Mr Brown

Hurn Road
Peterborough

Noise Assessment

August 2010

Anglia Consultants
15 The Lawns
Melbourn
Royston
Herts SG8 6BA

Tel: 01763 261955
Mob: 07952 217794

1. INTRODUCTION

An assessment of noise impact was carried out on the proposed development, at Hurn Road, Peterborough, where noise from the adjacent railway was likely to affect the amenity of the proposed development. An assessment according to PPG24 was carried out and calculations of noise levels undertaken using measured noise data, based on the proposed layout plan. Mitigation measures were recommended where needed.

The measurements and assessment have been carried out by John Hyde, a Chartered Physicist and Member of the Institute of Acoustics who has over 30 years experience as a noise and acoustics consultant and has lectured on acoustics at Middlesex University.

2. UNITS

It has become practice to measure sound levels in decibels (dB). The decibel scale is logarithmic rather than linear. It is helpful to remember that a noise level change of 3dB on a sound meter reading would not be readily perceptible, and that an increase of 10 dB is perceived, subjectively, as a doubling of loudness. The human ear responds differently to sounds of different frequencies. The ear "hears" high frequency sound of a given level more loudly than low frequency sound of the same level. The A-weighted sound level, dB(A), takes this response into consideration and is commonly used for measurement of environmental noise in UK. It indicates the subjective human response to sound.

Environmental noise levels vary continuously from second to second. It is clearly impractical to specify the sound level for each second thus time averaging is required. In practice human response has been related to various units which include allowance for the fluctuating nature of sound with time. For the purpose of this report these include:

$L_{Aeq,T}$: the equivalent A-weighted continuous sound level over period T.

This unit relates to the equivalent level of continuous sound for a specific time period T, for example 16 hr for daytime noise. It contains all the sound energy of the varying sound levels over the same time period, and expresses it as a continuous sound level over that period. The unit is used for assessing traffic, transportation and industrial noise for planning purposes and in particular for PPG24.

$L_{A10,T}$: the A-weighted level of sound exceeded for 10% of the time period T.

This unit is used for traffic noise measurement and is the preferred unit for prediction of traffic noise in the Department of the Environment publication, 'Calculation of Road

Traffic Noise'.

$L_{A90,T}$: the A-weighted level of sound exceeded for 90% of the time period T.

This latter unit is commonly used to represent the background noise, and is used in assessing the effects of industrial noise in UK.

3 NOISE CRITERIA

PPG 24

General guidance on the assessment of noise in connection with planning applications is given in PPG24. The guidance suggests the use of noise exposure categories to determine whether noise is likely to be a problem when considering new dwellings and to recommend whether planning conditions should be imposed. For traffic noise and railway noise, the categories are defined as follows:

- Category A

Traffic noise: below LAeq,16hr of 55dB day and LAeq,8hr of 45dB at night

Railway noise: below LAeq,16hr of 55dB day and LAeq,8hr of 45dB at night

Within category A, 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

- Category B

Traffic Noise:LAeq,16hr between 55 and 63dB day and LAeq,8hr of 45 to 57 at night

Railway Noise:LAeq,16hr between 55 and 66dB day and LAeq,8hr of 45 to 59 at night

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

- Category C

Traffic Noise: LAeq,16hr between 63 and 72dB day and LAeq,8hr of 57 to 66 at night

Railway Noise:LAeq,16hr between 66 and 74dB day and LAeq,8hr of 59 to 66 at night.

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

- Category D

Traffic Noise: above LAeq,16hr of 72dB day and LAeq,8hr of 66dB at night

Railway Noise: above LAeq,16hr of 74dB day and LAeq,8hr of 66dB at night

Within this category, planning permission should normally be refused.

PPG 24 also gives categories for mixed noise sources which are numerically the same as those quoted above for traffic noise. Mixed noise sources refer to any combination of road, rail, air and industrial sources where no individual source is dominant.

Internal Noise Levels

PPG24 refers to BS8223:1999 for guidance on internal noise levels for new homes, suggesting appropriate standards for different room uses and situations. The standard gives recommended design criteria for dwellings. For reasonable resting and sleeping conditions it recommends that a good standard for bedrooms is LAeq,8hr of 30dB and a reasonable standard of 35dB. The standards follow WHO Guidelines which suggest internal noise levels by day of 35dB(A) LAeq 16hr and 30dB(A) LAeq 8hr in bedrooms during the night time (2300 - 0700). In addition it is recommended that peak noise levels, should not exceed 45dB(A) inside bedrooms at night. (Berglund B, Lindvall T, Schwela D H (editors). 'Guidelines for Community Noise' World Health Organisation, Geneva, 2000). These guidelines are frequently used by local authorities and are considered to be an approepriate design standard for this assessment.

External Noise Levels

WHO Guidelines also recommend that external noise levels in amenity areas, including gardens, should not exceed LAeq 55dB.

4 NOISE MEASUREMENTS

Measurements of railway noise were carried out on 5th August 2010 at the site of the proposed development. The measurement was located at the position of the proposed dwellings, at a distance of approximately 36m from the nearest track and at a height of 1.5m above the ground, shown in Figure 1. Weather conditions throughout were dry with a light north westerly wind.

All measurements were carried out using a Norsonic 118 Type I integrating sound level meter which was calibrated before and after each set of measurements to ensure no drifting of the calibration signal. The measurements recorded individual train movements for about two hours and the parameter measured were:

L_{Amax} The maximum noise level during the movement

SEL The equivalent of the noise energy of the event condensed into 1 second, used to assess noise from individual trains or aircraft

The meter was also used to record ambient noise levels without trains, taking note of the following parameters:

L_{Aeq} The equivalent continuous noise level, a measure of the average noise energy for the duration of the measurement

L_{Amax} The maximum noise level during the period of the measurement

L_{A90} The level exceeded for 90% of the time, the background noise level during the period of the measurement.

Staff involved with noise measurements were fully competent, either being Members of the Institute of Acoustics or holding a Certificate of Competence in Environmental Noise Measurement. Results of the measurements are shown in Appendix 1.

5 NOISE CALCULATIONS

Train noise levels were measured through day time period, giving a 2 hour overall L_{Aeq} of 59.3dB. This was measured at the location of the proposed homes. The overall $L_{Aeq,16hr}$ would be slightly less than this average due to slightly lower levels in the evening but in order to cater for the worse case, the 2 hour average was assumed to be the same over the 16 hour period. This means that the site would fall into Category B of PPG24 for railway noise during the day time. At night the $L_{Aeq,8hr}$ noise level would be less than 59dB but would still be in Category B.

The logarithmic average L_{Amax} level of individual trains was determined to be 79.6dB(A) over the period of measurement and this figure was therefore used to assess the internal L_{Amax} levels at night according to the WHO guidelines.

6 ASSESSMENT

It is clear from the calculations that noise from the railway as perceived at the location of the proposed homes falls within Category B of PPG24. This means if permission is granted then noise must be taken into account in the design of the scheme and appropriate conditions imposed. In order to achieve satisfactory internal noise levels to the standards described above, sound reduction measures would be required.

It is understood that the proposed homes would be similar to those supplied by Tingdene Homes and would meet the requirements of BS:3632-2005, specifying a sound insulation of not less than 35dB over the frequency range 125 to 4000 Hz, including doors windows and ventilation apertures. In practice this would provide a sound attenuation of approximately 30dB(A) to external noise levels. The homes are double glazed and built to a high standard of sound insulation.

The noise level at the location of the nearest home was found to be $L_{Aeq,16hr}$ 59dB, resulting in a façade level of 62dB, taking into account reflection effects. Thus an internal noise level of 32dB(A) would be achieved inside the home which would slightly exceed the 'good' standard of BS8223, however, at night, the requirement for internal peak noise levels (L_{Amax}) to be less than 45dB(A) means that a reduction of 35dB(A) would be needed. Therefore additional mitigation measures are needed to reduce noise levels by at least 5dB(A).

A reduction of 8 dB(A) could be achieved by the construction of a noise barrier on the southwest boundary of the site with a minimum height above the track level of 2.5m. Alternatively a 3m barrier could be constructed close to the homes. The locations of these alternatives are shown on the section in Figure 1 and the plan in Figure 2.

If standard mobile homes were to be used on the site additional mitigation would be needed. These structures provide approximately 20dB(A) sound insulation and in order to meet the most stringent requirement of internal maximum noise levels at night not exceeding 45dB(A), a further 15dB(A) mitigation would be needed. This could not be achieved with a single barrier as a barrier on the southwest boundary would need to be 6m high or a barrier close to the homes would need to be 4.5m high. However, it would be possible to achieve a 12dB(A) reduction with a 3.5m barrier on the southwest boundary and a 3m barrier close to the homes. This would meet the 'good' standard of BS8223 but maximum noise levels would slightly exceed the criteria.

Noise levels within the amenity area around the homes would be reduced to below the criterion level of 55dB(A) whichever barrier is used.

7 CONCLUSIONS

The location of the proposed development falls within Category B of the national standards of PPG24. This means that if planning permission is granted then conditions on the control of noise should be imposed.

The proposed park homes provide a high standard of sound insulation but in order to achieve a 'good' standard of internal noise levels during day and night time according to BS8223 and WHO guidelines, a noise barrier would be needed, either on the southwest boundary or close to the homes as indicated in Figure 2.

The barrier on the southwest boundary could be earth mounding or part mounding and part close boarded fence. The barrier close to the homes would be close boarded fencing or purpose build panels.

If standard mobile homes are used on the site then a 'reasonable' standard of noise could be achieved by the construction of both the southwest boundary barrier (at a height of 3.5m) and the barrier close to the homes (at a height of 3m).

APPENDIX 1

Results of noise measurements

Hurn Road, Peterborough

Results of Railway Noise Measurements

Time	Train type*	SEL	LAmax
10.54	FDS	87.3	80.1
11.03	FEN	81.7	75.1
11.04	FES	88.2	84.1
11.13	FES	86.2	82.6
11.16	SFN	73.1	65.4
11.22	SDS	77.8	80.0
11.26	FDN	85.0	79.4
11.29	FES	85.9	80.5
11.30	SDS	77.7	76.4
11.34	FDS	83.7	79.8
11.37	SDN	71.6	69.7
11.44	FDN	82.9	78.3
11.45	FES	84.6	82.3
11.53	FEN	82.3	76.4
11.58	SDN	69.9	67.0
12.03	FDN	83.7	79.5
12.07	FDS	86.4	81.1
12.13	FDS	86.7	84.1
12.17	FDN	84.1	79.7
12.30	FES	83.5	80.2
12.31	FDN	81.5	77.7
12.36	FEN	83.3	75.6
12.38	SDN	71.6	69.7
12.43	FDN	82.9	78.3
12.44	FES	84.6	82.3
12.52	FEN	82.3	76.4
LAeq,2hr		59.3	
Log Average			79.6

* 1st letter, F = Fast, S = Slow
2nd letter, D = Diesel, E = Electric
3rd letter, N= Northbound, S = Southbound

Figure 1: Section through Noise Barriers

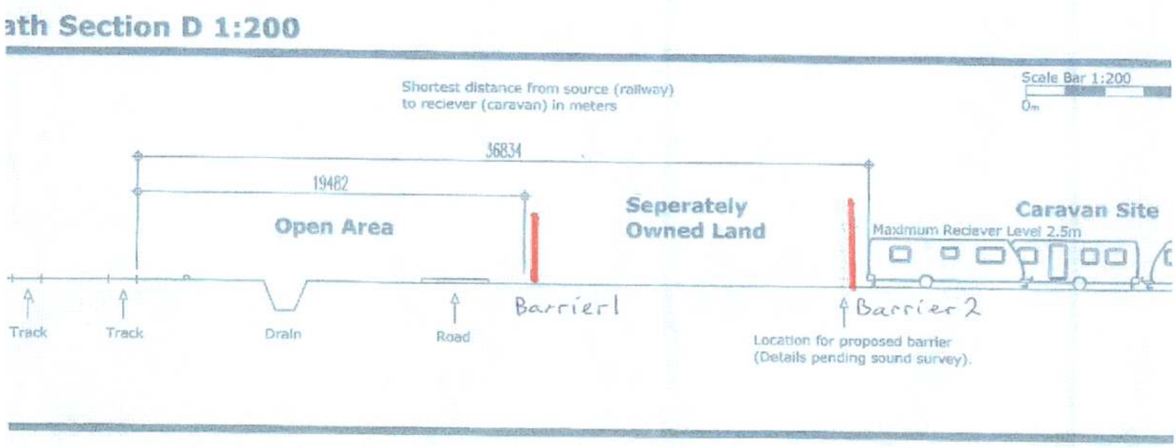

Figure 2: Plan of Noise Barriers