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Environmental Noise Survey & Assessment

Prepared: 11th September 2015

Report No – 16282-1 R2
Client – Redrow Homes
Site – Lake Lane
Barnham
PO22 0AF

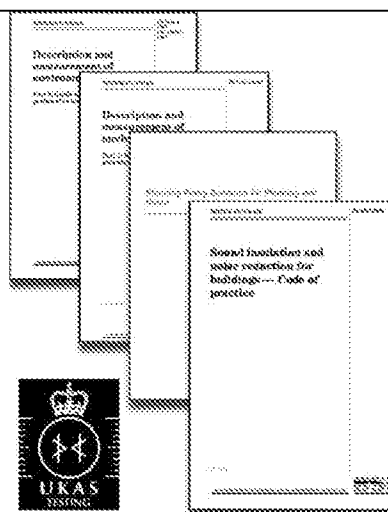
1. Executive Summary

- 1.1.1. An environmental noise survey has been carried out on a proposed residential development at Lake Lane, Barnham in order to assess the impact of environmental noise. This report details the findings of the survey and assesses the results against any relevant criteria.

1.2. 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.



1.3. Recommended Glazing Configuration

Noise Sensitive Receiver	Living Rooms	Dining Rooms	Bedrooms
NSR Facade 1	4 (6-24) 4	4 (6-24) 4	4 (6-24) 4

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2. Scope

- 3.1.1. noise.co.uk Ltd has been instructed by Redrow Homes to undertake an environmental noise assessment at Lake Lane, Barnham to assess the impact of environmental noise on a proposed residential development.
- 3.1.2. 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 internal areas
 - Comparison of these calculated levels to any specific Local Authority requirements, local planning policies for noise or otherwise to the most appropriate criteria; BS8233:2014 *“Sound insulation and noise reduction in buildings – code of practice”*
 - The design of any mitigation to meet the required internal noise levels

4. Introduction

- 4.1.1. The site is currently occupied by glass houses. The south of the development site is bounded by a railway line, with Lake Lane to the north.
- 4.1.2. An aerial view of the proposed site is shown in Figure 1.

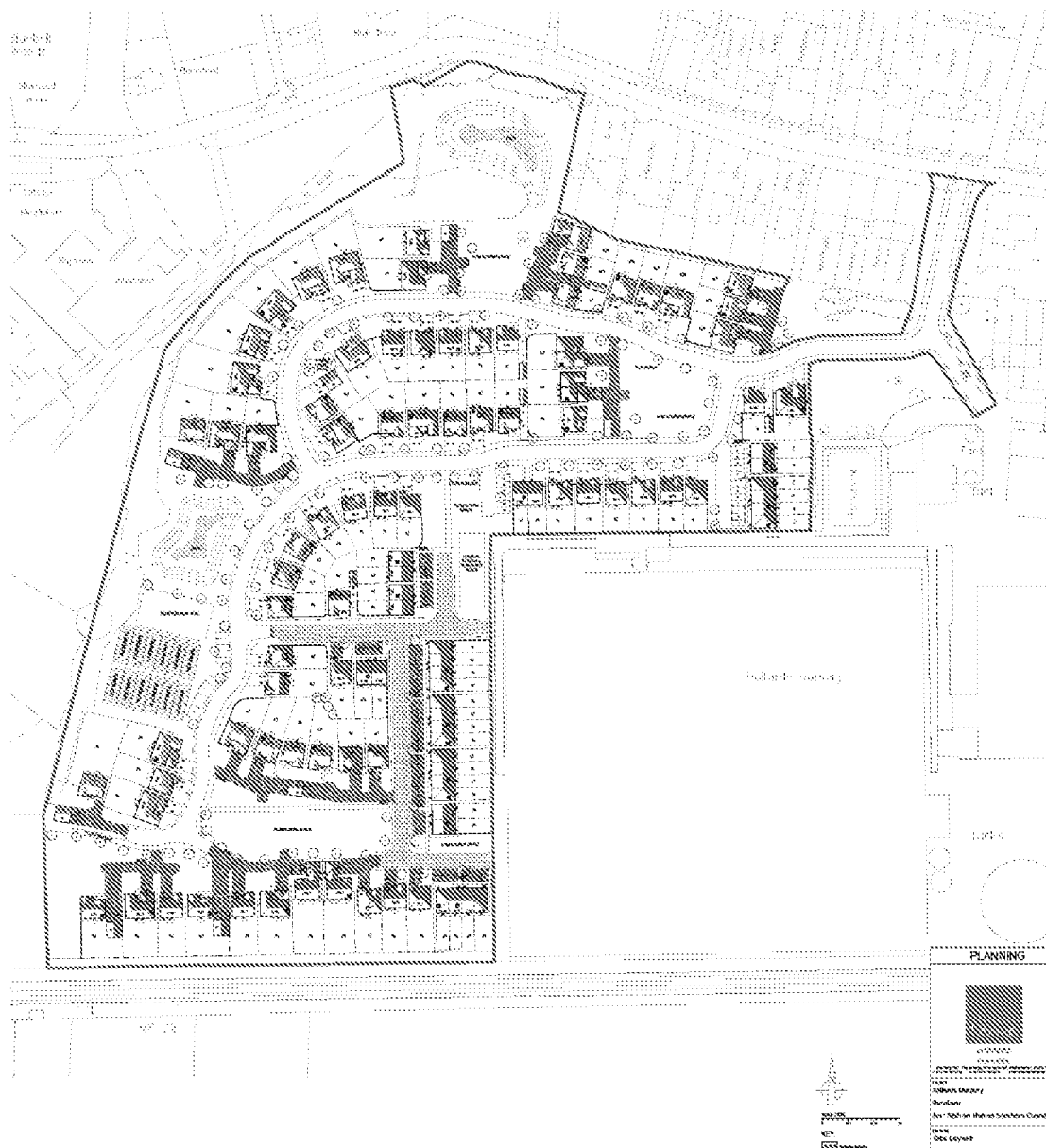


Figure 1 - Site aerial view showing the location of the proposed development

- 4.1.3. It is noted that the developers would like to move the first row of houses closer to the railway, but using the proposed glazing configuration to achieve the internal levels.
- 4.1.4. The clients preferred glazing data can be found in the appendix.

5. Background

5.1. National planning policy framework

- 5.1.1. 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"*

- 5.1.2. No quantitative values are provided to assist the assessment procedure.

- 5.1.3. 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 on to 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."

- 5.1.4. 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 BS8233:2014 which provides the internal design criteria for habitable rooms.

6. Local Authority Requirements

- 6.1.1. The Local Authority have submitted the following planning condition, with regard to noise:

20. Prior to the commencement of development, a noise survey shall be submitted that will inform detailed plans and determine necessary mitigation measures to noise sensitive facades and amenity areas.

Reason: Information to date confirms that parts of the application site are likely to be considered 'noise sensitive' and a full survey is required to inform the final layout of the site in accordance with policies GEN7 and GEN32 of the Arun District Local Plan.

NB: Arun District Local Plan refers to the now superseded PPG24. As discussed in Section 6 the most relevant and current criteria will be used to assess the noise levels at the proposed development site: BS8233 2014.

6.1.2. A summary of the criteria to be applied to this development is as such:

Criteria ID	Quantity	Living Space	Inclusive Hours	Inclusive Days	Maximum Value(dB)
1	L _{Aeq,16hr}	Living Rooms	0700-2300	Mon-Fri	35
2	L _{Aeq,16hr}	Dining Rooms	0700-2300	Mon-Fri	40
3	L _{Aeq,16hr}	Bedrooms	0700-2300	Mon-Fri	35
4	L _{Aeq,8hr}	Bedrooms	2300-0700	Mon-Fri	30

Table 1 - Design criteria for sound pressure level limits

7. Survey

7.1. Measurement Locations

- 7.1.1. Fixed position monitoring took place at one location around the site to take into consideration the likely dominant noise sources.
- 7.1.2. The monitoring equipment was positioned to measure representative sound pressure levels over a typical period at the worst affected facades of the proposed residential, with respect to noise.
- 7.1.3. The microphone position was free field and 1.5m from the ground.
- 7.1.4. The monitoring location can be seen in Figure 2.

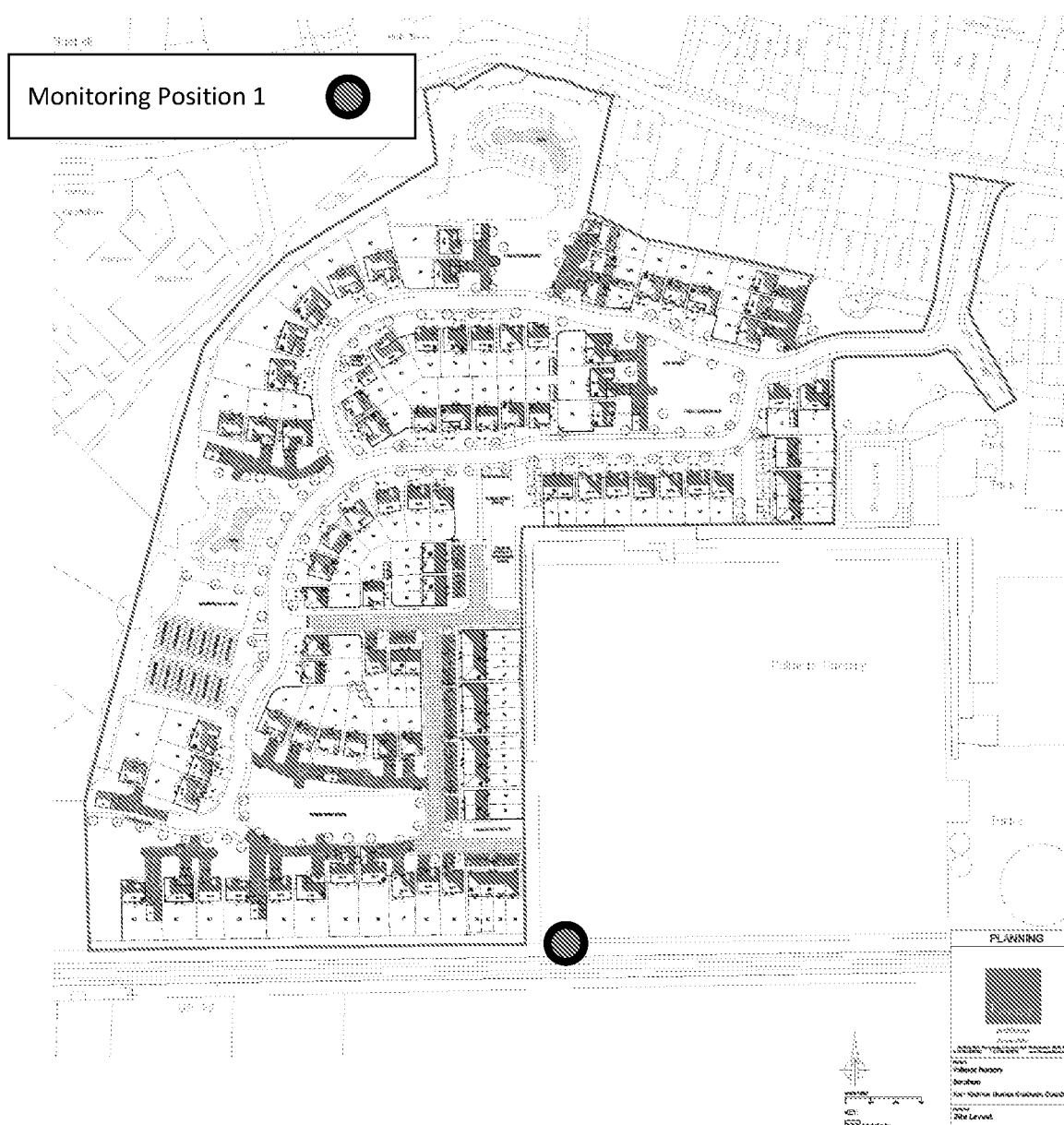


Figure 2 - Noise monitoring locations on site

7.1.5. The monitoring equipment was positioned at the site boundary, producing a worst case scenario assessment.

7.2. Noise climate

7.2.1. The general noise climate is described subjectively by the survey engineer in the following table.

Position	Engineer's Description
1	The general noise climate on the development site is dominated by road traffic from the surrounding roads, and rail traffic from the adjacent railway line. It is noted there is a constant 'hum' on the development site from the existing glass houses ventilation. There is also a nearby construction site that is occasionally audible.

Table 2 - Survey engineer noise climate description

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

7.3. Measurement instrumentation

- 7.3.1. The measurement instrumentation used during the survey is detailed in the appendix (see section 12.2).
- 7.3.2. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003¹ before and after the surveys. The calibration details are also detailed in the appendix.

7.4. Measurement and timescale

- 7.4.1. Unattended noise monitoring took place over a typical period between 20/08/2015 and 25/08/2015. The following quantities were measured:

$$L_{Aeq,1\ min}$$

- 7.4.2. Sound pressure measurements were subsequently averaged into hourly, day time and night-time periods.
- 7.4.3. The acoustic measurements and their interpretation shall be in accordance with BS 7445: Parts 1, and 2². All sound pressure levels are in dB (re 20μPa).

7.5. Meteorology

- 7.5.1. During the survey the weather information was noted. This is shown in the following table.

¹ BS7445-1:2003 "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"

	Position	Survey Start	Survey End
Roads(Wet/Dry)	All	Dry	Dry
Temperature (°C)	All	8	11
Wind Speed (ms ⁻¹) / Direction	1	4/SE	5/SE

Table 3 - Meteorological data noted during the survey

8. Results

8.1. Fixed Position Results Summary

8.1.1. The measurement results are summarised in Table 4.

Result ID	Measurement	Quantity	Inclusive Hours	SPL (dB)
1	Pos 1	L _{Aeq,16hr}	0700-2300	62.1
2	Pos 1	L _{Aeq,8hr}	2300-0700	57.2

Table 4 - Summary of the sound pressure levels measured during the fixed monitoring survey

8.1.2. Where Daytime is defined as the period 0700-2300 and night-time is defined as the period 2300-0700.

8.1.3. Further details and the full measurement results can be found in the Appendix.

9. Mitigation

9.1. Internal noise levels

9.1.1. The single figure glazing performance requirements in order to achieve the internal design criteria based on the measurement results in 9.1 are calculated in the appendix and are summarised below:

Noise Sensitive Receiver	Living Rooms (dB)	Dining Rooms (dB)	Bedrooms (dB)
NSR Facade 1	27.1	22.1	27.2

Table 5 - Required facade sound insulation

9.1.2. We have been provided with the clients preferred glazing configuration for the development site. The full specification sheet can be found in the appendix.

9.1.3. The table below summarises where the clients preferred glazing will meet the required internal levels:

Noise Sensitive Receiver	Living Rooms	Dining Rooms	Bedrooms
NSR Facade 1	4 (6-24) 4 ✓	4 (6-24) 4 ✓	4 (6-24) 4 ✓

Table 6 - Recommended glazing specification

9.2. Ventilation

- 9.2.1. 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.
- 9.2.2. Passive ventilation can be provided by an appropriate acoustic slot vent which must be matched to the relative window acoustic performance.

10. Conclusions

- 10.1.1. An environmental noise assessment has been conducted on a proposed site at Lake Lane, Barnham in order to assess the impact of environmental noise on a proposed residential development.
- 10.1.2. The clients chosen glazing configuration can be installed throughout the development site.
- 10.1.3. 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

11. Appendix

11.1. Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991	BS 8233:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Redrow Homes	
D	Full site address	Lake Lane, Barnham, PO22 OAF	
E	Date of surveys	Survey Start Date: 20/08/2015 Survey End Date: 25/08/2015	
F	Description & identification of proposed development	It is proposed to develop the site for residential.	
G	Brief Description of details of Procedure & equipment	See section 5 of this report	

11.2. Technical appendix

11.2.1. Measurements were made using the following equipment:

Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	Norsonic 140 (1405559)	Norsonic 1251 (33823)

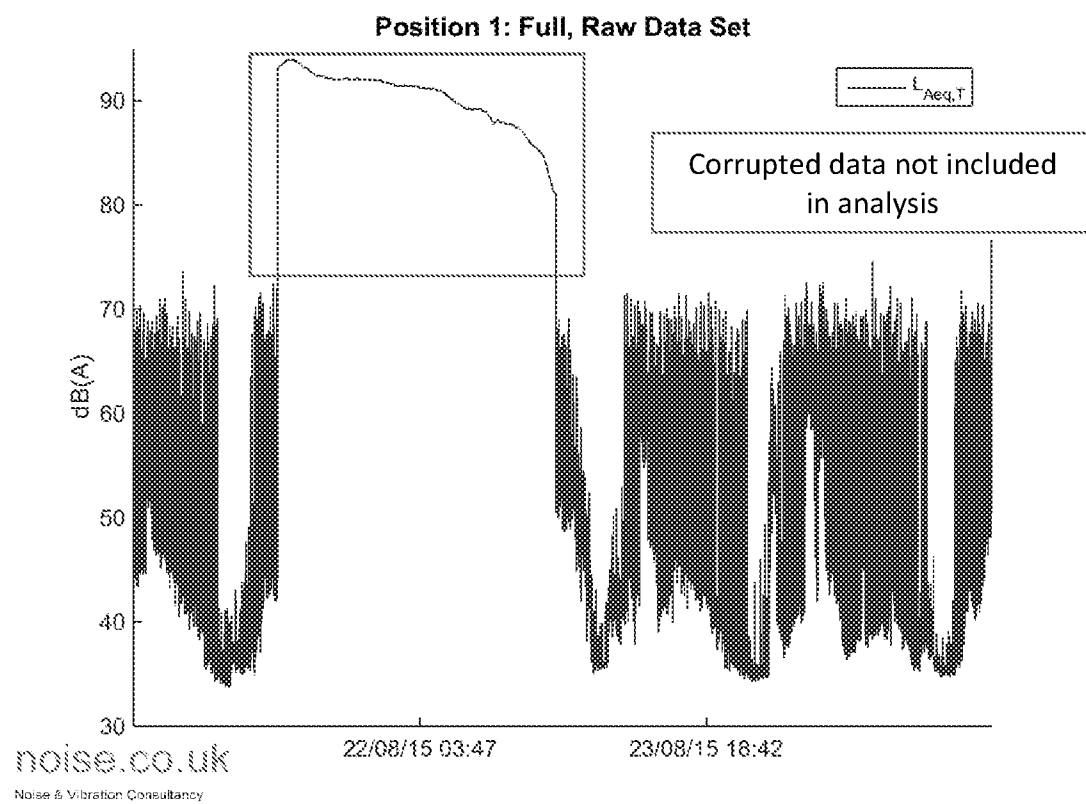
11.2.2. The equipment has traceable calibration.

11.2.3. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

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

11.2.4. There was no adverse deviation.

11.3. Recorded Raw Data-Figures:



11.4. Average Hourly Raw L_{Aeq} Levels - Tables

Position 1: Hourly L_{Aeq} Levels		
Date & Time	Day	$L_{Aeq,T}$
20/08/2015 13:00	Thu	61.2
20/08/2015 14:00	Thu	62.0
20/08/2015 15:00	Thu	60.8
20/08/2015 16:00	Thu	60.7
20/08/2015 17:00	Thu	61.7
20/08/2015 18:00	Thu	61.1
20/08/2015 19:00	Thu	61.8
20/08/2015 20:00	Thu	59.4
20/08/2015 21:00	Thu	59.0
20/08/2015 22:00	Thu	58.4
20/08/2015 23:00	Thu	59.4
21/08/2015 00:00	Fri	56.5
21/08/2015 01:00	Fri	35.7
21/08/2015 02:00	Fri	37.1
21/08/2015 03:00	Fri	38.2
21/08/2015 04:00	Fri	52.7
21/08/2015 05:00	Fri	60.1
21/08/2015 06:00	Fri	61.2
21/08/2015 07:00	Fri	61.4
21/08/2015 08:00	Fri	90.6
21/08/2015 09:00	Fri	93.8
21/08/2015 10:00	Fri	93.9
21/08/2015 11:00	Fri	93.6
21/08/2015 12:00	Fri	93.1
21/08/2015 13:00	Fri	92.6
21/08/2015 14:00	Fri	92.3
21/08/2015 15:00	Fri	92.2
21/08/2015 16:00	Fri	92.1
21/08/2015 17:00	Fri	92.1
21/08/2015 18:00	Fri	92.1
21/08/2015 19:00	Fri	92.1
21/08/2015 20:00	Fri	92.1
21/08/2015 21:00	Fri	92.0
21/08/2015 22:00	Fri	91.9
21/08/2015 23:00	Fri	91.7
22/08/2015 00:00	Sat	91.5
22/08/2015 01:00	Sat	91.5

22/08/2015 02:00	Sat	91.5
22/08/2015 03:00	Sat	91.4
22/08/2015 04:00	Sat	91.2
22/08/2015 05:00	Sat	91.2
22/08/2015 06:00	Sat	91.0
22/08/2015 07:00	Sat	90.5
22/08/2015 08:00	Sat	90.0
22/08/2015 09:00	Sat	89.5
22/08/2015 10:00	Sat	89.2
22/08/2015 11:00	Sat	89.2
22/08/2015 12:00	Sat	89.1
22/08/2015 13:00	Sat	88.2
22/08/2015 14:00	Sat	88.0
22/08/2015 15:00	Sat	87.8
22/08/2015 16:00	Sat	87.7
22/08/2015 17:00	Sat	87.2
22/08/2015 18:00	Sat	86.3
22/08/2015 19:00	Sat	85.6
22/08/2015 20:00	Sat	84.8
22/08/2015 21:00	Sat	82.6
22/08/2015 22:00	Sat	76.9
22/08/2015 23:00	Sat	59.2
23/08/2015 00:00	Sun	59.3
23/08/2015 01:00	Sun	52.5
23/08/2015 02:00	Sun	48.7
23/08/2015 03:00	Sun	38.7
23/08/2015 04:00	Sun	36.9
23/08/2015 05:00	Sun	41.3
23/08/2015 06:00	Sun	43.3
23/08/2015 07:00	Sun	56.1
23/08/2015 08:00	Sun	59.9
23/08/2015 09:00	Sun	61.2
23/08/2015 10:00	Sun	62.1
23/08/2015 11:00	Sun	60.1
23/08/2015 12:00	Sun	59.1
23/08/2015 13:00	Sun	59.7
23/08/2015 14:00	Sun	59.6
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23/08/2015 17:00	Sun	59.2
23/08/2015 18:00	Sun	59.4
23/08/2015 19:00	Sun	60.1
23/08/2015 20:00	Sun	59.3
23/08/2015 21:00	Sun	58.7
23/08/2015 22:00	Sun	57.0

23/08/2015 23:00	Sun	57.8
24/08/2015 00:00	Mon	54.8
24/08/2015 01:00	Mon	35.8
24/08/2015 02:00	Mon	39.1
24/08/2015 03:00	Mon	56.0
24/08/2015 04:00	Mon	55.6
24/08/2015 05:00	Mon	59.1
24/08/2015 06:00	Mon	59.8
24/08/2015 07:00	Mon	60.0
24/08/2015 08:00	Mon	64.9
24/08/2015 09:00	Mon	62.4
24/08/2015 10:00	Mon	65.9
24/08/2015 11:00	Mon	61.5
24/08/2015 12:00	Mon	61.9
24/08/2015 13:00	Mon	61.1
24/08/2015 14:00	Mon	61.8
24/08/2015 15:00	Mon	61.8
24/08/2015 16:00	Mon	61.0
24/08/2015 17:00	Mon	62.3
24/08/2015 18:00	Mon	61.1
24/08/2015 19:00	Mon	62.3
24/08/2015 20:00	Mon	60.2
24/08/2015 21:00	Mon	59.7
24/08/2015 22:00	Mon	59.3
24/08/2015 23:00	Mon	57.9
25/08/2015 00:00	Tue	58.0
25/08/2015 01:00	Tue	38.8
25/08/2015 02:00	Tue	35.7
25/08/2015 03:00	Tue	35.5
25/08/2015 04:00	Tue	54.4
25/08/2015 05:00	Tue	59.3
25/08/2015 06:00	Tue	60.9
25/08/2015 08:00	Tue	60.8

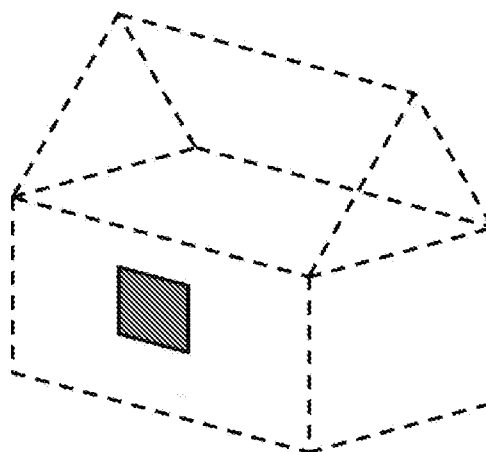
11.5. Calculations Matrix

Calculation ID	Criteria ID	Result ID
1	1	1
2	2	1
3	3	1
4	4	2

11.6. Glazing Design –Worst affected properties

To reduce the noise exposure inside the dwelling the façade sound insulation should be considered. The windows and trickle ventilators will normally be the weakest part of a brick and block façade³.

The glazing specification has been based on the corrected sound reduction index, R_{TRA} or R_{RAIL} depending on the dominant source of noise at the facade(see table 1).



11.6.1. The following table details the information used in each Internal or external calculation for reference purposes.

NSR Facade 1							
Calc ID	Living Space	SPL (dB)	Internal Max Value (dB)	Required Sound Insulation (dB)	Preferred Glazing	Performance of Selected Glazing	Calculated Internal Level (dB)
1	Living Rooms	62.1	35	27.1	4 (6-24) 4	29 Rw + Ctr	33.1
2	Dining Rooms	62.1	40	22.1	4 (6-24) 4	29 Rw + Ctr	33.1
3	Bedrooms	62.1	35	27.1	4 (6-24) 4	29 Rw + Ctr	33.1
4	Bedrooms	57.2	30	27.2	4 (6-24) 4	29 Rw + Ctr	28.2

³ BS8233:2014 "Sound insulation and noise reduction for buildings – Code of practice", P15

11.7. Clients Glazing Preference