

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

This scoping study has examined the feasibility of providing retroactive road traffic noise mitigation for over 740 existing roads across the territory. Among the roads examined, 90% of them or 663 roads have been identified as "noisy" roads. However, only 18 of the identified roads have the potential for retroactive noise mitigation because of six crucial factors which are likely to limit the practical and effective application of direct technical remedies to these roads. All these factors are related to safety, structural integrity or public disruption. They are: (1) obstruction to access for fire fighting or rescue operations; (2) inadequacy of installation space; (3) severe disturbance to public or business activities; (4) significant structural impacts on existing road infrastructure; (5) presence of multiple vehicular or pedestrian access; and (6) sightline problems.

Feasible forms of mitigation measures identified include plain barriers (3.5m or 7m high) and semi-enclosures. In general, noise barriers could be applied where the targeted NSRs are low-rise buildings. They are also applicable where high-rise NSRs are situated well away from the road, or the buildings are below the road level. Semi-enclosures may be used where high-rise buildings are clustered on one side of the road. The estimated unit costs of the mitigation options are summarized in Table 5, and the estimated implementation costs for each road section are presented in Appendix I.

While full enclosures are effective and often desirable in mitigating traffic noise at high-rise NSRs on both sides of a road, site-specific concerns, particularly those raised by HyD such as potential structural impacts on existing roadwork and lack of roadside space, have limited the application of this option to NSRs along the identified roads. As such, no full enclosure has been included in the list of recommended mitigation measures.

Altogether 37 subsections in these 18 noisy roads have been selected for detailed noise assessment and mitigation investigation. The total number of exposed units which can expect to be benefitted (i.e. having noise reduction by 1 dB(A) or more) is estimated to be 27,000, of which 21,000 units are expected to meet the HKPSG noise criterion as a result of implementing the noise mitigation scheme. An effectiveness factor (F) has been derived to take into account the number of dwellings protected, anticipated noise reduction and the approximate cost of implementing the retroactive treatment and this has been used to prioritize the noise mitigation works programme. Mitigation works with larger F values denote that they are more cost-effective and should receive higher implementation priority.

10.2 Recommendations

10.2.1 Roads for Further Review

It is recommended that the following roads should be investigated in greater details during the Phase 2 assessment for possible retroactive treatment :

- (1) Island Eastern Corridor (Tai Koo Shing)
- (2) Tung Tau Tsuen Road
- (3) Che Kung Miu Road
- (4) Tin Sam Street
- (5) Hung Mui Kuk Road
- (6) Tai Chung Kiu Road
- (7) Yuen Wo Road
- (8) Ma On Shan Road
- (9) Ting Kok Road (Yuen Sin Road to Brides Pool)
- (10) Po Lam Road North
- (11) Po Hong Road
- (12) Fung Shue Wo Road
- (13) Tuen Mun Road (Tsuen Wan, Tsing Lung Tau and Castle Peak Bay)
- (14) Castle Peak Road (Hung Sui Kiu and Ping Shan)
- (15) Hiram's Highway (Marina Cove)
- (16) Tolo Highway (Ma Liu Shui and Tai Po Kau)
- (17) Cheung Pei Shan Road
- (18) Junk Bay Road

The appropriate form of direct technical remedies, cost estimates of the measures, likely noise reduction and number of benefitted dwellings associated with each identified road are indicated in Appendices H and I.

10.2.2 Implementation Programme

On the basis of the above cost-effectiveness analysis, it is recommended that the mitigation works be implemented in three stages. Roads to be included in each stage are indicated in Table 7.

Table 7 Implementation Programme for Retroactive Noise Mitigation Measures

Implementation Programme	Roads
Stage 1	Ma On Shan Road, Tung Tau Tsuen Road, Po Lam Road North, Tin Sum Street, Hung Miu Kuk Road, Junk Bay Road
Stage 2	Tuen Mun Road, Yuen Wo Road, Fung Shue Wo, Tai Chung Kiu Road, Po Hong Road, Cheung Pei Shan Road
Stage 3	Island Eastern Corridor, Ting Kok Road, Che Kung Miu Road, Tolo Highway, Hiram's Highway, Castle Peak Road

10.2.3

Further Implementation Considerations

In the light of the concerns of various Government Departments, it is recommended that further considerations (other than those discussed in Section 5) should be given to safety and visibility, structural impacts, public disruption, obstruction to facilities and services, air quality and ventilation, lighting, maintenance, and visual impacts and amenity during the detailed engineering design of mitigation measures in the Phase 2 Study. The following are relevant:

Safety and Visibility

- Proper location of noise screening structures to avoid obstruction to emergency facilities such as fire hydrants.
- Use of barrier/enclosure materials with adequate fire resistance ratings.
- Provision of smoke extraction fans for full enclosures longer than 230m.
- Provision of adequate fire fighting installations for full enclosures longer than 450m.
- Possible impacts on the radio communication between fire appliances and the Fire Services Mobilizing and Communication Centre.
- Proper siting of noise barriers and enclosures to prevent the creation of criminal black spots (e.g. not placing noise barriers/enclosures between footway and carriageway).

Structural Impacts

- Wind loading on noise mitigation structures.

Public Disruption

- Possible objections from the commercial operators and other frontage users.

Obstruction to facilities and Services

- Avoid placing the foundations of noise screening structures on underground services.
- Design provisions for temporary removal and subsequent reinstatement of noise screening components (e.g. removable screening panels, simple panel to foundation joints) to facilitate easy operation and maintenance of services and utilities.
- Proper design and location of noise barriers and enclosures to prevent substantial utility and roadside facility diversions (e.g. cables, water mains, telephone mains, gas mains, drains, surface channel, kerbside car parks, loading/unloading bays, bus stops, footpaths, bicycle tracks, lamp posts, traffic signs, etc.).
- Provision of alternative access behind noise screening structures to facilitate slope maintenance work.

Air Quality and Ventilation

- Adverse air quality impacts on the adjacent buildings.
- Possible degradation of air quality inside noise enclosures.
- Use of modelling techniques (e.g. Computational Fluid Dynamics) for air quality assessment for enclosures.

Lighting

- Effect of the erection of high noise barriers or enclosures on the quantity of natural lighting available to the adjacent building.
- Prevention of tunnel effects due to sudden changes in light conditions in full enclosures.

Maintenance

- Availability of replacement parts for proprietary noise mitigating products.

Visual Impacts and Amenity

- Submission of the noise screening structures to the Advisory Committee on the Appearance of Bridges and Associated Structures for approval.
- Use of landscaping and roadside planting to ameliorate visual impacts.
- Preservation of existing trees and vegetation.

10.2.4

Other Recommendations

- (1) A detailed survey of all sensitive receivers potentially benefitted from the noise mitigation scheme should be commissioned.
- (2) A detailed site survey of soil and roadside features should be commissioned to provide information for foundation design of noise screening structures.
- (3) Information on underground utilities should be obtained from all relevant Government departments and utility companies for design of noise screening structures.
- (4) A focused feasibility study of retrofitting existing flyovers should be commissioned.