

CHAPTER 5

Environment, Transport and Works Bureau

Highways Department

Territory Development Department

Provision of noise barriers for mitigating road traffic noise

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PROVISION OF NOISE BARRIERS FOR MITIGATING ROAD TRAFFIC NOISE

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PROVISION OF NOISE BARRIERS FOR MITIGATING ROAD TRAFFIC NOISE

Summary

1. According to the Government's estimate, road traffic noise affects more than one million people in Hong Kong. In planning development projects, a policy objective of the Government for noise control is to have due regard to the potential noise problem. The Environmental Impact Assessment Ordinance (EIAO), which came into operation in 1998, requires that a road project proponent should undertake an Environmental Impact Assessment (EIA) study and incorporate noise mitigation measures to meet the noise standards. The use of noise barriers to screen off traffic noise is an established international practice. Up to 2002, about 37 kilometres of noise barriers have been put into use in Hong Kong. The expenditure on noise barriers for the three years ended March 2003 was about \$1,000 million (paras. 1.2 to 1.8).

AUDIT FINDINGS

Noise barriers for planned residential developments in Pak Shek Kok (PSK)

2. In November 2000, the Highways Department (HyD) issued a variation order to delete from the Tolo Highway widening works contract the noise barrier works intended to provide noise mitigation measures to the PSK residential sites. For deleting the contracted works, the HyD had to pay the contractor \$13 million (para. 2.17). The events leading to the deletion of the contracted noise barrier works are described in paragraph 3 below.

3. In October 1997, when the Territory Development Department (TDD) requested the HyD to provide noise barriers for the planned residential developments in PSK under the Tolo Highway widening project (THWP), an outline zoning plan (OZP) for PSK had not yet been made available. On 26 March 1999, the day on which the HyD awarded the Tolo Highway widening works contract (which included the provision of noise barriers), the land use proposals and the related planning parameters for the residential developments, as stated in the draft OZP for PSK, were gazetted for public consultation. Upon receiving public objections, the Town Planning Board decided to change the planning parameters for the PSK residential developments and agreed that mitigation measures *other than noise barriers*



would be implemented for the PSK residential developments. The contracted noise barrier works were no longer required. This episode has highlighted the risk of procuring noise mitigation measures (e.g. noise barriers) for screening off traffic noise for undeveloped land the uses of which may be subject to changes (para. 2.18).

Noise barriers for planned developments in Tai Po Area 39

4. In January 2003, the Administration informed the Legislative Council (LegCo) Panel on Transport that:

- (a) about 1,900 metres of the noise barriers built solely for the planned developments in Tai Po Area 39 and the Chinese University of Hong Kong could be removed; and
- (b) another 1,500 metres of the noise barriers built for both the planned and existing developments near Tai Po Area 39 and the Chinese University of Hong Kong could be trimmed.

The Administration also informed the LegCo Panel that the cost of dismantling and trimming down of the noise barriers was estimated to be \$8 million. While the noise barrier panels and steel posts would be reused in other projects, the installation works costing about \$5 million have been wasted. Moreover, the Government had incurred an additional cost of \$24 million due to prolongation of the contract (paras. 2.34 to 2.37). The events leading to the removal of the noise barriers are described in paragraphs 5 to 6 below.

5. In September 1998, the HyD noted that there was no firm implementation programme for the planned developments in Tai Po Area 39. Therefore, the HyD included some of the noise barrier works for the planned developments as *provisional* items in the Tolo Highway widening works contract. In September 1999, noting that there was no firm development programme for Tai Po Area 39 before 2004, the HyD confirmed with its consultant that the provisional items would *not* be instructed under the Tolo Highway widening works contract. However, it was only in August 2000, that the HyD made a firm decision to defer the noise barrier works for Tai Po Area 39. As the Environmental Permit (EP) had required that the noise barriers *should be* constructed as part of the THWP, in August 2000, the HyD's consultant made a draft application to the Environmental Protection Department (EPD) for a variation of the EP for the deferment. When the HyD found out that the application would require the carrying out of another EIA study and public consultation (which would take 8 months to complete),

in order not to cause delay to the contract, in March 2001 the HyD decided to construct the noise barriers. As a result, the noise barriers were built in 2002, in advance of the planned developments in Tai Po Area 39. But in 2003, the noise barriers were removed after hearing widespread public concerns (paras. 2.25 to 2.27 and 2.29 to 2.36).

6. Audit considers that if the application for a variation of the EP had been made in September 1999 (instead of in August 2000):

- (a) time would have been made available to complete the necessary EIA procedures to justify the deferment;
- (b) the provision of the noise barriers for Tai Po Area 39 could have been deferred; and
- (c) the removal of the noise barriers in 2003 could have been averted (para. 2.38).

Noise barriers for planned developments in Shek Mun and Hung Shui Kiu

7. In connection with the rezoning of an industrial site in Shek Mun for planned Private Sector Participation Scheme (PSPS) housing and school developments, noise barriers had to be built along Tate's Cairn Highway. In order to tie in with the scheduled completion date of the housing development, the TDD awarded the works contract for the noise barriers before the sale of the Shek Mun housing site. Due to subsequent changes in the land use, the PSPS housing development was cancelled. The noise barriers built in late 2002 have not served their intended purpose, i.e. not until the schools at that site are completed in 2006 (paras. 3.2 to 3.6).

8. In another case of provision of noise barriers for a planned public housing project in Hung Shui Kiu, the TDD awarded the works contract for the noise barriers before the allocation of land for the housing project. After a review, the Government subsequently decided not to proceed with the planned public housing project. Meanwhile, the installation works of the noise barriers were completed in mid-2003. As a result, the noise barriers in Hung Shui Kiu have not served their intended purpose (paras. 3.8 to 3.11).

9. These two cases highlighted the need to incorporate flexible terms in future works contracts for the provision of noise barriers for planned

housing developments where there is still uncertainty whether the development would proceed or not (para. 3.12).

Noise barriers for a private residential development in Ma On Shan

10. In 1996, for a private residential development in Ma On Shan, the Government included in the land grant a *condition* requiring the developer to provide noise mitigation measures at his own expense to abate the noise impact from the planned Trunk Road T7. As the land grant condition was made known *before* the land sale, it is reasonable to expect that the developer would have taken into account the cost of construction of the mitigation measures in determining the land premium he would pay to the Government. In October 1997, the developer's consultant indicated that the developer would build the noise barriers at his own expense (paras. 4.5 and 4.14).

11. With the EIAO coming into operation in April 1998, the TDD was required to provide noise barriers under the Trunk Road T7 project. However, by that time, the TDD's EIA study report of February 1998 had already recommended that the developer's noise barriers should be omitted from the private residential development. This was because the semi-enclosure type noise barriers along Trunk Road T7 to be built by the Government would serve the purpose. In April 1998, the developer's consultant proposed that the developer's on-site noise barriers would no longer be required, upon knowing that the Government would provide noise mitigation measures as proposed in the TDD's EIA study report. In the event, only the noise barriers paid for by the Government are built. (The expected completion date is April 2004.) The TDD has estimated that the cost of construction of the semi-enclosure type noise barriers for providing noise mitigation measures to the private residential development in Ma On Shan was about \$40 million. In Audit's view, before accepting the proposal of April 1998 that the developer would not build the noise barriers within his site, the relevant policy bureaux should have been consulted as to whether the proposed arrangement was consistent with established public finance policies. Negotiation should have been held with the developer so that he would be asked to contribute to the Government's cost of providing the noise barriers in the Trunk Road T7 project (paras. 4.7, 4.10, 4.15 and 4.16).

Monitoring the effectiveness of installed noise barriers

12. Some academics have indicated that the effectiveness of installed noise barriers could be undermined by improper design and installation. There have been calls by Members of LegCo for monitoring the effectiveness of the installed noise barriers. Audit found that there were two projects which did not have post-implementation monitoring of the effectiveness of the

noise barriers. There is a need to improve the arrangements for monitoring the effectiveness of noise barriers (paras. 5.4, 5.15 and 5.16).

AUDIT RECOMMENDATIONS

13. Audit has made the following main recommendations that:

Noise barriers for planned developments

- (a) the Secretary for the Environment, Transport and Works should issue guidelines requiring works departments responsible for road projects to:
 - (i) where changes to the proposed uses of the noise-affected land may be expected, consider using an incremental approach to provide the noise mitigation measures, instead of procuring them outright (para. 2.20(a)); and
 - (ii) if planned noise sensitive buildings are to be developed at a future date well after the completion of the road projects, consider asking the road works contractors to provide initially only the foundation works for the noise mitigation measures. The installation works for the noise mitigation measures (e.g. noise barriers) can be made to dovetail with the actual occupation of the planned noise sensitive buildings (para. 2.20(b));
- (b) the Secretary for the Environment, Transport and Works should require all works departments to allow sufficient time in the implementation plans of works contracts so that the relevant statutory requirements (such as those relating to a variation of the EP conditions) can be complied with (para. 2.39);
- (c) the Director of Territory Development should, where practicable, tie in the provision of noise barriers with the development of planned housing projects. Before the award of works contracts, where there is still an element of uncertainty in such developments, the TDD should consider including only foundation works of the noise barriers in the contracts and leaving the installation of the noise barrier panels as provisional items (para. 3.13(a));

Noise barriers for private residential developments

- (d) the Administration should:
- (i) issue guidelines to require that before carrying out works which would have the effect of relieving a third party's contractual obligation to the Government embodied in a legally enforceable instrument, the works department concerned should obtain the third party's agreement to pay for the cost of the works (para. 4.18(a));
 - (ii) issue guidelines to ensure that provisions will be incorporated into a land grant such that the Government is empowered to ask the grantee to contribute to the Government's cost of provisioning environmental mitigation measure which, by the conditions of the land grant, is the grantee's responsibility (para. 4.18(c)); and
 - (iii) seek legal advice on the Government's position in respect of the provision of noise barriers for the benefit of the private residential development at the Ma On Shan site and explore the feasibility of recovering from the developer a portion of the cost of constructing the noise barriers (para. 4.18(d) and (e)); and

Monitoring the effectiveness of installed noise barriers

- (e) the Director of Environmental Protection should ensure that there is post-implementation monitoring of all noise mitigation related projects (para. 5.17(b)(i)).

Response from the Administration

14. The Administration has accepted all the audit recommendations.

PART 1: INTRODUCTION

1.1 This PART describes the background to the audit on the provision of noise barriers to mitigate road traffic noise.

Background

1.2 According to the Government's estimate, road traffic noise affects more than one million people in Hong Kong. The Government's overall policy objectives for noise control as set out in the 1989 White Paper "**Pollution in Hong Kong — A time to act**" are:

- (a) to prescribe noise standards in the Hong Kong Planning Standards and Guidelines to guide those concerned with development in planning against noise in both the public and private sectors. The noise limits are 65 decibels (dB) for schools and 70 dB for residential premises;
- (b) to have due regard to noise in planning the Government's development projects such as roads, schools and hospitals as well as in Outline Zoning Plans (OZPs) and Development Plans where opportunities exist to plan against noise; and
- (c) to control specific sources of noise through enforcement of the Noise Control Ordinance (Cap. 400) and its associated regulations.

Environmental impact assessment

1.3 In carrying out preventive planning against the problem of road traffic noise, two types of developments are required to be assessed through the Environmental Impact Assessment (EIA) procedures. They are:

- (a) developments that may give rise to significant noise problems, such as new roads and major road widening projects; and
- (b) developments that may be seriously affected by noise (hereinafter referred to as *noise sensitive buildings*), such as residential developments and schools at short distance from roads with heavy traffic.

1.4 In June 1996, the Administration informed the Legislative Council (LegCo) Bills Committee that the EIA arrangements (Note 1) to deal with the impact of new roads on noise sensitive buildings were as follows:

- (a) **Strategic planning.** In the early stage of territorial and district planning, close attention would be paid to minimise potential road traffic noise through better road alignment and planning of uses of adjacent land. In cases where such measures alone were not sufficient to meet the noise planning guidelines, other noise mitigation measures would be examined through EIA on the road projects;
- (b) **EIA on road projects.** An EIA of a road project would assess and evaluate the impact of the road works on both the **existing and planned** noise sensitive buildings. The EIA would propose mitigation measures to be applied to the roads and, if necessary, the planned noise sensitive buildings in the vicinity. The practicability of the proposed mitigation measures would be thoroughly examined and evaluated before inclusion as EIA recommendations;
- (c) **Measures to protect existing noise sensitive buildings.** The road project proponent would be required to provide practicable direct mitigation measures, such as noise barriers and low noise road surfacing. Indirect mitigation measures, such as acoustic insulation and air-conditioning, would be provided to protect the existing noise sensitive buildings from the residual noise impact;
- (d) **Measures to protect planned noise sensitive buildings.** The road project proponent would be required to provide practicable direct mitigation measures on the roads, as recommended by the EIA. **If the planned noise sensitive buildings were to be developed at a later date, the proponent would, where practicable, provide the foundation works and install the noise mitigation measures before the completion of the buildings.** The feasibility of adopting other measures, such as positioning the planned noise

Note 1: *Prior to 1998, the need for carrying out an EIA was laid down in a technical circular for government projects, and in an advice note issued by the Environmental Protection Department for private projects. According to the joint Planning, Environment and Lands Branch Technical Circular No. 2/92 and Works Branch Technical Circular No. 14/92, entitled 'Environmental Impact Assessment of Major Development Projects', the proponent of a project with potentially significant impact was expected to be responsible for undertaking an EIA study and implementing the measures recommended as a result of the study.*

sensitive buildings farther away from the roads and special building design, would be evaluated during the EIA process. Development constraints on the planned noise sensitive buildings would also be identified; and

- (e) **Measures for new noise sensitive buildings.** New noise sensitive buildings proposed after the completion of the EIA of a road project would be dealt with through the planning process, having regard to the development constraints imposed by the road.

1.5 **Statutory requirements.** In February 1997, the Environmental Impact Assessment Ordinance (EIAO — Cap. 499) was enacted. In accordance with the EIAO, the then Secretary for Planning, Environment and Lands issued a Technical Memorandum. (The authority is now vested in the Secretary for the Environment, Transport and Works.) The Memorandum set out principles and guidelines for the Director of Environmental Protection in deciding on matters of the EIA process.

1.6 In June 1997, LegCo approved the Technical Memorandum on the EIA process. The EIAO came into operation in April 1998. Since then, the EIA arrangements mentioned in paragraph 1.4(b) and (c) have been made statutory requirements for new road projects. The Director of Environmental Protection is responsible for regulating and enforcing the EIA procedures set out in the EIAO. A works department responsible for a road project is required to apply to the Director of Environmental Protection for an Environmental Permit (EP) before construction works can commence. The works department concerned is responsible for meeting the requirements of the EP. Any proposed variation of the EP is subject to the approval of the Director of Environmental Protection.

Use of noise barriers as a noise mitigation measure

1.7 The use of noise barriers to screen off traffic noise is an established international practice. The noise reduction effect of noise barriers, as against other noise mitigation measures, is shown in Table 1. According to the Technical Memorandum, direct noise mitigation measures such as noise barriers, road alignment and building orientation should be used as far as practicable. If the direct mitigation measures are inadequate, indirect noise mitigation measures (such as window insulation and air-conditioning) can be used to abate the residual noise impact.

Table 1
Noise reduction effect of different noise mitigation measures

Noise mitigation measure	Noise reduction	Remarks
(A) Noise barriers:		
(a) Straight type	Up to 5 dB	The effect depends on the relative position of the noise barriers to the noise sensitive buildings.
(b) Cantilever/ semi-enclosure type	Up to 15 dB	
(c) Enclosure type	Up to 25 dB	
(B) Low noise road surfacing materials		
	Up to 3 dB on low speed roads	
	Up to 5 dB on high speed roads	
(C) Tree planting		
	Up to 1 dB (For a 10-metre depth of densely planted 4-metre tall tree belt.)	

Source: *Papers for the joint LegCo Panels on Environmental Affairs and Transport of February 2001 and January 2003.*

1.8 Up to 2002, about 37 kilometres of noise barriers had been built and put into use in Hong Kong. For the past three years ended March 2003, the expenditure on noise barriers was about \$1,000 million.

Audit review

1.9 Audit has recently conducted a review to ascertain whether there are lessons to be learnt in the provision of noise barriers under the Tolo Highway widening project (THWP) and other similar development projects (Note 2). Audit has found that there is room for improvement in various areas and has made a number of recommendations to address the related issues.

Note 2: *In 2002, there were widespread public concerns over the provision of noise barriers for the planned developments in Tai Po Area 39 under the THWP.*

PART 2: NOISE BARRIERS FOR THE TOLO HIGHWAY WIDENING PROJECT

2.1 This PART examines the provision of noise barriers under the THWP for the planned developments in the Pak Shek Kok (PSK) reclamation area and Tai Po Area 39. The audit has revealed that there is room for improvement in the process of providing noise barriers for developments which are still under planning.

The Tolo Highway widening project

2.2 Tolo Highway is part of the major highway serving the Northeast New Territories (Note 3). Since its opening in 1985, the volume of traffic on Tolo Highway has steadily increased. In 1996, the Highways Department (HyD) commissioned a feasibility study on the widening of Tolo Highway (the section between Island House Interchange at Tai Po and Ma Liu Shui Interchange at Sha Tin) to cope with the increasing traffic demand. As part of the feasibility study, the HyD's consultant conducted an EIA study.

2.3 **Noise impact assessment for planned developments.** In January 1997, the HyD and its consultant held an EIA working group meeting with the Environmental Protection Department (EPD), the Territory Development Department (TDD), the Planning Department (Plan D) and the Lands Department (Lands D) to discuss the planned developments along Tolo Highway that should be taken into account in the EIA study (see para. 1.4(b)). The developments under planning were mainly in the PSK reclamation area and Tai Po Area 39. The meeting agreed that for the purpose of noise impact assessment, the planned developments in the two areas would be assumed to be noise sensitive and the HyD should consider necessary noise mitigation measures.

2.4 **Recommendations of the Tolo Highway EIA study.** In April 1997, the HyD's consultant completed the Tolo Highway EIA. In May 1997, the Advisory Council on the Environment endorsed the EIA study report. The study report recommended the following measures to reduce the road traffic noise impact to *within* the limits stated in the Hong Kong Planning Standards and Guidelines:

- (a) the adoption of low noise road surfacing on the whole road widening section;
- (b) the installation of noise barriers (ranging from 1.5-metre to 8-metre high) at road kerb and the central median; and

Note 3: *At its north, Tolo Highway connects Fanling Highway at Tai Po near Hong Lok Yuen. At its south, it connects the Sha Tin section of Tai Po Road near the Sha Tin Race Course.*

- (c) the setting back of buildings (i.e. positioning them farther away from Tolo Highway) and the use of special building design at the planned residential and institutional uses in the PSK reclamation area to deal with the residual traffic noise impact.

2.5 **Additional noise barriers required by PSK feasibility study.** In April 1997 (after completion of the Tolo Highway EIA study), the TDD commissioned a consultant to conduct a feasibility study for the PSK reclamation area. The study comprised the preparation of a recommended outline development plan, an EIA and a detailed engineering study. In September 1997, the TDD's consultant formulated a PSK *development concept plan* for endorsement by the Committee on Planning and Land Development (Note 4), before proceeding to the next stage of the feasibility study. Based on this development concept plan, the TDD's consultant opined that the noise barriers planned under the Tolo Highway EIA study were inadequate. Upon the request of the TDD, the HyD decided to provide additional noise barriers under the THWP for the *planned* developments in the PSK reclamation area (see para. 2.11 for details).

2.6 **The Tolo Highway Widening Contract.** In November 1998, the Finance Committee approved the upgrading of the THWP, which included the noise barrier works for the PSK and Tai Po Area 39 planned developments, to Category A of the Public Works Programme. In late November 1998, the EPD issued an EP (Note 5) for the THWP. **One of the conditions of the EP was that the noise barriers as recommended in the Tolo Highway EIA study report should be constructed as part of the THWP (Note 6).** In March 1999, the HyD awarded a re-measurement contract for the Tolo Highway widening works. The works were originally scheduled for

Note 4: *The Committee on Planning and Land Development was chaired by the then Secretary for Planning, Environment and Lands (now chaired by the Permanent Secretary for Housing, Planning and Lands (Planning & Lands) or his deputy). Its terms of reference included monitoring the formulation and review of development strategies, considering the adequacy of development plans and programmes, and approving outline development and layout plans.*

Note 5: *In September 1998, the then Secretary for Transport authorised the THWP under the Roads (Works, Use and Compensation) Ordinance (Cap. 370). In accordance with the EIAO, an EP was required for a road works project authorised after the EIAO came into operation in April 1998. In October 1998, the HyD submitted an application for an EP for the THWP.*

Note 6: *According to Condition 1.7 of the 1998 EP for the THWP, the HyD should ensure that the THWP was designed, constructed and operated in accordance with the information and recommendations contained in the Tolo Highway EIA study report. The Tolo Highway EIA study report stated that the noise barriers for both the existing and planned noise sensitive buildings would be implemented and built as part of the THWP.*

completion in December 2001, but were only substantially completed in mid-2003 (Note 7). The widened Tolo Highway was opened to traffic by stages (the southbound carriageway in December 2002, and the northbound carriageway in June 2003). In late 2002, the HyD estimated that the final contract sum would be about \$880 million, of which \$140 million was for the installation of noise barriers.

2.7 In the course of the Tolo Highway widening works, there were major changes to the contracted noise barrier works for the PSK and Tai Po Area 39 planned developments. The circumstances leading to these changes and the financial consequences are described:

- (a) for PSK — in paragraphs 2.8 to 2.19; and
- (b) for Tai Po Area 39 — in paragraphs 2.23 to 2.38.

Noise barriers for planned residential developments in PSK

2.8 The PSK reclamation area covers an area of about 70 hectares along the waterfront of Tolo Highway. The Civil Engineering Department (CED) is responsible for forming the area using public filling materials by stages from 1996 to 2003.

2.9 In 1996, the Committee on Planning and Land Development endorsed an action area plan to provide the basis for undertaking the planning and feasibility study for PSK. The plan outlined the broad land uses for the PSK reclamation area, which included a Science Park in the south, residential developments in the north and recreational uses in the middle.

2.10 **Noise barriers planned for PSK reclamation area.** In January 1997, the EIA working group decided that the Tolo Highway EIA study should assess the noise impact on the potential residential developments in the northern part of the PSK reclamation area based on the PSK action area plan. The Tolo Highway EIA study, which was completed in April 1997, allowed for the provision of 320 metres of noise

Note 7: *The contributing factors to the extension of time in the Tolo Highway widening works contract were inclement weather, unforeseen difficult ground conditions affecting piling, dredging of extra loose rockfill material, dumping permits required for reclamation works and revision to road works.*

barriers on the southbound carriageway for protecting the planned residential developments in the PSK reclamation area (Note 8).

2.11 **More noise barriers under the THWP.** In October 1997, the TDD requested the HyD to provide more noise barriers for the PSK proposed residential developments under the THWP due to the following reasons:

- (a) for assessing the noise barrier requirements, at the time of the Tolo Highway EIA study in early 1997, there was limited information on the size and planning parameters of the PSK proposed residential developments. Based on the PSK development concept plan formulated in September 1997, the TDD's consultant assessed that the 320 metres of noise barriers on the southbound carriageway planned under the Tolo Highway EIA study *should be extended by about 1,600 metres*. This would provide adequate protection to the proposed residential developments; and
- (b) if the additional noise barriers were to be constructed as a separate works project *after* the completion of the Tolo Highway widening works contract in late 2001, it would not be able to tie in with the expected completion date of the PSK proposed residential developments in 2003.

After the Committee on Planning and Land Development's endorsement of the PSK development concept plan, and the EPD's agreement of the proposed additional noise barriers had been obtained, in November 1997 the HyD incorporated the additional 1,600-metre noise barrier requirements in the THWP. In December 1997, the THWP was gazetted under the Roads (Works, Use and Compensation) Ordinance.

Expected completion date of PSK residential developments changed

2.12 The completion date of PSK residential developments was revised as follows:

- (a) in October 1998, at a meeting for the monitoring of housing sites, the Lands D advised the TDD that there was a need to revise the expected completion date of 2003 (see para. 2.11(b)) for the PSK proposed residential developments. It was considered that the normal production period for

Note 8: *The Tolo Highway EIA study identified the Science Park as a non-sensitive noise receiver because there would be no residential units. There would also be barrier building blocks and a tree-lined fringe of landscape between them and Tolo Highway to screen off the traffic noise. As for the planned recreational uses in the central part of the PSK reclamation area, they were not classified as noise sensitive uses in accordance with the Hong Kong Planning Standards and Guidelines.*

residential flats of four years, instead of one and a half years, should be used for estimating the expected completion date;

- (b) in December 1998, the then Works Bureau informed the Steering Committee on Land Supply for Housing (Note 9) that the expected completion date for the PSK residential developments would be April 2005; and
- (c) in early March 1999, the TDD agreed that the expected completion date for the first three PSK residential developments should be 2008, based on the Lands D's advice that these sites were planned to be sold in 2003/04 when the infrastructure works would be completed (Note 10).

Changes in the planning parameters of PSK residential developments

2.13 ***EIAO requirements.*** According to the EIAO, a road project proponent should take into account the existing and planned land use in the noise impact assessment. Planned land use is defined as the land use proposed in the *draft and approved* plans prepared under the Town Planning Ordinance (Cap. 131), or any other land use plans published by the Government. There are two types of statutory plans published by the Town Planning Board (TPB), viz. a Development Permission Area Plan and an OZP:

- (a) ***Development Permission Area Plan.*** This is an *interim* plan mainly for rural areas which require immediate planning control *prior to* the preparation of an OZP; and
- (b) ***OZP.*** This is a plan which shows the proposed principal land uses and major road and rail systems for the individual planning scheme area. Attached to an OZP is a Schedule of Notes which specifies planning parameters such as plot ratios and building heights.

2.14 ***Pak Shek Kok (East) OZP.*** The PSK reclamation area was newly formed land *not* covered by any statutory plan. In March 1998, the TPB gazetted for public

Note 9: *The Steering Committee on Land Supply for Housing, chaired by the Financial Secretary, is responsible for overseeing the level of flat production with a view to securing an even and adequate annual supply of flats for the foreseeable future.*

Note 10: *Up to end of August 2003, the PSK residential sites had not been sold.*

inspection a *draft* PSK (East) OZP because the land use zoning for the Science Park should go through public consultation before a land grant could be approved. As the PSK feasibility study had not yet been completed in March 1998, the draft PSK (East) OZP was prepared on the basis of the development concept plan formulated in September 1997 (see para. 2.5). In August 1998, the PSK feasibility study was completed and a *recommended outline development plan* was formulated. The land use proposals in the recommended outline development plan were more articulate than those in the development concept plan. There were some changes in the layout of the residential sites in the northern part of the PSK reclamation area. Consequently, the draft PSK (East) OZP had to be revised to accommodate these changes. On 26 March 1999, the TPB gazetted an amended draft PSK (East) OZP for public inspection.

2.15 **Town Planning Board decided to change the planning parameters in the draft OZP.** During the statutory public consultation period which ended in April 1999, two objections to the draft PSK (East) OZP were received. These objections were mainly related to the development restrictions of the planned residential sites in the northern part of the PSK reclamation area. In considering the objections, the TPB expressed concern over the development intensity and building heights of the residential sites, the need for preservation of the public view of the Tolo Harbour and the provision of noise barriers along Tolo Highway. To address the TPB's concern, the following events occurred:

- (a) the Plan D and the TDD reviewed the development layout and parameters of the residential sites;
- (b) the Plan D recommended that the plot ratios and building heights should be *reduced* in the draft PSK (East) OZP;
- (c) the departments concerned, including the Plan D, TDD, EPD and HyD reviewed the length and height of the noise barriers included in the THWP, with technical support provided by the TDD's consultant; and
- (d) the Plan D considered that, with the reduction in plot ratios and building heights and the adoption of suitable noise mitigation measures for buildings facing Tolo Highway, the planned noise barriers for the PSK residential sites would *not* be required.

2.16 **As a result, in June 2000, the TPB endorsed the recommendations of the Plan D to reduce the plot ratios and building heights of the planned residential sites**

in the draft PSK (East) OZP. The TPB requested the HyD to *delete* the noise barrier works along the southbound Tolo Highway intended for the residential sites from the Tolo Highway widening works contract. Instead, alternative mitigation measures such as special building design should be adopted.

2.17 ***Financial implications of the deletion of noise barrier works for PSK.*** In July 2000, the HyD issued a suspension order to halt the construction works of the noise barriers for PSK (East). After obtaining the Lands D's confirmation that suitable noise mitigation requirements would be incorporated in the land sales conditions of the residential sites to the satisfaction of the EPD, in November 2000, the HyD issued a variation order for the deletion of the noise barrier works from the Tolo Highway widening works contract. The deletion was considered necessary to avoid nugatory expenditure on the noise barriers which were no longer required. However, the HyD had to pay the contractor \$13 million for deleting the contracted works.

Audit observations

Changes in the planning parameters of PSK residential developments

2.18 According to the EIAO, a road project proponent should take into account the noise impact on land uses proposed in a draft OZP. In October 1997, when the TDD requested the HyD to provide additional noise barriers for the PSK planned residential developments under the THWP, an OZP for the PSK reclamation area was not yet available. At that time the noise barrier requirements were assessed on the basis of a *development concept plan*. On 26 March 1999 (i.e. the date on which the HyD awarded the Tolo Highway widening works contract thereby committing itself to building the noise barriers), the land use proposals and the related planning parameters for the residential developments as stated in the draft PSK (East) OZP were gazetted for public consultation. Upon hearing public objections, the TPB changed the planning parameters for the residential developments and agreed that mitigation measures other than noise barriers would be implemented to resolve the noise problem. The contracted noise barriers works were no longer required. This episode highlighted the risk of procuring and installing noise mitigation measures (e.g. noise barriers) for proposed land uses which are not yet finalised (e.g. still in a draft OZP the planning parameters of which could still be changed).

Changes in expected completion date of PSK residential developments

2.19 One of the reasons for incorporating the noise barrier requirements for PSK under the THWP in October 1997 was to tie in with the expected completion date of the proposed residential developments there in 2003 (see para. 2.11(b)). However, *before*

the award of the Tolo Highway widening works contract in late March 1999, in December 1998 the expected completion date of the residential developments had been revised to 2005. Again in early March 1999, the completion date was further revised to 2008. In Audit's view, consideration should have been given to adopting the option of providing only the foundation works for the noise barriers in the Tolo Highway widening works contract (see the guideline in para. 1.4(d)). The noise barriers could be installed later. If only the foundation works had been included in the Tolo Highway widening works contract, the cost incurred by the Government due to deleting the contracted works could correspondingly have been reduced.

Audit recommendations

2.20 **Audit has recommended that the Secretary for the Environment, Transport and Works should issue guidelines requiring works departments responsible for road projects to:**

- (a) **where changes to the proposed uses of the noise-affected land may be expected, consider using an incremental approach to provide the noise mitigation measures, instead of procuring them outright; and**

- (b) **if planned noise sensitive buildings are to be developed at a future date well after the completion of the road projects, consider asking the road works contractors to provide initially only the foundation works for the noise mitigation measures. The installation works for the noise mitigation measures (e.g. noise barriers) can be made to dovetail with the actual occupation of the planned noise sensitive buildings as far as practicable.**

Response from the Administration

2.21 The **Secretary for the Environment, Transport and Works** welcomes Audit's recommendations.

2.22 The **Director of Planning** has said that land use planning is a continuous process. Review and change in land use proposals to meet changes in community needs and government policy are not uncommon. Some planning data may be changed subsequent to the assessment on the requirement of noise barriers. Therefore, it is the responsibility of the project proponent to obtain the most up-to-date information from relevant government departments including the Plan D.

Noise barriers for planned developments in Tai Po Area 39

2.23 Tai Po Area 39 lies on the landward side of Tolo Highway, midway between Tai Po and Sha Tin. Southeast of the Area are facilities of the Chinese University of Hong Kong. Cheung Shue Tan Village is located at its southwest side and there is a low density residential development at its northwest corner. The EPD's estimation in 2001 was that there were about 590 existing dwellings in Tai Po Area 39.

2.24 In January 1997, the EIA working group decided that the Tolo Highway EIA study should take into account both the planned land uses and the existing developments in Tai Po Area 39 (see Appendix A). The working group also agreed that:

- (a) for the purpose of noise impact assessment, the planned land uses as shown in a Tai Po Area 39 Layout Plan (Note 11) "**should be assumed to be noise sensitive**" and the THWP should provide noise mitigation measures for them. According to this Layout Plan, key noise sensitive developments included tertiary education institutions in that area and a Government, Institution and Community (GIC) site which might be used for educational purposes; and
- (b) the HyD would consult the departments concerned during the design stage of the THWP to confirm the need for noise barriers.

No firm implementation programme for the planned developments in Tai Po Area 39

2.25 **Noise barrier works included as provisional works items.** Following the EIA working group's decision, in May 1998, the HyD's consultant ascertained from the Plan D that no firm development data were available for the planned developments but any further change in the development scenario, which would result in a reduction of the noise barrier requirement, would be unlikely. In September 1998, the HyD reviewed the need for noise barrier works for the planned developments in the context of the Tolo Highway widening works contract. Based on updated information provided by the Plan D, the TDD, the Lands D, the Education Department and the Chinese University of Hong Kong, the HyD noted that there was no firm programme for planned noise sensitive developments to be completed by end-2001, i.e. the expected completion date of the Tolo Highway widening works contract. Accordingly, the HyD only included the foundation works for some of the planned noise barriers for Tai Po

Note 11: *This Tai Po Area 39 Layout Plan was prepared by the Plan D based on the land use framework laid down in the Tai Po OZP. The Plan was approved by the Committee on Planning and Land Development in December 1995.*

Area 39 in the Tolo Highway widening works contract awarded in March 1999. The installation of the noise barrier panels was included as provisional items in the works contract. It was considered that there would be flexibility of incorporating the panels only if required at a later stage.

2.26 **Decision to defer noise barrier works.** In August 1999, the HyD consulted the TDD about the implementation programme for the planned land uses in Tai Po Area 39. In September 1999, based on the TDD's advice that there was no development programme for Tai Po Area 39 before 2004, the HyD confirmed with its consultant that the provisional works items would *not* be instructed under the Tolo Highway widening works contract. In August 2000, the HyD made a firm decision to defer the construction of noise barriers for Tai Po Area 39 (Note 12).

EIAO requirements for deferring the noise barrier works

2.27 **One of the conditions of the EP for the THWP was that the planned noise barriers for Tai Po Area 39 should be constructed as part of the THWP (see para. 2.6).** According to the EIAO, the HyD must apply to the EPD for a variation of the conditions of the EP for not constructing those noise barriers.

2.28 In October 1998, the then Works Bureau and the then Planning, Environment and Lands Bureau jointly issued WBTC No. 18/98 (superseded by Environment, Transport and Works Bureau Technical Circular (Works) No. 13/2003 of September 2003) to promulgate the EIAO requirements. The Circular advises project proponent departments to apply for a variation of the EP conditions when such a need arises. The departments are also reminded that:

- (a) for variations where the environmental performance requirements set out in the EIA study report for the project may be exceeded or violated, even with the mitigation measures in place, the EPD "may require" the project proponent department to submit another EIA study report for the variations sought. In such cases, the project proponent department "will need to follow the procedures to apply for a study brief and to prepare an EIA report as set out in sections 5 to 8 of the EIAO". (In other words, the whole EIA process, including the preparation of a new EIA study report and public consultation, will have to be carried out again); and
- (b) for other cases where an EIA study report is not required, the EPD will issue an amended EP within 30 days.

Note 12: *In August 2000, the HyD held an interdepartmental meeting to discuss the TPB's request to delete the noise barrier works for PSK (see para. 2.16). The meeting also agreed for the first time that it would be best to defer the construction of noise barriers for Tai Po Area 39.*

Application for a variation of the EP

2.29 In August 2000, the HyD's consultant invited the EPD's comments on a draft application for a variation of the EP. In the draft application, the HyD's consultant said that:

- (a) there would be *at least 5 years after* the completion of the Tolo Highway widening works contract before the planned developments in Tai Po Area 39 would be ready for occupation; and
- (b) there was also a possibility that due to planning change, the planned developments would turn out to be not sensitive to noise and the noise barriers built would become not useful.

In September 2000, the HyD suspended the foundation works for the noise barriers of Tai Po Area 39 (Note 13) while further discussions with the EPD took place.

2.30 ***The EPD's views.*** In September 2000, the EPD advised the HyD that under the EIAO, a variation of the EP could only be approved subject to a new EIA study (Note 14). In November 2000, the EPD further advised the HyD that there would be a material change to the environmental impact if the construction of the noise barriers for Tai Po Area 39 was to be deferred. This was because some existing noise sensitive buildings would be exposed to noise levels up to 16 dB higher than those stated in the Tolo Highway EIA study report, almost reaching the statutory limit of 70 dB.

2.31 In December 2000, the HyD sought clarification from the EPD whether it was necessary to go through the whole EIA process for an application to defer the provision of the noise barriers. The HyD said that if the noise barriers for the planned developments in Tai Po Area 39 were to be constructed as originally planned, *they*

Note 13: *As a result, the Government incurred an additional cost of \$19 million for disruption of works and contract prolongation.*

Note 14: *The wording of the EPD's advice was as follows:*

"If any project proponent wishes to make any change to the project, he may apply for variation of an environmental permit under section 13 of the Environmental Impact Assessment (EIA) Ordinance. Under section 13(5) of the Ordinance, Director of Environmental Protection may amend the environmental permit without calling for an EIA report if the applicant justifies that there is no material change to the environmental impact of the project with the mitigation measures in place and the project complies with the requirements described in the technical memorandum.

You should review carefully with the project proponent whether all intended changes can fulfil the requirements of the EIA Ordinance prior to the application for variation of permits."

would not serve any useful purpose for a number of years and would block the road users' view and would attract public criticism. In January 2001, the EPD confirmed that the HyD had to go through the whole EIA process if the HyD decided to defer the construction of the noise barriers for Tai Po Area 39.

2.32 In March 2001, the HyD instructed its consultant to *proceed with the construction of the noise barriers for Tai Po Area 39* based on the following considerations:

- (a) deferring the construction of the noise barriers would require another EIA study and public consultation. The whole process would take 8 months to complete but the outcome of the EIA study and public consultation was uncertain. An increase in the unmitigated noise level of the existing noise sensitive buildings by 1 dB would justify the immediate construction of the noise barriers (Note 15). Even if the unmitigated noise level stayed within the statutory limit, there might be problems in resolving objections during the consultation process; and
- (b) if the application to the EPD for deferment turned out to be unsuccessful after the 8-month EIA process, the noise barrier works would not match with the construction programme of the Tolo Highway widening works contract. There would be claims for extension of time from the contractor and additional cost implications.

As a result, noise barriers were installed on the northbound lane of Tolo Highway along Tai Po Area 39.

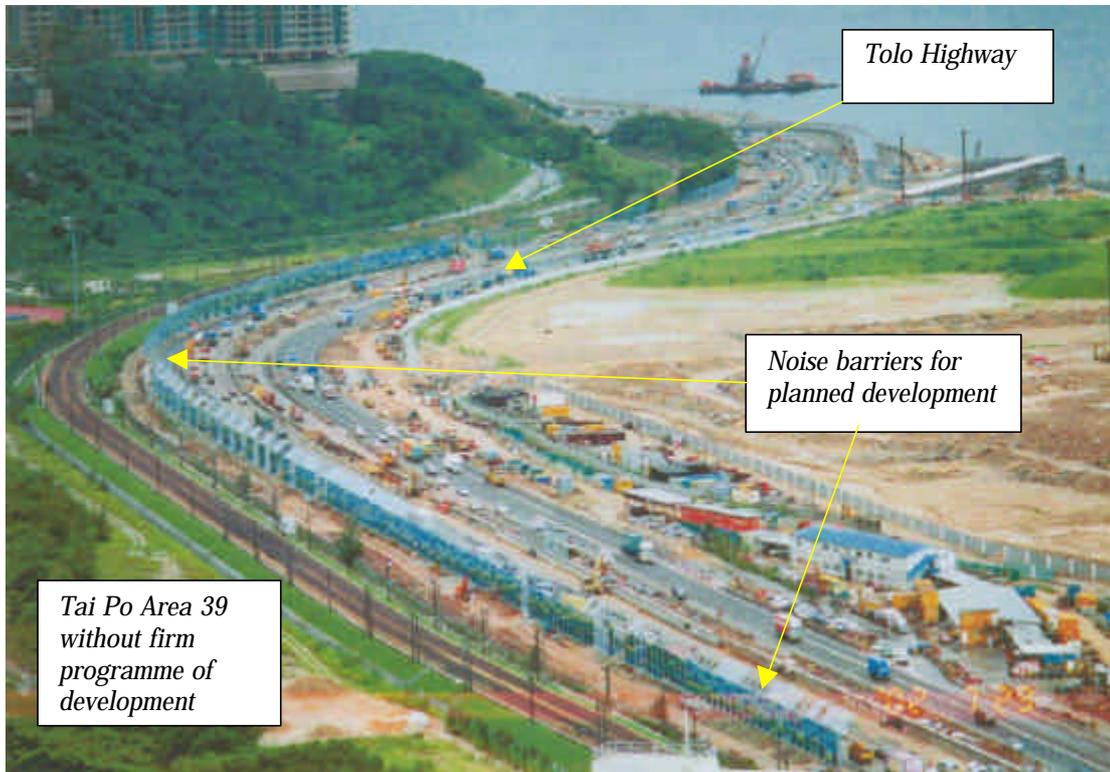
***Removal and trimming down of
installed noise barriers for Tai Po Area 39***

2.33 In mid-2002, there were public complaints that the noise barriers then under construction in Tolo Highway (see photograph 1) would obstruct the road users' view. Some Members of LegCo and the Tai Po District Council also expressed concern over the provision of the noise barriers for some sections of Tolo Highway where there were few dwellings in the vicinity. In November 2002, the Administration undertook to review the provision of the noise barriers under the THWP.

Note 15: *It was predicted that noise level at some existing dwellings in Tai Po Area 39 would be up to 69 dB without the noise barriers, which would only be meeting the 70 dB standard marginally. Because of that, if a fresh EIA concluded that the noise level would be 1 dB or more above 70 dB, immediate construction of the noise barriers would be warranted.*

Photograph 1

Noise barriers for the THWP



Source: HyD's records of July 2002

2.34 In January 2003, the Administration informed the LegCo Panel on Environmental Affairs and Panel on Transport of the following guiding principles in providing noise barriers for new roads:

- (a) **Compliance with statutory requirements.** The Administration must comply with the statutory noise planning standards and EP requirements stipulated under the EIAO. The road project proponent had to meet the requirements which usually included the noise mitigation measures proposed in the EIA study report approved by the EPD. As the project proponent could not foresee all possible circumstances when drawing up the EIA study report, the EIAO contained provisions that allowed the project proponent to apply for variations of the EP to cater for any new and unforeseeable events; and
- (b) **Implementation of mitigation measures.** The EIAO provided the project proponent with flexibility in terms of the timing of installing noise barriers

so long as they were in place to properly protect a noise sensitive development:

- (i) if the development would not take place until a few years after the commissioning of a new road, the project proponent could defer the noise mitigation measures to a later stage; and
- (ii) if the measures were no longer required because of a change of plan for development, the project proponent could review with the EPD appropriate adjustments to the installation programme.

In the light of the experience in the THWP, relevant government departments had been reminded to observe this principle more diligently while also taking into account other implications such as costs and disruption to traffic.

2.35 In accordance with the guiding principle that the installation of noise barriers should tie in with the programme of planned developments, the Administration said that:

- (a) about 1,900 metres of the noise barriers built solely for the planned developments in Tai Po Area 39 and the Chinese University of Hong Kong could be removed; and
- (b) another 1,500 metres of the noise barriers built for both the planned and existing developments near Tai Po Area 39 and the Chinese University of Hong Kong could be trimmed (see Appendix A).

2.36 In late February 2003, the Administration informed the LegCo Panel on Transport of the proposed works for removing and reducing some of the noise barriers. In early May 2003, the EPD approved a variation of the EP allowing the removal of the noise barriers on condition that they would be reinstated *before* the occupation of planned developments in Tai Po Area 39 and the Chinese University of Hong Kong. In May 2003, the removal and trimming down of the noise barriers were substantially completed.

2.37 **Financial implications.** In February 2003, the Administration informed the LegCo Panel on Transport that the cost of removal and trimming down of the noise barriers built for Tai Po Area 39 was estimated to be \$8 million. While the noise barrier panels and steel posts taken down would be reused in other works projects (Note 16), the installation works have been wasted. **The HyD estimated that the installation cost involved was about \$5 million. Moreover, the Government had incurred an additional cost of \$24 million due to prolongation of the contract.**

Audit observations

2.38 In 2003, the noise barriers were removed. Audit noted that the HyD only made a firm decision to defer the noise barrier works for Tai Po Area 39 in August 2000 because the HyD considered that there was still uncertainty over the implementation programme of the planned developments in Tai Po Area 39 in September 1999. However, there was a need to allow sufficient time to complete the EIAO procedures relating to a variation of the EP for deferring the noise barrier works. In Audit's view, if the decision for the deferment and an application for a variation of the EP had been made in September 1999, instead of in August 2000, time would have been made available to undertake the necessary EIA procedures to justify the deferment of the noise barriers works for Tai Po Area 39. The provision of noise barriers for Tai Po Area 39 in 2002 could have been deferred, and the subsequent removal of the barriers in 2003 could have been averted.

Audit recommendation

2.39 **Audit has recommended that the Secretary for the Environment, Transport and Works should require all works departments to allow sufficient time in the implementation plans of works contracts so that the relevant statutory requirements and procedures (such as those relating to a variation of the EP conditions) can be complied with.**

Response from the Administration

2.40 The **Secretary for the Environment, Transport and Works** welcomes Audit's recommendation.

Note 16: *In late June 2003, the HyD informed the joint Panels on Environmental Affairs and Transport that the noise barrier panels recovered from the THWP (of about 9,000 square metres) would be reused in three other works projects starting in early 2004. Up to September 2003, the noise barrier panels were stored in the PSK reclamation area.*

PART 3: NOISE BARRIERS FOR PLANNED HOUSING DEVELOPMENTS

3.1 This PART examines the provision of noise barriers for two planned housing developments, one in Shek Mun, Sha Tin (see paras. 3.2 to 3.6) and another one in Hung Shui Kiu, Yuen Long (see paras. 3.7 to 3.11). The audit has revealed that it is preferable to incorporate some flexible terms in works contracts to ensure that the provision of noise barriers can cater for changes in housing developments.

Provision of noise barriers for planned developments in Shek Mun, Sha Tin

3.2 In April 1998, the TDD's consultant completed a feasibility study for housing sites in Sha Tin. The study identified an industrial site in Shek Mun which could be rezoned for residential use. The proposed development in Shek Mun comprised a Private Sector Participation Scheme (PSPS) housing project (Note 17) and a school. The study also identified the need to construct cantilever noise barriers (of 570 metres long and 7 metres high) along Tate's Cairn Highway to ensure that the traffic noise impact would stay within the prescribed noise limits.

3.3 In June 1998, the TPB endorsed the Government's application for a change in land use of the site on the understanding that the noise mitigation measures would be implemented. **According to the Public Housing Development Programme, the Housing Department's aim was to make available the PSPS flats in Shek Mun by 2003.**

3.4 In June 2000, the Finance Committee approved funding for the project "Local roads, drainage and associated engineering works at Shek Mun, Sha Tin". In order to meet the building development programme, in July 2000, the TDD awarded the works contract for the Shek Mun project. The contract was scheduled for completion in mid-2003. The contract sum was \$127 million, of which about \$62 million was for the construction of the noise barriers (including \$50 million for the foundation works).

Note 17: *The development proposed in the feasibility study for the Shek Mun site comprised a PSPS development and a Sandwich Class Housing development. In the Public Works Subcommittee (PWSC) paper of June 2000 for the Shek Mun project, the two housing sites were earmarked for PSPS development only.*

3.5 The PSPS housing site in Shek Mun was put into the 2001-02 land sale programme. The key events which occurred were as follows:

- (a) in June 2001, the Steering Committee on Land Supply for Housing carried out a mid-year overall review of housing demand and supply. The Steering Committee noted the low market interest in the PSPS housing site. The Steering Committee agreed that if the Shek Mun PSPS housing site was not taken up by developers, consideration should be given to offering the site for private housing development;
- (b) in October 2001, the then Housing Bureau (HB) confirmed to the Lands D that the Shek Mun PSPS housing site could be removed from the application list of the 2001-02 land sale programme;
- (c) in December 2001, in response to an urgent demand for additional school sites, the entire Shek Mun site was re-planned. The revised layout comprised a private housing site plus four schools. The private housing site at Shek Mun was included in the application list of the 2002-03 land sale programme with an estimated available date of December 2002; and
- (d) in November 2002, as a measure to rectify the imbalance in land supply and demand, the Government decided to suspend the sale of land by application until end-2003. The Government allocated two of the school sites to school sponsors in early 2003 and, together with a third school, the schools are planned for completion in June 2006.

3.6 In the circumstances, the PSPS housing project in Shek Mun was cancelled. No residential flats were made available there in 2003. Meanwhile, the TDD's works for Shek Mun continued. In late 2002, the noise barrier works were substantially completed (see photograph 2). Given the change in land use, the noise barriers built will not serve their intended purpose until the three schools are completed in 2006, almost 4 years after the barriers were completed.

Photograph 2

**Noise barriers for planned developments
in Shek Mun, Sha Tin**



Source: Photograph taken by Audit in February 2003

**Provision of noise barriers for a planned
housing development in Hung Shui Kiu, Yuen Long**

3.7 According to the Hung Shui Kiu Layout Plan approved in December 1992, there were three sites designated for housing developments within the area bounded by Roads D2 and L1, Hung Tin Road and Hung Shui Kiu Main Street. The main site (Area 13) was earmarked for the Hong Kong Housing Society (HKHS) to provide 3,350 public housing flats. In February 1998, the TDD completed an EIA study which recommended the construction of 150 metres of vertical noise barriers along Road D2, with height ranging from 2 to 5 metres, to ensure that the traffic noise impact would stay within the prescribed noise limits.

3.8 The construction of the public housing project in Hung Shui Kiu was originally scheduled to commence in August 2000 for completion between early 2004 and mid-2005. In order to tie in with the population intake, the TDD planned to start the infrastructure works in late 2000.

3.9 In June 2000, the Finance Committee approved funding for the project "Roads and associated engineering works for Hung Shui Kiu North". In November 2000, the TDD awarded the works contract for the Hung Shui Kiu North project. This contract was scheduled for completion in January 2004. The contract sum was \$65 million, of which about \$4 million was for the construction of the noise barriers (including \$2 million for the foundation works) to protect the public housing development.

3.10 In August 2000, the Lands D authorised the HKHS to carry out site investigation works prior to the completion of the land grant. The processing of the land grant was subsequently withheld because the HKHS decided to review the development. In August 2001, the HB requested the Lands D to suspend the processing of all land grants for the HKHS. In September 2002, in line with the recommendations of the Review of the Institutional Framework for Public Housing Report, the Housing Department advised the Lands D not to allocate government sites to the HKHS for public housing development purpose.

3.11 In the circumstances, the planned HKHS public housing development in Hung Shui Kiu did not materialise. Meanwhile, the TDD's infrastructure works for Hung Shui Kiu continued. In July 2003, the noise barrier works were substantially completed (see photograph 3). As the Hung Shui Kiu housing site was not included in the land disposal programme for public housing from 2002-03 to 2006-07, and as the lead time for building construction was about four years, the noise barriers built are unlikely to serve their intended purpose for a number of years.

Photograph 3

**Noise barriers for a planned housing development
in Hung Shui Kiu**



Source: *Photograph taken by Audit in March 2003*

Audit observations

3.12 These two cases highlighted the need to incorporate flexible terms in future works contracts for the provision of noise barriers for planned housing developments. Before the award of the contracts, where there is still an element of uncertainty (such as a developer has not yet been found), consideration could be given to including only the foundation works of the noise barriers in the works contracts, and leaving the installation of the noise panels as provisional items. This approach is consistent with the established arrangements for the provision of noise barriers arising from road works (i.e. the noise panels can be installed later to tie in with the completion of noise sensitive buildings — see para. 1.4(d)).

Audit recommendations

3.13 **Audit has recommended that:**

- (a) **the Director of Territory Development should, where practicable, tie in the provision of noise barriers with the development of planned housing projects. Before the award of works contracts, where there is still an element of uncertainty (e.g. the developers have not yet been found), the TDD should consider including only foundation works of the noise barriers in the contracts and leaving the installation of the noise barrier panels as provisional items; and**

- (b) **the Secretary for the Environment, Transport and Works should notify all works departments who are responsible for the provision of noise barriers of the recommendation in paragraph 3.13(a).**

Response from the Administration

3.14 The **Secretary for the Environment, Transport and Works** and the **Director of Territory Development** welcome Audit's recommendations.

PART 4: NOISE BARRIERS FOR A PRIVATE RESIDENTIAL DEVELOPMENT IN MA ON SHAN

4.1 This PART examines the provision of noise barriers for a private residential development at a site along Trunk Road T7 in Ma On Shan (hereinafter referred to as the Ma On Shan site). The audit has revealed that there is a need to safeguard the use of public moneys in providing noise barriers.

Land grant condition of the Ma On Shan site

4.2 Trunk Road T7, which connects Ma On Shan Road and Sai Sha Road, is designed to allow through traffic going to north Ma On Shan and Sai Kung to bypass the busy Ma On Shan Town Centre area. The need for Trunk Road T7 had been identified at the town planning stage and was shown in the draft Ma On Shan OZP of 1991.

4.3 ***Developer's obligations under the land grant.*** In July 1995, in connection with the proposed sale of the Ma On Shan site for a private residential development, the EPD strongly supported the inclusion of a clause drafted by the Lands D requiring the land purchaser to propose environmental mitigation measures and implement approved measures *at his own expense*. The EPD also advised the Lands D that the site would be subject to various types of environmental impact, including traffic noise from the planned Trunk Road T7. This environmental protection clause was made known to the tenderers in the land sale tender in December 1995. In response to a prospective developer's enquiry in January 1996, the EPD advised that the potential traffic noise of the planned Trunk Road T7 was an environmental problem. In February 1996, the Ma On Shan site was sold. **The related land grant, which was executed in March 1996, contained a condition requiring the developer to submit proposals to mitigate the environmental problems and to implement at his own expense the approved mitigation measures.**

4.4 ***Noise mitigation measures proposed by the developer's consultant.*** In accordance with the land grant condition, the developer was required to submit traffic noise impact assessment for vetting by the EPD before approval was granted by the Lands D. From 1996 to 1998, the developer's consultant submitted ten traffic noise impact assessments, taking into account changed circumstances as the development's planning progressed. In August 1996, the developer's consultant confirmed that the developer would be responsible for the cost of the noise barriers to be provided **inside** the site boundary of the land grant.

4.5 ***Developer's noise mitigation measures accepted by the EPD.*** In October 1997, in the ninth traffic noise impact assessment, the developer's consultant

said that he would incorporate in the site layout design the following noise mitigation measures:

- setting back of residential towers away from Trunk Road T7; and
- constructing straight type noise barriers along the site boundary to partially screen off the traffic noise from Trunk Road T7.

The developer's consultant pointed out that, after incorporating these measures, 72% of the residential units inside the developer's site boundary would comply with the Hong Kong Planning Standards and Guidelines noise limits. In accordance with the Practice Note for Professional Persons issued by the EPD, a compliance level of 72% was acceptable for this development, with its site area of 2.5 hectares. For the residential units still exposed to an excessive noise level, the developer would provide window insulation and air-conditioning. In December 1997, the EPD accepted the ninth traffic noise impact assessment.

TDD built noise barriers under the Trunk Road T7 project

4.6 ***EIA study of Trunk Road T7.*** In March 1997, the TDD commissioned a consultant to carry out an EIA study of the construction of Trunk Road T7. The EIA study noted that the private residential development at the Ma On Shan site had included noise barriers alongside its site boundary. However, the results of a noise modeling simulation indicated that the installation of noise barriers alongside the slip road leading from Trunk Road T7 to Sai Sha Road would be more beneficial. In order to provide the appropriate protection as far as practicable to the private residential development as well as to provide continuity, the EIA study report of February 1998 recommended that the on-site noise barriers should be *omitted* from the private residential development, and be replaced by continuous cantilever noise barriers along Trunk Road T7 to be built by the Government. In an EIA Study Management Group meeting held in February 1998, the EPD and the TDD noted the recommendation of the EIA study report. It was agreed that:

- (a) the EPD would ask the Lands D to inform the developer of the Ma On Shan site of the recommendation; and
- (b) the TDD would follow up with the Lands D on the land premium implications, if any.

4.7 ***Revised noise mitigation measures proposed by the developer's consultant.***

In April 1998, the developer's consultant submitted the tenth traffic noise impact assessment. The assessment took into account the noise mitigation measures proposed in the TDD's Trunk Road T7 EIA study report. The assessment showed that, with the Government's construction of off-site cantilever noise barriers along Trunk Road T7, the percentage of residential units complying with the Hong Kong Planning Standards and Guidelines noise limits would increase from 72% (see para. 4.5) to 98.5%. The previously proposed on-site noise barriers would no longer be required. Instead, the developer would provide window insulation to the remaining 1.5% (i.e. 24) of the residential units still exposed to excessive traffic noise. In June 1998, the EPD accepted the tenth noise impact assessment. In early 2000, the private residential development was substantially completed. In June 2000, the Lands D issued a certificate of compliance signifying the developer's fulfillment of the obligation under the land grant.

4.8 ***Upgrading of the noise barriers.*** In 2000, the TDD's consultant reviewed the 1998 EIA study report of Trunk Road T7 in line with the latest traffic flow forecast. This review concluded that the findings and conclusion of the TDD's 1998 EIA study report were still valid. However, to provide noise mitigation measures to the Ma On Shan site, the TDD's consultant proposed to upgrade the noise barriers along Trunk Road T7 from the cantilever type to the semi-enclosure type based on the latest traffic flow forecast. The consultant predicted that, with the semi-enclosure type noise barriers, even the remaining 24 residential units inside the Ma On Shan site (see para. 4.7) would comply with the noise limits set out in the Technical Memorandum of the EIAO (i.e. there would be 100% compliance). In May 2000, the EPD issued an EP for the Trunk Road T7 project.

4.9 ***Funding approval of noise barriers under the Trunk Road T7 project.*** In June 2000, the Finance Committee approved funding for the Trunk Road T7 project. The funding included the construction of the semi-enclosure type noise barriers to cover the noise mitigation requirements of the private residential development of the Ma On Shan site.

4.10 In December 2000, the TDD awarded the Trunk Road T7 contract. Of the contract sum of \$1,386 million, \$382 million was for the provision of the noise barriers. The TDD estimated that the cost of construction of 254 metres of the semi-enclosure type noise barriers for the private residential development was about \$40 million. The construction works commenced in January 2001 and the anticipated completion date of the noise barrier works is April 2004.

Who should pay for the noise barriers for the Ma On Shan site

4.11 In February 1998, when making the decision to construct the noise barriers along Trunk Road T7 in lieu of the noise barriers *to be provided by the developer* within his lot boundary, the EIA Study Management Group agreed that the TDD would follow up with the Lands D on the land premium implications.

4.12 In 2003, in response to Audit's enquiry on the TDD's follow-up actions with the Lands D, the TDD said that:

- (a) in February 1998, the EPD had copied the minutes of the EIA Study Management Group Meeting to the Lands D;
- (b) as the EPD had drawn the Lands D's attention to the EIA Study Management Group's decision, the TDD did not send another reminder to the Lands D;
- (c) in the TDD's view, if the Lands D considered that there were land premium implications, the Lands D would have taken action in accordance with the EIA Study Management Group's decision; and
- (d) there was no mechanism for recovering the construction cost of public noise barriers from private developers.

4.13 In June 2003, the Lands D confirmed that there was no provision under the lease conditions which empowered the Government to ask the developer of the Ma On Shan site to pay for the cost of public works outside his lot boundary.

Audit observations

4.14 At the time of the sale of the Ma On Shan site in 1996, the Government had included in the land grant of the Ma On Shan site a condition requiring the developer to provide noise mitigation measures for his development at his own expense. As the land grant condition was made known to the developer before the land sale, it is reasonable to expect that he would have taken into account the cost of the required noise mitigation measures in determining the land premium he would pay to the Government.

4.15 At the time of drafting the land grant condition for the Ma On Shan site in 1995, the prevailing administrative EIA arrangements were that a road project

proponent should provide noise mitigation measures (see Note 1 to para. 1.4). The EIA Bill (then under public consultation), sought to formalise these administrative EIA arrangements in the EIAO. As such, there was a possibility that the Government would still be required to provide the noise barriers under the Trunk Road T7 project for the Ma On Shan site at public expense, notwithstanding the provision of noise mitigation measures by the developer under the land grant condition. On the other hand, it was quite clear in the land grant that the developer was required to provide the noise mitigation measures. Indeed, in October 1997 the developer's consultant had indicated that the developer would do so at his own expense (see para. 4.5).

4.16 In April 1998, the EIAO came into operation. The EIAO requires a road project proponent to provide noise mitigation measures (i.e. the TDD was required to provide noise barriers for the Ma On Shan site to meet the EIAO requirements). However, by that time, the EIA study report of February 1998 had already recommended that the on-site noise barriers should be omitted from the private residential development, and be replaced by Government-built noise barriers along Trunk Road T7. In Audit's view, *before* accepting the proposal of April 1998 that the developer would not build the noise barriers within his site, the Administration should have addressed the following issues:

- (a) the relevant policy bureaux (including the Financial Services and the Treasury Bureau) should have been consulted as to whether the proposed arrangement was consistent with established public finance policies; and
- (b) whether, following the intention of the land grant condition, negotiations could be held with the developer so that he would contribute to the cost incurred by the Government of providing the noise barriers under the Trunk Road T7 project.

Public accountability

4.17 The TDD did not mention in the June 2000 PWSC paper for the Trunk Road T7 project that the developer had the obligation of providing noise mitigation measures under the land grant conditions of March 1996, and the circumstances leading to the use of public funds of about \$40 million to build the noise barriers by the Government.

Audit recommendations

4.18 **Audit has recommended that the Administration should:**

- (a) **issue guidelines to require that, before carrying out works which would have the effect of relieving a third party's contractual obligation to the Government embodied in a legally enforceable instrument (e.g. allowing a developer not to build noise barriers which he is obligated to do so under a land grant), the works department concerned should obtain the third party's agreement to pay for the cost of the works;**
- (b) **issue guidelines to require that, where there are exceptional reasons justifying the use of public funds for noise mitigation works which should have been carried out by a third party, the works department concerned should provide full information to LegCo in the funding proposal;**
- (c) **issue guidelines to ensure that provisions will be incorporated into a land grant such that the Government is empowered to ask the grantee to contribute to the Government's cost of provisioning environmental mitigation measures which, by the conditions of the land grant, is the grantee's responsibility;**
- (d) **seek legal advice on the Government's position in respect of the provision of noise barriers for the benefit of the private residential development at the Ma On Shan site; and**
- (e) **explore the feasibility of recovering from the developer a portion of the cost of constructing the noise barriers and ascertain whether there are similar cases of noise mitigation works and take recovery action where necessary.**

Response from the Administration

4.19 The **Secretary for the Environment, Transport and Works**, the **Director of Territory Development** and the **Director of Environmental Protection** welcome Audit's recommendations.

4.20 The **Director of Lands** has said that it is possible to draft land grant conditions to meet the requirement as recommended in paragraph 4.18(c). With reference to the audit recommendation in paragraph 4.18(d), the Lands D has also sought legal advice. Having regard to the relevant facts of the case, it is *not* possible to recover any cost from the developer of the Ma On Shan site.

PART 5: MONITORING THE EFFECTIVENESS OF INSTALLED NOISE BARRIERS

5.1 This PART examines the arrangements for monitoring the effectiveness of installed noise barriers and suggests measures for improvement.

LegCo's concern

5.2 In October 1997, at a meeting of the Panel on Environmental Affairs of the then Provisional LegCo, a Member pointed out that based on the results of field measurements conducted by some concern groups, the noise barriers built in some existing roads could not reduce traffic noise to the maximum permissible level for domestic premises under the Hong Kong Planning Standards and Guidelines. The Administration was urged to assess the effectiveness of the installed noise barriers. In response, the Administration said that:

- (a) the Administration had conducted tests on the effectiveness of the noise barriers on existing public roads. However, it was not always possible to reach a conclusion about the effectiveness of installed noise barriers from the field measurement of the noise level alone. In accordance with internationally acceptable practice, the design of the noise barriers was based on the projected maximum traffic flow for 10 to 15 years after the opening of the road. The predicted performance of the noise barriers at certain noise sensitive buildings was dependent on a number of factors, e.g.:
 - (i) the physical property of the barriers and their topographical relationship with the buildings;
 - (ii) traffic related parameters such as the number of vehicles, the percentage of heavy vehicles and speed; and
 - (iii) other contributing noise from nearby traffic;
- (b) the traffic related parameters at the time of the field measurement might differ from those used for the prediction of traffic noise. In order to yield a meaningful result for assessment, a number of mathematical corrections were required to account for any changed traffic related parameters. The correction exercise might not always be practicable and cost-effective. Nevertheless, project proponents would be required to assess, upon the completion of their projects, the effectiveness of their noise mitigation measures where practicable; and
- (c) based on the results of the EPD's tests on the noise barriers installed at four locations, the noise barriers concerned were effective in screening off traffic noise. In 1998 and 1999, the EPD would conduct a survey on the

background noise levels in Hong Kong. After completion of the survey, it was expected that more information on the performance of noise barriers would be available.

5.3 In February 2001, upon the request of the LegCo Panel on Environmental Affairs and Panel on Transport, the Administration provided further information on the assessment of the effectiveness of the noise barriers. The Administration informed the LegCo Panels that the EPD and a number of works departments had conducted assessments at 16 locations to verify their noise reduction performance against the predictions in the relevant EIA studies. Results of the assessments (after correction for any changed traffic parameters) indicated that the noise reduction performance of the noise barriers was generally in line with that of the predictions.

Views of some academics

5.4 In January 2001, in connection with the Administration's consultation with the Panel on Environmental Affairs and the Panel on Transport on the measures to address the noise impact of existing roads, the Building and Construction Department of the City University of Hong Kong made a submission of its views. The Department said that noise barriers that were not properly designed and installed could not achieve the expected noise reduction. The Department suggested that there should be a post-commissioning test to ensure that the noise barriers would attain their design noise reduction capability.

Environmental monitoring and audit programme under the EIAO

5.5 According to the Technical Memorandum of the EIAO, the EPD may impose in the EP requirements for monitoring the environmental impact of a project. In determining the scope of the environmental monitoring and audit programme (EMAP), the EPD shall have regard to the findings and recommendations of the approved EIA study report. Generally, the implementation of an EMAP shall be required under the following circumstances:

- (a) the project has the potential of causing environmental impact which is or is likely to be prejudicial to the health or well-being of people, the flora, fauna or ecosystem if the recommended mitigation measures are not properly implemented;
- (b) the project is situated in an area of high conservation value;
- (c) the project involves unproven mitigation measures, or if the effectiveness of the measures may require a long period to establish;
- (d) the project involves an unproven technology;

- (e) an otherwise familiar or routine measure is proposed for a new or unfamiliar environmental setting;
- (f) the analysis is based on a new technique or model, or there is other uncertainty about design assumptions and/or the conclusion; or
- (g) the project scheduling is subject to change such that significant environmental impact could result.

Post-implementation monitoring of noise barrier projects

5.6 For the five years since the EIAO came into effect in April 1998, the EPD has issued EPs for 22 noise barrier related projects. Of the 22 projects, Audit found that two projects did not have post-implementation EMAPs incorporated into the EPs for assessing the effectiveness of the noise barriers (see Table 2). One of the two projects was the THWP, which had incurred a very significant amount of expenditure on the noise barriers. Audit understands that the EIA studies for these two projects were conducted before the enactment of the EIAO. At that time it was not the common practice for project proponents to incorporate post-implementation EMAPs for monitoring the effectiveness of noise barriers installed. However, under the EIAO, the EPD may impose in the EP requirements for monitoring the environmental impact of the project so as to verify predictions, or to assess the effectiveness of mitigation measures.

Table 2

Two noise barrier projects without post-implementation EMAP

Project	Cost of noise barriers (Note) (\$ million)	Project proponent department
(A) THWP	140	HyD
(B) Hiram’s Highway improvement phase 3: improvement between Nam Wai and Ho Chung and upgrading local access road	15	HyD

Note: The cost of noise barriers for project (A) is based on the HyD’s estimate of the final contract sum in late 2002, while that for project (B) is based on the rates in the Bills of Quantities of the works contract.

Audit review of the measured noise level of public roads with noise barriers

5.7 In October 1998, the EPD commissioned a consultant to conduct a survey on the background noise levels in Hong Kong. The survey covered 500 locations, of which 18 were public roads provided with noise barriers. The EPD then fine-tuned the field measured noise levels of the 18 public roads to account for changed traffic parameters (see para. 5.2). In February 2001, the EPD's assessment results of 6 roads were reported to the Panel on Environmental Affairs and the Panel on Transport. In early 2003, with the assistance of the EPD, Audit reviewed the survey results of the remaining 12 (i.e. 18 less the 6) cases. Based on the assessment results provided by the EPD, Audit found that the effectiveness of the noise mitigation measures at two locations, namely Tsing Yi Road West and Police School Road was open to doubt. Details of these two cases are given in paragraphs 5.8 to 5.11.

Noise barriers for Tsing Yi Road West, Tsing Yi

5.8 The noise barriers for Tsing Yi Road West were provided in connection with the Tsing Yi Road West improvement works project. According to a noise impact assessment study completed by the HyD in 1994, the Tsing Yi Road West improvement works project should provide for about 200 metres of noise barriers with height ranging from 3.5 to 7 metres and noise reducing road surfacing. In 1997, the HyD's contractor completed the construction of the Tsing Yi Road West improvement works and the related noise mitigation measures. The construction cost of the noise barriers was about \$10 million.

5.9 In June 1995, an information paper for the PWSC concerning the Tsing Yi Road West improvement works stated that, with the noise mitigation measures in place, the noise level at Hang Lai House of Cheung Hang Estate, Tsing Yi would be reduced to 70 dB. This would comply with the Hong Kong Planning Standards and Guidelines. However, the noise level as measured in May 1999 was 74 dB, i.e. 4 dB higher than that predicted.

Noise barriers for Police School Road, Hong Kong Island

5.10 The noise barriers for Police School Road were provided in connection with the construction of an access road linking Police School Road with Heung Yip Road in Wong Chuk Hang. Based on an EPD environmental review in 1990, the HyD was required to provide noise barriers under the access road construction project to protect a primary school in the vicinity from excessive traffic noise. In 1994, the HyD's contractor completed the works for the access road and the related noise barriers (measuring 112 metres in length). The construction cost of the noise barriers was about \$2 million.

5.11 In April 1993, it was stated in the PWSC paper for the construction of the access road between Police School Road and Heung Yip Road that, with the provision

of noise barriers, the noise level at the nearby primary school would be reduced to below 65 dB. This would comply with the Hong Kong Planning Standards and Guidelines. However, the measured noise levels were higher than those predicted. The noise level was 75 dB as measured by the EPD's consultant in November 1998, and 68 dB as measured by the EPD again in March 2001 (Note 18).

Audit observations

Review of the measured noise levels of public roads with noise barriers

5.12 The noise mitigation measures for Tsing Yi Road West and Police School Road were designed to cater for the peak traffic flow for at least 10 years after the opening of the roads. After implementation, the noise level of Tsing Yi Road West as measured in 1999 was 4 dB higher than that predicted, while that of Police School Road as measured in 2001 was 3 dB higher than predicted (see paras. 5.9 and 5.11).

5.13 In response to Audit's observations, in August 2003, the EPD carried out re-measurements. The results showed that the noise levels were within the limits allowed, i.e. 68 dB for Tsing Yi Road West and 65 dB for Police School Road. For the Tsing Yi Road West, the EPD further explained that the predicted noise level of 70 dB was for 1997 when the noise barriers and the noise-reducing road surfacing were newly installed. Because of wear and tear, the effectiveness of the noise reducing road surfacing had been eroded over time. This could have affected the overall measured noise levels in 1999.

5.14 Audit understands that it may not be possible to reach a conclusion on the effectiveness of the noise barriers if other factors affecting the measured noise level exist. However, if there are doubts about the validity of the previous noise level assessments for Tsing Yi Road West and Police School Road, the EPD should have carried out reassessments to clarify the situation so that any remedial action required (such as repaving the road surface) could be carried out without delay.

Post-implementation monitoring of noise barrier related projects

5.15 The use of noise barriers to screen off traffic noise is an established international practice. There have been calls by Members of LegCo and some academics for monitoring the effectiveness of the installed noise barriers.

Note 18: *In March 2003, the EPD informed Audit that one of the causes for the difference between the predicted noise level and that measured in 1998 was that there were vehicles parking illegally on the near-side lane. All vehicles had to use the lane further away from the barriers (and hence resulting in less noise mitigation). This was not the normal situation. Hence, the EPD did not consider the measured noise level appropriate for evaluating the performance of the noise barriers.*

5.16 Under the EIAO, the EPD may impose in the EP requirements for monitoring the environmental impact of the project for verification of predictions or of the effectiveness of environmental mitigation measures. However, based on Audit's checking on the noise barrier related projects as detailed in paragraph 5.6, two of the 22 projects did not have post-implementation EMAPs for monitoring the effectiveness of the noise barriers.

Audit recommendations

5.17 **Audit has recommended that:**

- (a) **the Director of Highways should conduct post-implementation monitoring of the effectiveness of the noise barriers for the two works projects mentioned in Table 2 of paragraph 5.6; and**
- (b) **the Director of Environmental Protection should:**
 - (i) **ensure that post-implementation EMAPs are incorporated in all noise mitigation related projects; and**
 - (ii) **if the EPD has doubts about its assessment results on the effectiveness of the noise mitigation measures, carry out a reassessment to clarify the situation so that remedial action can be taken by responsible departments promptly (see para. 5.14).**

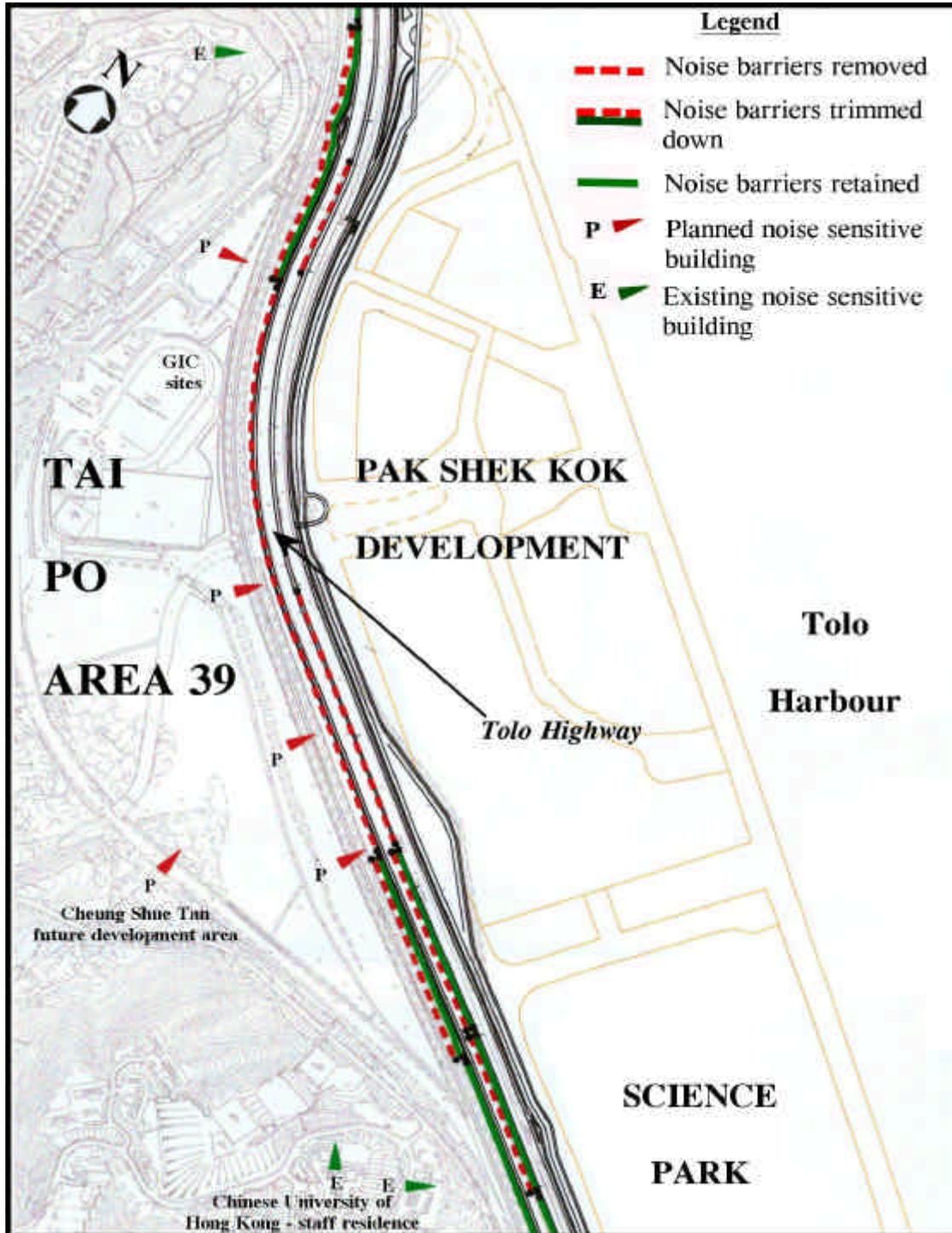
Response from the Administration

5.18 The **Secretary for the Environment, Transport and Works**, the **Director of Highways** and the **Director of Environmental Protection** welcome Audit's recommendations. Regarding repaving of the road surface mentioned in paragraph 5.14, they have said that if the full effectiveness of the surfacing material is to be maintained at all times, resurfacing works will have to be carried out rather frequently. Their maintenance programme for noise reducing road surfacing takes into consideration other factors, such as costs and disruption to road users. Generally speaking, resurfacing works are carried out once every two to three years.

5.19 The **Director of Environmental Protection** has also said that since late 1998, it has already been the EPD's standard practice to require post-project monitoring and audit in the EPs of projects involving noise mitigation measures.

Appendix A
(paras. 2.24 and 2.35 refer)

Location plan of noise barriers for Tai Po Area 39



Source: HyD's records

Chronology of key events

Noise barriers for the THWP

February 1997	The EIA Ordinance was enacted.
April 1997	The Tolo Highway EIA study recommended noise barriers to protect both the existing and planned developments in PSK and Tai Po Area 39.
April 1998	The EIAO came into operation.
November 1998	The Finance Committee approved funding for the THWP.
Late November 1998	The EPD issued an EP for the THWP with a condition that the noise barriers should be constructed as part of the THWP.
December 1998	The expected completion date for the PSK residential developments was changed from 2003 to April 2005.
March 1999	The expected completion date for the PSK residential developments was changed from April 2005 to 2008.
26 March 1999	The HyD awarded the works contract for the THWP on the same day that the draft PSK (East) OZP was gazetted for public inspection.
September 1999	The HyD confirmed with its consultant that the provisional works items of noise barriers for Tai Po Area 39 would not be instructed.
June 2000	The TPB decided to reduce the plot ratios and building heights of the planned residential sites in the draft PSK (East) OZP and requested the HyD to delete the noise barrier works.
August 2000	The HyD decided to defer the noise barrier works for Tai Po Area 39 and the HyD's consultant submitted a draft application to the EPD for a variation of the EP for the deferment.
November 2000	The EPD advised the HyD that there would be a material change to the environmental impact if the noise barrier works for Tai Po Area 39 were to be deferred.
January 2001	The EPD confirmed that the HyD had to go through the whole EIA process for deferring the noise barrier works for Tai Po Area 39.

March 2001	The HyD instructed the noise barrier works for Tai Po Area 39.
November 2002	The Administration undertook to review the provision of noise barriers under the THWP in view of the public concerns.
Late February 2003	The Administration informed the LegCo Panel on Transport of the proposed works for removing the noise barriers for Tai Po Area 39.

Noise barriers for a private residential development in Ma On Shan

December 1995	The environmental protection clause was made known to tenderers of the Ma On Shan site.
February 1996	The Ma On Shan site was sold.
March 1996	The land grant for the Ma On Shan site required the developer to implement environmental mitigation measures at his own expense.
December 1997	The EPD accepted the proposal that the developer would provide noise barriers within his site boundary.
February 1998	The EIA study report of Trunk Road T7 recommended that the developer's noise barriers should be replaced by noise barriers along Trunk Road T7. It was agreed that the TDD would follow up with the Lands D on land premium implications.
June 1998	The EPD accepted the proposal that the developer would not provide noise barriers within his site boundary.
May 2000	The EPD issued an EP for the Trunk Road T7 project.
June 2000	The Finance Committee approved funding for the Trunk Road T7 project.
June 2000	The Lands D issued a certificate of compliance signifying the developer's fulfillment of the obligation under the land grant.
December 2000	The TDD awarded the works contract for the Trunk Road T7 project.

Appendix C

Acronyms and abbreviations

CED	Civil Engineering Department
dB	Decibels
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EMAP	Environmental monitoring and audit programme
EP	Environmental Permit
EPD	Environmental Protection Department
GIC	Government, Institution and Community
HB	Housing Bureau
HKHS	Hong Kong Housing Society
HyD	Highways Department
Lands D	Lands Department
LegCo	Legislative Council
OZP	Outline Zoning Plan
Plan D	Planning Department
PSK	Pak Shek Kok
PSPS	Private Sector Participation Scheme
PWSC	Public Works Subcommittee
TDD	Territory Development Department
THWP	Tolo Highway widening project
TPB	Town Planning Board