APPENDIX D

GLOSSARY OF TECHNICAL TERMS

TECHNICAL TERMS AND UNITS

Decibel (dB) This is the unit used to measure sound. The human ear has an approximately logarithmic response to sound over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals) We therefore use a logarithmic scale to describe sound pressure levels intensities and power levels. The logarithms used are to base 10; hence an increase of 10 dB in sound pressure level corresponds to a doubling in perceived loudness of the sound

Sound Power Level (PWL) This is a function of the noise source alone and is independent of its surroundings It is a measure of the amount of sound power output measured in decibels.

Sound Pressure Level (SPL) - This is a function of the source and its surroundings and is a measure of the sound pressure at a point in space. For example, a sound pressure level measured at 1 metre from a sound source of certain sound power in reverberant room will not be the same as the sound pressure level a 1 metre from the sound source measured in open space

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a range of approximately 20 Hz to 20 KHz and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands and the sound pressure level is measured in each band The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into three *one-third octave bands.*

"A" Weighting - A number of frequency weightings have been developed to imitate the ear's varying sensitivity to sound of different frequencies. The most commonly used weighting is the "A" weighting. The "A" weighted SPL can be measured directly or derived from octave or one third octave band SPLs. The result is a single figure index which gives some idea of the subjective loudness of the sound, but which contains no information as to its frequency content.

Noise Rating (NR) and Noise Criteria (NC) Curves - The "A" weighted sound pressure level cannot be used to define a spectrum or to compare sounds of different frequencies. NR curves convey frequency information in a single figure index. This is done by defining the *maximum permissible sound pressure level at each frequency for each curve. To measure the noise rating of a given environment, the SPL is* measured in octave or one-third octave bands and the noise rating is then the highest NR curve touched by the measured levels. Typical NR levels for various environments are shown below:

Workshops	NR 60 70
Mechanised Office	NR 50-55
Gymnasium, Sport Halls, Swimming Baths	NR 40 50
Restaurants, Bars, Cafeterias	NR 35 45
Cinemas, Hospitals, Churches, Small Conference Rooms	NR 25 35
Classrooms, TV Studios, Large Conference Rooms	NR 20-30
Concert Halls, Theatres	NR 20-25
Diagnostic Clinics, Audiometric Rooms	NR 10 20
Broadcasting Studios	NR 5-15

NC curves are similar to NR curves and are evaluated in the same way. At low frequencies, NC curves are below the equivalent NR curves They are often used for setting ventilation noise levels.

Intermittency and Time-Weighting - The degree of annoyance caused by a noise also depends on its duration and intermittency of a noise. Intermittent, impulsive or repetitive noises tend to be more annoying than continuous noises. Various time weightings have been derived to measure sounds of differing intermittences and these can be measured directly on modern equipment. The most common time-weightings in use are as follows:-

L_{90} This is the sound pressure level exceeded for 90% of the measurement period It is widely used to measure background noise levels.

L_{50} this is the sound pressure level exceeded for 50% of the measurement period. It is widely used to measure background noise levels with an element of other intrusive noise. For a given measurement, the L_{50} level is by definition greater than or equal to the L_{90} level.

L_{10} This is the sound pressure level exceeded for 10% of the measurement period. It is widely used to measure traffic noise For a given measurement period, the L_{10} level is by definition greater than or equal to the L_{90} level.

L_{eq} The equivalent continuous noise level is often used to measure intermittent noise. It is defined as the *notional steady noise level that* would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic, the L_{eq} level tends to be dominated by the higher noise levels measured.