2 STUDY METHODOLOGY

2.1 Noise Sensitive Receivers

Noise Sensitive Receivers (NSRs) in the Study refer to all existing domestic premises, including temporary housing accommodation. Court of law, hotels and education institutions are excluded as NSRs since they are either fully air-conditioned for the former or they are being included in the territory-wise "Noise Abatement Measures for Schools" projects.

2.2 Direct Technical Remedies

For the purpose of this Study, direct technical remedies mean roadside barriers, semi-enclosures and enclosures, whilst the application of friction course and other Low Noise Road Surface are not considered as a direct technical remedy, since the Environmental Protection Department is currently implementing a territorised Quiet Road Surfacing Programme to reduce traffic noise by applying Low Noise Road Surface on high speed roads; the Environmental Protection Department (EPD)/Highways Department (HyD) are currently studying the feasibility of applying Low Noise Road Surface on low speed roads.

2.3 Assessment Methodology

2.3.1 General

The Study Brief is very specific of the requirements concerning methodology and in the interests of conciseness specific procedures are not repeated at length here.

The broad approach to this study was:

- To review the "Working Tool" and identify any potential technical difficulties by reference to complicated actual site conditions;
- To further define the criteria for use in the "Working Tool" if necessary;
- To carry out review of existing at-grade roads using the "Working Tool";
- To recommend and list all identified at-grade roads with priority to which practicable direct technical remedies can be provided;
- To identify and recommend further site investigation, surveys and studies necessary to fulfil the objectives required by this study.

2.3.2 Methodology

Identification of at-grade Roads

With reference to the Annual Traffic Census 1997 and the latest commercial street guidebook, a total of 3,228 roads were identified for the review study. Of these, 940 roads are on Hong Kong Island, 870 roads on Kowloon Peninsula and 1418 roads in the New Territories and Outlying Islands.

Organisation of Site Plans and Building Plans

1:1000 scale survey maps produced by Lands Department (Survey and Mapping Office) were sufficient to provide necessary information such as road alignment and sensitive receiver orientation for use in the "Study". In case the maps were not updated enough, site visits were carried out to check the prevailing conditions. Building plans within the last two years from Buildings Department were collected where appropriate.

Application of Working Tool

The Working Tool was applied systematically to:

- Identify the noise problem;
- Select the noise barrier form;
- Identify site constraints, including fire fighting, road safety, blockage of access, pedestrian movements and commercial activities;
- Identify the requirement for noise mitigation measures, e.g. land, visual, landscaping
- Ascertain the acoustic effectiveness of the identified barrier form.

It is understood that the "Working Tool" uses a systematic approach with general objective criteria for evaluation. In identifying a specific noise problem, site specific information such as traffic flows and previous noise measurement/assessment records were reviewed to supplement the evaluation. A summary of the simplified assessment procedures is presented in Figure 2.1. Figures 2.2 to 2.8 show the details of Charts 1 to Chart 7.

Evaluation of Engineering Feasibility

A brief evaluation of the engineering feasibility was carried out. For this, Maunsell Consultants Asia Limited (MCAL), were consulted for engineering feasibility for providing the proposed noise mitigation measures as shown in Figures 2.9 to 2.15.

Database and Records

Logical spreadsheets were set up to show the stepwise assessment procedures of the "Working Tool". Database files on roads in Hong Kong Island, Kowloon, the New Territories and outlying islands were linked together such that roads in unknown locations could readily be searched.

A GIS was proposed to manipulate the database containing findings in this review study. With the aid of the GIS programme, the database is linked to digital drawings of all the identified roads and the road information can be showed together with the digital drawing for easy reference. Also, all proposed barriers on the recommended at-grade roads can be indicated on the digital maps.

2.4 Key Issues

The *Scoping Study for Providing Retroactive Road Traffic Noise Mitigation Measures* was a scoping study aimed to identify potential at-grade roads for further, detailed engineering feasibility studies. A total of 18 roads were identified. However, it becomes clear during the *Feasibility Study for Providing Retroactive Road Traffic Noise Mitigation Measures* that the feasibility of providing noise mitigation measures depends largely on site conditions. Given the large number of roads examined during the study, it was not possible to investigate in detail the site conditions for each road section. However, the need for a re-visit of all existing roads was recognized during the Feasibility Study and a set of working tools was developed in order to provide a systematic screening of all existing roads. The main objective of this study was to ensure that all at-grade roads with potential for retroactive noise mitigation were identified through a set of systematic and objective working tools.

Key issues in this study were the identification of site conditions, site constraints from the available site plans and the estimation of building heights and numbers of dwellings exposed and to be protected by the identified measures.

As this is a desk-top study, involving no detailed noise modelling, no traffic data, and presumably no site visits, chances are that: (a) the effect of other nearby roads cannot be discriminated; (b) the site conditions are unidentified from the site plans; and (c) the latest residential developments are missed out because the site plans are not updated. In view of these constraints, the previous noise calculations and information collected at the Scoping Study stage were referenced where appropriate. Furthermore, limited site visits were carried out and building plans within the last two years were collected from the Buildings Department where necessary.

However, as it is not possible to obtain all building heights and building layouts from the Buildings Department within the time period of this Study, the number of storeys of a building can be estimated by experience and/or professional judgement based on the characteristics of the district. If necessary, a site visit is appropriate for confirmation.