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Environmental Noise Assessment

Prepared : 13 May 2014

Report No - 14971-1
Client - Taylor Wimpey (Oxford)
Site - Longford Park
Banbury

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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 which was not addressed in the EIS chapter.

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. Scope

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

3.1.2. 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.

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

- 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.

3.1.4. 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]	LAm _{ax, fast} [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

3.1.5. 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 Source	Noise Exposure Category			
	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

- 3.1.6. 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.

4. Introduction

- 4.1.1. The site is bounded by Oxford Road to the West and Bankside Road to the North. The M40 motorway runs close to the eastern side of the site. A site plan is shown in Figure 1.

ALL DIMENSIONS TO BE CHECKED ON SITE
ARCHITECT NOTIFIED OF ANY DISCREPANCY
PRIOR TO COMMENCEMENT

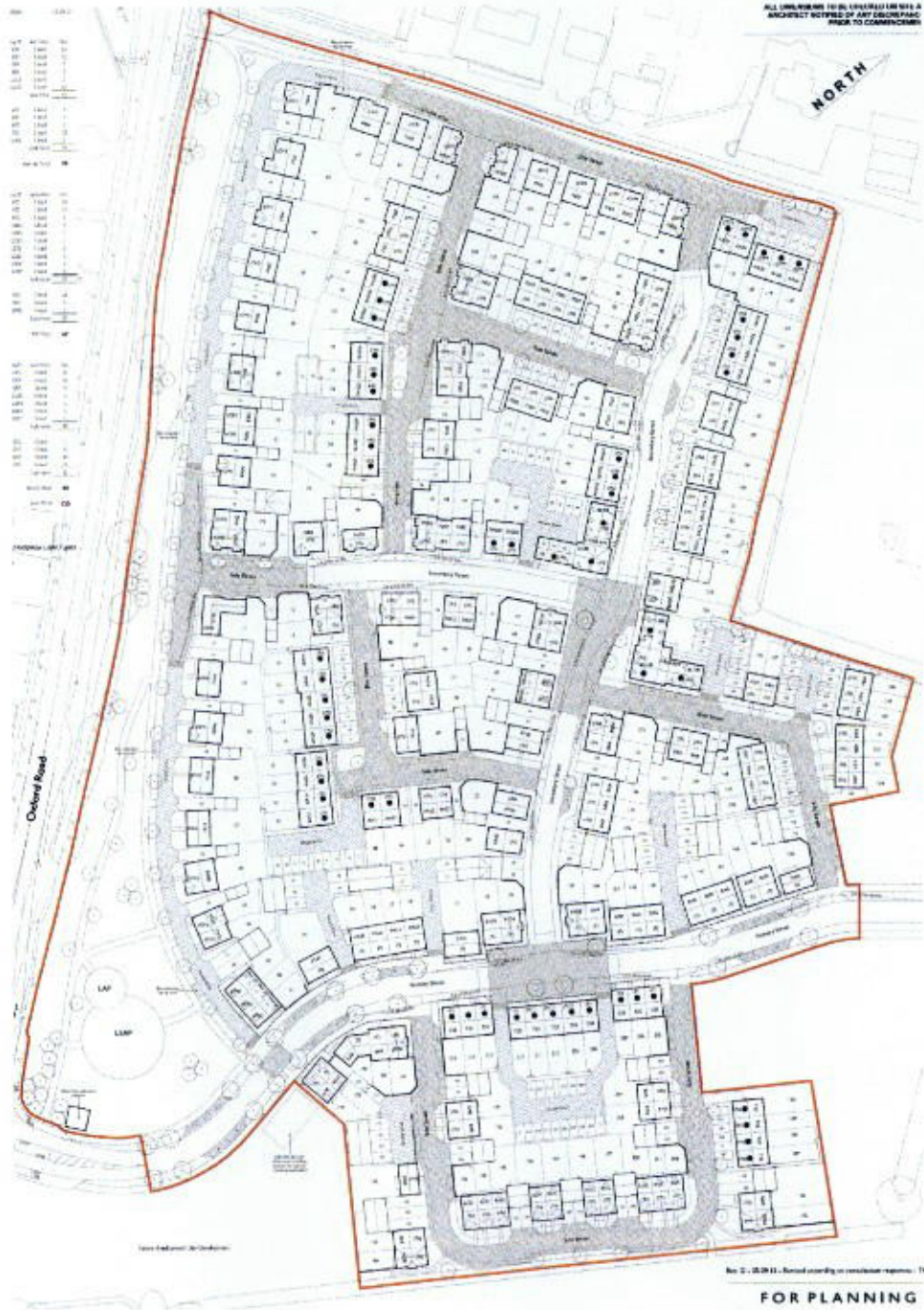


Figure 1 - Site plan

5. Survey

- 5.1.1. 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".

6. Results

6.1. SoundPLAN Images

- 6.1.1. 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.
- 6.1.2. 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 well with the measured daytime levels on these facades. Theses 18hr traffic flow figures were split into day and night time figures using the ratios in the EIS.
- 6.1.3. The M40 traffic flow figures are adjusted up using traffic flow data taken from the DfT (Department for Transport) website, for 2005 to 2012 (when the original measurements were done to the most recent data available) giving an 11.5% increase. The model is therefore effectively based upon 2012 flows as predicted by the original report.
- 6.1.4. Figure 2 and Figure 3 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

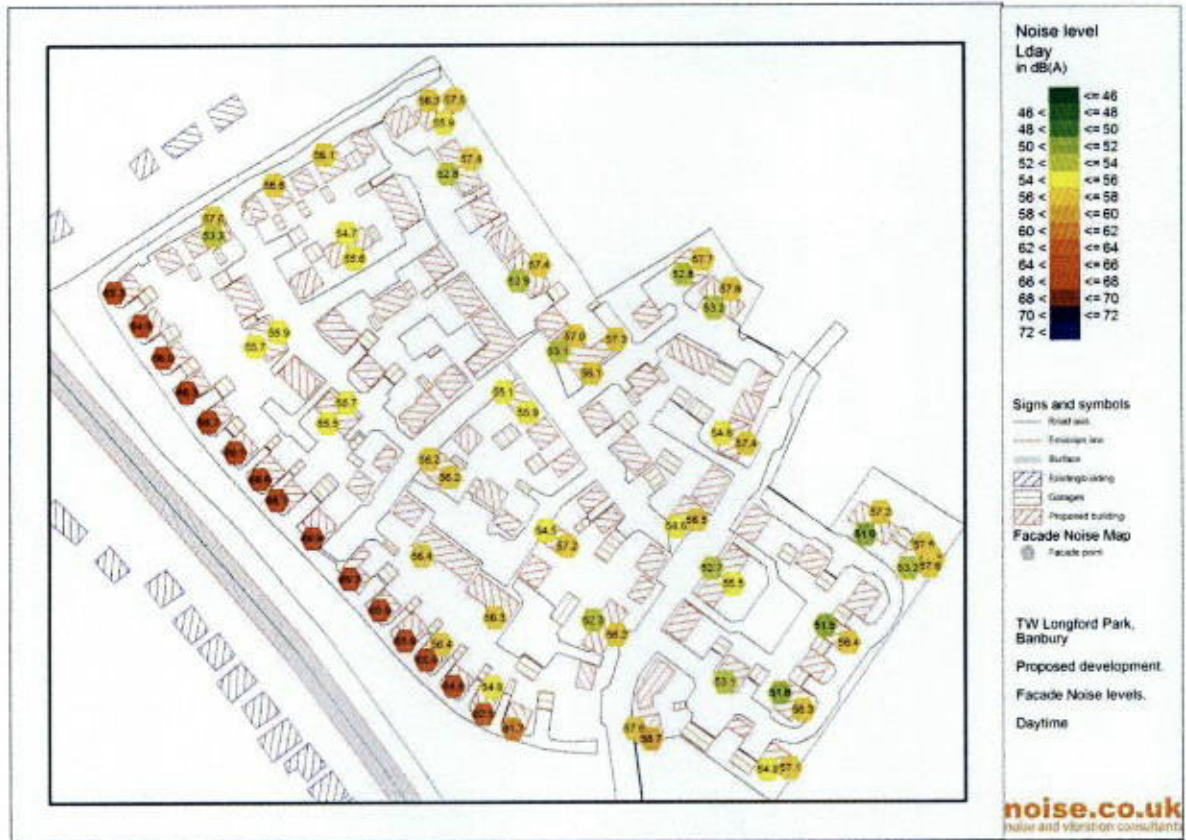


Figure 2 - Facade Levels during the Daytime



Figure 3 - Facade Levels during the Night-time

6.1.5. Using these noise levels, the following figure indicates the NEC categories of the properties around the site

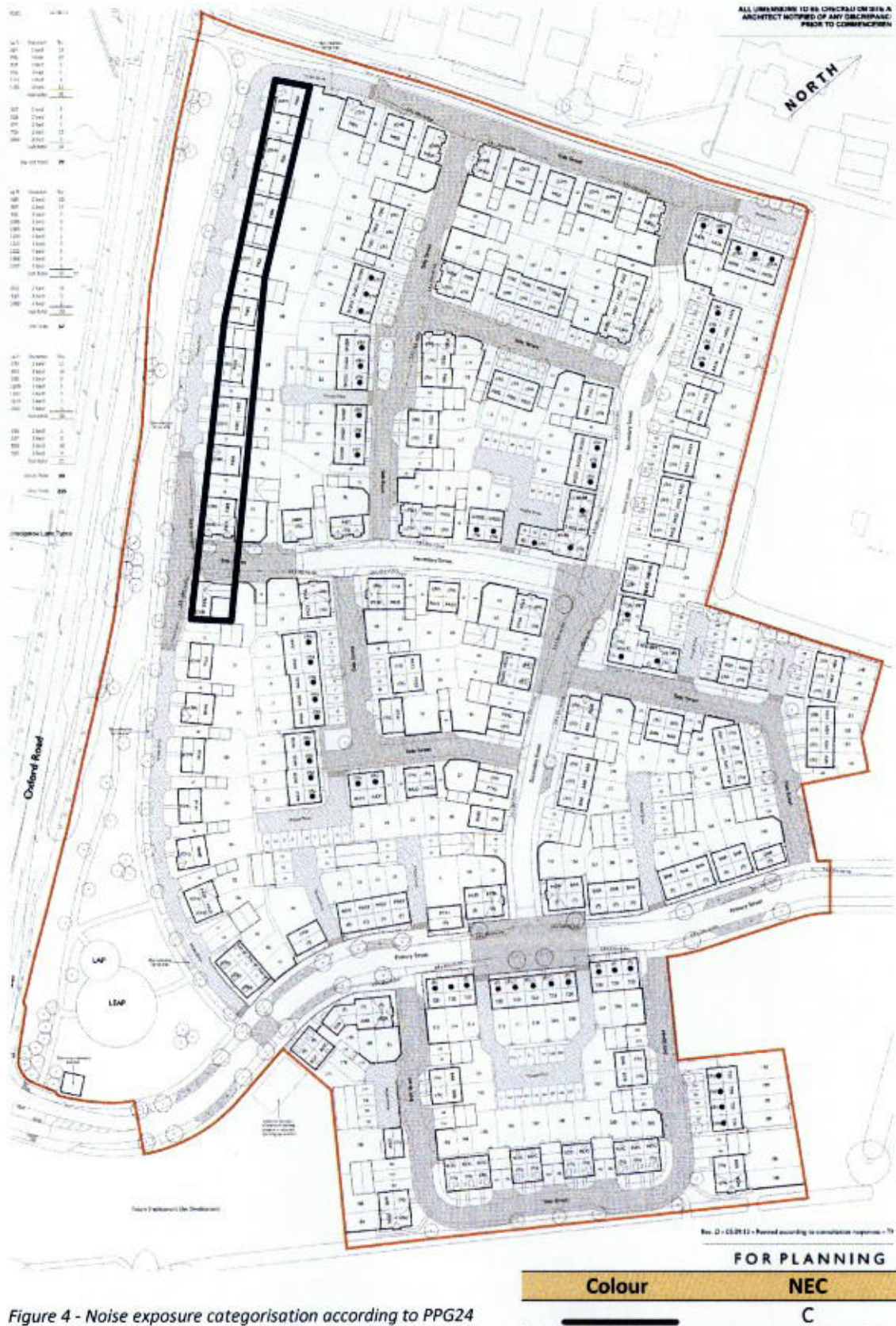


Figure 4 - Noise exposure categorisation according to PPG24

- 6.1.6. All other properties around site are classified as NEC category B.
- 6.1.7. It can be seen from Figure 2 and Figure 3 that the noise levels are highest along the Oxford Road facade. Therefore it is logical to distinguish these properties from the others around site.
- 6.1.8. The worst case condition for these two areas is summarised below:

Area of Site	Living Rooms (Daytime) L_{Aeq}	Bedrooms (Night-time) L_{Aeq}
Oxford Road Facade	63.7dB	55.7dB
Remainder of Site	54.8dB	48.6dB

Table 1 - Worst Case Noise Levels – Free field

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

7. Mitigation

7.1. Internal noise levels

- 7.1.1. 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 noise.
- 7.1.2. 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.
- 7.1.3. 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.
- 7.1.4. 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)
Oxford Road Facade	29dB R_{TRA}	26dB R_{TRA}
Remainder of Site	20dB R_{TRA}	19dB R_{TRA}

Table 2 - Required facade sound insulation

- 7.1.5. This required facade reduction is based on the highest level within each category and to give a worst case scenario.
- 7.1.6. The glazing configurations which achieve the required performance from Table 2 are as follows:

Area of Site	Living Rooms (Daytime)	Bedrooms (Night-time)
Oxford Road Facade	4(6)8 †	6/(6-16)/4
Remainder of Site	4/(6-16)/4	4/(6-16)/4

Table 3 - Recommended glazing specification

- 7.1.7. Table 3 shows the different glazing specification required to meet the internal noise.
- 7.1.8. Our glazing selection makes use of data from; BS EN 12354-3 2000, Pilkington Design guide and Saint Gobain Glasst.
- 7.1.9. A full glazing mark-up for the Client's proposed layout plan is detailed 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. Acoustic performance data provided by Greenwood has been used to calculate the affect on internal levels with the installation of different ventilation systems on a facade.
- 7.2.4. The calculation method from 7.1 is expanded to consider both the glazing and the ventilation system as the weakest points of a facade. A composite sound reduction index based on the sound reducing performance of these two elements is calculated and the simple calculation method from BS8233:1999 outlined previously is followed using this value.

7.2.5. Guidance from Approved Document F: Means of Ventilation:2010² is used to determine the number of vents of each specification that are required in habitable spaces. Section 5.2 of this document states that

“Background ventilators should be located in all rooms with external walls, with at least 5000 mm² equivalent area in each habitable room.”

7.2.6. This minimum equivalent area is assumed for the purpose of the calculation

7.2.7. Given the assumptions in this method the information in this section should be treated as general guidance only. The acoustic performance of third party products cannot be guaranteed by noise.co.uk.

7.2.8. The figures below show the internal levels achieved for both the bedrooms and living rooms with the glazing specified in section 7.1 and different Greenwood Ventilation products. The graph includes the design criteria for living rooms and bedrooms for reference.

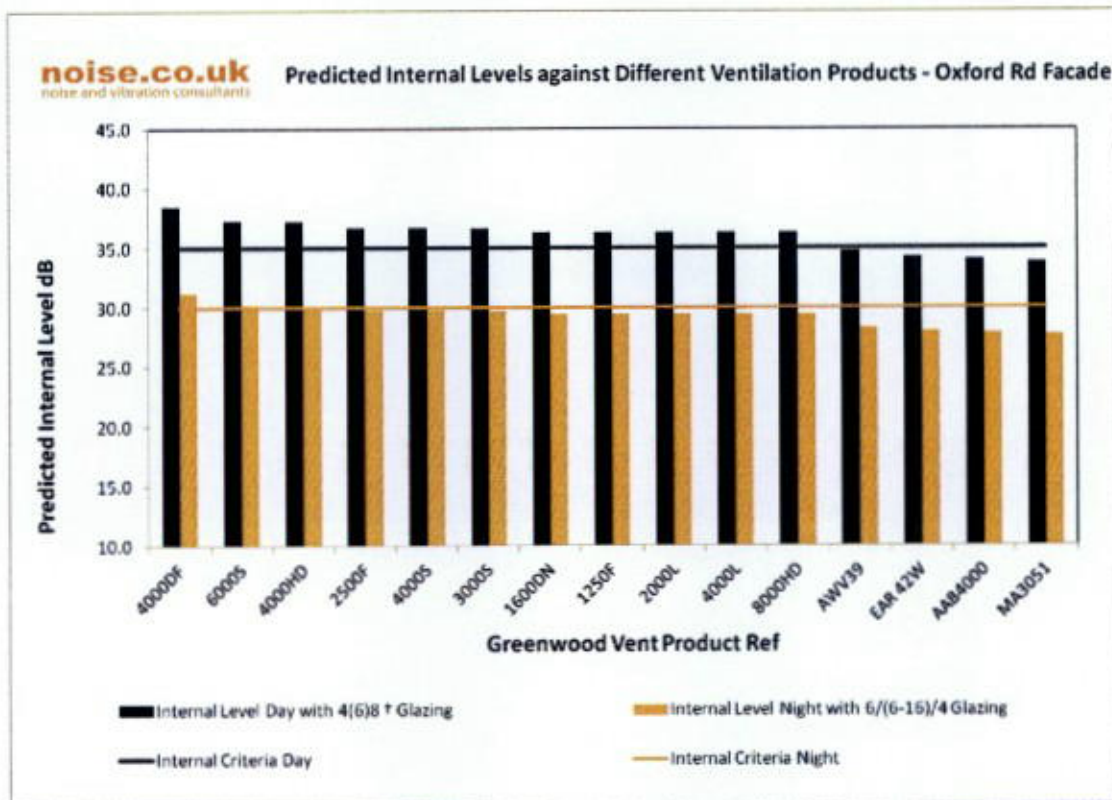


Figure 5 - Internal noise levels with different ventilation products - Oxford Road Facade

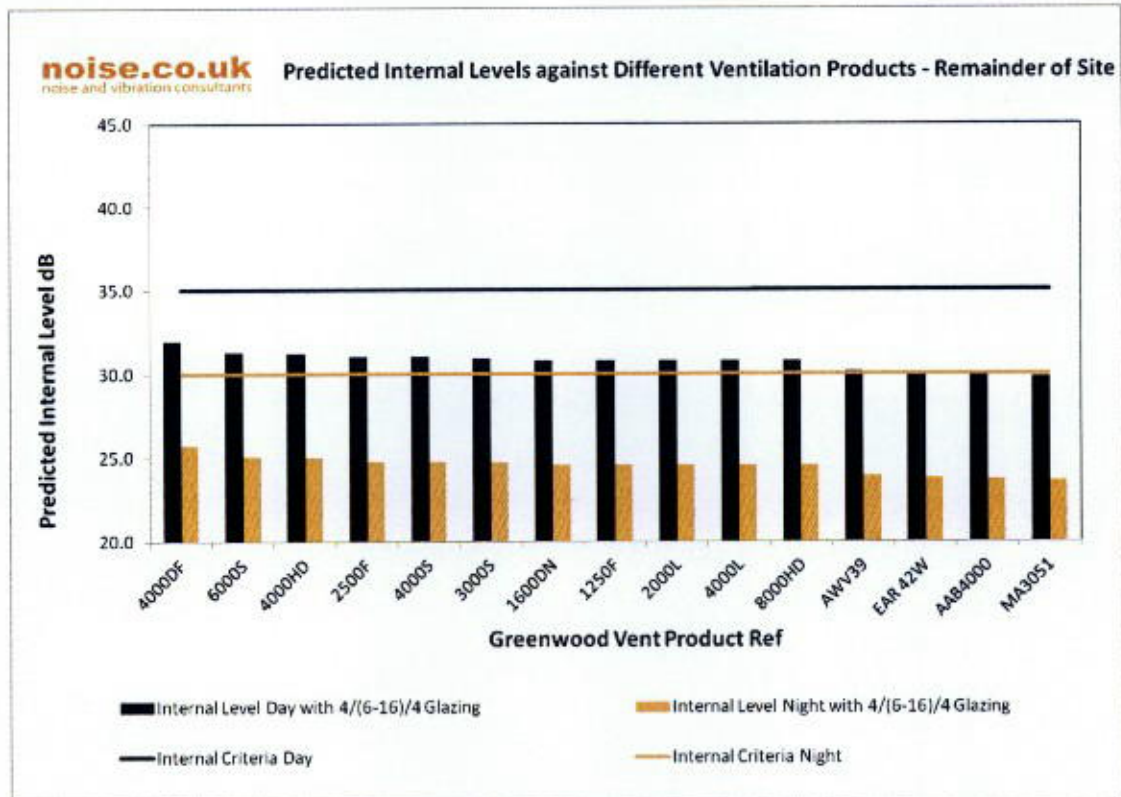


Figure 6 - Internal noise levels with different ventilation products - Remainder of Site

- 7.2.9. With the introduction of a ventilation system in to the calculation the sound reduction of the facade is reduced and the predicted internal levels higher than compared with a glazing only consideration. In cases where only a high end vent will meet the internal level criteria with our recommended glazing it may be cost effective to increase the glazing specification marginally so a more appropriate vent can be matched.
- 7.2.10. We would recommend the services of Greenwood (or equal and approved) for expert advice on ventilation strategies. For more information please contact:

Mike Beck, Greenwood
M: 07801039584

8. Conclusions

- 8.1.1. 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.
- 8.1.2. Suitable mitigation in the form of a glazing configuration has been specified to allow even the worst affected property facade (internal habitable rooms (Bedrooms and Living Rooms) to achieve the internal criteria required by the Local Authority.
- 8.1.3. 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

9. Appendix

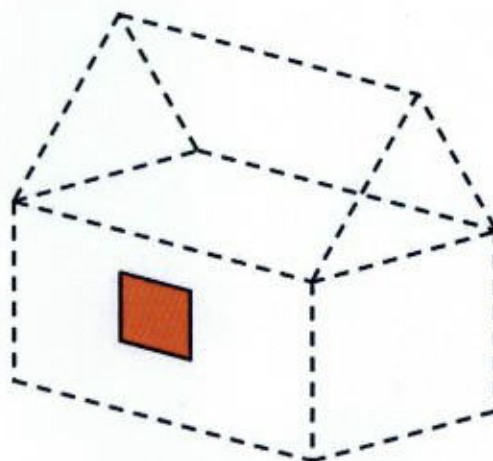
9.1. Appendix A: Summary Information

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
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Taylor Wimpey (Oxford)	
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	

9.2. 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 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).

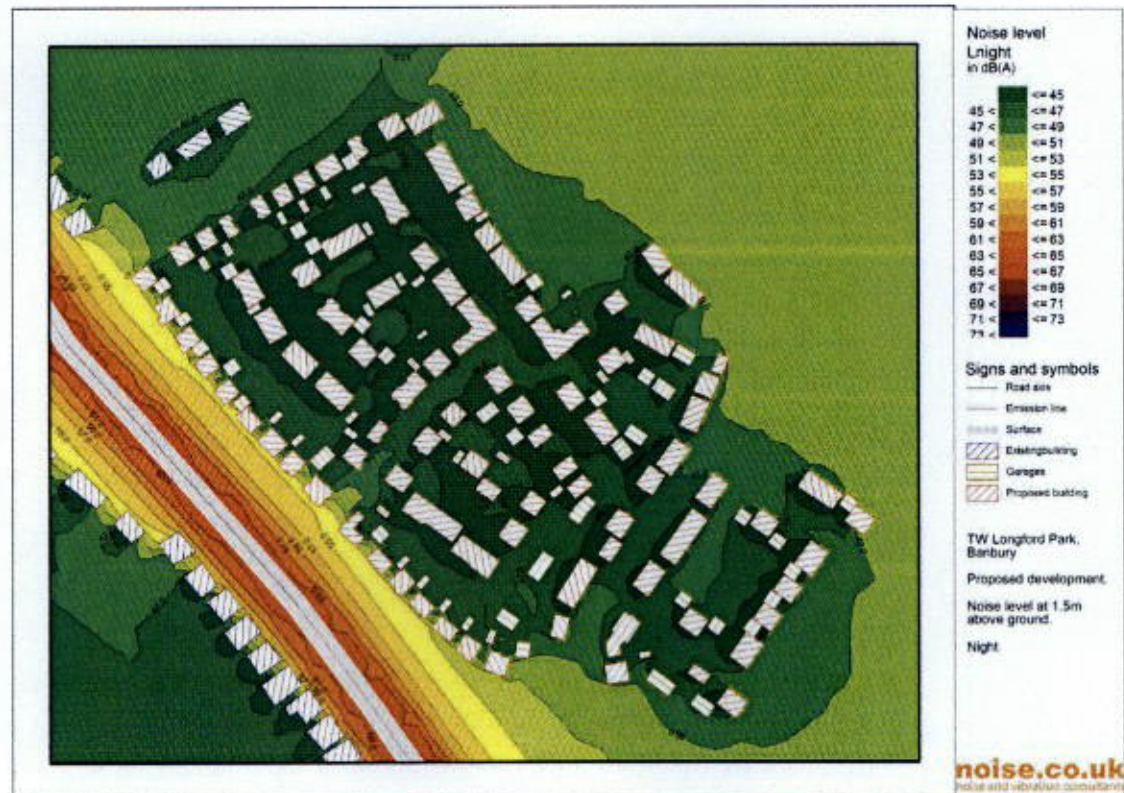
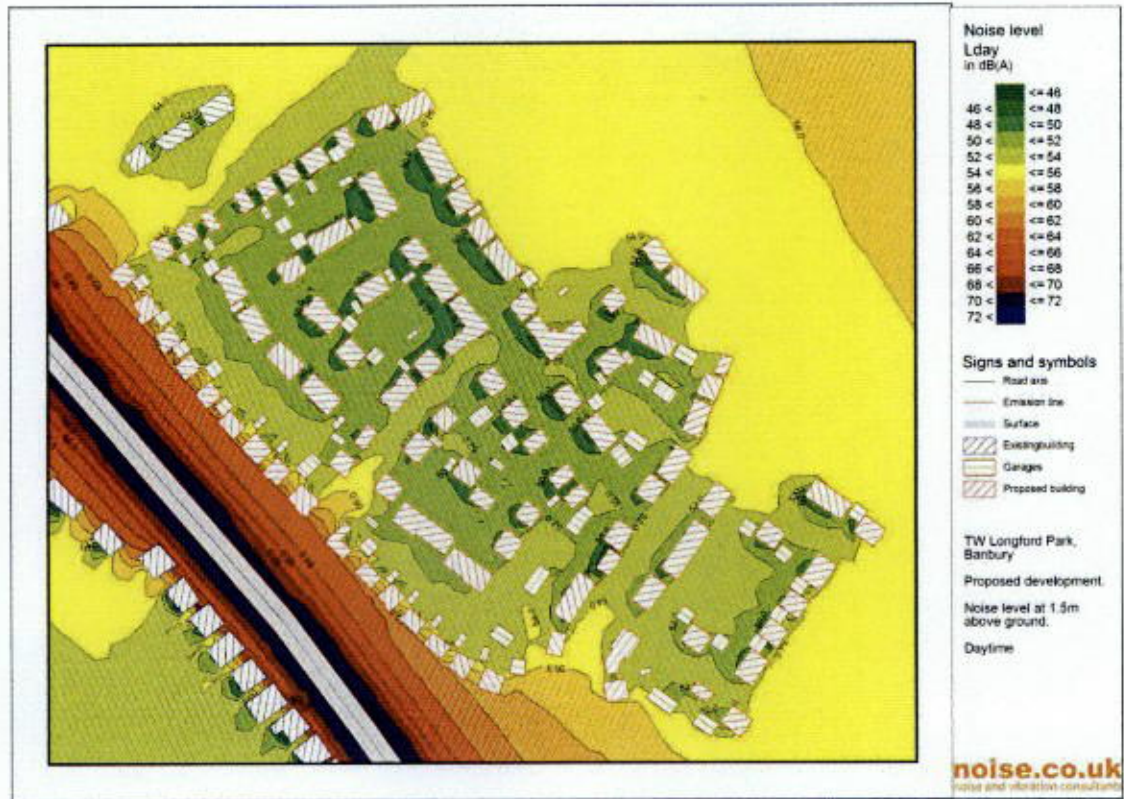


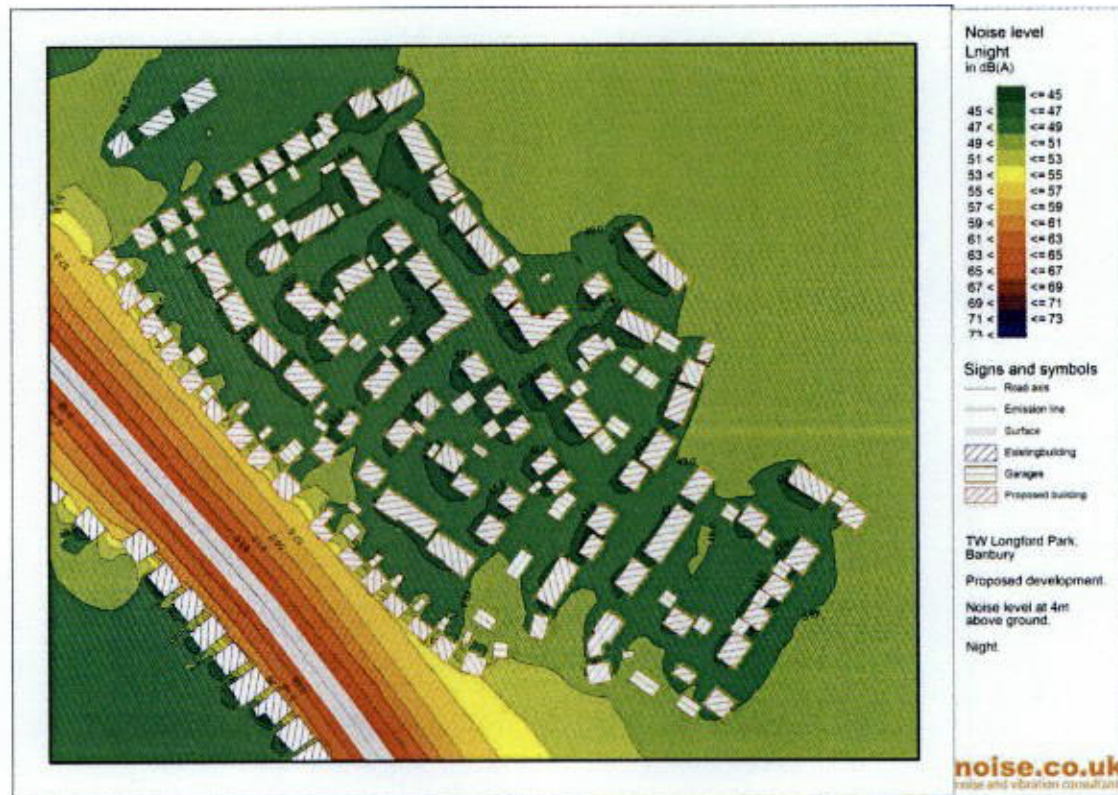
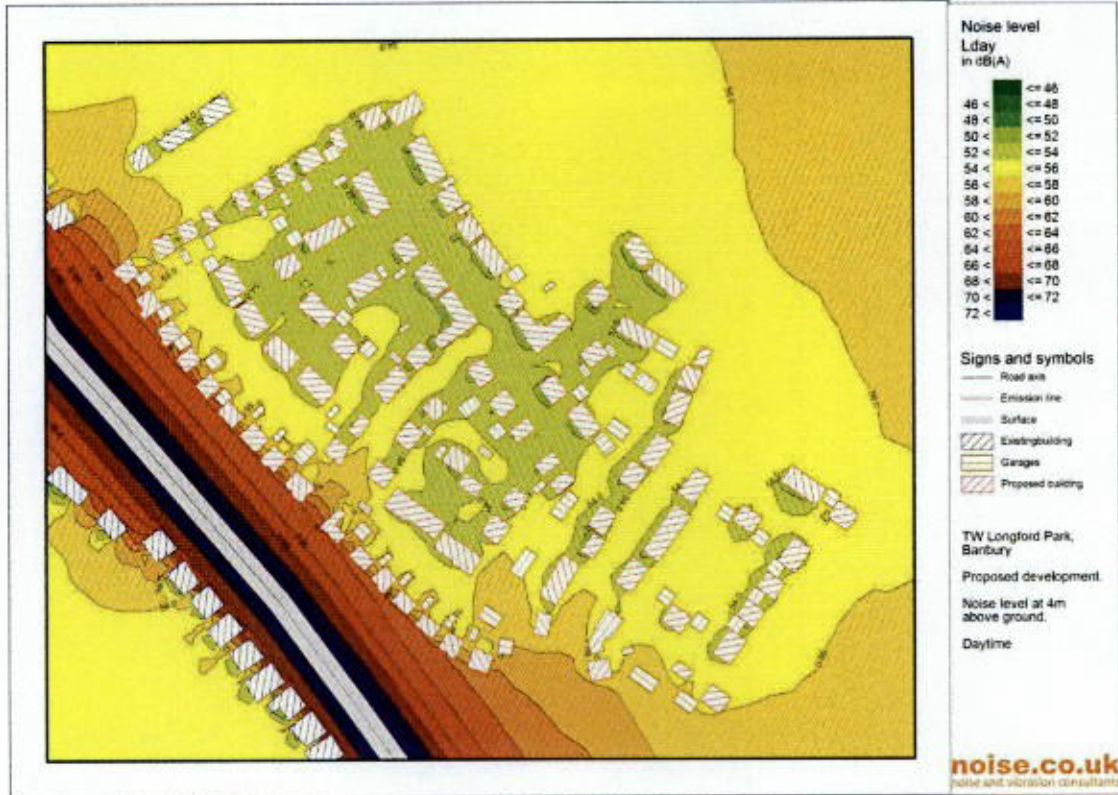
Oxford Road Facade	Day	Night
Sound pressure level at facade	63.7dB $L_{Aeq,16hr}$	55.7dB $L_{Aeq,8hr}$
Internal design criteria	35 dB	30 dB
Required facade sound insulation	29dB RTRA	26dB RTRA
Glazing specification	4(6)8 †	6/(6-16)/4
Performance of chosen glazing	30dB R_{TRA}	28dB R_{TRA}
Predicted internal level	33.7dB $L_{Aeq,16hr}$	27.7dB $L_{Aeq,8hr}$

Remainder of Site	Day	Night
Sound pressure level at facade	54.8dB $L_{Aeq,16hr}$	48.6dB $L_{Aeq,8hr}$
Internal design criteria	35 dB	30 dB
Required facade sound insulation	20dB RTRA	19dB RTRA
Glazing specification	4/(6-16)/4	4/(6-16)/4
Performance of chosen glazing	25dB RTRA	25dB RTRA
Predicted internal level	29.8dB $L_{Aeq,16hr}$	23.6dB $L_{Aeq,8hr}$

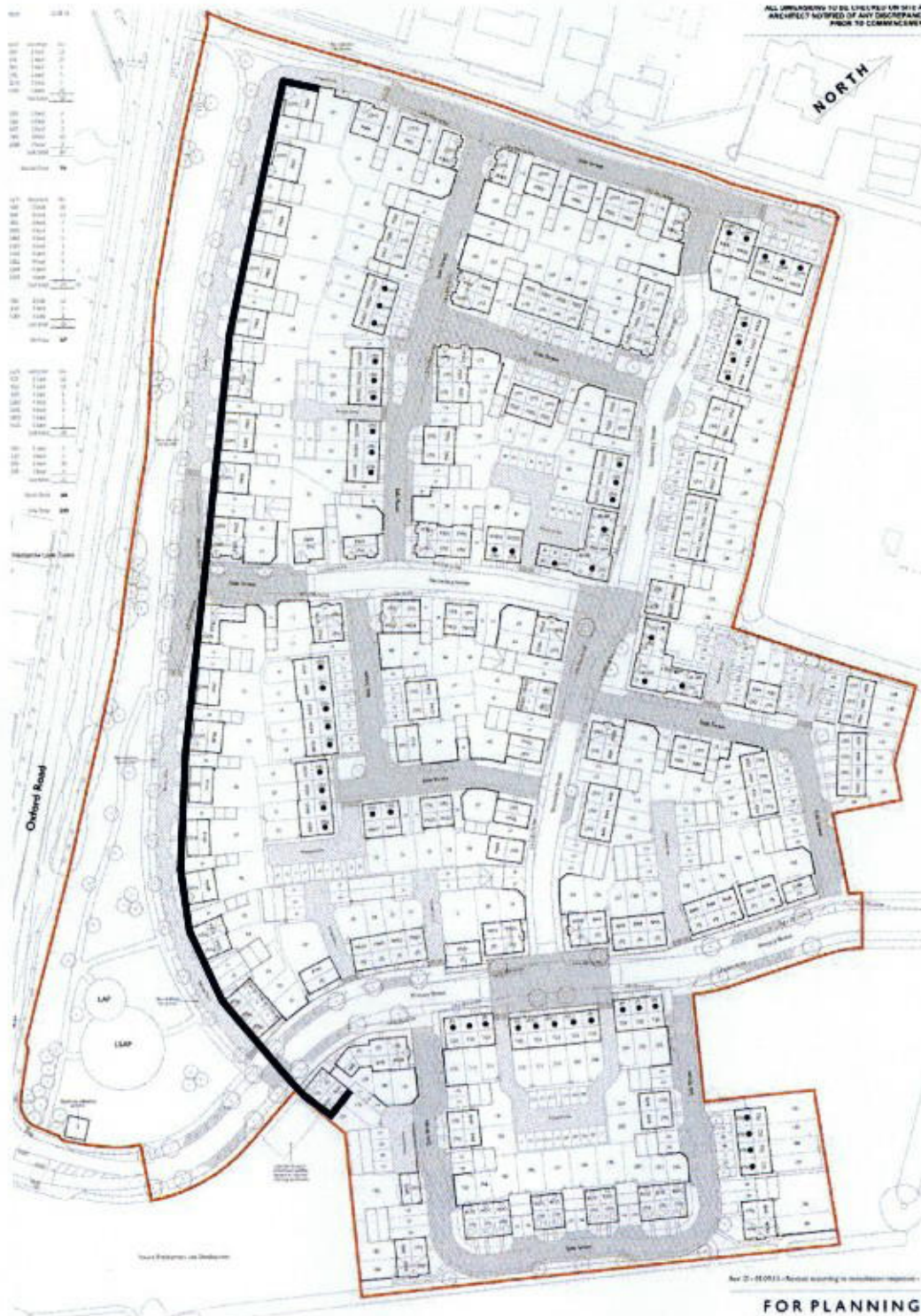
³ BS8233:1999 "Sound insulation and noise reduction for buildings – Code of practice", P15
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9.3. Appendix C: SoundPLAN Plots





9.4. Appendix D: Glazing Mark-up



Area of Site	Living Rooms (Daytime)	Bedrooms (Night-time)
Oxford Road Facade —————	29dB R _{TRA} (4/6)8 †	26dB R _{TRA} (6/(6-16)/4)

The remainder of site can use a 4/(6-16)/4 glazing configuration