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Environmental Noise Assessment

Prepared: 17 November 2014

Report No – 15417-1
Client – Bovis Homes Central
Site – Land off Steppingley Road and Froghall Road Flitwick

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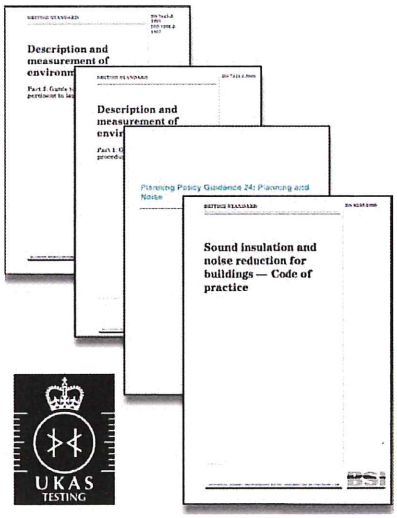
1. Executive Summary

An environmental noise assessment has been carried out over a typical weekday period between the 28th and 30th of October 2014 on a proposed development on the land at Land off Steppingley Road and Froghall Road, Flitwick, in order to assess the impact of environmental noise on a new development.

Measurement, assessment and evaluation

The survey was conducted to BS7445-1:2003 "Description and measurement of environmental noise – Part 1: *"Description of quantities and procedures"* and BS7445-2:1991 *"Guide to the acquisition of data pertinent to land use"* which are covered under our UKAS Accreditation.

The interpretation of the data and the specification of suitable mitigation or treatment is outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.



Steppingley Road Boundary	Glazing Configuration Required	Glazing Performance
Living Rooms	4(6)8	30dB R_{TRA}
Bedrooms	6/100/4	37dB R_{TRA}
Railway Boundary	**Glazing Configuration Required**	**Glazing Performance**
Living Rooms	4/(6-16)/4	28dB R_{RAIL}
Bedrooms	6/(6-16)/4	31dB R_{RAIL}
Froghall Road Boundary	**Glazing Configuration Required**	**Glazing Performance**
Living Rooms	4(6)8	30dB R_{TRA}
Bedrooms	4(6)10	33dB R_{TRA}

2. Contents

3. Scope

3.1.1. noise.co.uk Ltd has been instructed by Bovis Homes Central to undertake an environmental noise assessment at Land off Steppingley Road and Froghall Road, Flitwick, to assess the impact of environmental, road traffic and rail noise on a proposed residential development.

3.1.2. The Local Authority have submitted the following planning condition for this site:

> 23 No development in any area of the development approved as per condition 4 of this permission shall commence until a scheme of attenuation measures for noise and vibration from the adjacent railway line as identified in the Noise Assessment Report of URS Infrastructure & Environment UK Limited Reference 47065407 R01 Revision 3 dated 11th February 2013 has been submitted to and approved in writing by the Local Planning Authority so far as may be necessary to ensure that internal noise levels within dwellings from the adjacent railway line shall not exceed 35 dB L_{Aeq}, 07:00 – 23:00 in any habitable room or 30 dB L_{Aeq} 23:00 - 07:00 and 45 dB L_{Afmax} 23.00 - 07:00 inside any bedroom, and that external noise levels in outdoor amenity areas of dwellings from the railway line shall not exceed 55 dB L_{Aeq}, 07:00 – 23:00. The submitted scheme shall include a verification plan to demonstrate the effectiveness of the scheme. The works which form part of the scheme approved by the Local Authority for each dwelling shall be completed before the dwelling is occupied. The effectiveness of the scheme shall be demonstrated to the Local Planning Authority in accordance with the approved verification plan.
>
> Reason: To protect the amenity of the future occupiers of the residential properties from noise and vibration associated with the railway in accordance with Policy DM3 of the Central Bedfordshire (North Area) Core Strategy and Development Management Policies (2009) and policy 43 of the Development Strategy for Central Bedfordshire (Pre-Submission Version).

3.1.3. This report covers all aspects of the survey, including:

- An objective sound pressure level survey of the existing site;
- Prediction of the internal sound pressure levels in bedrooms and living areas and comparison of these levels with the appropriate criteria in BS8233 *"Sound insulation and noise reduction in buildings – code of practice";*
- The design of any mitigation to meet the proposed internal levels for living rooms and bedrooms as specified in BS8233;
- Consideration of the Local Authority garden criteria;
- SoundPLAN noise modelling software will be used throughout this report.

4. Introduction

4.1.1. The site is located in a residential area of Steppingley.

4.1.2. An aerial view of the proposed site is shown in Figure 1.

Figure 1 - Site location aerial view showing the location of the proposed development

4.2. Proposed development

4.2.1. Bovis Homes Central are proposing a residential development at Land off Steppingley Road and Froghall Road, Flitwick.

4.3. Noise climate

4.3.1. The general noise climate is described subjectively by the survey engineer in the table below.

Subjective Description of Noise Climate

Position	Engineer's Description
1	The noise climate at this position is dominated by road traffic noise from Steppingley Road.
2	The noise climate at this position is dominated by rail events from the railway line.
3	The noise climate at this position is dominated by road traffic noise from Froghall Road.

Table 1 – Survey engineer noise climate description

4.3.2. Other less specific noise sources will also have contributed to the measured sound pressure levels.

4.4. National planning policy framework

4.4.1. Until recently Planning Policy Guidance 24: Noise, (PPG24) was used to survey, assess and categorise noise exposure levels for residential development and advise on how to minimise the impact of noise. In March 2012 the National Planning Policy Framework was published superseding PPG24. The NPPF document covers all aspects of planning including transport and sustainability, not just noise. Unfortunately there has been a movement away from the comprehensive guidance provided in PPG24 and the guidance specifically regarding noise limits is inadequate. Noise is first mentioned in a section about conserving and enhancing the natural environment, it states:

"109. The planning system should contribute to and enhance the natural and local environment by:
*Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or **noise** pollution or land instability"*

"123. Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from **noise** from new development, including through the use of conditions;*
- *recognise that development will often create some **noise** and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by **noise** and are prized for their recreational and amenity value for this reason."*

Noise is later mentioned in the National Planning Policy Framework in regard to the sustainable use of minerals and says an environmental criteria should be set out to ensure: *"permitted operations do not have unacceptable adverse impacts on the natural and historic environment or human health, including from **noise**, dust, visual intrusion"* etc. Noise limits are mentioned in this section, the policy says:

*"ensure that any unavoidable **noise**, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to **noise** sensitive properties"*

No quantitative values are provided to assist the assessment procedure.

4.4.2. The Noise Policy Statement for England, published by DEFRA in 2010, is referenced in the National Planning Policy Framework and states the policy

vision is to: *"Promote good health and a good quality of life through the effective management of **noise** within the context of Government policy on sustainable development"*. The NPSE introduces "No observed effect level" (NOEL), "Lowest observed effect level" (LOAEL) and "Significant observed adverse level" (SOAEL). A grouping method similar to this is already an established concept in toxicology health. The NPSE goes onto explain why they have not introduced specific values for each of the categories.

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

4.4.3. The lack of any specific values in the new policy gives no indication of the reduction index required by building element to provide good living conditions. Therefore it is desirable to refer back to the most appropriate British Standard which is BS8233:1999 which provides the internal design criteria for Bedrooms and Living Rooms in Table 5 on p19 of the standard.

4.4.4. For this survey specific conditions relating to internal noise levels have been issued by the Local Authority. These are outlined in Table 2:

Living Rooms	Bedrooms	L_{AMAX} Criteria
35dB	30dB	45dB

Table 2– Design criteria for internal sound pressure levels.

5. Survey

5.1. Measurement instrumentation

5.1.1. The measurement instrumentation used during the survey was as follows:

		Manufacturer and Type	Serial Number
Position 1	Sound Level Meter	Norsonic 140	1405557
	Calibrator	Norsonic 1251	33825
Position 2	Sound Level Meter	Norsonic 140	1405560
	Calibrator	Norsonic 1251	33824
Position 3	Sound Level Meter	Norsonic 140	1405559
	Calibrator	Norsonic 1251	33823

Table 3 – Equipment used during the survey.

5.1.2. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003[1] before and after the surveys. The calibration was as follows:

Sound Level Meter	Before	After
Norsonic 140 (1405557)	114.0dB	114.0dB
Norsonic 140 (1405560)	114.0dB	114.0dB
Norsonic 140 (1405559)	114.0dB	114.0dB

Table 4– Calibration details

There was no adverse deviation.

5.2. Measurement and timescale

5.2.1. Unattended noise monitoring took place over a typical weekday period between the 28th and 30th of October 2014. The following quantities were measured:

$L_{Aeq,1min}$
$L_{Aeq,5min}$
$L_{AMAX,5min}$
$L_{AMAX,1min}$

5.2.2. Sound pressure measurements were subsequently averaged into hourly, daily and night-time periods.

5.2.3. The acoustic measurements and their interpretation shall be in accordance with BS 7445: Parts 1, and 2[2]. All sound pressure levels are in dB (re 20μPa).

5.3. Meteorology

5.3.1. During the survey the weather information was noted. This is displayed below in Table 5.

Meteorology

	Survey Start	Survey End
Roads(Wet/Dry)	Dry	Dry
Temperature (^{0}C)	16	16
Wind Speed (ms^{-1}) / Direction	5/SW	4/S

Table 5– Meteorological data noted during the survey.

[1] B7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"
[2] BS7445-2:2003 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

5.4. Measurement Locations

5.4.1. The fixed monitoring equipment was positioned to measure representative sound pressure levels over a typical weekday period at the worst affected facades of the site.

5.4.2. All microphone positions were free field and 1.5m from the ground. The monitoring location can be seen in Figure 2.

Figure 2 - Noise monitoring location on site

6. Results

6.1. Fixed position results summary

6.1.1. SoundPLAN noise modelling software has been used to build a noise maps of the proposed site using measured current sound pressure levels.

6.1.2. Firstly a baseline model of the site has been created. This indicates the levels throughout the site in its current state, i.e. no buildings. This is shown below:

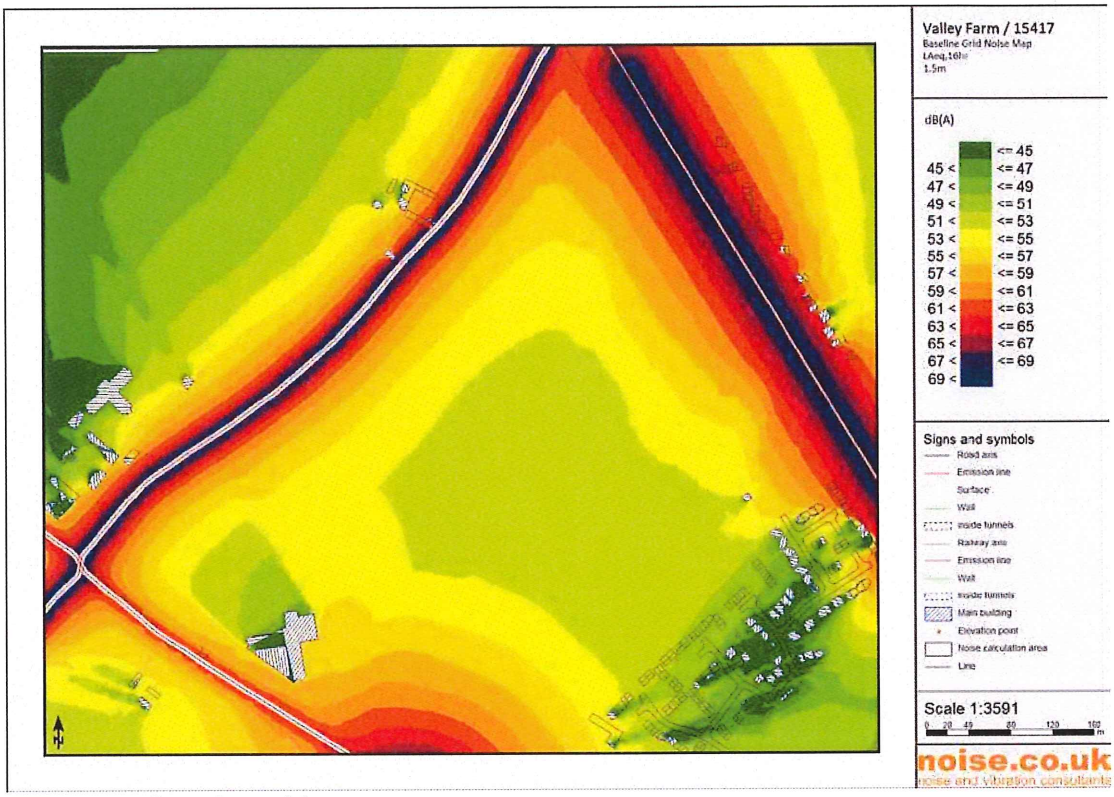


Figure 3 – Baseline noise model

6.1.3. By incorporating the proposed layout plan into the model the sound pressure levels at the facades of the residential properties can be predicted. The predicted sound pressure levels will then be used to determine the glazing specification required to meet the desired internal levels.

6.1.4. SoundPLAN models have been built for day time (LAeq,16hr) levels and night time (LAeq,8hr) levels. Theses are displayed below (larger PDF SoundPLAN maps have been provided in the Appendix).

NB: The day time noise map has a grid height of 1.5m and the night time noise map has a grid height of 4m. This represents the typical residential situation in houses where living rooms are on the ground floor and bedrooms are on the first floor.

Figure 4 - Grid noise map @ 1.5m

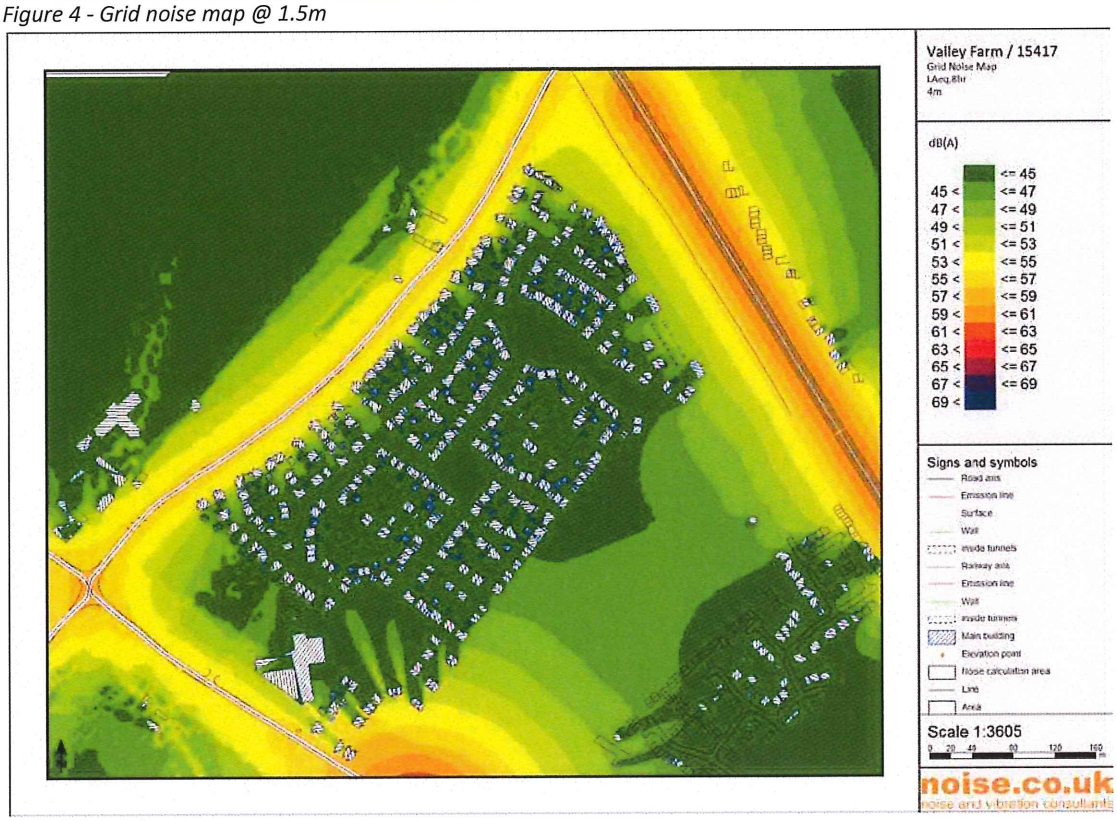


Figure 5 - Grid noise map @ 4m

6.1.5. Where Daytime is defined as the period 0700-2300. Night-time is defined as period 2300-0700.

6.1.6. The table below details the sound pressure levels at each position marked on the above SoundPLAN noise maps.

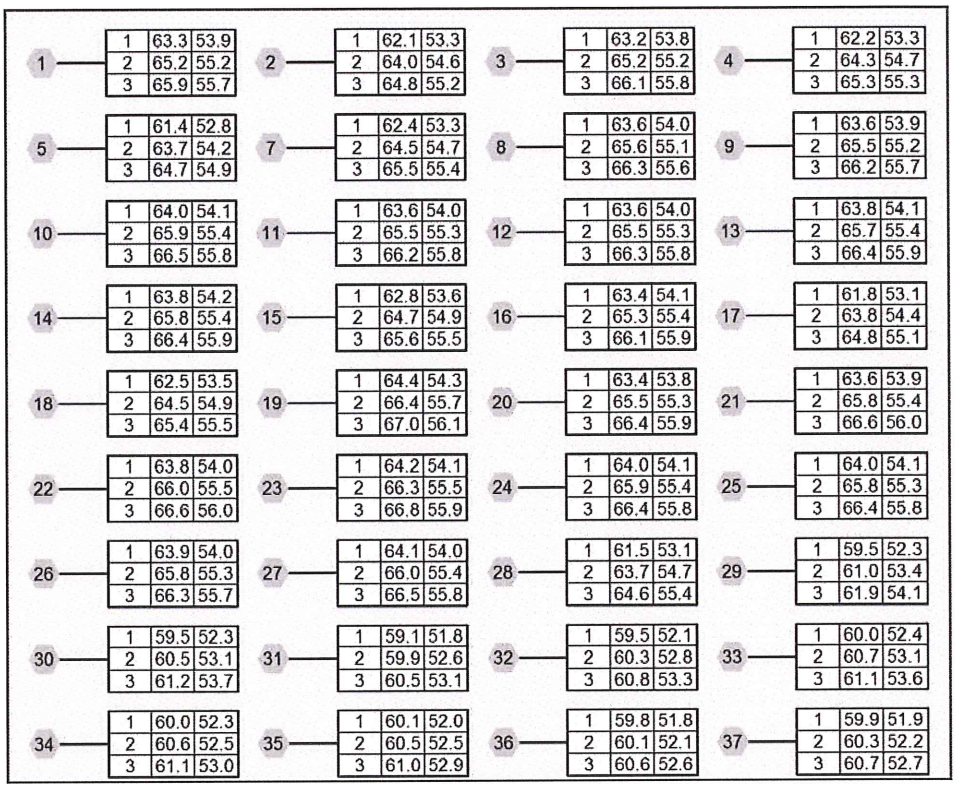


Figure 6 - Sound pressure levels at receiver positions

NB: Please note where there are multiple numbers per point this indicates the level at each floor of the residential receiver.

6.1.7. Full data tables have been provided in the appendix.

6.2. External Noise Criteria:

6.2.1. The Local Authority require that external amenity space / private gardens meet the 55dB LAeq,16hr WHO criteria. The following SoundPLAN map has been produced to show the areas on the developed site, where the noise is predicted to be under 55dB.

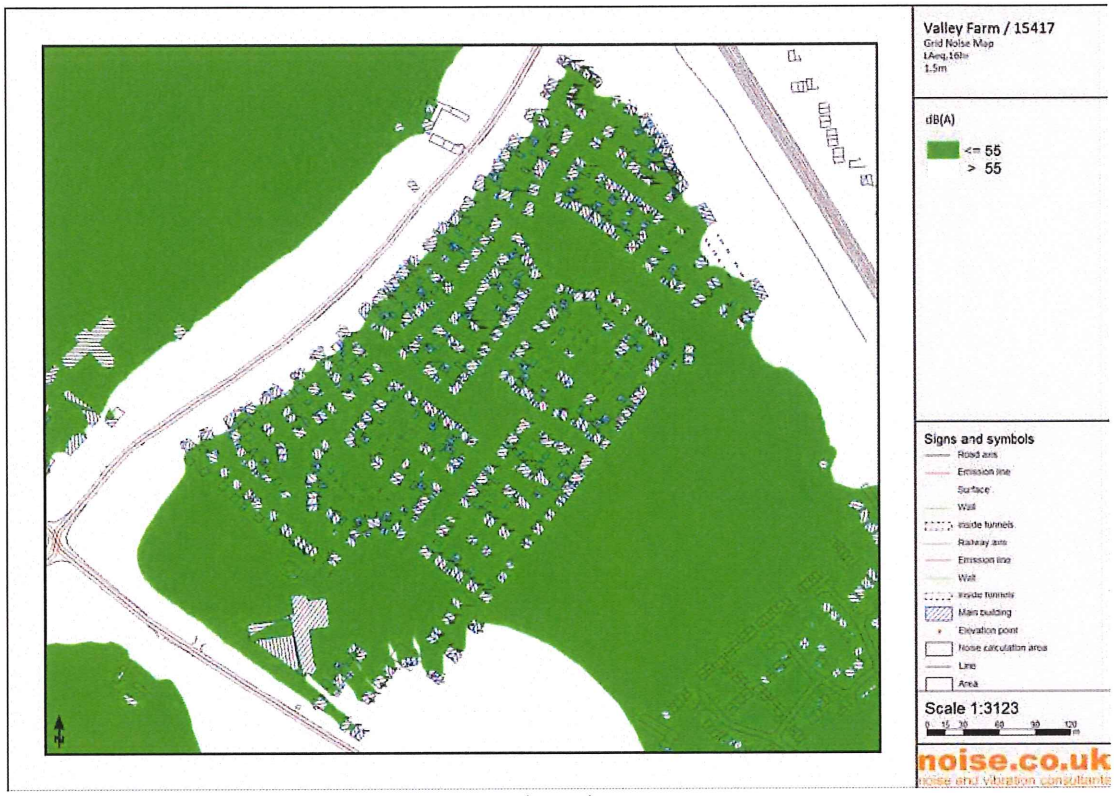


Figure 7 - Grid noise map @ 1.5m indicating areas under 55dB

6.2.2. The SoundPLAN model in Figure 7 shows that the Local Authority criteria is expected to be met for the garden areas.

6.2.3. Full data tables have been provided in the Appendix.

7. Mitigation

7.1. Internal noise levels

7.1.1. Internal noise levels – Residential Dwellings

7.1.2. The prevailing ambient noise at the residential dwellings is depicted in the SoundPLAN models above.

7.1.3. The glazing performance selection for these affected façades will be based on either the road traffic or rail traffic corrected sound reduction index, R_{TRA}[3] and R_{Rail}[4] where appropriate, to take into account the frequency characteristics of the noise.

7.1.4. Based on the measurement data the simple calculation method from BS8233:1999 is used to select the glazing. Standard forms of construction are

[3] Glass and Noise: Technical Bulletin, Pilkington Glazing, May 1997

assumed such that the glazing is likely to be the lowest performing facade element.

7.1.5. The following table summaries the glazing configuration required to meet the Local Authority criteria.

NOTE: These are suggested glazing configurations. Any other glazing configuration can be used provided it achieves the minimum glazing performance level in the right hand column.

Steppingley Road Boundary	Criteria	Glazing Configuration Required	Glazing Performance
Daytime	35dB	4(6)8	30dB R_{TRA}
Night time	30dB	4(6)8	30dB R_{TRA}
Night time (LAmax)	45dB	6/100/4	37dB R_{TRA}
Railway Boundary	**Criteria**	**Glazing Configuration Required**	**Glazing Performance**
Daytime	35dB	4/(6-16)/4	28dB R_{RAIL}
Night time	30dB	4/(6-16)/4	28dB R_{RAIL}
Night time (LAmax)	45dB	6/(6-16)/4	31dB R_{RAIL}
Froghall Road Boundary	**Criteria**	**Glazing Configuration Required**	**Glazing Performance**
Daytime	35dB	4(6)8	30dB R_{TRA}
Night time	30dB	6/(6-16)/4	28dB R_{TRA}
Night time (LAmax)	45dB	4(6)10	33dB R_{TRA}

Table 6 - Glazing requirements

7.1.6. Glazing performance definitions:

$$R_{TRA} = R_w + C_{tr}$$

$$R_{RAIL} = R_w + C$$

7.1.7. A glazing mark-up plan has been provided in the appendix indicating where the higher glazing performance is necessary.

7.1.8. A full glazing calculation can be found in the appendix.

7.2. Ventilation

7.2.1. It should be noted that in order to achieve these internal levels the windows must remain closed on the building facade. The Client must decide on a suitable ventilation strategy to comply with Building Regulation requirements.

7.2.2. A passive ventilation can be provided by an appropriate acoustic slot vent which must be matched to the relative window acoustic performance.

7.2.3. We would recommend the services of Greenwood Air Vac (or equal and approved) for expert advice on ventilation strategies. For more information please contact:

Mike Beck, Greenwood AirVac
M: 07801039584

8. Conclusions

8.1.1. An environmental noise assessment has been conducted on a proposed site at Land off Steppingley Road and Froghall Road, Flitwick, in order to assess the impact of environmental noise on a proposed residential development.

8.1.2. The Local Authority criteria was considered and was determined to be met for all the garden areas on the development site.

8.1.3. Suitable mitigation in the form of a glazing configuration has been specified to allow even the worst affected properties to achieve the internal criteria required by the Local Authority.

8.1.4. We strongly recommend that this report be passed to the Local Authority for approval before any works are carried out.

Dr Bill Whitfield **BA, MSc, Phd, MIOA**
Managing Director