



DEVELOPMENT OF SCREENING CRITERIA

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3.1. Identification of the Problem

3.1.1. In order that a road is eligible for consideration for retroactive noise mitigation, it is necessary that the following criterion is met:

- Peak-hour noise level $L_{10}(1\text{-hour})$ at a nominal facade from the edge of the carriageway exceeds the HKPSG noise criteria, i.e. 70 dB(A) for domestic premises; and the above criteria follow directly from an analogy of the HKPSG criteria since currently no noise standard applies to existing sensitive receivers affected by road traffic noise.

3.2. Identification of Traffic Engineering and Road Safety Constraints

3.2.1. Noise barriers and enclosures should not be installed where they will present a hazard to road safety or reduce the degree of road safety in any respect. Wherever existing conditions allow, it is desirable to locate a noise barrier behind the footpath, verge, hard strip or hard shoulder of a carriageway. The actual position will vary with the width of verge, medium strip and/or hard shoulder.

3.2.2. Setback requirement of noise mitigation measures should be evaluated against road safety considerations. Special emphases on road alignment, sight stopping distance and visibility splays, are in turn functions of vehicle speed, acceleration and deceleration rates, horizontal and vertical alignments of road and driver behaviour. Due considerations should be given to situations like on and off-ramps, intersections, and intersecting roadways.

3.2.3. In general, barriers and partial enclosures may be placed at the back of footpath or verge along a straight section of road without impairment of the visibility. However, for a curved section with a speed limit of 70 kph, it is a requirement of the Transport Department that the barriers/partial enclosures must be so located to give a clear minimum visibility of 125m ahead. Similarly, a minimum sight distance of 70m must be maintained for a curve with a speed limit of 50kph. Therefore, additional setback would be required to maintain the required visibility

3.2.4. In addition, the proposed barrier structure should avoid conflict with existing street furniture, e.g. footbridge, fire hydrants, road signs, etc. If this is unavoidable, consideration should be given to either modifying the scheme to accommodate this furniture or relocating the existing furniture or a combination of both.

3.2.5. Proper selection of barrier and enclosure materials constitutes another important safety aspect. Metallic and transparent materials can produce headlight glare at certain incident angles. Materials that have low fire rating or produce toxic fumes in a fire should be avoided. Additionally, the screening structure should be carefully designed such that it will not be easily broken into splinters in a crash situation. Under certain circumstances, addition of a safety barrier may be desirable.

3.3. Identification of Fire Fighting and Emergency Access Constraints

- 3.3.1. In densely developed areas, maintenance of adequate emergency access becomes a crucial safety factor. The proposed mitigation scheme should not obstruct the egress of public vehicles in crises, and operation of fire engines, ambulances, police vehicles, cranes and other emergency vehicles, equipment or plant.
- 3.3.2. The Fire Services Department requires that no noise screening structures should be erected at positions such that:
- (1) external rescue and fire fighting operation by means of ladders is rendered impossible;
 - (2) vehicular access to areas on both sides of a road is blocked; or
 - (3) emergency crossing to the opposite lane of a road is blocked,
 - (4) operation and maintenance of waterworks installation such as valves and fire hydrants

In this respect, restrictions on the setting out and dimensions of noise barriers or enclosures should be observed to minimise the safety implications.

3.4. Identification of Conflict with Existing Pedestrian Access and Street-Level Commercial Activities

- 3.4.1. The location of noise screening structures should not obstruct pedestrian flows or interfere with street-level business activities e.g. disruptions to kerbside parking, bus stopping, loading/unloading, vehicular access to buildings and commercial activities.

3.5. Identification of Conflict with Existing Utilities and Services

- 3.5.1. As the underground utilities (including sewers, and water pipes) and services (including power cables, telecommunication cables, and gas pipes) are usually very congested especially in some old districts, e.g. Tung Tau Tsuen Road, consideration should be given to diversion or re-provision of these existing utilities and services without significant impact on the livelihood of the surrounding developments.
- 3.5.2. The relevant authorities should be consulted for the likely impact, time and costs involved for the necessary diversion or re-provisioning of these utilities. In the event that diversion of these utilities becomes difficult, the scheme should be modified or abandoned as impractical.
- 3.5.3. In addition, the location of the barrier structure should avoid interfering with the existing road lighting and drainages. If this is unavoidable, these services may be relocated and/or diverted subject to satisfactory arrangement with Highways Department and Drainage Services Department.

3.6. Identification of Conflict with Existing Highway Structure

3.6.1. The foundation of a noise screening structure should be kept clear from the underground infrastructure. The foundation should be wholly outside any box culverts, major pipelines and lot boundaries. The clearance varies from 1m to 3m. This space requirement may not be met for roads running through urban areas because of the limited road space. It is also not often practical to anchor any barriers or enclosures on current highway structures, unless separate or independent structures could be provided.

3.7. Evaluation of Side-Effects

3.7.1 The proposed mitigation scheme should minimise side effects arising from the installation of the scheme. Possible side effects include:

- local air quality impact
- visual impact
- fung shui

3.8. Evaluation of Acoustic Effectiveness

3.8.1. In order to achieve a viable scheme, the proposed mitigation scheme should result in compliance with the HKPSG noise criteria at 50% or more of the exposed population. For high rise buildings, the scheme should ensure that the road traffic noise levels at over 50% of the exposed facades on any vertical section are reduced to below 70dB(A), L_{10} (1-hr). This is based on the understanding that the scheme may not be able to protect the upper floor receivers. On the other hand, for low-rise receivers, scattering or spreading out over a long stretch of the road, it is necessary that the proposed scheme should be able to reduce the overall traffic noise levels at over 50% of the exposed facades along the road section. This is based on the understand that while the upper floor receivers for low-rise buildings can be readily protected by relatively short barriers, the horizontal extent of the barriers should be able to protect at least half the buildings along the road. A noise impact assessment should be conducted to evaluate the acoustic effectiveness of the identified scheme for a particular road section considered for mitigation.

3.9. Evaluation of Social Impact

3.9.1 The proposed mitigation scheme should minimise social impacts on the community arising from the implementation of the scheme. Possible social impacts include:

- severance of two housing areas by the proposed measures
- creation of black spot for crime
- accumulation of debris and the associated odour and vermin problems

3.10. Public Consultation

- 3.10.1 The recommended scheme should be presented first to the relevant District Board(s) from deliberation. This is an important channel for communication with public and relevant comments from District Board(s) should be incorporated, where appropriate for the proposed scheme. The next stage is to gazette the mitigation measures and the associated utilities/drainage work and respond any objections from the public on the proposed scheme.

3.11. Assessment of Engineering Feasibility

- 3.11.1. Apart from the various aspects considered above, engineering feasibility for the provision of noise barrier proposals should aim to produce a safe and economical structure that requires minimal maintenance. In the restricted area, large spread footings may pose difficulties in many urban areas. Piling foundation often requires supporting the proposed barrier. Wind pressure is the determining factor in the design criteria for noise barriers. Minimising the foundation as far as possible is a realistic approach to many cases being examined in this study.
- 3.11.2. Structure form and the landscaping treatments are an important part of the consideration in the engineering feasibility.