Tracy Miller

From: Tom Barrows [tbarrows@morrishomes.co.uk]
Sent: 10 March 2008 09:15
To: Tracy Miller
Subject: FW: Brodick Road, Hinckley
Attachments: Brodick Road industrial noise report.pdf

Good morning Tracey

Please find enclosed our noise report as submission of details for condition 7 under planning reference 07/01030/FUL.

I trust you find the enclosed in order, however, if you require further information or have any queries please do not hesitate to contact me

Kind regards

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AcousticAir

Noise, Vibration & Air Quality Services

BRODICK ROAD
HINCKLEY

Noise Assessment

February 2008

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Noise Assessment

February 2008

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for

Morris Homes

BRODICK ROAD
HINCKLEY

Noise Assessment

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1. INTRODUCTION

1.1 AcousticAir have been commissioned by Morris Homes to undertake a noise survey and assessment for proposed residential development on land at Brodick Road, Hinckley. Figure 1 shows the location of the site relative to nearby commercial uses that the planning condition (see below) relates to. A new marina lies adjacent to the western boundary, and existing commercial uses are present on land further to the south.

1.2 The planning permission for the site (07/01030/FUL) requires the following at Condition 7:

Development shall not begin until a scheme for protecting the proposed dwellings from noise from existing and proposed commercial/industrial operations adjacent to and within close proximity to the site, has been submitted to and approved by the Local Planning Authority; and all works which form part of the scheme shall be completed before any of the permitted dwellings are first occupied.

Reason: To ensure that the proposed use does not become a source of annoyance to nearby residents to accord with policy BE1 and NE2 of the Hinckley and Bosworth Local Plan.

1.3 It has been assumed that the planning permission's reason for condition 7 relates to ensuring that commercial uses do not represent a source of annoyance to the new occupiers rather than vice versa as written.

1.4 Relevant national guidance on environmental and industrial noise is presented in Section 2. Section 3 of this report presents the results of the surveys undertaken for the site. The assessment of noise on the proposed residential development is considered in Section 4 together with our recommendations for mitigation. Our conclusions are summarised in Section 5.

2. NOISE CRITERIA

2.1 The main UK guidance document for planners is Planning Policy Guidance Note 24 – Planning and Noise (PPG24), published by the Department of the Environment. The principal purpose of the guidance is to determine the suitability of land for residential development, especially where land is affected by noise from transportation or industrial sources. However, the PPG also provides general guidance with respect to matters to be taken into account in determining planning applications both for noise-sensitive developments and for those activities that will generate noise.

2.2 PPG24 provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. As such, it outlines some of the main considerations which local planning authorities should take into account when determining planning applications for development that will either generate noise or be exposed to existing noise sources.

2.3 With respect to the planning of new residential development, PPG24 provides guidance in terms of Noise Exposure Categories (NEC) for residential development. Four NEC categories are recommended by the PPG as shown below in Table 2.1. The PPG noise criteria are in units of $L_{Aeq,T}$ dB which is a measure of the total sound energy present in a time period, T, expressed as an equivalent continuous noise level. A fuller description of noise units used in this report is presented in Appendix I.

2.4 Annex 1 of PPG24 explains at footnote 3 beneath the table of recommended NEC categories how to deal with situations where there may be more than one source affecting a site, and how to determine whether a noise source is dominant or forms part of a mix of sources. For a noise to be dominant it must lie within 2 dB(A) of the calculated combined value.

2.5 The guidance given to planning authorities with respect to areas where industrial noise is dominant is also presented in the footnote in Annex 1 of PPG24 where it states "If the dominant source is industrial noise see paragraph 19 of Annex 3". The relevant guidance at paragraph 19 of PPG24 is that the likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS4142.

2.6 Where no individual noise source is dominant PPG24 requires use of the NEC criteria for 'mixed sources', which actually equate to those for road traffic presented in Table 2.1. It will be seen from the noise survey data in Section 3 that, during both the day and night, there was no dominant noise from the

commercial/industrial uses and that the noise climate reflects a mix of sources with road traffic being the more dominant.

Table 2.1: Recommended Noise Exposure Categories for New Dwellings near Existing Road Traffic and Mixed Sources.

NEC	$L_{Aeq,T}$ dB (0700-2300)	$L_{Aeq,T}$ dB (2300-0700)[1]	Advice
A	<55	<45	Noise need not be considered as a determining factor in granting planning permission, although the noise level 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 alternative 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

Note: (1) Sites where individual noise events during the night-time (2300-0700) regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).

2.7 In the case of night-time noise, the NEC criterion at the boundary of categories A and B is based on a World Health Organisation (WHO) guideline which states that for night-time: " based on limited data available, a level of less than 35 dB(A) is recommended to preserve the restorative process of sleep". In order to assess internal noise levels, the WHO use a facade insulation level of 15 dB (A) where windows are partially open, and PPG24 recommends a reduction of 33 dB(A) for closed thermal double-glazing.

2.8 The latest guidance from the World Health Organisation (Community Noise, WHO Vol. 2, Issue 1, 1995, and Guidelines for Community Noise, 2000) is that in order to avoid sleep disturbance the period noise level (L_{Aeq}) should not exceed 30 dB internally. BS 8233:1999 'Sound insulation and noise reduction for buildings - Code of Practice' similarly recommends a good design standard for bedrooms to be 30 dB L_{Aeq} or a reasonable standard to be 35 dB, and individual noise events should not normally exceed 45 dB L_{Amax} as a

reasonable internal standard. The BS design criteria for living rooms are 40 dB L_{Aeq} as a reasonable standard and 30 dB L_{Aeq} as a good standard.

2.9 With respect to outdoor noise levels, PPG24 refers to WHO guidance that "general daytime outdoor noise levels of less than 55 dB L_{Aeq} are desirable to prevent any significant community annoyance".

2.10 However, in considering the application of an outdoor criterion of 55 dB L_{Aeq}, it is important to take account of the feasibility of achieving such a level. A recent review of 'Health effect-based noise assessment methods: A review and feasibility study' (NPL Report CMAM 16, 1998) reported the following:

"Perhaps the main weaknesses of both WHO-inspired documents is that they fail to consider the practicality of actually being able to achieve any of the stated guideline values. ..... We know from the most recent national survey of noise exposure carried out in England and Wales (Sargent 93) that around 56% of the population are exposed to daytime noise levels exceeding 55 L_{Aeq} and that around 65% are exposed to night-time noise levels exceeding 45 L_{Aeq} (as measured outside the house in each case). ..... The percentages exposed above the WHO guideline values could not be significantly reduced without drastic action to virtually eliminate road traffic noise and other forms of transportation noise (including public transport) from the vicinity of houses. The social and economic consequences of such action would be likely to be far greater than any environmental advantages of reducing the proportion of the population annoyed by noise. In addition, there is no evidence that anything other than a small minority of the population exposed at such noise levels find them to be particularly onerous in the context of their daily lives."

Industrial Noise

2.11 With respect to noise from industrial and commercial developments, PPG24 does not provide noise limits for emissions from industrial or commercial sources but suggests that the likelihood of complaints about noise can be assessed using guidance in British Standard 4142: 1990 'Method for rating industrial noise affecting mixed residential and industrial areas' (Revised 1997). The PPG also suggests that since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. The PPG's recommended time periods for day and night assessments are 0700-2300 and 2300-0700 hours respectively.

2.12 BS4142 provides a system for rating noise from industrial development and evaluating the likelihood of complaints by comparing this to the background noise level at sensitive receiver locations. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is accounted for in the rating procedure through the addition of 5 dB(A) to the

rating level where these noise characteristics are present or likely to be present. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise level. The Standard states that: "A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance. If the rating level is more than 10 dB below the measured background noise level then this is a positive indication that complaints are unlikely".

3. NOISE SURVEY

3.1 Day and night-time noise levels were monitored between Wednesday 13th and Thursday 14th February 2008. Statistical noise data was gathered at a point on the site boundary having an unscreened view towards the nearest existing industrial/commercial uses (Position 1), and at a position on the site boundary adjacent to the marina and its car park (Position 2). The main noise sources were distant road traffic, occasional daytime movements of individual vehicles in the car park, occasional high-altitude aircraft noise, and birdsong.

3.2 Noise levels were recorded using the following equipment, which was calibrated to a reference signal of 94 dB immediately prior to and after the survey and exhibited zero drift.

CEL-90249 eNVi system hardware and NoiseMaster software;
CRL MV 181A Pre-amplifier and cable;
MK 224 Precision ½ inch electret condenser microphone;
Psion Series 3c organiser to log and display data; and
CEL-2835/3 Acoustic calibrator.

3.3 The microphone was positioned at a height of 1.2 m in a free-field location, i.e. excluding the effect of reflections from buildings or structures. Weather conditions were damp, overcast and cold with no wind at night but a light north to south wind during the day.

3.4 All noise measurements are presented in Appendix II. The L_{Aeq} noise measurements at the site boundary facing the commercial units (Position 1) were relatively low, at 53 dB during the day and 39 dB at night. Apart from distant traffic noise, the main noise events during the day were a passing helicopter and birdsong. During the night the noise sources were distant traffic and occasional high-altitude aircraft. At no time was there any audible noise from the commercial units.

3.5 The noise measurements at the boundary with the marina (Position 2) were similarly low, with an L_{Aeq} of 52 dB during the day and 38 dB at night. The main noise events were again distant traffic noise plus occasional vehicle movements in the marina car park and birdsong during the day, and distant traffic and occasional high-altitude aircraft at night. At no time was there any audible noise from the commercial units.

4. NOISE ASSESSMENT

4.1 There was no dominant, or indeed any audible industrial noise at the boundaries of the site closest to the existing commercial units to the south or the new marina to the west. The L_{Aeq} noise levels from the mixed sources (52-53 dB during the day and 38-39 dB at night) equate to NEC A.

4.2 The PPG guidance For NEC A is that "*Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level*".

4.3 Therefore, no specific noise mitigation measures are required adjacent to the west and southern boundaries as acceptable internal noise levels will be achieved with normal thermal double glazing. Also, external noise levels already lie below the PPG criterion of 55 dB L_{Aeq}.

4.4 If the above measurements are used to reflect noise levels at the facades of new dwellings, i.e. with the addition of 3 dB(A) for façade reflection effects, the resulting noise levels will be as shown in Table 4.1.

Table 4.1: Internal Noise Levels, dB(A)

Situation	Day	Night
Façade noise level	56	42
Insulation due to thermal double glazing	-33	-33
Internal noise level	23	9
Insulation due to partly open windows	-15	-15
Internal noise level	41	27

4.5 If the new dwellings are fitted with thermal double glazing, PPG24 indicates that the attenuation provided by the building facade will be about 33 dB(A) which is virtually equivalent to that provided by secondary glazing under the Noise Insulation Regulations. Therefore, with windows closed the internal noise levels of 23 and 9 dB would lie well below the good design standards recommended by BS8233 for living rooms and bedrooms (30 dB).

4.6 Indicative sound reduction data presented in Appendix III indicates that normal thermal double glazing will be more than capable of achieving a good noise standard inside new dwellings.

4.7 Opening windows for ventilation purposes would reduce the insulation provided by the building façade, however, internal noise levels would still be equivalent to the reasonable standard during the day and would continue to meet the good standard at night. Therefore, no specific noise mitigation

measures are required adjacent to the west and southern boundaries as acceptable internal noise levels will be achieved with normal thermal double glazing, and external noise levels lie below the PPG criterion of 55 dB L_{Aeq}.

5. CONCLUSIONS

5.1 There was no dominant, or indeed any audible industrial noise at the boundaries of the site closest to the existing commercial units to the south or the new marina to the west. The L_{Aeq} noise levels from the mixed sources (52-53 dB during the day and 38-39 dB at night) equate to NEC A.

5.2 The PPG guidance For NEC A is that "*Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level*".

5.3 If the new dwellings are fitted with thermal double glazing, PPG24 indicates that the attenuation provided by the building facade will be about 33 dB(A) which is virtually equivalent to that provided by secondary glazing under the Noise Insulation Regulations. As a consequence, with windows closed the internal noise levels would be 23 during the day and 9 dB at night and would lie well below the good design standards recommended by BS8233 for living rooms and bedrooms.

5.4 Opening windows for ventilation purposes would reduce the insulation provided by the building façade, however, internal noise levels would still be equivalent to the reasonable standard during the day and would continue to meet the good standard at night.

5.5 Therefore, no specific noise mitigation measures are required adjacent to the west and southern boundaries as acceptable internal noise levels will be achieved with normal thermal double glazing, and external noise levels lie below the PPG criterion of 55 dB L_{Aeq}.

FIGURE 1
Site Location Plan and Noise Monitoring Locations

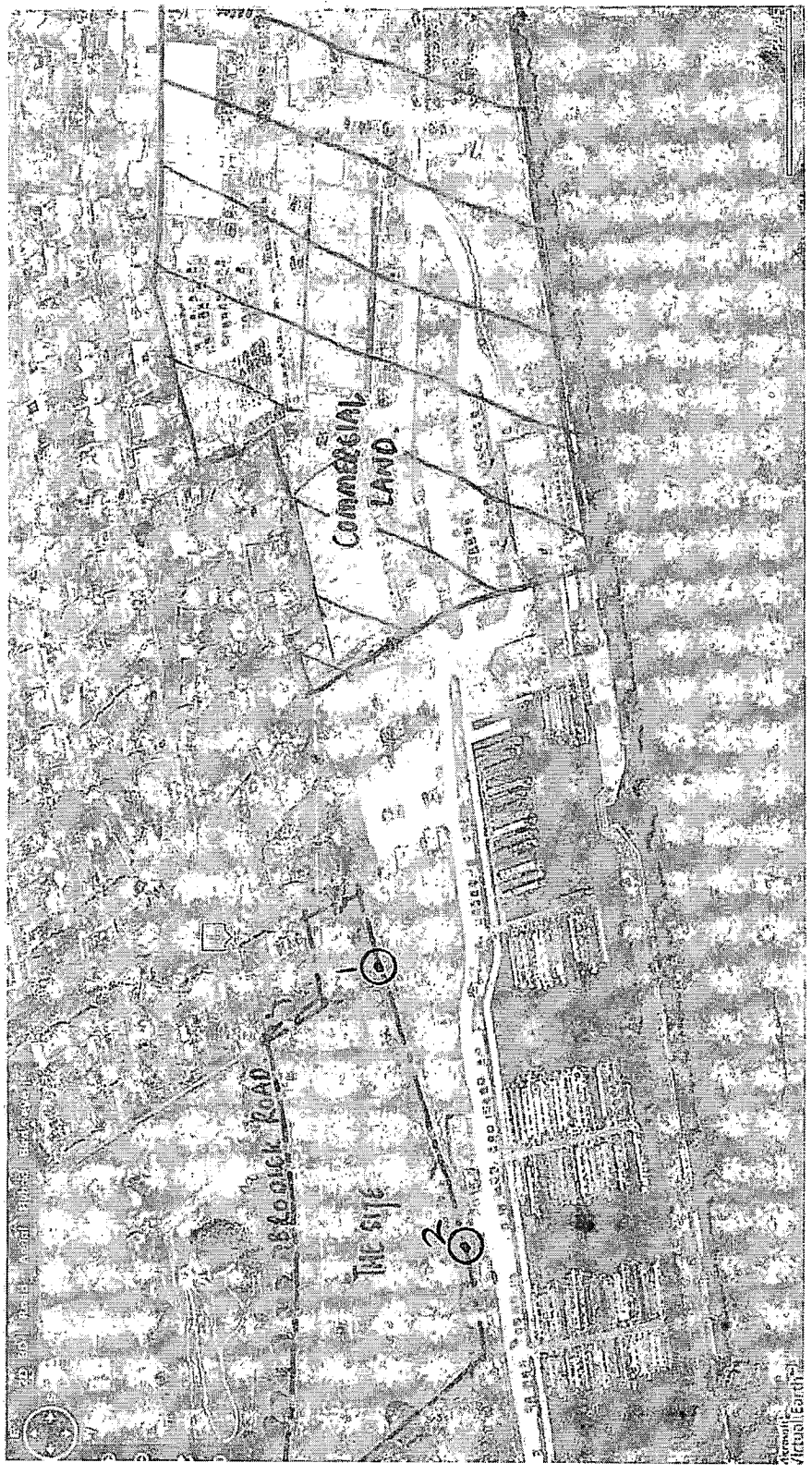
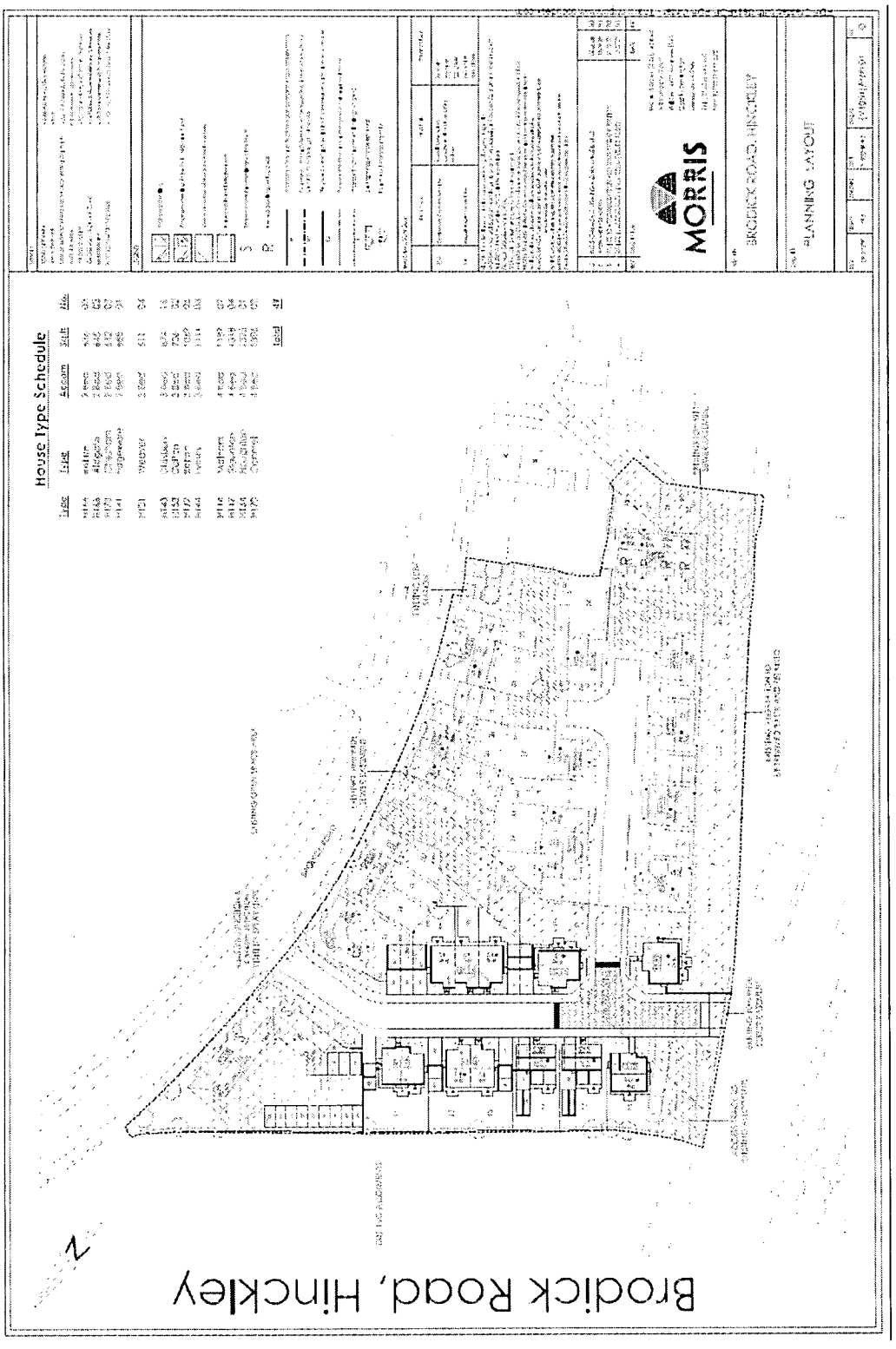


FIGURE 2
Planning Layout



APPENDIX I

DESCRIPTION OF NOISE UNITS

DESCRIPTION OF NOISE UNITS

- The sounds that we hear are a result of successive air pressure changes. These air pressure changes are generated by vibrating sources, such as motor vehicle engines, and they travel to a receiver, i.e. the human ear, as air pressure waves.

- The human ear is capable of detecting a vast range of air pressures, from the lowest sound intensity that the normal ear can detect (about 10^{-12} watts/m^2) to the highest that can be withstood without physical pain (about 10 watts/m^2). If we were to use a linear scale to represent this range of human sensitivity it would encompass a billion units. Clearly this would be an unmanageable scale yielding unwieldy numbers.

- The scale can be compressed by converting it to a logarithmic or Bel scale, the number of Bels being the logarithm to the base 10 of one value to another (as applied by Alexander Graham Bell to measure the intensity of electric currents). The Bel scale gives a compressed range of 0 to 12 units which in practice is a little too compressed. A change of 1 Bel represents a doubling or halving of loudness to the average listener. A more practical operating range of 0 to 120 is obtained by multiplying by 10, i.e. 10 x Bel, which produces the scale units known as decibels or dB.

- Examples of typical sound intensity levels within the decibel range of 0 to 120 dB are listed below:

Four engine jet aircraft at 100m	120 dB
Riveting of steel plate at 10m	105 dB
Pneumatic drill at 10m	90 dB
Circular wood saw at 10m	80 dB
Heavy road traffic at 10m	75 dB
Telephone bell at 10m	65 dB
Male speech, average at 10m	50 dB
Whisper at 10m	25 dB
Threshold of hearing, 1000 Hz	0 dB

- Due to this logarithmic scale noise levels have to be combined logarithmically rather than arithmetically. For example, two equal sound sources of 70 dB each, when operated simultaneously, do not produce a combined level of 140 dB but instead result in a level of 73 dB, i.e. a rise of 3 dB for each doubling of sound intensity. Subjectively, a 3 dB change does not represent a doubling or halving of loudness; to make a sound appear twice as loud requires an increase in sound pressure level of about 10 dB.

- The sensitivity of the human ear to different acoustic frequencies of sound can be taken into account when measuring or calculating noise by applying a filter or weighting which equates to the frequency response of the human ear. This is referred to as an A-weighting and when applied results in noise levels expressed as dB(A). dB(A) noise levels reflect the human perception of loudness.

- Due to the often broadband and variable nature of environmental noises such as traffic, people exposed to different levels of noise do not make consistently different judgements about the noise climate until the difference in average noise

level is about 3 dB(A). This is equivalent to a doubling of sound energy or, for example, a doubling of traffic flow. However, individuals are able to detect much lesser changes in noise exposure in any given situation and under ideal conditions can detect differences of as little as 1dB.

- Noise levels that fluctuate over time can be measured using a variety of noise indices. One index that correlates fairly well with community annoyance due to road traffic noise is the $L_{A10(18\ hour)}$ noise index. The L_{A10} is the A-weighted sound level exceeded for 10% of the time, and the $L_{A10(18\ hour)}$ is the arithmetic mean of the 18 hourly L_{A10} values during the period 6am to midnight (0600 to 2400 hours).

- An alternative index used in the UK to characterise intermittent sources of noise such as railways or construction sites is the equivalent continuous noise level, L_{Aeq}. It is a measure of the total sound energy generated by a fluctuating sound signal within a given time period and can be derived by 'spreading' the total sound energy evenly over the same time period as the fluctuating signal, hence the term 'equivalent continuous noise level'.

- Other useful noise units include the L_{Amax}, which is the maximum A-weighted sound level often used to characterise single events, and the L_{A90} which is the level of noise exceeded for 90% of the time and is an indicator of the background noise levels in the absence of specific sources such as traffic.

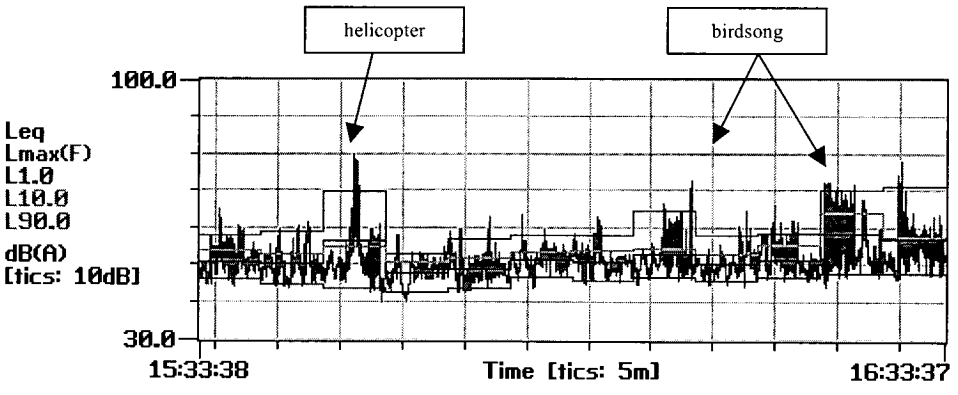
APPENDIX I1

NOISE MEASUREMENTS

Noise Measurements

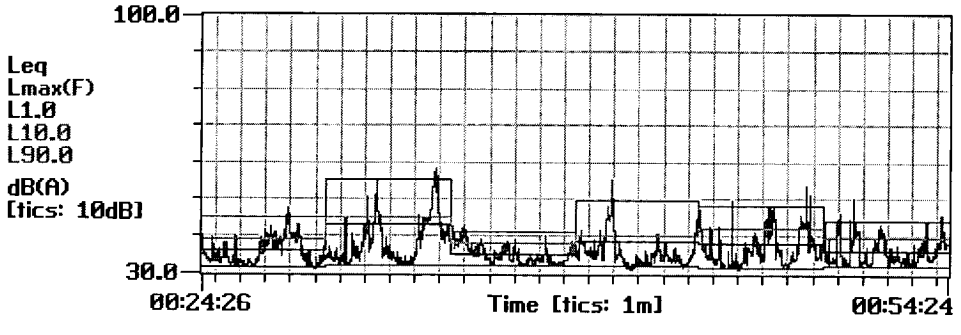
Position 1
Daytime
Thursday 14th February 2008

Daytime



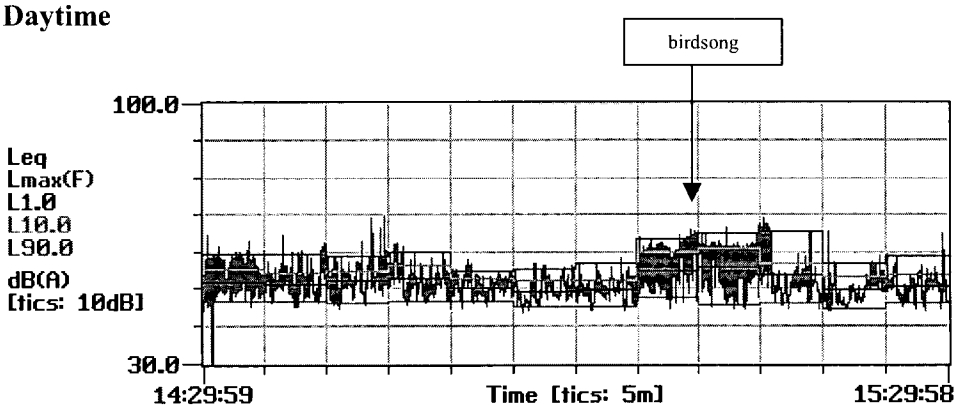
Time	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{A01}
1533-1633	53.4	79.8	65.1	54.4	45.3

Night time
Wednesday 13th February 2008



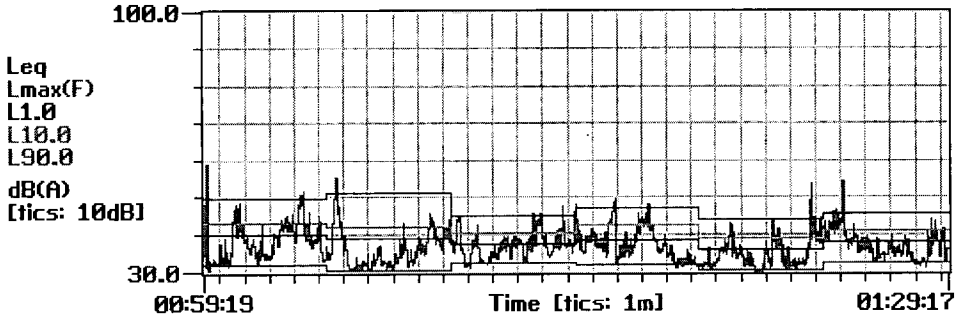
Time	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{A01}
0024-0054	38.7	58.4	50.6	40.8	31.7

Position 2
Daytime



Time	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{A01}
1429-1529	52.3	69.7	62.0	56.2	45.9

Night –Time



Time	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{A01}
0059-0129	38.3	59.0	48.3	41.7	31.2

APPENDIX III

INDICATIVE SOUND INSULATION PERFORMANCE OF WINDOWS

Indicative Sound Insulation Performance of Different Window Configurations

Third octave band centre frequency Hz	Sound Insulation (dB) for Glass Thickness (mm)																					
	4/16/4 or 4/12/4		6/12/6		6/12/6.4 PVB		10/12/4		10/12/6		10/12/6.4 PVB		Acoustic Laminate									
													6/12/7		6/12/11		10/12/16		13/12/13		16/12/16	
100	25		17		19		23		27		27		25		26		26		30		31	
125	24	24	26	20	24	21	28	25	27	26	28	27	27	26	25	26	28	27	27	28	34	32
160	23		22		21		26		24		26		26		25		26		27		33	
200	21		18		19		19		24		26		23		25		24		31		34	
250	21	20	18	19	19	20	23	22	29	27	30	29	24	25	28	28	28	27	38	34	38	37
315	19		24		24		26		31		32		28		32		31		39		39	
400	22		27		28		31		33		34		30		35		34		41		43	
500	25	25	29	29	32	31	33	33	34	34	36	36	34	33	39	38	38	37	44	44	46	45
630	30		33		34		36		37		40		37		43		41		48		48	
800	33		37		38		39		39		41		42		46		44		51		50	
1000	36	35	39	38	40	39	41	40	41	40	42	41	45	44	47	47	45	45	53	52	48	46
1250	38		39		40		41		41		41		46		47		46		52		43	
1600	40		39		39		41		39		41		46		46		44		49		43	
2000	41	38	34	36	35	37	45	43	37	38	42	42	45	46	43	43	42	44	45	47	46	46
2500	35		37		39		45		40		44		48		42		44		48		50	
3150	31		42		44		42		43		49		51		47		51		52		53	
4000	40	35	47	45	49	47	44	44	47	46	53	52	52	52	54	51	56	54	57	55	59	57
R_m dB	29		30		31		34		34		36		36		37		39		42		42	
R_w dB	31		33		34		36		38		40		38		41		42		45		46	
R_{TRA} dBA	25		26		27		29		32		34		31		33		37		38		41	

Notes:
1. The glass thickness is presented in terms of the thickness of one pane of glass, followed by the size of the air gap, followed by the thickness of the second pane of glass, all dimensions in millimetres.
2. 6.4mm PVB glass denotes a laminated glass consisting of a tough plastic interlayer made of polyvinyl butyral (PVB) bonded together between two panes of glass.