PROPOSED RESIDENTIAL DEVELOPMENT
FORMER S R GENT PREMISES
FOR BARRATT SHEFFIELD

Prepared by A E Charles, M.Phil, M.I.O.A., M.I.H.T.

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RPS Planning, Transport and Environment
52 Princess Street
Manchester

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1 Introduction

1.1 This site is located off Dodworth Road, Barnsley and it is proposed to demolish the existing industrial unit and erect residential properties.

1.2 This Technical Noise Report considers the impact of the surrounding noise climate of the area on the proposed residential development and if necessary proposes mitigation measures to ensure that noise levels will be within acceptable levels

1.3 As part of the exercise to produce the Technical Noise Report, information on the current baseline noise conditions were obtained.

1.4 The approach to the noise and vibration assessment involved the following key elements:

- establishment of noise surveys to obtain representative data on the baseline noise environment in the area;
- assessment of the Site for new residential development with regard to the guidance contained within Planning Policy Guidance 24 (PPG 24);

2 Site Description

2.1 The site is located on land off Dodworthand is located in a residential area. The nearby Manor Road is lightly traffic but noise from the M1 motorway can be heard.

3 Noise Units, Standards and Guidelines

Noise Units

3.1 Noise is defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

3.2 For variable noise sources such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB(A). The "loudness" of a noise is a purely subjective parameter but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.

3.3 External noise levels are rarely steady but rise and fall according to activities within an area. In an attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is the "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in BS 7445 [1] as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise, noise from industrial premises and is also the most suitable unit for the description of other forms of environmental noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

3.4 In addition, the term "ambient noise" is often referred to. Ambient noise is defined in BS 4142: 1997 as the *"Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far"*. It is commonly measured in terms of L_{Aeq}.

Noise Standards and Guidelines

Planning Policy Guidance Note 24: Planning and Noise (PPG 24)

3.5 Principles and specific guidelines on noise and planning issues are given in the Department of Environment Planning Policy Guidance Note 24: Planning and Noise (PPG 24) [CD 7/6]. This document, published by the Department of the Environment, supersedes DoE Circular 10/73 but builds upon advice previously contained within it.

3.6 PPG 24 offers guidance on the development of new housing near to existing noise sources, and defines four noise exposure categories, which indicate to what extent noise should be considered in the granting of planning permission. PPG 24 also defines noise levels for each category, for a variety of noise sources. PPG 24 allows local authorities to reduce or increase the noise levels defined for each category by up to 3 dB in some cases.

3.7 PPG 24 recommends that the night-time period is 23:00 hours to 07:00 hours and the daytime period is 07:00 hours to 23:00 hours.

3.8 Table 3.1 below reproduces the summary in PPG 24 relating to the recommended noise exposure categories for new dwellings near to existing noise sources.

Table 3.1 : Summary of PPG 24 Noise Exposure Categories for New Dwellings Near Existing Sources

Noise Levels and Advice 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 23:00 - 07:00	 <55 <45	 55 - 63 45 - 57	 63 - 72 57 - 66	 >72 >66
Rail Traffic 07:00 - 23:00 23:00 - 07:00	 <55 <47	 55 - 66 45 - 59	 66 - 74 59 - 66	 >74 >66
Mixed Sources 07:00 - 23:00 23:00 - 07:00	 <55 <45	 55 - 63 45 - 57	 63 - 72 57 - 66	 >72 >66
Advice	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.	Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection against noise.	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.	Planning permission should normally be refused.

3.9 The guidelines given in PPG 24 correspond to a noise level measured under freefield conditions (away from any reflecting facades) and at a height of 1.2 to 1.5 m above ground.

3.10 A further stipulation of PPG 24 is that, for night-time noise levels (23:00 hours to 07:00 hours), sites where individual noise events regularly exceed 82 dB L_{Amax} (Slow 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).

3.11 PPG24 further advises in paragraphs paragraph 8 that:

"…….Categories B and C deal with situations where noise mitigation measures may make development acceptable……."

3.12 When internal levels are considered, PPG 24 recommends that guidance on suitable internal noise levels can be found in BS 8233: 1999. It is considered that, with suitable glazing, acceptable internal noise environments can usually be achieved.

Sound Insulation and Noise Reduction in Buildings (BS 8233)

3.13 BS 8233 defines limit ambient noise levels for a number of design criteria, in order that good or reasonable conditions are achieved in certain environments. For restaurants, it defines upper and lower ambient noise level limits to achieve reasonable acoustic privacy in the dining area.

3.14 Table 3.2 shows a summary of the levels recommended in BS 8233 for the rooms expected in the proposed development.

Table 3.2: Indoor Ambient Noise Levels as Recommended in BS 8233

Criterion	Typical Situation	Design Range dB $L_{Aeq,T}$	
		Good	Reasonable
Reasonable resting conditions	Living rooms	30	40
Reasonable sleeping conditions	Bedrooms	30	35
Reasonable speech or telephone communications	Department Store	50	55
Reasonable acoustic privacy in shared spaces	Restaurant	40 - 55	

World Health Organisation Guidance (WHO)

3.15 In Guidelines for Community Noise, the World Health Organisation (WHO) considers that the $L_{Aeq,\ 8hr}$ noise level "should not exceed 30 dB indoors, if negative effects on sleep are to be avoided", and "At night-time, outside sound levels about 1 m from facades of living spaces should not exceed 45 dB L_{Aeq}, so that people may sleep with bedroom windows open".

3.16 The WHO also considers that, "To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}".

3.17 In a review of health effects based noise assessment methods undertaken for the DETR just before the issue to the 2000 WHO guidelines, it is noted that “perhaps the main weakness of both the WHO-inspired documents is that they fail to consider the practicality of actually being able to achieve any of the stated guideline values.”

3.18 The report goes onto say that, “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.”

4 Assessment Criteria

Effects of Existing Noise Environment Upon New Residential Developments

4.1 It is consider that, provided the external levels are less than 55 dB $L_{Aeq(16\ hour)}$ and internal levels achieved at the new properties when their windows are closed meet the 'reasonable' criteria in BS 8233 and adequate ventilation can also be achieved, there would be no significant impact to residents, or users of the retail or restaurant areas.

5 Baseline Conditions

5.1 In order to define representative baseline noise conditions, long-term noise surveys have been carried out at the development site.

5.2 The noise surveys provide the necessary data for the evaluation of the existing environment. This enables the impact of the existing environment on the residential aspect of the development and the impacts of the development on the existing environment, to be assessed.

Long Term Noise Surveys

- Noise surveys were carried out in April 2007, with the microphone located to the boundary of the site adjacent to Dodworth Road. Before and after the surveys, the calibration of the meters was checked. All instrumentation is also calibrated at least every two years by the manufacturer, as recommended in BS 4142.

5.3 All measurements were made using A-weighted frequency response and fast time weighting.

5.4 Meteorological data for the survey periods were noted and are given in Appendix A. Conditions were considered acceptable for noise monitoring purposes, although there were occasional gust of wind none of which exceeded the proposed limit for noise monitoring of 5 m/s.

5.5 A summary of the noise survey data is provided in Table 5.1. Full survey details and results from the noise survey are provided in Appendix A.

Table 5.1: Attended Noise Survey Summary

Day/Date	Metric	L_{Aeq} dB		Weather
		DAY 07:00 to 23:00	NIGHT 23:00 to 07:00	
24.04.07 07.00 to 23.00	AVERAGE	67.8	65.3	Dry
	MAX	67.3	72.1	Slight wind
	MIN	49.8	61.4	Mild temperature
24/25.04.07 23.00 to 07.00	AVERAGE	68.6	65.1	Dry
	MAX	72.4	69.0	No wind
	MIN	64.8	61.4	Mild temperature

The average freefield noise levels for the daytime and night-time, and the corresponding Noise Exposure Categories are:

- **Daytime: 68 dB, $L_{Aeq,16\text{-}hours}$, NEC 'B'**
- **Night-time: 65 dB, $L_{Aeq,8\text{-}hours}$, NEC 'C'**

6 Impacts and Mitigation Measures

6.1 Observations at the Site indicated that the proposed residential would be predominately affected by road traffic noise. The Appeal Site falls within NEC B during the day time and the night time based on PPG

6.2 As indicated in the Porter et al study undertaken for the DETR prior to the issue of the 2000 WHO guidelines, the WHO document fails to consider the practicality of actually being able to achieve the recommended guideline values, and are aspirational and not neccessarily achievable.

7 Mitigation

New Residential Properties

7.1 The new residential properties will be designed to ensure that the external and internal acoustic environment will be of a reasonable standard, based on the criteria in PPG24 and BS 8233.

7.2 It is considered that a daytime acoustic design criterion for living rooms of 40 dB $L_{Aeq,16hours}$ or less and a night-time acoustic design criterion for bedrooms of 35 dB $L_{Aeq,8hours}$ or less would be acceptable in achieving reasonable internal noise levels, in accordance with BS 8233. Whilst external levels should be less than 55 dB $L_{Aeq(16\ hour)}$

7.3 The results of the noise survey were processed to give daytime and night-time L_{Aeq} noise levels, as required by PPG 24, the results are summarised in Table 7.1, as attached, with an indication of the corresponding NEC.

7.4 The long-term attended survey indicates that the Appeal Site falls into the following NEC categories.

- Daytime (07:00 hours to 23:00 hours): **NEC 'B'**
- Night-time (23:00 hours to 07:00 hours): **NEC 'C'**

7.5 Acceptable external level in external recreational areas, i.e. rear gardens, can be achieved by erecting close boarded fences to these areas and/or orientation the buildings such the majority of rear gardens are screened from the road .

7.6 Where appropriate acceptable internal levels can be achieved within the residential developments with the use of appropriate glazing, i.e. 4/12/4, and closed windows. Internal noise levels will meet the 'reasonable' standard as recommended in BS 8233 and a full glazing specification will be provided at the detailed design stage.

Ventilation

7.7 Where it is necessary to maintain closed windows, in order to safeguard the internal noise environment within the dwellings, an alternative means of ventilation will be provided to ensure that the acoustic protection afforded by the glazing is not compromised, is compliant with current Building Regulations and should and is comparable to the Sound Reduction Index performance of the glazing unit. The specification of ventilation will not preclude the windows from being openable, at the resident's discretion, and to allow for rapid ventilation.

WHO Assessment

7.8 The WHO document, Guidelines for Community Noise 2000 states that *"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces, and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady continuous noise."* However, the WHO then goes onto indicate that around 56% of the population are already exposed to daytime noise levels exceeding 55 $L_{Aeq.}$ The WHO guidance levels are therefore more aspirational than immediately attainable.

8 Conclusions

8.1 An assessment of the potential noise impacts on the proposed residential properties has been carried out.

8.2 The assessment has considered noise impacts on noise sensitive receptors, with reference to baseline conditions. Baseline conditions have been obtained through a noise survey carried out at a representative location to the proposed development.

8.3 Based on the guidance contained in PPG 24 and BS 8233, it is considered that external levels can be reducted to acceptable levels by the erection of close boarded fences to the external recreational areas, i.e. rear gardens, and suitable orientation of the properties. Whilst reasonable internal noise levels can be achieved in habitable rooms with double glazing and with windows closed. Alternative means of ventilation should be specified to comply with current Building Regulations, but should allow residents to open windows at their own discretion, for natural means of ventilation, if desired.

References

1. British Standards Institution. British Standard 7445: Description and Measurement of Environmental Noise, Part 1. Guide to Quantities and Procedures, 1991.

2. Department of the Environment. Planning Policy Guidance, Planning and Noise, PPG 24, September 1994.

3. British Standards Institution. British Standard 8233: Sound Insulation and Noise Reduction for Buildings - Code of Practice

4. World Health Organisation. Guidelines for Community Noise, 1999.

5. Porter, N. D. et al. NPL Report CMAM 16, Health Effect-Based Noise Assessment Methods: A Review and Feasibility Study, 1998.

Appendix A

Noise Monitoring Results