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Environmental Noise Assessment

Prepared : 1 June 2015

Report No – 14971A-1
Client – Barratt Homes (WM), Taylor
Wimpey (Oxford) and Bovis
Homes
Site – Longford Park
Banbury



1. Executive Summary

An environmental noise assessment has been carried out on a proposed development at the land at Longford Park, Banbury in order to assess the impact of environmental noise on a new development.

This report uses survey data from the original noise section (produced by Cole Jarman) of the environmental impact statement for this site ("S/1644/CD Volume 1 Environmental Statement / 17 June/Rev C"). This additional assessment uses a SoundPLAN model to consider planning condition 30 for the whole development site.

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.



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3. Limitations

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- 3.1.2. The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by Noise has not been independently verified by Noise, unless otherwise stated in the report.
- 3.1.3. The methodology adopted and the sources of information used by Noise in providing its services are outlined in this report. The work described in this report was undertaken on 20th May 2015 and is based on the conditions encountered and the information available up to the said date. The scope of this report and the services are accordingly factually limited by these circumstances.
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4. Scope

4.1.1. noise.co.uk Ltd has been instructed by Barratt Homes (WM), Taylor Wimpey (Oxford) and Bovis Homes to undertake an environmental noise assessment at Longford Park, Banbury to assess the impact of environmental noise on a proposed residential development.

4.1.2. This report covers the following:

- SoundPLAN modelling of the site
- Prediction of the internal sound pressure levels in bedrooms and living areas and comparison of these levels with the appropriate criteria in WHO Noise, 4. Guideline Values, 1999
- The design of any mitigation to meet the proposed internal levels for living rooms and bedrooms.

4.1.3. This report considers the following planning condition from the local authority:

In terms of complying with condition 30 for Parcel B – as per the above, there should have been some assessment of noise constraints for the properties on Parcel B (in compliance with condition 30). What I asked for in terms of Parcel A was a copy of this information – i.e. if there were no properties affected by noise then this be confirmed, but that if any properties were within NEC B or above, then the details of the acoustic insulation be provided. An Environmental Noise Assessment was submitted on this basis.

30 Before commencement of development on any phase any part of the phase subject to noise levels within NEC B shall be identified. Any properties proposed which have been identified as being within the areas affected by noise levels within NEC B or above shall be acoustically insulated to ensure that current WHO internal noise levels are achieved in all habitable rooms. Full details of the acoustic insulation shall be submitted to and approved in writing by the LPA prior to the commencement of development of that phase or sub phase and the approved scheme shall be fully implemented before the first occupation of the dwellings.

Reason - To ensure the creation of a satisfactory environment free from intrusive levels of noise and to comply with the Environmental Statement and to comply with Policies NRM10 and CC6 of the South East Plan 2009 and Policy C30 of the adopted Cherwell Local Plan.

4.1.4. Referring to the WHO guidelines for Community Noise, 4. Guideline Values, 1999 the following table summarises internal noise levels that should be achieved.

Table 4.1: Guideline values for community noise in specific environments.

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	L _{Amax, fast} [dB]
Outdoor living area	Serious annoyance, daytime and evening Moderate annoyance, daytime and evening	55 50	16 16	- -
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	
Inside bedrooms	Sleep disturbance, night-time	30	8	45

4.1.5. The following table is taken from Annex 2 of PPG24:1994 and explains noise exposure categories for new dwellings near existing noise.

Noise Levels ⁰ Corresponding To The Noise Exposure				
Categories For New Dwellings L _{Aeq,T} dB				
	Noise Exposure Category			
Noise Source	A	B	C	D
road traffic				
07.00 - 23.00	<55	55 - 63	63 - 72	>72
23.00 - 07.00 ¹	<45	45 - 57	57 - 66	>66
rail traffic				
07.00 - 23.00	<55	55 - 66	66 - 74	>74
23.00 - 07.00 ¹	<45	45 - 59	59 - 66	>66
air traffic ²				
07.00 - 23.00	<57	57 - 66	66 - 72	>72
23.00 - 07.00 ¹	<48	48 - 57	57 - 66	>66
mixed sources ³				
07.00 - 23.00	<55	55 - 63	63 - 72	>72
23.00 - 07.00 ¹	<45	45 - 57	57 - 66	>66

- 4.1.6. This table will be used determine the noise exposure categories of the properties around site. Any property facades in category B or worse will require mitigation to ensure the WHO internal noise levels are achieved in habitable rooms.

5. Introduction

- 5.1.1. The development site is spread over a large area of land in Banbury, to the west of the M40.
- 5.1.2. Oxford Road (A4260) runs along the south west boundary of Parcel A.
- 5.1.3. The site layout plan can be seen in Figure 1.

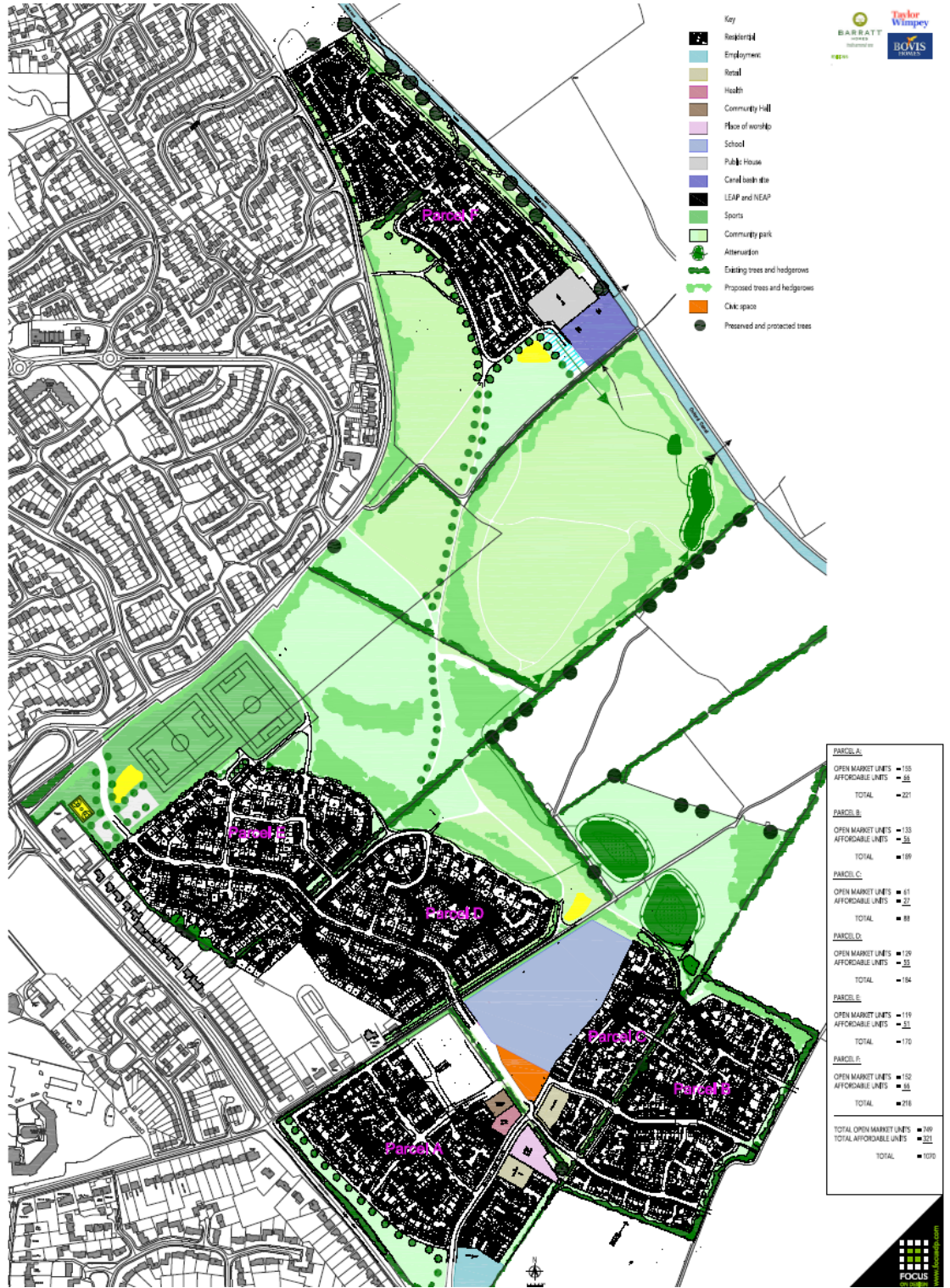


Figure 1 - Site plan

6. Survey

- 6.1.1. This report uses survey data from the original survey carried out in 2005 (report produced by Cole Jarman) to predict the sound pressure levels affecting the proposed development residential receivers. The data used is found in Appendix 10 of "S/1644/CD Volume 1 Environmental Statement / 17 June/Rev C".

7. Results

7.1. SoundPLAN Images

- 7.1.1. A SoundPLAN contour model of the site at both 1.5m and 4m above ground and day and time periods as been produced and these plots are included in the appendix.
- 7.1.2. Noise emissions from the M40 were found by using the measured noise levels (see: "S/1644/CD Volume 1 Environmental Statement / 17 June/Rev C"). Noise levels for Bankside Road and Oxford Road were constructed from the traffic flow figures (also taken from the EIS) as these compared with the measured daytime levels on these facades. These 18hr traffic flow figures were split into day and night time figures using the ratios in the EIS.
- 7.1.3. The M40 traffic flow figures are adjusted up using traffic flow percentage increase data taken from CRTN, extrapolated for 2005 to 2015 (when the original measurements were done to the current situation) giving an 13% increase. The model is therefore effectively based upon 2015 flows as predicted by the original report.
- 7.1.4. Data from the current train timetables was used in the modelling process.
- 7.1.5. The figures below show the facade levels at various locations around the site for day and night time periods respectively. A -3dB correction to these levels will be applied to give free field levels. Free field levels are then used in the glazing calculation process.

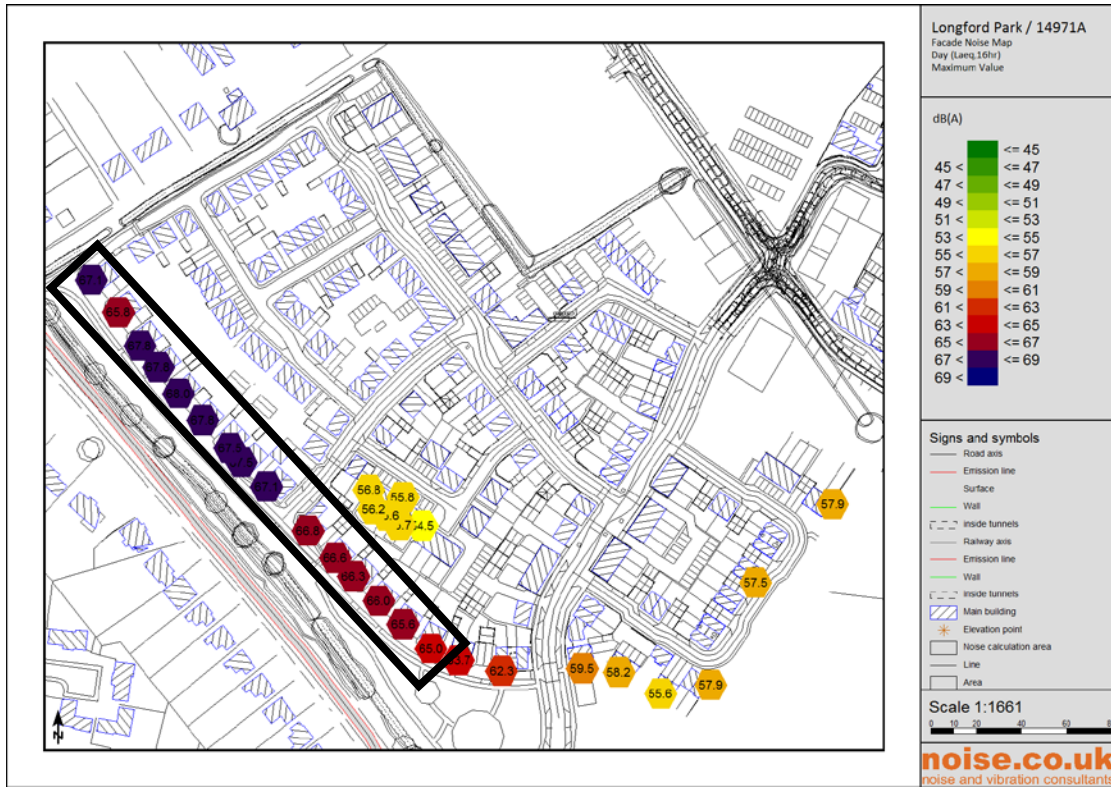


Figure 2 – Parcel A day-time facade noise map.

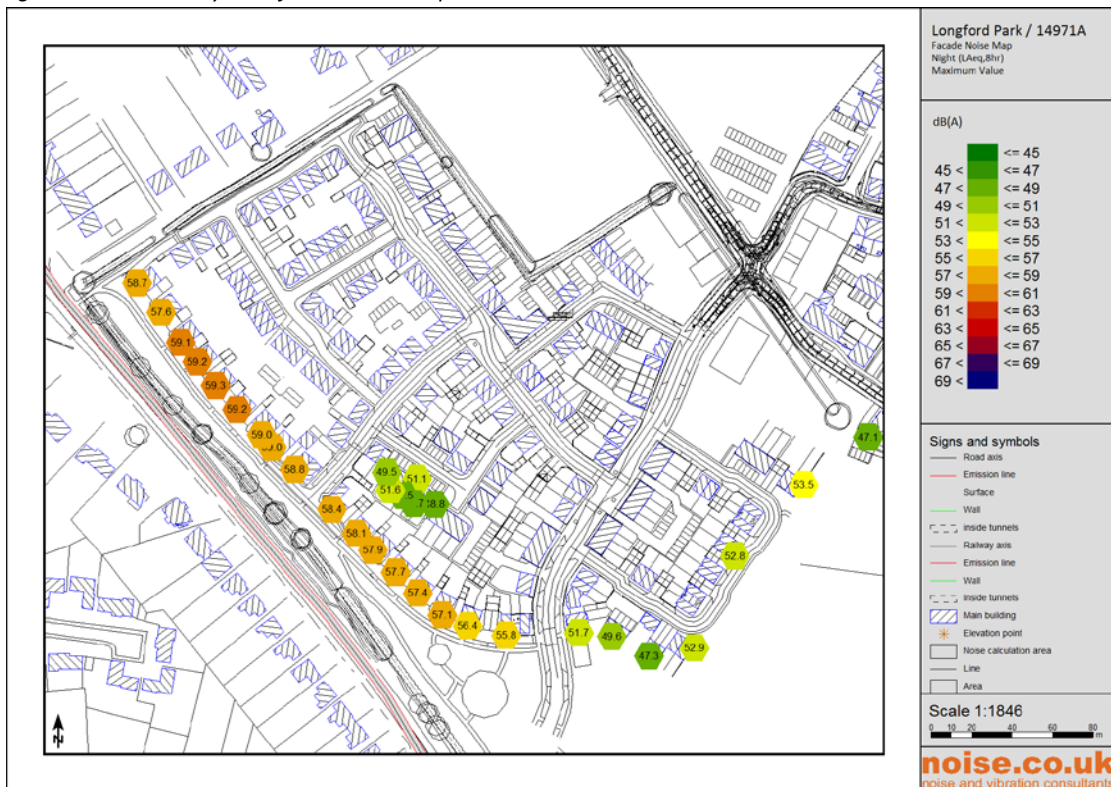


Figure 3 - Parcel A night-time facade noise map.

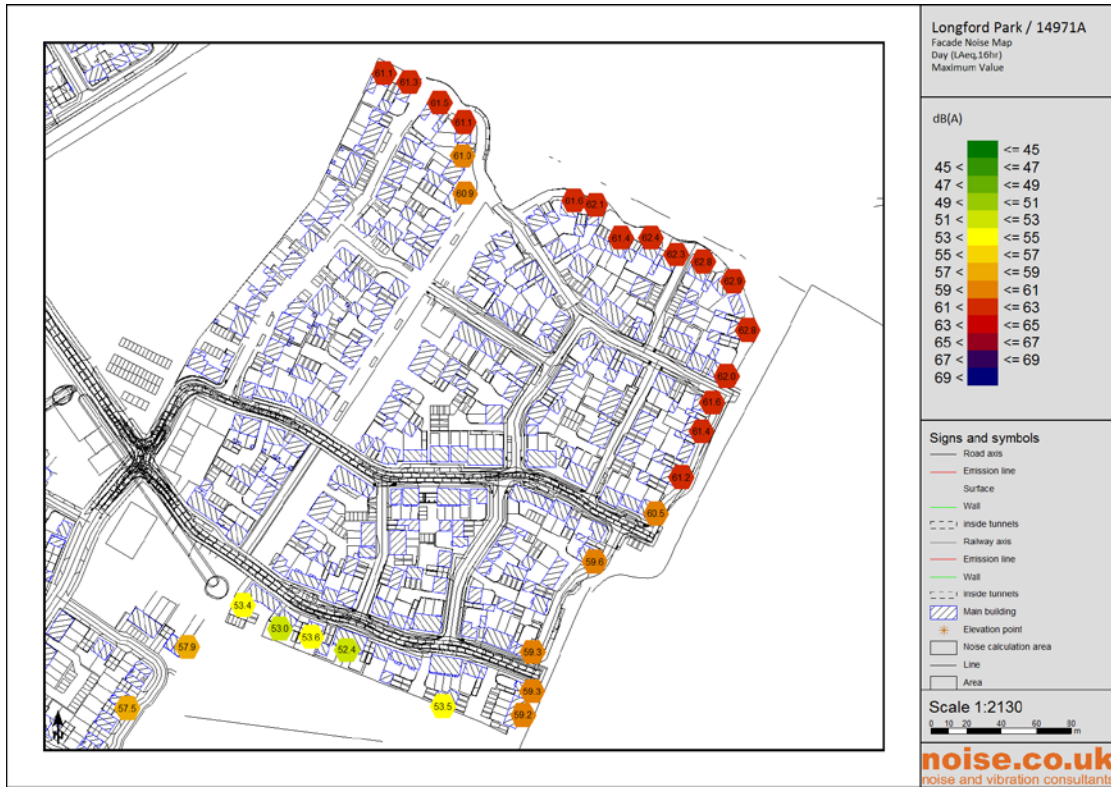


Figure 4 - Parcel B / C day-time facade noise map.

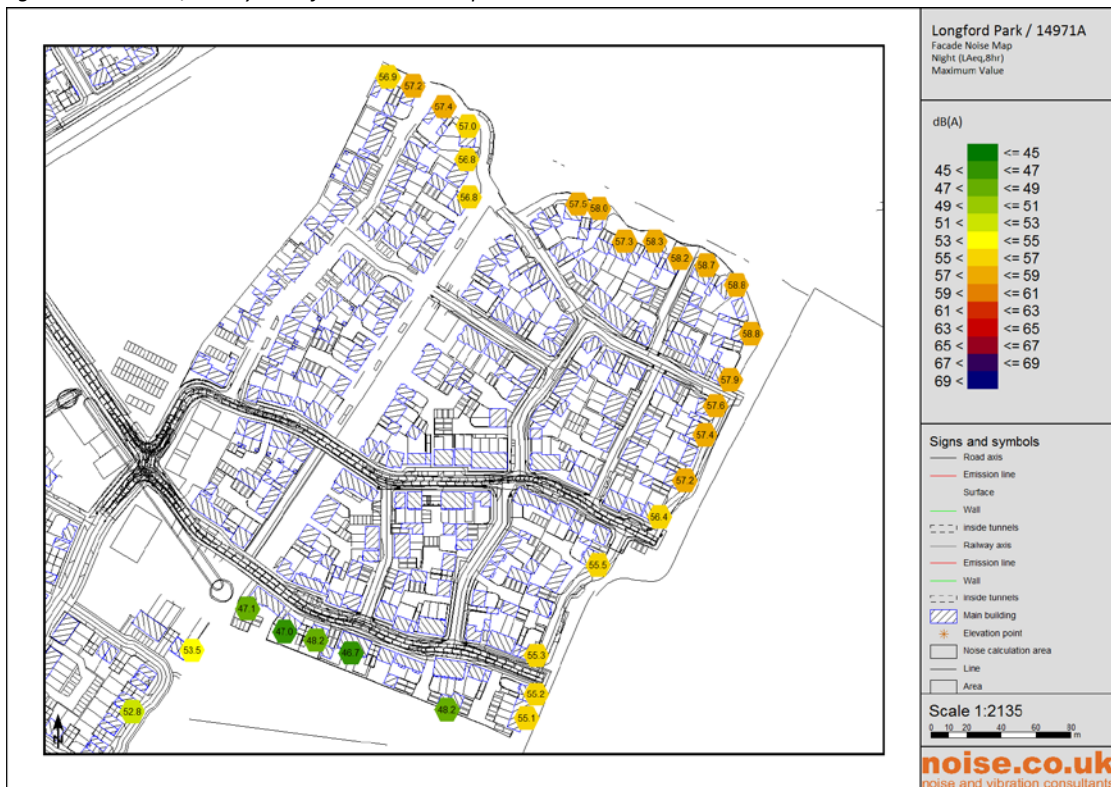


Figure 5 - Parcel B / C night-time facade noise map.

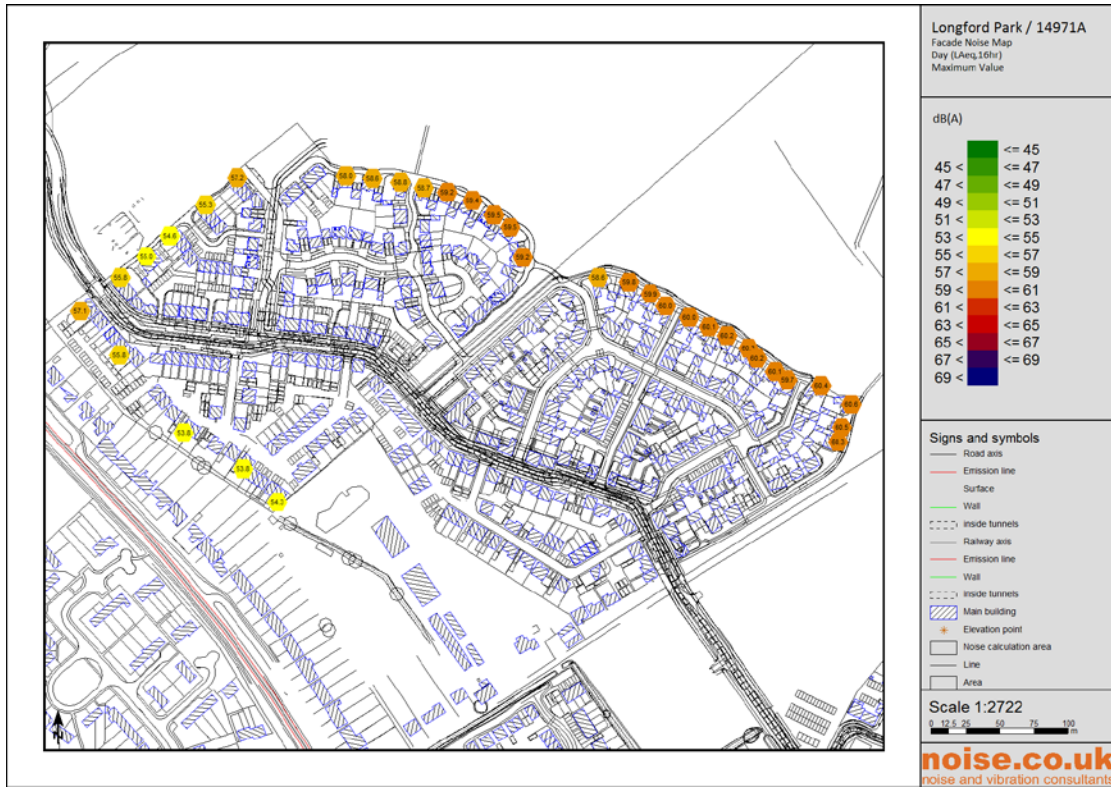


Figure 6 - Parcel D / E / DE day-time facade noise map.

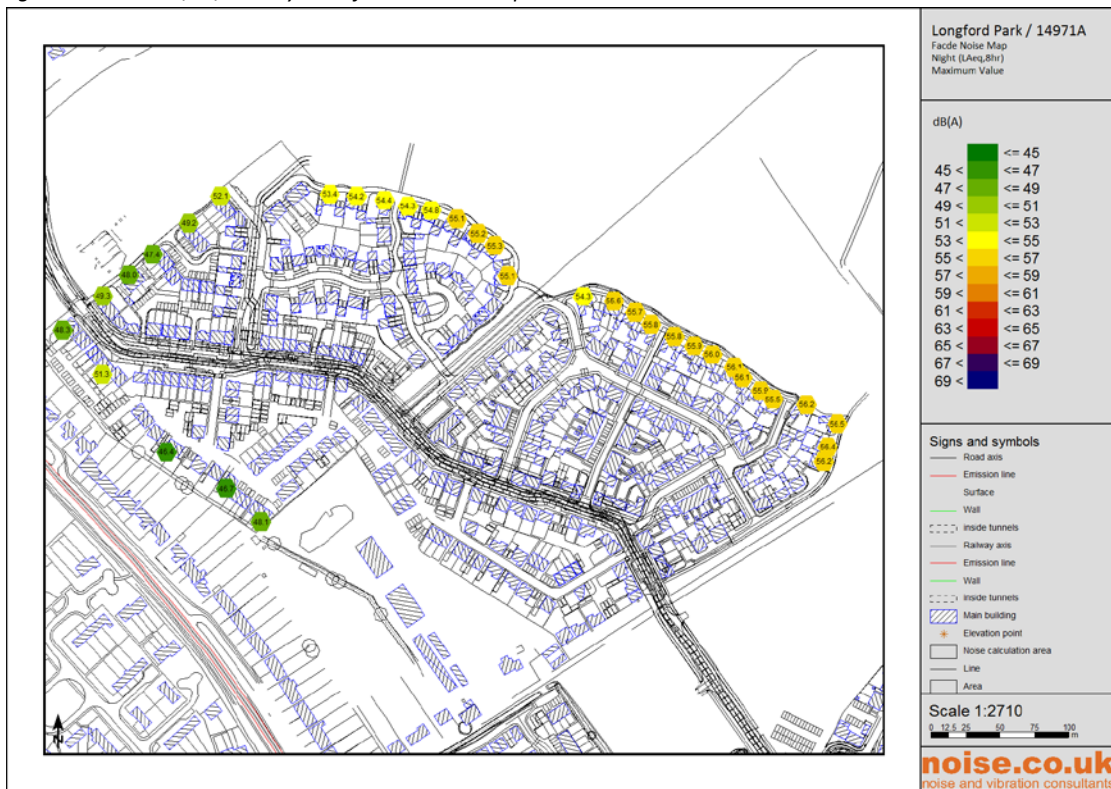


Figure 7 - Parcel D / E / DE night-time facade noise map.

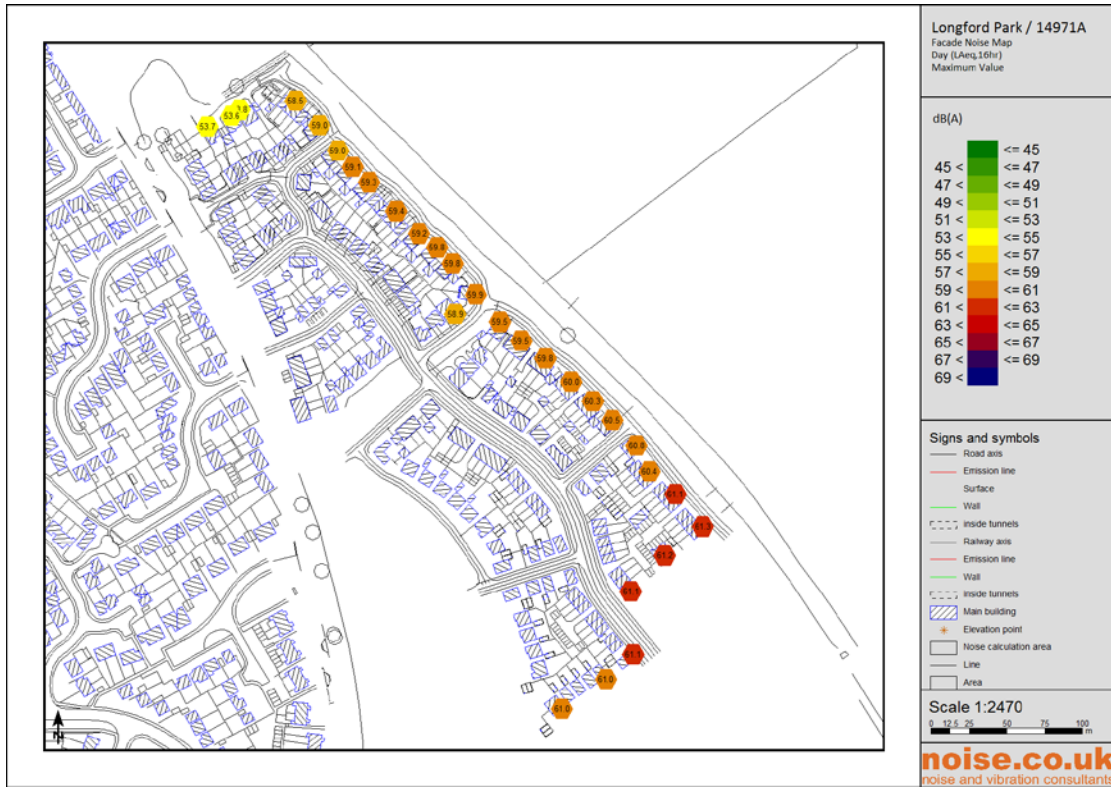


Figure 8 - Parcel F day-time facade noise map.

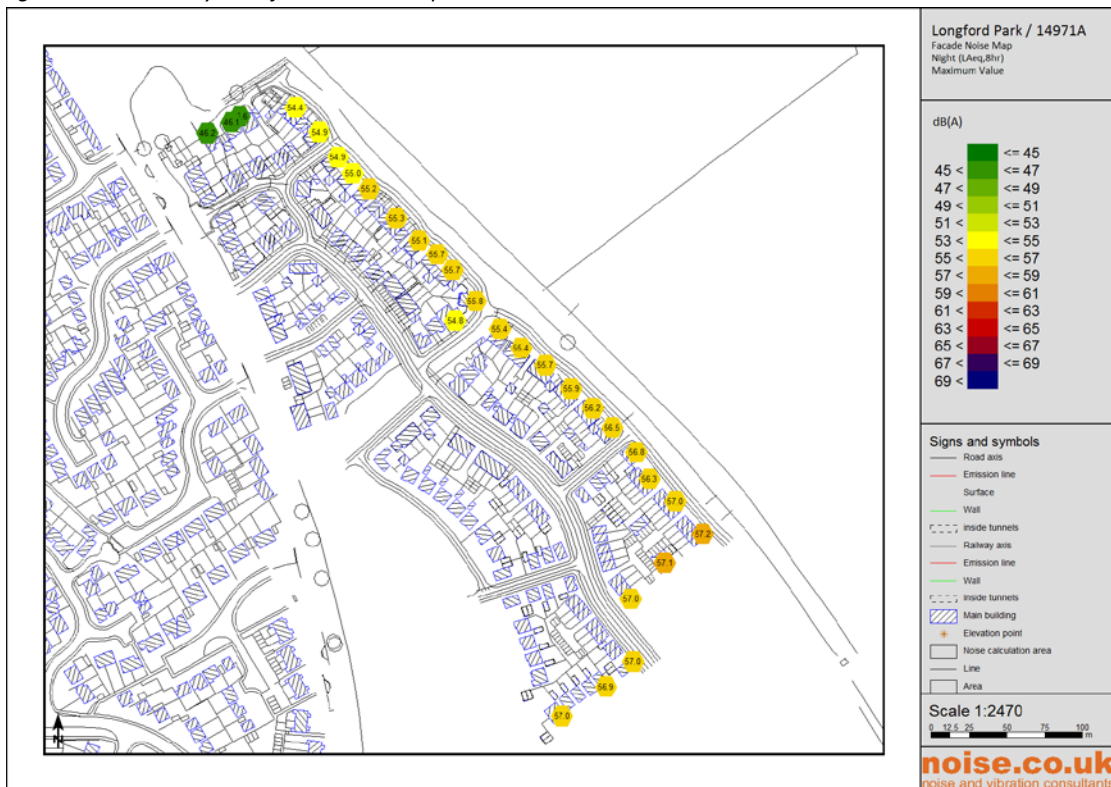


Figure 9 - Parcel F night-time facade noise map.

7.1.6. The black box in Figure 2 above indicates the area of site which falls into NEC C.

7.1.7. All other properties around site are classified as NEC category B.

- 7.1.8. The worst affected property from each parcel of land will be used during the glazing configuration calculation process. This will present the worst case scenario. These are summarised below:

Parcel	Living Rooms (Daytime) L_{Aeq}	Bedrooms (Night-time) L_{Aeq}
A	64.8 dB	56.3 dB
B / C	59.9 dB	55.8 dB
D / E / DE	57.6 dB	53.5 dB
F	58.3 dB	54.2 dB

Table 1 - Worst Case Noise Levels – Free field

- 7.1.9. These noise levels will be used as the basis for the mitigation.

8. Mitigation

8.1. Internal noise levels

- 8.1.1. The glazing performance selection for these affected façades will be based on the road traffic corrected sound reduction index, R_{TRA} ¹ to take into account the frequency characteristics of the dominant noise source in the area.
- 8.1.2. The road traffic corrected sound reduction index R_{TRA} includes a correction term, C_{tr} , in the glazing calculation which reduces the likelihood of disturbance from any low frequency noise.
- 8.1.3. Based on the measurement data the simple calculation method from BS8233:1999 is used to select the glazing. Standard forms of construction are assumed such that the glazing is likely to be the lowest performing facade element.
- 8.1.4. The single figure glazing performance requirements in order to achieve the internal design criteria are calculated in the Appendix and are summarised below.

Area of Site	Living Rooms (Daytime)	Bedrooms (Night-time)
A	30 dB R_{TRA}	27 dB R_{TRA}
B / C	25 dB R_{TRA}	26 dB R_{TRA}
D / E / DE	23 dB R_{TRA}	24 dB R_{TRA}
F	24 dB R_{TRA}	25 dB R_{TRA}

Table 2 - Required facade sound insulation

¹ Glass and Noise: Technical Bulletin, Pilkington Glazing, May 1997
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8.1.5. This required facade reduction is based on the highest level within each category and to give a worst case scenario.

8.1.6. An example glazing configuration which will achieve the required performance from Table 1 are as follows:

Parcel	Living Rooms (Daytime)	Bedrooms (Night-time)
A	4(6)6	4(12)4
B / C	4(12)4	4(12)4
D / E / DE	4(12)4	4(12)4
F	4(12)4	4(12)4

Table 3 - Recommended glazing specification

8.1.7. Table 3 shows the different glazing specification required to meet the internal noise.

8.1.8. Our glazing selection makes use of data from; BS EN 12354-3 2000, Pilkington Design guide and Saint Gobain Glasst.

8.1.9. A full glazing mark-up for the Client's proposed layout plan is detailed in the Appendix.

8.2. Ventilation

8.2.1. 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.

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

9. Conclusions

- 9.1.1. An environmental noise assessment has been conducted on a proposed site at Longford Park, Banbury in order to assess the impact of environmental noise on a proposed residential development. A predicted noise model has been produced using recently obtained historic data prior to the commencement of the current development.
- 9.1.2. Suitable mitigation in the form of a glazing configuration has been specified to allow even the worst affected property facade to achieve the internal criteria required by the Local Authority.
- 9.1.3. We strongly recommend that this report be passed to the Local Authority for approval before implementation of mitigation.

Dr Bill Whitfield BA, MSc, PhD, MIOA
Managing Director

10. Appendix

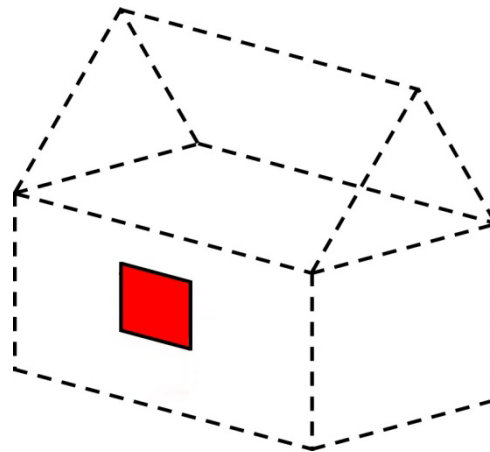
10.1. Appendix A: Summary Information

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 8233:1999 / WHO
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Barratt Homes (WM), Taylor Wimpey (Oxford) and Bovis Homes	
D	Full site address	Longford Park, Banbury.	
E	Description & identification of proposed development	It is proposed to develop the site for residential.	
F	Brief Description of details of Procedure & equipment	See section 5 of this report	

10.2. Appendix B: 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 façade².

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).



A	Day	Night
Sound pressure level at facade	64.8 dB $L_{Aeq,16hr}$	56.3 dB $L_{Aeq,8hr}$
Internal design criteria	35 dB	30 dB
Required facade sound insulation	29.8 dB RTRA	26.3 dB RTRA
Glazing specification	4(6)6	4(12)4
Performance of chosen glazing	31dB R_{TRA}	27dB R_{TRA}
Predicted internal level	33.8dB $L_{Aeq,16hr}$	29.3dB $L_{Aeq,8hr}$

B / C	Day	Night
Sound pressure level at facade	59.9 dB $L_{Aeq,16hr}$	55.8 dB $L_{Aeq,8hr}$
Internal design criteria	35 dB	30 dB
Required facade sound insulation	24.9 dB RTRA	25.8 dB RTRA
Glazing specification	4(12)4	4(12)4
Performance of chosen glazing	27dB R_{TRA}	27dB R_{TRA}
Predicted internal level	32.9 dB $L_{Aeq,16hr}$	28.8 dB $L_{Aeq,8hr}$

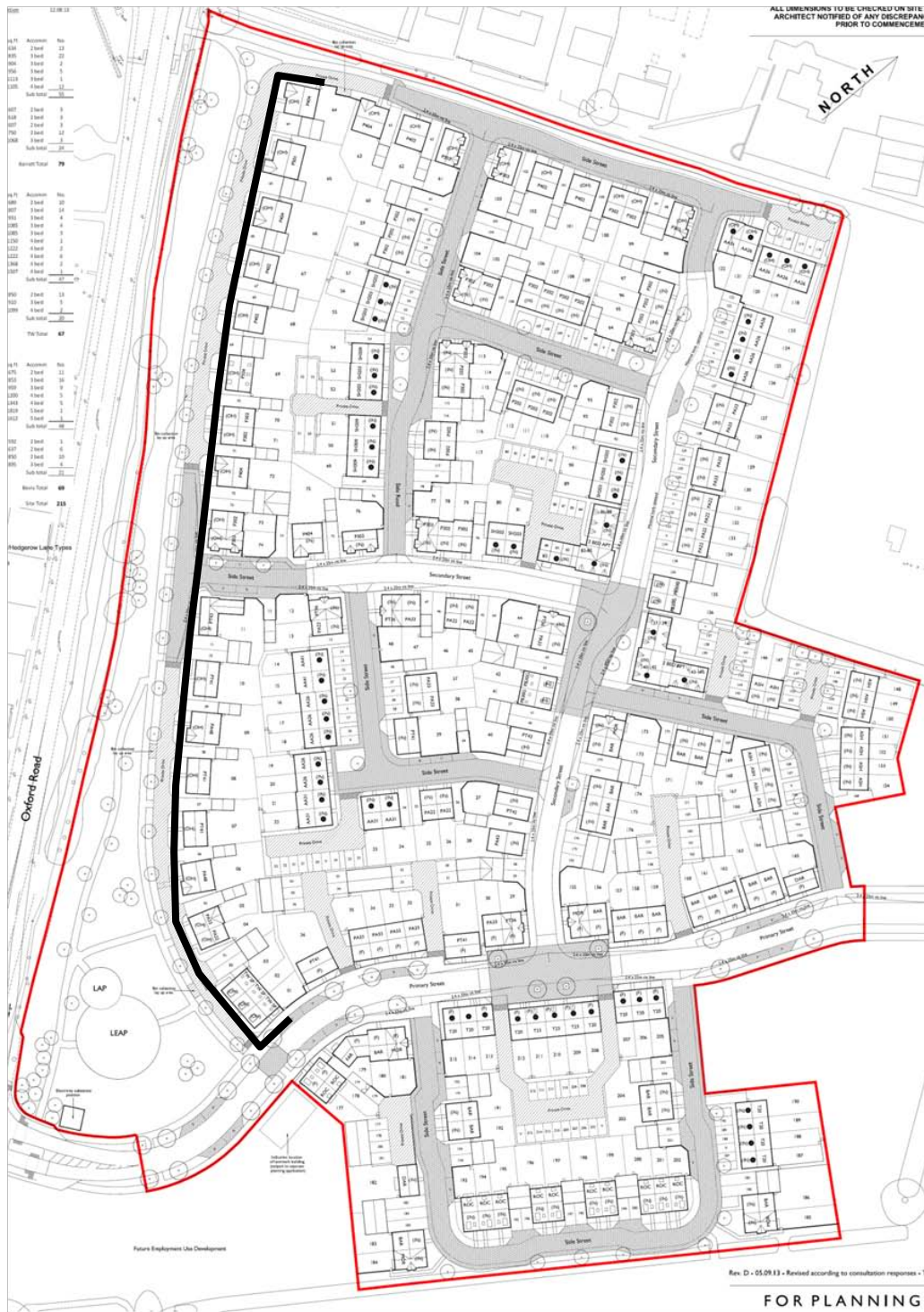
² BS8233:1999 “Sound insulation and noise reduction for buildings – Code of practice”, P15
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D / E / DE	Day	Night
Sound pressure level at facade	57.6 dB $L_{Aeq,16hr}$	53.5 dB $L_{Aeq,8hr}$
Internal design criteria	35 dB	30 dB
Required facade sound insulation	22.6 dB R _{TRA}	23.5 dB R _{TRA}
Glazing specification	4(12)4	4(12)4
Performance of chosen glazing	27dB R _{TRA}	27dB R _{TRA}
Predicted internal level	30.6 dB $L_{Aeq,16hr}$	26.5 dB $L_{Aeq,8hr}$

F	Day	Night
Sound pressure level at facade	58.3 dB $L_{Aeq,16hr}$	54.2 dB $L_{Aeq,8hr}$
Internal design criteria	35 dB	30 dB
Required facade sound insulation	23.3 dB R _{TRA}	24.2 dB R _{TRA}
Glazing specification	4(12)4	4(12)4
Performance of chosen glazing	27dB R _{TRA}	27dB R _{TRA}
Predicted internal level	31.3 dB $L_{Aeq,16hr}$	27.2 dB $L_{Aeq,8hr}$

10.3. Appendix C: SoundPLAN Grid Noise Maps

10.4. Appendix D: Glazing Mark-up



Area of Site	Living Rooms (Daytime)	Bedrooms (Night-time)
Oxford Road Facade	30dB R _{TRA} (4(6)6)	27dB R _{TRA} (4(12)4)

The remainder of the development site can use a 4(12)4 glazing configuration.