Aeq} 8 hour

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	58.5	48.5	28.5	30
R02	52.7	42.7	22.7	30
R03	53.2	43.2	23.2	30
R04	49.6	39.6	19.6	30
R05	45.4	35.4	15.4	30
R06	31.8	21.8	1.8	30
R07	30.6	20.6	0.6	30
R08	29.7	19.7	0.0	30
R09	36.5	26.5	6.5	30
R10	50.3	40.3	20.3	30
R11	50.8	40.8	20.8	30
R12	51.3	41.3	21.3	30

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R13	51.8	41.8	21.8	30
R14	49.0	39.0	19.0	30
R15	48.5	38.5	18.5	30
R16	38.8	28.8	8.8	30

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

Figure 5.2 Noise Contour Plot Night-time $L_{Aeq,8hour}$ (Grid Height 4.0m)



Not to scale
OS Licence No. AL553611

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

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	79.1	69.1	49.1	45
R02	73.5	63.5	43.5	45
R03	74.0	64.0	44.0	45
R04	70.4	60.4	40.4	45
R05	66.2	56.2	36.2	45
R06	52.4	42.4	22.4	45

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} With windows open	Internal L_{Aeq} With windows closed	Criteria Internal L_{Aeq}
R07	51.2	41.2	21.2	45
R08	50.2	40.2	20.2	45
R09	57.0	47.0	27.0	45
R10	70.2	60.2	40.2	45
R11	70.8	60.8	40.8	45
R12	71.5	61.5	41.5	45
R13	71.1	61.1	41.1	45
R14	68.8	58.8	38.8	45
R15	67.0	57.0	37.0	45
R16	59.4	49.4	29.4	45

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

The results presented in Tables 5.1 to 5.3 show the predicted noise intrusion levels at properties across the site. The recommended WHO/BS 8233 internal noise levels are exceeded at a number of receptors across the site during the daytime and night-time, assuming a windows-open scenario; in order to achieve the internal noise criteria, a range of mitigation measures are outlined in Section 6.0 of this report.

5.2 EXTERNAL AMENITY SPACES ASSESSMENT

Daytime noise levels within proposed amenity terraces have been assessed with the results presented in Table 5.4 below.

Table 5.4 Private External Amenity Area Noise Levels $L_{Aeq,16hr}$

Ref	External $L_{Aeq,16hr}$ Daytime	BS 8233 Upper Limit Criteria L_{Aeq}
G01	54.0	55
G02	52.6	55
G03	40.7	55
G04	54.7	55
G05	48.9	55

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

The results in the table above show that daytime L_{Aeq} noise levels are not predicted to exceed the BS 8233 upper guideline value (55 dB) within proposed terrace spaces.

5.5 TRANQUILLITY ASSESSMENT

The development is situated in CPRE Zone 1 for tranquillity (1 being least tranquil and 10 being most). As such, the site is considered to have little tranquillity value, and will not limit access to areas of higher tranquillity.

6.0 MITIGATION

The glazing and ventilation strategy is designed to achieve internal daytime L_{Aeq} of 35 dB, an internal night-time L_{Aeq} of 30 dB and an internal night-time L_{Amax} of 45 dB in habitable rooms of the proposed development as required by BS 8233. It highlights which areas will feature enhanced glazing and an alternative means of ventilation in order to meet both ventilation and internal ambient noise criteria (shown in section 2.1). Alternative 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), to other passive ventilation systems or mechanical ventilation systems.

In order to meet the internal target noise levels and protect the amenity of future occupants against road traffic noise, facades exposed to Moorhill Road will feature enhanced glazing, with a minimum specification of $R_w + C_{tr}$ 34 dB with a means of alternative ventilation which is equal or greater to this specification. The northern and southern facades will feature double glazing of $R_w + C_{tr}$ 30 dB and an alternative means of ventilation, whilst the eastern façade will feature double glazing of $R_w + C_{tr}$ 30 dB and a natural means of ventilation. Locations for the glazing and ventilation strategy for each floor is shown illustratively on Figures 6.1-6.3.

Figure 6.1 Ground Floor Glazing and Ventilation Strategy



Figure 6.2 First Floor Glazing and Ventilation Strategy



Not to scale
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Figure 6.3 Second Floor Glazing and Ventilation Strategy



7.0 CONCLUSIONS

This report has been prepared for a proposed 70-bed care home at a site off Moorhill Road, Southampton. The NPPF provides test points against which the proposed development has been assessed. Considering these points, the following conclusions can be drawn:

NPPF paragraphs 170 (e) and 180 (a)

In considering the NPPF test in section 170 (e), the proposed development is not expected to have an 'adverse impact' on health or quality of life. Similarly, with regard to NPPF section 180, point A, it is considered that all 'adverse impacts on health and quality of life' (relating to noise) are mitigated by the use of the following mitigation:

All facades will feature standard double glazing with a minimum sound reduction of R_w+C_{tr} 30 dB (e.g. 6/12/6mm double glazing) with the exception of facades exposed to Moorhill Road which will feature enhanced glazing with a minimum sound reduction of R_w+C_{tr} 35 dB. Nearly all sensitive rooms will feature passive ventilation in order to meet both ventilation and internal ambient noise level criteria.

NPPF 180 (b), 182 and 183

The development site is not expected to affect local access to areas of tranquillity. Furthermore, 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).

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 than 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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