






**PEAR TREE, OXFORD
RESIDENTIAL DEVELOPMENT
PPG24 NOISE IMPACT
ASSESSMENT**

Worcester College & Kier Ventures Ltd.

January 2006

QM

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PEAR TREE, OXFORD
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PPG24 Noise Impact Assessment

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PEAR TREE, OXFORD
RESIDENTIAL DEVELOPMENT
PPG24 Noise Impact Assessment

1.0 Introduction

- 1.1 WSP Acoustics has been appointed by Carter Jonas LLP on behalf of Worcester College and Kier Ventures Ltd. to undertake a noise impact assessment at the site known as Pear Tree, Oxford – hereafter referred to as the site.
- 1.2 This assessment essentially represents a repeat of a previous assessment undertaken on the site by WSP in August 1999. As this assessment has found (see Paragraph 6.10), the original assessment was robust and remains valid; however, given the six year time lapse, repeating the assessment was considered to be appropriate.
- 1.3 The assessment has been undertaken in accordance with the Scope of Work presented in our Letter to Mr Ian Gillespie of Carter Jonas, dated 14 September 2005. Accordingly, this Report presents the outcome of an assessment of the existing ambient noise levels on the site in accordance with the former DoE's document Planning Policy Guidance Note 24: *Planning and Noise* and associated British Standards.
- 1.4 Noise measurements were taken at three positions on the site, at the closest points to the dominant sources of noise. The details of the noise survey methodology are given in Section 4 of this Report.
- 1.5 This Report is necessarily technical in nature and a glossary of terms can be found in Appendix A.



2.0 Site Description

- 2.1 A Site Plan showing the site (in its existing state) and the surrounding area is presented in Appendix B of this Report.
- 2.2 It can be seen from this plan that the site is essentially a triangular plot between the Pear Tree Park & Ride to the north, the railway line to the east, some existing dwellings to the south and the A44 (Woodstock Road) to the west.
- 2.3 The site is currently used for grazing. The topographically lowest point of the site is at the north-westernmost corner where the site meets with the A44 and the entrance/exit to the Park & Ride. The site then slopes gradually up towards the eastern and southernmost parts of the site, such that the highest points are approximately 6m above the lowest point.
- 2.4 At the south end of the site, the railway is in a cutting such that the trains cannot be seen; the railway line slopes down towards a tunnel which takes the trains underneath Wolvercote Roundabout. At the northern end of the site, the railway line is no longer in cutting and is approximately level with the site.
- 2.5 The Pear Tree Park & Ride operates between the following hours:
- Monday to Saturday: 06:00 to 23:15
 - Sundays & Public Holidays: 08:40 to 18:45
- 2.6 The Park & Ride bus movements occurring every 8-10 minutes during the peak hours, and between 15 and 30 minutes during off peak/ Sunday and Public Holiday periods.
- 2.7 Further to the north-east of the site is the Pear Tree Interchange, where the A44 meets the A34, whilst further to the south of the site is the Wolvercote Roundabout, where the A44 meets the A40 Northern Bypass. On the other side of the railway line from the site are the dwellings of Five Mile Drive, Carey Close and Lakeside Avenue.
- 2.8 Also to the south of the site, on the corner of the A44 and the A40, is the BP service station, the BMW car dealership and the Telephone Station Repeater.



2.9 Given the above, the area surrounding the site can be described as predominately urban in nature, comprising a diverse mixture of uses, including residential and commercial, with road and rail movements being the dominant sources of noise.



3.0 Methodology and Criteria

Planning Policy Guidance Note 24: Planning and Noise

3.1 Planning Policy Guidance Note 24 (PPG24), published in September 1994, sets out the Government's policies on noise related planning issues. It gives guidance to local authorities in England on the use of their planning powers to minimise the adverse impact of noise. Specifically, it:

- outlines the considerations to be taken into account when determining planning applications for both noise-sensitive developments and for those activities which will generate noise;
- introduces the concept of Noise Exposure Categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and
- advises on the use of planning conditions to minimise the impact of noise.

3.2 PPG24 recommends the use of four Noise Exposure Category (NEC) bands, designed to assist local planning authorities in evaluating applications for residential development in noisy areas. The following table shows each NEC band, defined by a range of 'free-field' noise levels into which development land falls, together with relevant planning advice to the local authority. The definition of each NEC band depends on the noise source in question. It is discussed in the following section that despite one of the measurement locations being in close proximity to the railway, the road traffic on the A44 etc. is the dominant noise source throughout the site. Accordingly, the Noise Exposure Categories for road traffic sources have been adopted for the purposes of this assessment. This results in a more stringent assessment than were the train movements found to be dominant on any part of the site.

Table 1 PPG24 Noise Exposure Categories for new dwellings near existing and future noise environments dominated by road traffic noise

NEC	Noise Source Bands		Planning Advice
	Day time 0700-2300 $L_{Aeq,16hr}$ (dB)	Night-time 2300-0700 $L_{Aeq,8hr}$ (dB)	
A	<55	<45	Noise need not be considered as a determining factor in granting planning permission, although noise at the high end of the category should not be regarded as a desirable level.
B	55-63	45-57	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	63-72	57-66	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	>72	>66	Planning permission should normally be refused.

3.3 In addition to the above, PPG24 also states that during the night, (23:00 – 07:00 hours): *‘Sites where individual noise events regularly exceed 82dB L_{Amax} (slow time weighting) several times in any hour should be treated as being in NEC C, regardless of the L_{Aeq} (8 hour) (except where the L_{Aeq} (8 hour) already puts the site into NEC D).’*

3.4 Paragraph 9 of PPG24 states that *‘...in some cases it may be appropriate for local planning authorities to determine the range of noise levels which they attribute to any or each of the NECs. For example, where there is a clear need for new residential development in an already noisy area some or all of the NECs might be increased by up to 3dB(A) above the recommended levels. In other cases, a reduction of up to 3dB(A) may be justified.’*

3.5 This effectively means that if the Local Authority considers it appropriate, they have the power to relax or increase the noise limits within PPG24 (see paragraph 3.7 below).

Local Authority Criteria

3.6 The Local Planning Authority in this instance is Oxford City Council, and for the purposes of this assessment WSP Acoustics consulted with one of the Council’s



Environmental Health Officers who is responsible for dealing with issues relating to noise. It was agreed with Karen Seal that the PPG24 guidelines should be adopted as published, and, therefore, they would not automatically seek to adjust the NEC values, as discussed in paragraph 3.4.

- 3.7 At this early stage in the assessment of the site in general, i.e. in the absence of a master plan, there is little more that it is necessary to agree or discuss with the Local Authority. Oxford City Council do not have any set policies on noise and so it will be a question of agreeing internal and external noise targets, as appropriate, based on the outcome of this assessment and as the development proposals progress.

4.0 Baseline Noise Survey

- 4.1 WSP conducted a noise measurement survey to establish representative baseline day and night time noise levels at key locations on the site. The survey comprised long-term unattended noise measurements at three key locations on the site.
- 4.2 The survey was undertaken over the 48-hour period commencing 13:00 hours on Wednesday 12 October 2005. The approximate positioning of the microphones are shown in the Site Plan presented in Appendix B, and in the photographs presented below:

PHOTO 1: Position 1 (noise - at the North-westernmost corner of the site, overlooking the A44 and the entrance/ exit Pear Tree Park & Ride)






PHOTO 2: Position 2 (noise - at the north-easternmost corner of the site, overlooking the Pear Tree Park & Ride and the railway)



PHOTO 3: Position 3 (noise - at the south-westernmost corner of the site, overlooking the A44. Also close to the nearest existing dwellings to the site)



- 
- 4.3 In accordance with PPG24, the noise measurements were undertaken within ‘free-field’ conditions, i.e. 3.5m or greater from any hard, acoustically reflective surfaces other than the ground. PPG24 also states that measurements should be undertaken at a height of between 1.2 and 1.5m above the ground. For Positions 1 and 3, it was necessary for security reasons to elevate the microphone slightly higher than this range to approximately 2.5m above the ground. Accordingly, a 3-D noise map of the site has been constructed (see Section 5 of this Report) allowing the noise levels to be calculated at the required height, i.e. between 1.2 and 1.5m above the ground. The measurements at Position 2 were obtained at a height of approximately 1.5m above the ground (see Photo 2).
- 4.4 The weather conditions during the initial survey were generally conducive to the measurement of noise, it being fine and dry and with little or no wind. There was some rainfall on the afternoon of the first day’s measurements; however, this will not have greatly affected the results used for the purposes of this assessment.
- 4.5 The equipment used for the measurements comprised three remote logging 01dB-Stell sound level meter (serial numbers: 10565, 10330 and 10717), with ½ inch Microtech Gefell GmbH MCE212 condenser microphones (serial numbers: 22267, 37991 and 42448), which were protected by 90mm windshields. The meters were calibrated before and after the survey using a 01dB-Stell CAL01 acoustic calibrator (serial number 11331), which had itself been calibrated within the preceding twelve months by a UKAS accredited calibration laboratory. No significant drift in calibration levels occurred during the survey.
- 4.6 The L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} noise indices were measured. Table 3 presents a summary of the measured daytime and night-time noise levels pertinent to the PPG24 assessment. The full set of hourly results is presented in Appendix C.
- 4.7 Whilst the L_{Amax} threshold in PPG24 is in terms of ‘slow’ time weighting response, the criterion that will ultimately of use is that contained in BS8233: 1999: *Sound Insulation and Noise Reduction for Buildings - Code of Practice*, and this is in terms of the ‘fast’ time weighting response. And so, given that the measurement equipment used will only store one or other weighting, it was considered appropriate to adopt the ‘fast’ response for the purposes of this assessment. The affect being that the measured L_{Amax} levels will be higher, by typically 2-3dB, than the equivalent levels measured with the slow response – they would not be lower under any circumstances.

Consequently, should the PPG24 threshold be met based on the measured (fast) levels, then it will also be met were the slow response used. Similarly, if the threshold is only exceeded by 2-3dB, then it can also be confidently stated that it would be met with the slow response.

Table 3 Summary of measured and estimated day and night time noise levels

Position	Daytime (07-23hrs) $L_{Aeq,16hr}$	Night-time (23-07hrs) $L_{Aeq,8hr}$	Highest night-time $L_{Amax,fast}$
1. North-west corner	67.8-69.7	63.9-64.4	89.4
2. North-east corner	57.3-59.3	51.8-54.5	82.7
3. South-west corner	74.0-74.4	67.5-68.1	86.3

4.8 These levels are assessment in accordance with PPG24 in the Section 5. In the first instance, however, it can be seen that the L_{Aeq} levels measured closest to the A44 at Position 3 are greater those at either Position1, which was set further back from the A44, and Position 2, which was at the other side of the site.

4.9 A higher L_{Amax} level was recorded at Position 1 than at Position 3, which isn't to be expected, however, on further analysis of the measurement data, this level seems to represent a one off, with the L_{Amax} levels at Position 1 generally being lower than at Position 3.

4.10 It can also be seen that the L_{Aeq} levels measured at Position 2 are significantly lower than those at Positions 1 and 2. This is despite being in close proximity to the railway. Indeed, on further analysis of the results, it has been found that, in accordance with the relevant procedure contained in PPG24, the road traffic remains the dominant noise source at Position 2, i.e. on the eastern boundary of the site.



5.0 Noise Exposure Category Classification

- 5.1 The measured $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night-time noise levels recorded at the measurement locations were detailed in the preceding Section. In order to establish the noise levels across the site as a whole, the site and surrounding area has been modelled using the noise modelling software package, NoiseMap 2000. The model was calibrated using the measured L_{Aeq} 16 and 8 hour levels and constructed using topographical data provided for the site and an Ordinance Survey drawing of the local area. The model enables predictions across the site as a whole, and the resultant noise contour plots are presented in Appendix D. In accordance with PPG24, the contours are presented for a height of 1.5m above the ground.
- 5.2 It can be seen from these contour plots that the daytime and night-time situations are very similar, where the site falls within a combination of NEC B and C. During the day, the split between NEC B & C is approximately 50/50, whilst, at night, a greater area falls within NEC B.
- 5.3 With respect to the L_{Amax} threshold, it can be seen from the results in Table 3 that levels were recorded above 82dB, albeit using the fast time weighting (see paragraph 4.7). However, further analysis of the recorded night-time noise levels at Positions 1 and 2 shows that this did not occur 'several times in any one hour' such that the NECs for these two positions remains unchanged. And whilst the criterion is exceeded at Position 3, the relevant area of the site is already in NEC C, such that the category for this location also remains unchanged.
- 5.4 The 1999 assessment also found that the site fell within a combination of NEC B and C; and it was stated in the 1999 report that the boundary between these categories was approximately 70m from the A44 for both the day and night-time periods. From the noise model produced for this assessment, it has been found that the boundary between NEC B and C ranges from approximately 60m to 80m from the A44; the 1999 distance of 70m, therefore, falling within this range. It must borne in mind that in 1999 modelling software was not so widely available or used and so the 1999 assessment was naturally less detailed than this assessment. Consequently, it is considered that the findings discussed above, i.e. with respect to the location of the



boundary between NEC B and C, are indicative of the good correlation between the two assessments, and thus the robustness and validity of the original assessment.

5.5 The guidance contained in PPG24 for the above classifications is as follows:

NEC B

Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.

NEC C

Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.

5.6 Given the advice above, some form of mitigation will be required to protect future occupants of residential development on the Pear Tree site.

5.7 As mentioned in the introduction of this Report, mitigation measures are considered in a separate report (Pear Tree, Oxford Residential Development: Noise Mitigation Appraisal, January 2006). The outcome of this report, which is in keeping with WSP's experience on similar developments, is that a range of alternative development concepts could be pursued that would achieve the relevant noise targets. The mitigation measures required to implement each scheme will vary, but are likely to include the use of a noise barrier/ earth bund along the site's boundary with the A40; high performing glazing units, alternative means of ventilation; and the appropriate location of internal and external noise-sensitive areas.



6.0 Summary

- 6.1 A study has been undertaken in order to assess the suitability of the site known as Pear Tree in Oxford for residential development. Accordingly, and in agreement with the Local Planning Authority, Oxford City Council, the assessment has been carried out in accordance with the requirements of Planning Policy Guidance Note 24.
- 6.2 The baseline noise survey revealed that the daytime and night-time noise environments on site were dominated by road traffic noise – the noise from the trains was audible and measurable on the site, but the road traffic noise was still found to be dominant.
- 6.3 From the model constructed of the site and noise environment using specialist software, the site has been found to fall within Noise Exposure Categories (NECs) B and C. In accordance with the corresponding guidance in PPG24, therefore, it will be necessary to provide suitable mitigation to protect the future occupants.
- 6.4 Whilst mitigation measures are not discussed in this Report, the findings of a separate assessment presented in the Noise Mitigation Appraisal report (January 2006) are that a range of alternative development concepts could be pursued that would achieve the relevant noise targets. The mitigation measures required to implement each scheme will vary, but are likely to include the use of a noise barrier/ earth bund along the site's boundary with the A40; high performing glazing units, alternative means of ventilation; and the appropriate location of internal and external noise-sensitive areas..
- 6.5 It should also be noted that existing dwellings adjacent to the site are located in close proximity to both the A44 and the railway, such that the proposed development is unlikely to be any more affected than these existing dwellings. Furthermore, a number of other recent residential developments have been permitted in Oxford, that are in close proximity to similarly busy roads, such as the A40 Ring Road.
- 6.6 It is the author's opinion, therefore, that given the measured and predicted noise levels, with suitable mitigation in place, the site can be developed for residential use.

WSP Acoustics



APPENDICES



APPENDIX A
Noise Terminology

Noise is defined as unwanted sound. Human hearing is able to respond to sound in the frequency range 20Hz (deep bass) to 20,000Hz (high treble) and over the audible range of 0dB (the threshold of perception) to 140dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used, which reduces the importance of lower and higher frequencies in a similar manner to human hearing.

The weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc, according to the parameter being measured. The Glossary explains the acoustic terminology that is used in this Report.

The decibel scale is logarithmic rather than linear, and hence a 3dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels found commonly in the environment is given in Table 1.

Typical sound levels found in the environment

Sound Pressure Level, dB(A)	Location
0	Threshold of hearing
20 to 30	Quiet bedroom at night
30 to 40	Living room during the day
40 to 50	Typical office
50 to 60	Inside a car
60 to 70	Typical high street
70 to 90	Inside factory
100 to 110	Burglar alarm at 1m away
110 to 130	Jet aircraft on take off
140	Threshold of pain

The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations.

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20 μ Pa (20x10 ⁻⁶ Pascals) on a decibel scale.
Sound Power	The sound energy radiated per unit time by a sound source. Measured in Watts (W).
Sound Power Level, L_w	Sound power measured on a decibel scale, relative to a reference value of 10 ⁻¹² W
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s ₁ and s ₂ is given by 20 log ₁₀ (s ₁ / s ₂). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 μ Pa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
L_{eq,T}	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L_{max,T}	A noise level index defined as the maximum noise level during the period T. L _{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{90,T}	A noise level index. The noise level exceeded for 90% of the time over the period T. L ₉₀ can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L_{10,T}	A noise level index. The noise level exceeded for 10% of the time over the period T. L ₁₀ can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS5969.



APPENDIX B
Site Plan Showing Measurement Locations



APPENDIX C
Full Noise Survey Results

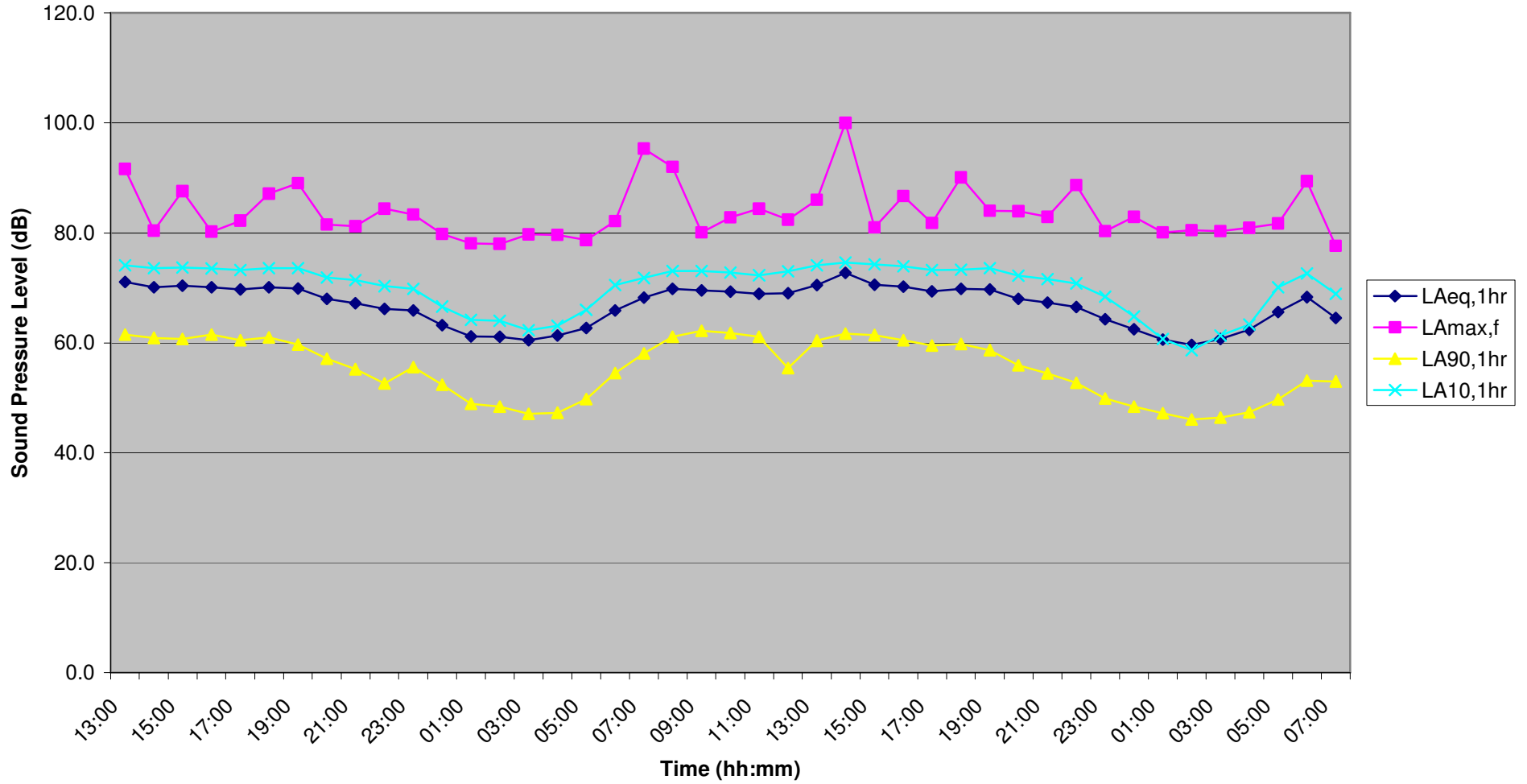
FULL NOISE SURVEY RESULTS

Position 1: close to the P&R and the A44				
Date & Time	L_{Aeq,1hr}	L_{Amax,fast}	L_{A10,1hr}	L_{A90,1hr}
12/10/2005 13:00	71.1	91.6	61.5	74.1
13/10/2005 14:00	70.1	80.4	60.9	73.6
14/10/2005 15:00	70.4	87.6	60.7	73.7
15/10/2005 16:00	70.1	80.2	61.5	73.5
16/10/2005 17:00	69.7	82.2	60.5	73.2
17/10/2005 18:00	70.1	87.1	61.0	73.6
18/10/2005 19:00	69.9	89.0	59.7	73.6
19/10/2005 20:00	68.0	81.5	57.1	71.9
20/10/2005 21:00	67.2	81.2	55.2	71.4
21/10/2005 22:00	66.2	84.4	52.6	70.3
22/10/2005 23:00	65.9	83.3	55.6	69.8
24/10/2005 00:00	63.2	79.8	52.4	66.6
25/10/2005 01:00	61.2	78.1	48.9	64.2
26/10/2005 02:00	61.1	78.0	48.4	64.0
27/10/2005 03:00	60.5	79.7	47.1	62.3
28/10/2005 04:00	61.3	79.6	47.3	63.1
29/10/2005 05:00	62.7	78.7	49.8	66.0
30/10/2005 06:00	65.9	82.1	54.5	70.5
31/10/2005 07:00	68.2	95.3	58.1	71.8
01/11/2005 08:00	69.8	92.0	61.1	73.1
02/11/2005 09:00	69.5	80.1	62.2	73.1
03/11/2005 10:00	69.3	82.8	61.8	72.8
04/11/2005 11:00	68.9	84.4	61.1	72.3
05/11/2005 12:00	69.0	82.4	55.4	73.0

Position 1: close to the P&R and the A44

Date & Time	L_{Aeq,1hr}	L_{Amax,fast}	L_{A10,1hr}	L_{A90,1hr}
06/11/2005 13:00	70.5	86	60.4	74.1
07/11/2005 14:00	72.7	100	61.7	74.6
08/11/2005 15:00	70.6	81.0	61.4	74.3
09/11/2005 16:00	70.2	86.7	60.5	73.9
10/11/2005 17:00	69.4	81.8	59.5	73.2
11/11/2005 18:00	69.8	90.1	59.8	73.3
12/11/2005 19:00	69.7	84.0	58.7	73.6
13/11/2005 20:00	68.0	83.9	55.9	72.2
14/11/2005 21:00	67.3	82.9	54.4	71.6
15/11/2005 22:00	66.5	88.7	52.7	70.8
16/11/2005 23:00	64.3	80.3	49.9	68.4
18/11/2005 00:00	62.5	82.9	48.4	64.8
19/11/2005 01:00	60.6	80.1	47.2	60.7
20/11/2005 02:00	59.6	80.5	46.1	58.7
21/11/2005 03:00	60.7	80.3	46.4	61.3
22/11/2005 04:00	62.4	80.9	47.4	63.3
23/11/2005 05:00	65.6	81.7	49.7	70.1
24/11/2005 06:00	68.3	89.4	53.1	72.6
25/11/2005 07:00	64.5	77.6	53.0	68.9

Pear Tree, Oxford: Baseline Noise Survey Position 1 (close to P&R and the A44) - Wednesday 12 to Friday 14 October 2005



Position 2: close to the P&R and the Railway

Date & Time	L _{Aeq,1hr}	L _{Amax,fast}	L _{A10,1hr}	L _{A90,1hr}
12/10/2005 14:00	54.8	77.6	51.0	55.4
12/10/2005 15:00	54.6	76.2	51.7	55.3
12/10/2005 16:00	54.4	73.8	52.0	55.1
12/10/2005 17:00	53.9	75.8	51.3	54.4
12/10/2005 18:00	53.3	73.4	50.3	54.3
12/10/2005 19:00	54.3	76.0	50.8	54.6
12/10/2005 20:00	51.8	59.9	49.2	53.5
12/10/2005 21:00	50.8	60.2	48.3	52.5
12/10/2005 22:00	54.1	79.7	46.7	52.5
12/10/2005 23:00	47.2	57.5	43.8	49.1
13/10/2005 00:00	46.7	61.0	41.8	48.9
13/10/2005 01:00	49.4	59.3	44.9	52.1
13/10/2005 02:00	53.5	61.2	49.1	55.9
13/10/2005 03:00	53.5	61.8	48.7	56.0
13/10/2005 04:00	53.5	61.6	49.3	55.8
13/10/2005 05:00	55.8	66.8	52.6	57.7
13/10/2005 06:00	60.1	82.7	56.5	59.7
13/10/2005 07:00	60.4	80.0	58.6	61.0
13/10/2005 08:00	61.0	79.6	59.0	61.9
13/10/2005 09:00	60.1	77.5	58.0	60.9
13/10/2005 10:00	59.7	78.9	56.8	60.4
13/10/2005 11:00	58.6	77.5	55.9	59.5
13/10/2005 12:00	59.1	75.9	55.5	59.6
13/10/2005 13:00	58.5	77.3	55.7	59.7



Position 2: close to the P&R and the Railway				
Date & Time	L_{Aeq,1hr}	L_{Amax,fast}	L_{A10,1hr}	L_{A90,1hr}
13/10/2005 14:00	59.9	78.4	57.0	60.4
13/10/2005 15:00	59.2	79.0	56.9	60.1
13/10/2005 16:00	57.6	74.1	55.5	58.6
13/10/2005 17:00	57.0	78.3	55.1	57.4
13/10/2005 18:00	56.1	76.0	53.8	56.7
13/10/2005 19:00	55.5	80.1	52.6	55.6
13/10/2005 20:00	53.2	74.2	50.4	53.8
13/10/2005 21:00	51.7	59.5	49.3	53.2
13/10/2005 22:00	51.6	66.8	48.1	52.8
13/10/2005 23:00	50.0	64.7	46.7	51.7
14/10/2005 00:00	49.1	57.9	45.4	51.2
14/10/2005 01:00	49.3	64.9	44.7	51.5
14/10/2005 02:00	50.7	65.1	45.9	53.0
14/10/2005 03:00	49.1	57.1	44.8	51.6
14/10/2005 04:00	49.7	58.7	45.8	51.9
14/10/2005 05:00	56.1	79.8	48.1	53.1
14/10/2005 06:00	53.8	60.3	51.5	55.3
14/10/2005 07:00	55.6	77.1	53.1	55.9

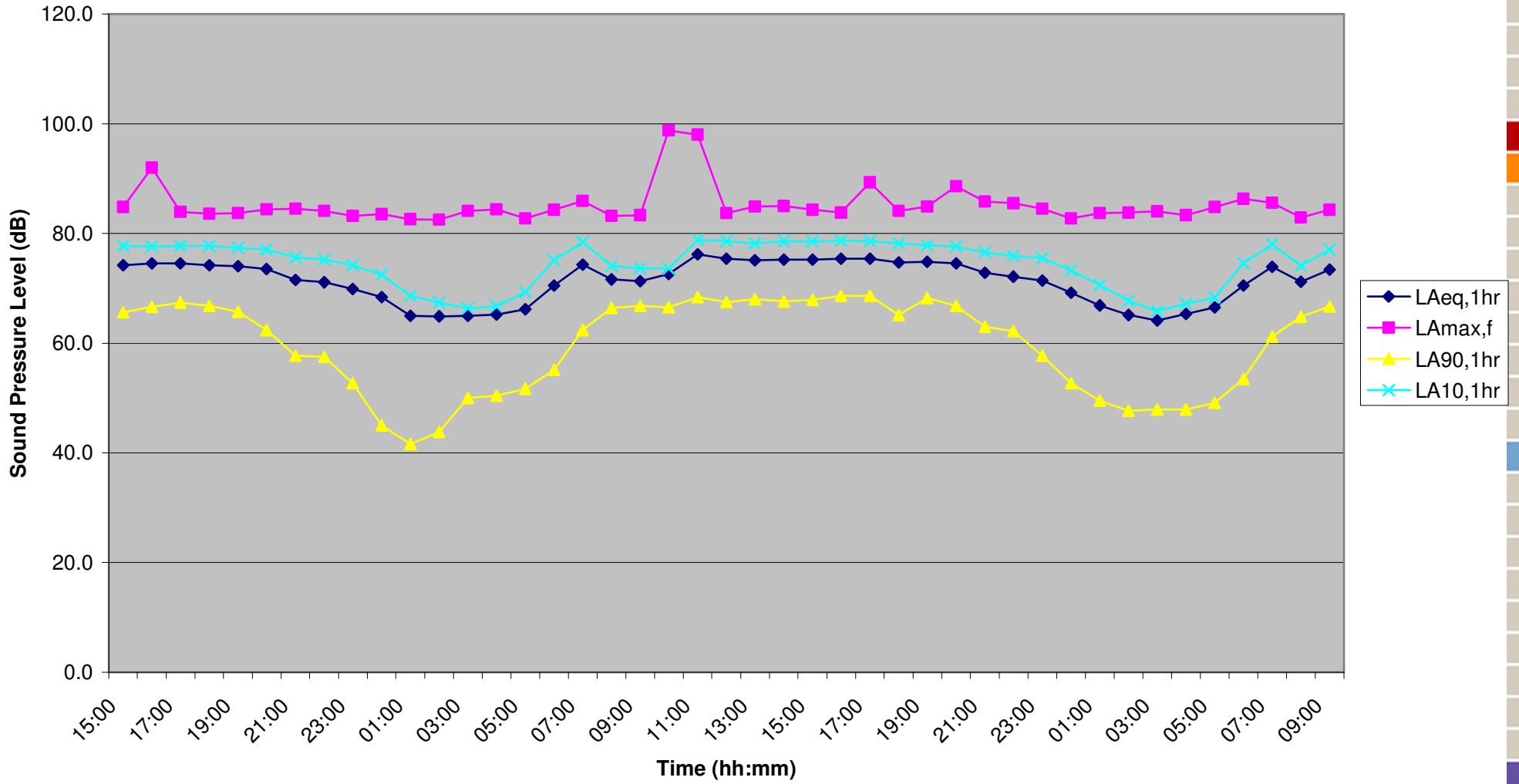
Position 3: close to the A44 and the Existing Dwellings

Date & Time	L _{Aeq,1hr}	L _{Amax,fast}	L _{A10,1hr}	L _{A90,1hr}
12/10/2005 15:00	74.2	84.8	65.6	77.7
12/10/2005 16:00	74.5	92.0	66.6	77.6
12/10/2005 17:00	74.5	83.9	67.4	77.7
12/10/2005 18:00	74.2	83.6	66.8	77.7
12/10/2005 19:00	74.0	83.7	65.7	77.4
12/10/2005 20:00	73.5	84.4	62.4	77.0
12/10/2005 21:00	71.5	84.5	57.7	75.6
12/10/2005 22:00	71.1	84.1	57.5	75.2
12/10/2005 23:00	69.9	83.2	52.7	74.2
13/10/2005 00:00	68.4	83.5	45.0	72.5
13/10/2005 01:00	65.0	82.6	41.6	68.6
13/10/2005 02:00	64.9	82.5	43.8	67.4
13/10/2005 03:00	65.0	84.1	50.0	66.3
13/10/2005 04:00	65.2	84.4	50.4	66.7
13/10/2005 05:00	66.2	82.7	51.7	69.3
13/10/2005 06:00	70.5	84.3	55.1	75.1
13/10/2005 07:00	74.3	85.9	62.4	78.4
13/10/2005 08:00	71.6	83.2	66.4	74.1
13/10/2005 09:00	71.3	83.3	66.8	73.6
13/10/2005 10:00	72.6	98.8	66.5	73.6
13/10/2005 11:00	76.2	98.0	68.4	78.8
13/10/2005 12:00	75.4	83.7	67.5	78.6
13/10/2005 13:00	75.1	84.9	68.0	78.2
13/10/2005 14:00	75.2	85.0	67.6	78.6

Position 3: close to the A44 and the Existing Dwellings

Date & Time	L_{Aeq,1hr}	L_{Amax,fast}	L_{A10,1hr}	L_{A90,1hr}
13/10/2005 15:00	75.2	84.3	67.9	78.5
13/10/2005 16:00	75.4	83.8	68.6	78.7
13/10/2005 17:00	75.4	89.3	68.6	78.6
13/10/2005 18:00	74.7	84.1	65.1	78.2
13/10/2005 19:00	74.8	84.9	68.2	77.8
13/10/2005 20:00	74.5	88.6	66.8	77.6
13/10/2005 21:00	72.8	85.8	63.0	76.5
13/10/2005 22:00	72.1	85.5	62.2	75.9
13/10/2005 23:00	71.4	84.5	57.7	75.5
14/10/2005 00:00	69.2	82.7	52.7	73.2
14/10/2005 01:00	66.9	83.7	49.5	70.6
14/10/2005 02:00	65.1	83.8	47.7	67.7
14/10/2005 03:00	64.1	84.0	47.9	65.8
14/10/2005 04:00	65.3	83.3	47.9	67.2
14/10/2005 05:00	66.5	84.8	49.1	68.3
14/10/2005 06:00	70.5	86.3	53.5	74.5
14/10/2005 07:00	73.9	85.6	61.2	78.0
14/10/2005 08:00	71.2	82.9	64.8	74.1
14/10/2005 09:00	73.4	84.3	66.7	77.0

Pear Tree, Oxford: Baseline Noise Survey Position 3 (close to the A44 and existing dwellings) - Wednesday 12 to Friday 14 October 2005



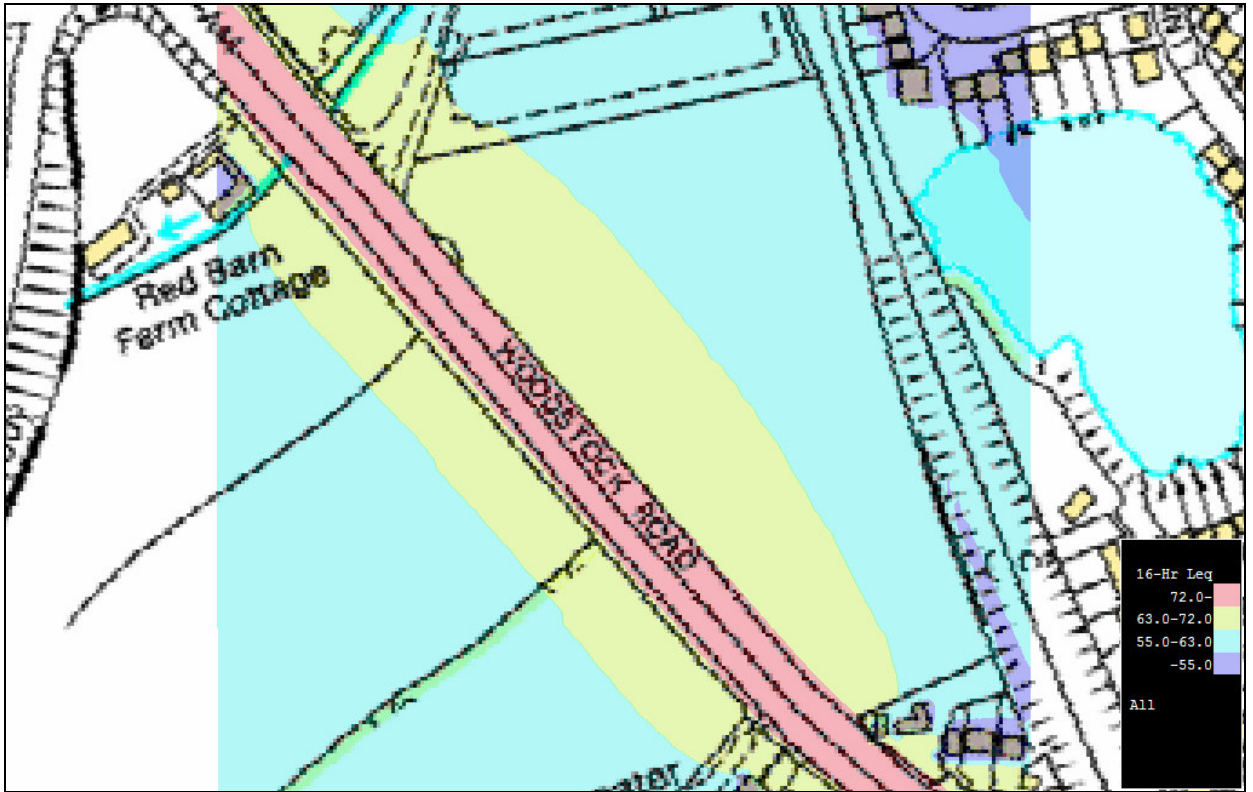


APPENDIX D
PPG24 Noise Contour Plots



PPG24 DAYTIME NOISE CONTOUR PLOT

Purple = NEC A; Light Blue = NEC B; Green = NEC C; and Pink = NEC D



PPG24 NIGHT-TIME NOISE CONTOUR PLOT

Purple = NEC A; Light Blue = NEC B; Green = NEC C; and Pink = NEC D

