

Chapter 9 MONITORING AT POLICY/STRATEGIC LEVEL

- 9.1 As the recommended transport strategy will take a long time to materialise, monitoring will be needed to evaluate the effects of the policies to identify further studies and modifications needed during implementation, and feed back into future decision making. It is very important to monitor the assumptions and forecasts used in the SEA against the actual traffic growth and the related environmental impacts arising from the future transport strategy. Adjustment to the proposed mitigation measures will then be required before the recommended implementation date to ensure that the pollution level does not exceed the predicted level. This process can be used to confirm the validity of the recommended mitigation measures and to inform future decisions.

Monitoring and Auditing Framework

- 9.2 One approach to avoid environmental degradation is to adopt the precautionary principle for implementation of the recommended transport strategy. Up-to-date information on vehicle number and class, vehicle-kilometres-travelled (vkt) and the related traffic emissions, ambient air quality and noise levels at sensitive receivers could act as indicators to highlight the changing environmental conditions arising from the proposed strategy. Suitable mitigation measures could then be implemented before environmental conditions deteriorate further. Furthermore, the population, GDP growth, private and goods vehicle fleets, and cross boundary traffic are also fundamental strategic parameters that should be monitored so as to check whether there is a need for review of the transport strategy and/or its environmental performance. The key assumptions are presented in Chapter 4 of this report. In addition, the following table summarises the vkt predicted by the traffic model:

Table 9.1
Summary of vkt Predicted by the Traffic Model

Transport Scenarios	Predicted Annual vkt (Total)
2001	12,892,114,000
2006 High Growth	15,905,851,000
2006 Medium Growth	14,993,795,000
2011 High Growth	19,861,301,000
2011 Medium Growth	17,271,200,000
2016 High Growth (High End)	26,789,277,000
2016 High Growth (Low End)	23,815,905,000
2016 Medium Growth	19,309,282,000
2016 Low Growth	15,640,215,000

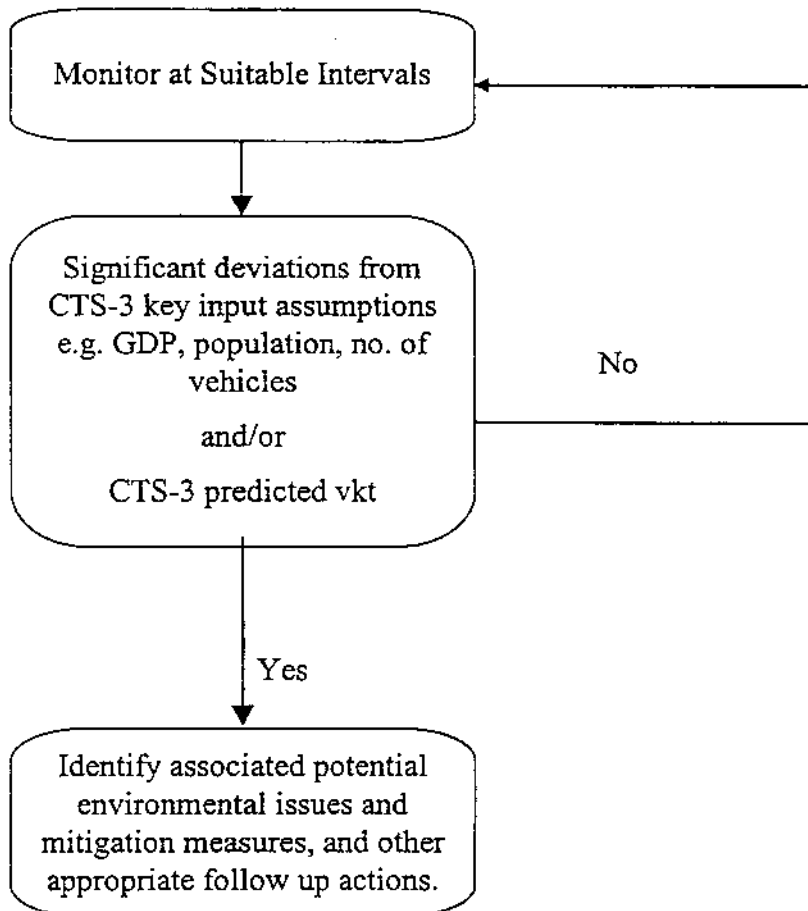
Notes:

- (i) The vkt predicted by the traffic model has been adjusted to account for minor roads.
- (ii) Figures presented to the nearest thousand.

- 9.3 A simple way to monitor environmental impacts from the recommended strategy is to use the updated vehicle numbers and class and compare them against the projected number. Any significant deviation from the projection will trigger a systematic review of the knock-on environmental effects such as the projected pollutant emissions or

increase in traffic noise levels using the approaches presented in this Technical Report. Such regular review could ensure the effectiveness of the proposed environmental mitigation measures being put into practice according to the SEA.

- 9.4 In order to keep the monitoring task manageable, a simple review system is needed. For example, one could monitor the private/goods vehicles fleet size growth annually to keep track of the real growth in vehicle numbers e.g. if the growth exceeded the projected level by more than 10%, a review would be commissioned to identify the cause of increase and the knock-on environmental effects by initially reviewing the changes in emissions and noise levels. The effectiveness of the recommended mitigation measures would be checked if the emission levels were above 10% of the original predicted level. Further mitigation measures could then be identified to tackle such unexpected increases in pollution levels especially in the identified hot-spot areas. The following figure shows a simplified schematic diagram that could act as an initiator to identify potential environmental problems.



- 9.5 Information is thus crucial to identify the environmental issues arising from the recommended transport strategy. Information can make problems clear, help raise support for solutions, promote understanding of environmental effects and allow progress to be monitored. The Government has the responsibility to publicise

environmental quality and performance and centralise the environmental information from various government sources to establish baseline conditions and future monitoring purposes. For example, EPD operates a comprehensive air quality monitoring network to monitor general air quality trend as well as pollution levels at selected road-side monitoring stations. This will generate information to compare with the baseline situation and will be able to identify trends related to the traffic emission especially the monitored results from the roadside monitors. However, road traffic noise monitoring at strategic locations has not been monitored. Baseline traffic noise levels can be estimated using the UK Department of Transport's "Calculation of the Road Traffic Noise" procedures for this purpose.

- 9.6 Once the baseline conditions have been defined, the monitoring for the development proposals can then be reviewed at policy/strategic level. While there are many criteria which could trigger environmental pollution it is recommended that a single government department should be responsible for the collection of these parameters and dissemination of information. It should be noted that most of the information required is not new information and it would not be too difficult for the department to provide it.
- 9.7 The Government can then decide whether a comprehensive review will be required by checking the environmental conditions and the other criteria discussed above against the baseline levels. It should be noted that the Chief Executive, in his 1998 Policy Objectives, requires all Controlling Officers within the government to publish reports on their environmental policies and actions starting this year to promote environmentally responsible management within the administration.

Monitoring and Auditing of Mitigation Measures Identified

- 9.8 In terms of deploying mitigation measures to address air and noise pollution, the proposed mitigation measures in this report could be monitored and could act as a starting point and action plan. Tables 9.2 & 9.3 list the possible mitigation measures identified in this study which the Government should consider further.
- 9.9 A facilitating agent should be identified to oversee the implementation of each of the mitigation measures, although it may not necessarily be the execution department/bureau. The facilitating agents could initiate feasibility studies to identify resources implications, practicality of proposed mitigation measures in Hong Kong as well as suitable parties for implementation (e.g. other Government departments, external contractors). The facilitating agents should develop an implementation schedule and report the progress of implementation through regular reporting (e.g. in the annual environmental report that was recommended by the Chief Executive 1998 Policy Objectives).

Table 9.2
Mitigation Measures for Air Quality

Mitigation Measures	Objective	Audit Parameter	Action
Euro III	Reduce vehicle emissions	<ul style="list-style-type: none"> implementation schedule roadside air quality 	<ul style="list-style-type: none"> reassess environmental conditions if implementation schedule is delayed monitor effectiveness by observing trends in roadside air quality
LPG Taxi	Reduce particulates emissions from taxis	<ul style="list-style-type: none"> implementation schedule (2001 -2005) roadside air quality 	<ul style="list-style-type: none"> ensure implementation schedule meets target dates monitor effectiveness by observing trends in roadside air quality
Motorcycle Emissions Control	Reduce pollutant emissions from motorcycles	<ul style="list-style-type: none"> implementation schedule (from end of 1999) 	<ul style="list-style-type: none"> ensure implementation schedule meets target dates
Diesel Catalytic Converters (DCC)#	Reduce pollutant emissions from vehicles	<ul style="list-style-type: none"> target dates and no of vehicles fitted with DCC 	<ul style="list-style-type: none"> ensure progress meets target dates
Particulate Traps (PT)#	Reduce particulate emissions from vehicles	<ul style="list-style-type: none"> target dates and no of vehicles fitted with PT 	<ul style="list-style-type: none"> ensure progress meets target dates
More Frequent Street Cleaning	Reduce prd emissions	<ul style="list-style-type: none"> frequency of street washing roadside air quality 	<ul style="list-style-type: none"> ensure frequencies are met monitor effectiveness by observing trends in roadside air quality
Strengthening of Inspection and Maintenance Programme	Reduce vehicle emissions	<ul style="list-style-type: none"> inspection frequencies no. of failed inspection 	<ul style="list-style-type: none"> expand requirements to other vehicles increase parameters to be tested during inspection
Diesel with low sulphur content/City Diesel (ULSD)#	Reduce vehicle emissions and permit use of DCC	<ul style="list-style-type: none"> target dates for implementation % of diesel sold as ULSD 	<ul style="list-style-type: none"> introduce legislation to replace conventional diesel by ULSD set target dates for implementation
Pedestrianisation	Separate sensitive receivers from vehicle emissions	<ul style="list-style-type: none"> no. of Pedestrianisation Zones target dates for introduction of Pedestrianisation Zones 	<ul style="list-style-type: none"> set target dates for introduction of Pedestrianisation Zones ensure implementation meets target dates
Incentive for scrapping old cars	Replace polluting cars	<ul style="list-style-type: none"> no. of old cars being scrapped 	<ul style="list-style-type: none"> increase incentives monitor the no of old cars being scrapped
Vehicle Restraint Measures	Restrain growth of vehicles	<ul style="list-style-type: none"> no. of vehicles registered per year 	<ul style="list-style-type: none"> set target no of vehicles and implement measures to ensure targets are met
Freight Transport by Rail	Reduce no. of heavy vehicle trips	<ul style="list-style-type: none"> freight movement by goods vehicles freight movement by rail 	<ul style="list-style-type: none"> investigate feasibility of freight rail
LPG for Public Light Buses#	Reduce particulate emissions from PLBs	<ul style="list-style-type: none"> implementation schedule 	<ul style="list-style-type: none"> set implementation schedule ensure schedule is met

Mitigation Measures	Objective	Audit Parameter	Action
Expand River Trade Terminal (RTT) Operations	Reduce no. of heavy vehicle trips	<ul style="list-style-type: none"> freight movement by goods vehicles freight movement by RTT 	<ul style="list-style-type: none"> investigate feasibility of expanding RTT
Hybrid Vehicles [#]	Replace polluting vehicles	<ul style="list-style-type: none"> no. of operating hybrid vehicles 	<ul style="list-style-type: none"> promote hybrid vehicles when commercially viable
Cycling and Walking paths in all New Towns	Separate sensitive receivers from vehicle emissions	<ul style="list-style-type: none"> length of cycling and walking paths 	<ul style="list-style-type: none"> ensure incorporation of cycling and walking paths in New Towns
Trolley Buses	Eliminate emissions from diesel powered buses	<ul style="list-style-type: none"> no. of trolley buses in service 	<ul style="list-style-type: none"> promote and plan for the introduction of trolley buses where viable
Areas Restrictions	Reduce pollution in hot-spots areas	<ul style="list-style-type: none"> no. of areas being restricted 	<ul style="list-style-type: none"> investigate feasibility of areas restrictions
Limiting Vehicle Fleet Age	Replace polluting cars	<ul style="list-style-type: none"> average vehicle fleet age 	<ul style="list-style-type: none"> incentives for scrapping old cars
Incentives on Environmentally Friendly Vehicles	Replace polluting cars	<ul style="list-style-type: none"> no. of environmentally friendly cars registered 	<ul style="list-style-type: none"> provide incentive for environmentally friendly cars
Electric Vehicle [#]	Replace polluting vehicles	<ul style="list-style-type: none"> no. of operating electric vehicles 	<ul style="list-style-type: none"> promote electric vehicles when commercially viable
<p>[#]: These measures are still under development and will be recommended, after detailed feasibility study, if deemed commercially available in the future.</p>			

Table 9.3
Mitigation Measures for Noise

Mitigation Measures	Objectives	Audit Parameter	Action
More extensive network of rail service	reduce vehicle trips	<ul style="list-style-type: none"> passenger trips via rail vs road transport 	<ul style="list-style-type: none"> promote rail as the primary transportation service provider
Putting new roads underground as far as practicable	separate sensitive receivers from traffic noise	<ul style="list-style-type: none"> number of new roads built underground 	<ul style="list-style-type: none"> promote and plan for underground roads wherever feasible
Pedestrianisation	separate sensitive receivers from traffic noise	<ul style="list-style-type: none"> no of pedestrianisation zones target dates for introduction of pedestrianisation zones 	<ul style="list-style-type: none"> set target dates for introduction of pedestrianisation zones ensure implementation meets target dates
More stringent vehicle noise emission standards	reduce noise emission from individual vehicles	<ul style="list-style-type: none"> the prevailing noise emission standard 	<ul style="list-style-type: none"> introduce the most current emission standards in force in Japan and the European Union Ensure Hong Kong is not lagging behind Japan and the European Union in terms of implementation schedule
Engine encapsulation for heavy vehicles	reduce engine noise from heavy vehicles	<ul style="list-style-type: none"> no of engine encapsulated heavy vehicles 	<ul style="list-style-type: none"> identify the types of heavy vehicles that could be encapsulated introduce legislation to require engine encapsulation of the identified vehicle types
Trolley Buses	provide alternative to buses powered by diesel engines	<ul style="list-style-type: none"> no of trolley buses in service 	<ul style="list-style-type: none"> promote and plan for the introduction of trolley buses where viable

Mitigation Measures	Objectives	Audit Parameter	Action
More extensive use of low noise surface materials	Reduce road/tyre interaction noise	<ul style="list-style-type: none"> no. of low speed roadways with low noise surfaces 	<ul style="list-style-type: none"> investigate the local applicability of various types of low noise surface materials
Consideration of retrofitting existing roads	Provide relief to residents who could not benefit from more recent planning against traffic noise initiatives	<ul style="list-style-type: none"> no. of roadways retrofitted with noise mitigation measures 	<ul style="list-style-type: none"> consider the feasibility (financial or otherwise) of the retrofitting exercise
Traffic management on noise grounds	Reduce traffic noise by diverting heavy vehicles from sensitive areas	<ul style="list-style-type: none"> number of roadways with applicable traffic management measures on noise grounds 	<ul style="list-style-type: none"> investigate and identify roadways suitable for applicable traffic management measures
Speed regulation	Reduce traffic noise associated with high speed vehicle movements	<ul style="list-style-type: none"> no. of roadways with reduced speed limits 	<ul style="list-style-type: none"> identify roadway sections that would benefit from lowering of speed limits

9.10 Apart from mitigation measures, the Main Study has identified and recommended some transport and planning measures that have major strategic environmental implications. These measures could improve the environmental performance of the transport sector through impact avoidance instead of mitigation. Such measures identified include:

- Integrated land-use and transport planning to reduce the need for travel;
- More extensive rail network and promoting trunk and feeder services to maximise rail usage;
- Better co-ordination of different transport modes;
- Park and ride facilities;
- Application of new technologies in traffic management to relieve congestion;
- Pedestrianisation, possibly along with cycling facilities; and if necessary,
- The more drastic measures such as restraining the growth and usage of vehicles.

Auditing and Reporting

9.11 Facilitating agents within the Government should be identified to undertake the various strategic environmental monitoring and auditing works. An overall auditing and review mechanism is recommended to ensure that the follow up work is properly conducted. This mechanism could also trigger further investigations, or initiate review of the strategy or its individual elements in response to any changes in circumstances detected or new information collected in the strategic monitoring and auditing exercise.

9.12 The progress and findings of the strategic environmental monitoring and auditing work could be recorded in an auditing and review report to be produced by the Government.