

Solid Waste Disposal

Chapter 7



CHAPTER SEVEN

SOLID WASTE DISPOSAL

1. Planned increases in population and industrial development could have potential resource implications in terms of the capacity of existing or committed waste disposal facilities in the territory. In addition to the practicalities of disposing of the waste, there is potential congestion due to collection vehicles using narrow roads or indeed the number of vehicles required to convey waste, especially in the New Territories, not to mention the noise and air pollution from refuse collection, transportation and disposal. All of these issues were highlighted in the evaluation of the Prototype Preferred Options and are considered in more detail in the assessments of the Refined Preferred Options.
2. The Territorial Waste Disposal Strategy (WDS) and the findings of the Waste Reduction Study (WRS) and the Monitoring of Municipal Wastes 1991-1992 have been reviewed in the context of the present assessments. The latter is in keeping with one of the principal aims of the TDS to minimise the generation of waste wherever practical. This concept is strongly supported as it will not only reduce the amount of material used but also will extend the life of the existing solid waste disposal sites.
3. In the Evaluation Methodology and Assessment Criteria for the Hybrid Options, it was agreed that solid waste arisings after 2001 would be estimated, using data on existing trends and regression analysis, on the basis of a per capita ratio (1.65kg/cap/day). While it is acknowledged that the estimated future waste arisings may be reduced on a per capita basis it is considered important that the methodology agreed for the assessment of the Hybrid Options should be retained for consistency. Notwithstanding this, cognisance has been given to the findings of the Waste Reduction Study and an estimate of the waste arisings has also been made on the basis of that Study.
4. Assuming a standard refuse collection vehicle contains 4 tonnes of wastes, the number of vehicle trips associated with the conveyance of wastes to the relevant disposal facilities can also be estimated. Estimates were made for waste arising for the three time horizons considered, and the implications in terms of capacity of the existing and planned facilities were similarly addressed. Assessments were also made for each strategic growth area and by district and sub-region.
5. Industrial waste arisings were estimated for I(B) industry, as it was assumed, for the purposes of this assessment, that I(A) and I(C) industry would not be significant generators of solid wastes. In the Evaluation Methodology and Assessment Criteria Final Report 1993, the method reported was to assume a per capita (employee) contribution to solid wastes. Estimates made, using the I(B) category employee forecast and multiplying by 1.64kg/employee/day, are included in Appendix F. Furthermore it was assumed all hazardous or chemical wastes would be disposed of at the Chemical Waste Treatment Plant on Tsing Yi Island. It should however be stressed that this plant does not have an infinite capacity and that further study may be required to forecast industrial wastes arising as a result of the changing nature of the industrial activities undertaken in the territory.
6. Appendix F contains the details of solid wastes arising and an overview of the traffic implications. Initially waste arisings were estimated on the aforementioned per capita basis. Subsequently the implications of the measures proposed under the Waste Reduction Study were considered in connection with the available disposal facilities.
7. Although the estimation of construction waste arisings was not a defined performance measure, in view of the anticipated construction works required to implement the development proposals (residential, industrial land, highways, bridges etc.) an estimate of the waste



Disposal of solid wastes at landfill



Domestic refuse being collected

arisings was made for each time horizon. The base data used were the matrix of number of construction workers at each time horizon multiplied by a factor (0.466kg/cap/day) which was extracted from the Monitoring of Municipal Solid Waste 91-92 (EPD).

Domestic Wastes

8. On the basis of the estimates it is apparent that less than 15% of the total waste disposal fleet, for Scenario A, will be involved in the disposal of domestic waste from strategic growth areas. Under Scenario B, the relative contribution is less than 20%.
9. In the NWNT and NENT, particularly for Scenario B, the potential side effects of solid waste disposal from these strategic development areas could be translated into road congestion or local air and noise pollution. In overall terms the generation of domestic waste is the greatest in the Metro area, which will nevertheless be well served by refuse transfer stations by 2006. The waste generation rates in NWNT and NENT even at 2001 remain high indicating the need to reduce domestic waste production over the next few years. In NWNT the waste production rate is approximately 30% that of the Metro area but the consequences of collection and disposal (longer distances, local roads, interface problems) are potentially more severe.
10. If it is assumed that no waste reduction measures are adopted, on the basis of the forecast waste arisings the areas with the greatest quantities of waste generated are in Metro area followed by NWNT and NENT, as illustrated in Figures 7.1 and 7.2. In sub-regional terms there are minimal differences between the two Refined Preferred Options, although at the district level the differences are particularly marked.
11. According to the estimates given in the Monitoring of Municipal Solid Waste the estimated daily wastes arising in the territory by 2001 will be 8105 tonne. This is estimated to increase to 9520 tonne by the year 2006. On the basis of the assumptions made herein (for the TDS Review data matrices) it is apparent that the forecast daily domestic wastes arising are about 35% higher than previously estimated in the Monitoring of Municipal Solid Wastes (91-92) for 2001 and 25% higher for 2006.
12. The WRS adopted the forecasts made in the Monitoring of Municipal Solid Wastes (91-92) and its conclusion was based on the lower estimates. In the WRS it was reported that the lifespan of the existing landfill sites are of the order of 17 years. An increase of 30% in domestic waste arisings implies that the lifespan of these disposal facilities could be significantly shortlisted. The implications of this issue in fiscal and planning terms need to be considered as a matter of priority. Furthermore the implementation of the measures proposed to reduce waste should be considered further especially new landfill sites are scarce (especially with the development proposals in the NWNT and NENT).

Industrial Wastes

13. Forecasts of strategic industrial and commercial related waste arisings are relatively insignificant compared with domestic waste arisings. The greatest waste generating area is Metro area which is well provided with waste reception facilities. Impacts associated with collection and disposal should therefore be minimised.
14. Notwithstanding the foregoing it should also be incumbent on the industrial sector to minimise the contribution of waste requiring disposal. Each of the sectors responsible for generating wastes should take a proactive approach to the minimisation of waste through initiatives to recycle or reuse materials. Although this approach may require an initial financial outlay in it is likely to be more cost effective in the long run especially as the sites for disposal of

waste are limited within the territory.

Construction Wastes

15. Estimates of the construction waste arisings are illustrated in Figure 7.3 which indicate that, in common with current practice, the construction wastes generated on a daily basis far outstrip the domestic waste arisings. The WRS did not take into account the disposal or reduction of construction waste arisings which are particularly problematic to control and dispose of. The amount of bamboo and wooden formwork used on construction sites (and then disposed of by means other than burning) is a particular concern.
16. It was estimated in the Monitoring of Municipal Solid Waste that in 2001 a daily total of 26,425 tonne of construction wastes would be generated increasing to 26,825 tonne by 2006. In the present assessments this forecast would be exceeded even for the base growth (although not Scenario A) in the Metro area alone. The situation is forecast to deteriorate further by 2006 and 2011. All the foregoing indicate the urgent need for action to be taken by all sectors of the community to reduce the amount of wastes produced and thus the environmental costs to society.

Off-Site Impacts

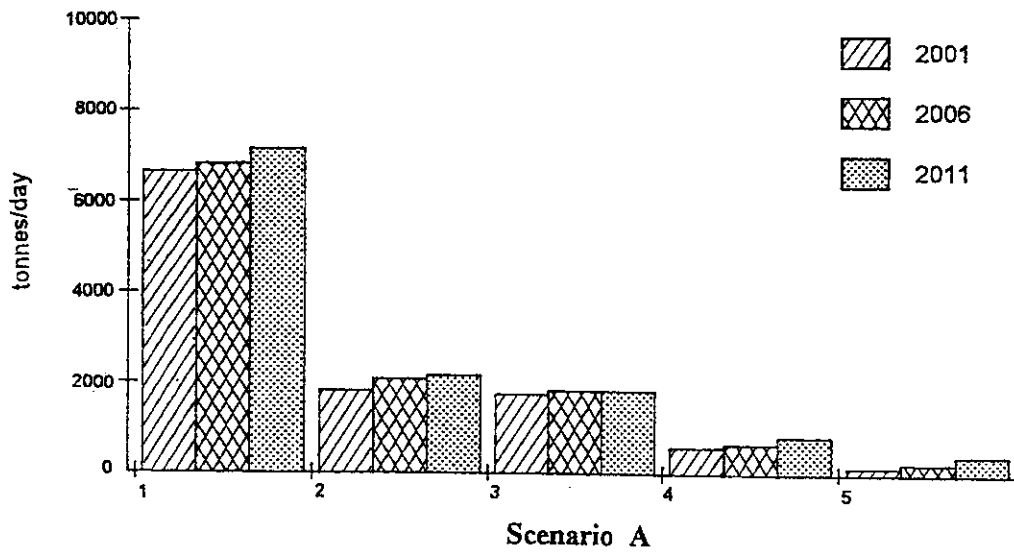
17. The routes adopted (refer to Figure 7.4) and the distances between the strategic residential areas and the wastes disposal facilities (refer to Figure 7.5) were estimated and are included in Appendix F. The areas with the greatest distance between developments and landfill/disposal facilities are located in NWNT and NENT. Similarly the burgeoning development forecast under Scenario B is reflected in the greater distances between the site of the wastes arising and thus potential problems in terms of air quality, noise and road congestion are all issues which will need to be carefully considered when preparing preliminary and detailed designs for the new developments at the district level.



Industrial refuse in industrial area



Construction wastes can be suitable for reclamation



Legend
 1 : METRO
 2 : NWNT
 3 : NENT
 4 : SWNT
 5 : SENT

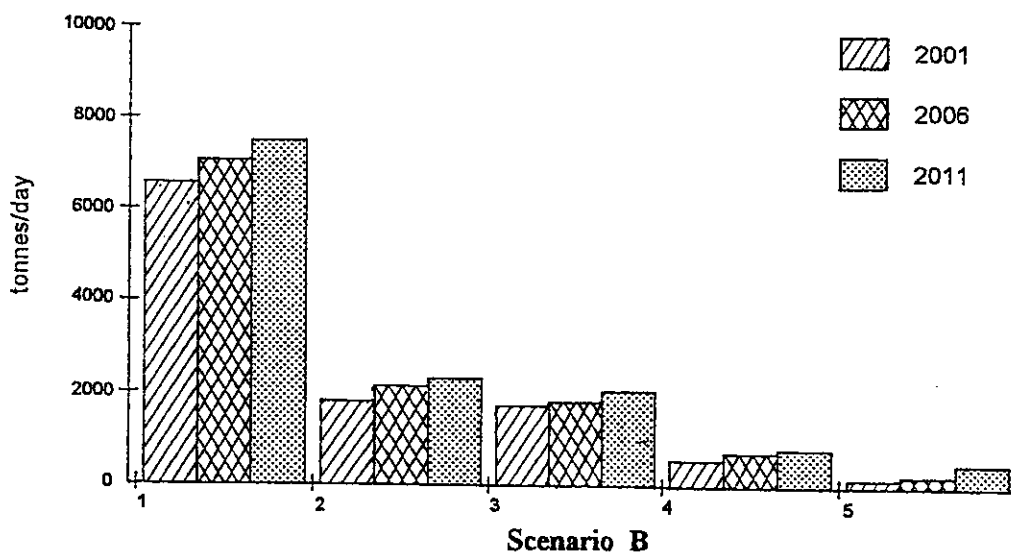
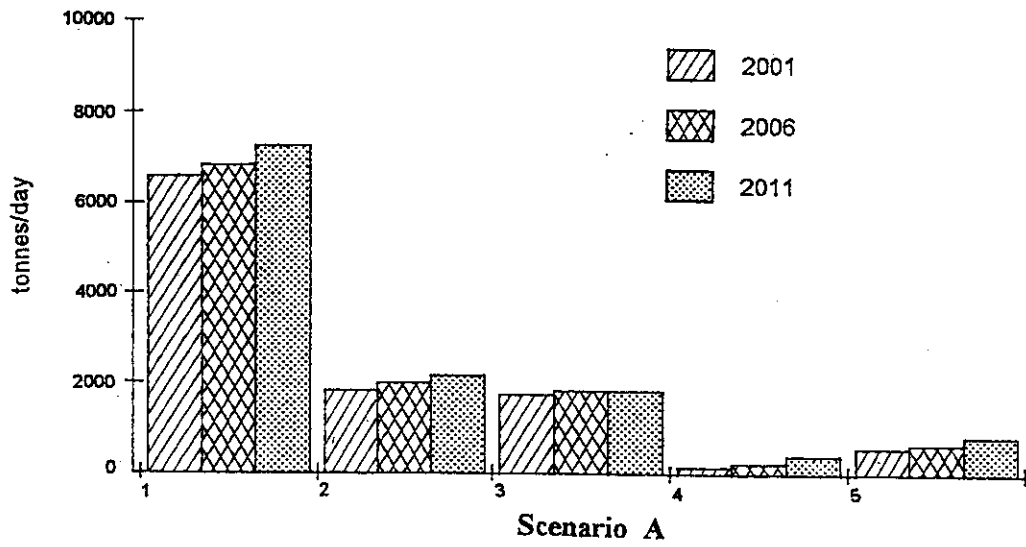


Figure 7.1 Solid Waste Generated Under Prototype Preferred Options



- Legend
- 1 : METRO
 - 2 : NWNT
 - 3 : NENT
 - 4 : SWNT
 - 5 : SENT

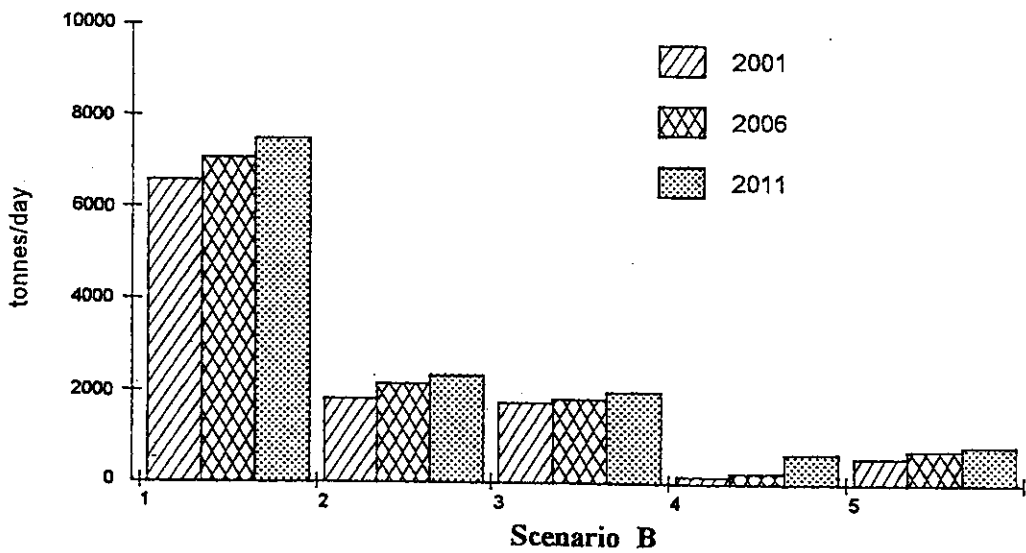


Figure 7.2 Solid Waste Generated Under Refined Preferred Options

- Legend
 1 : METRO
 2 : NWNT
 3 : NENT
 4 : SWNT
 5 : SENT

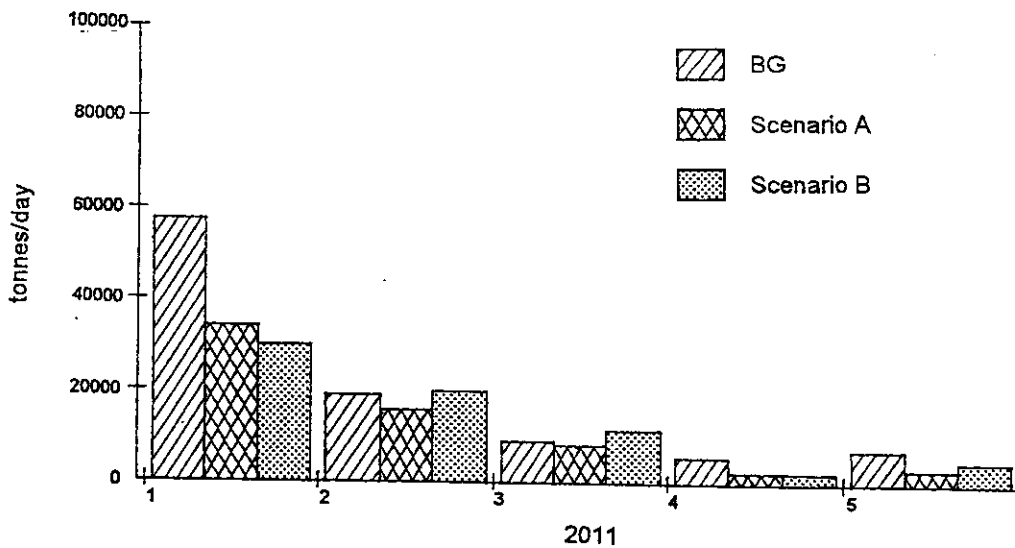
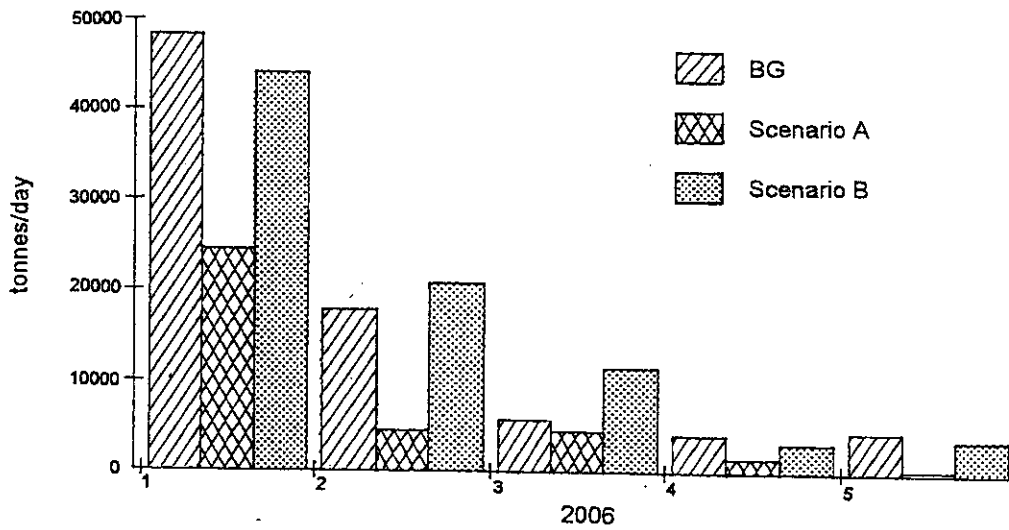
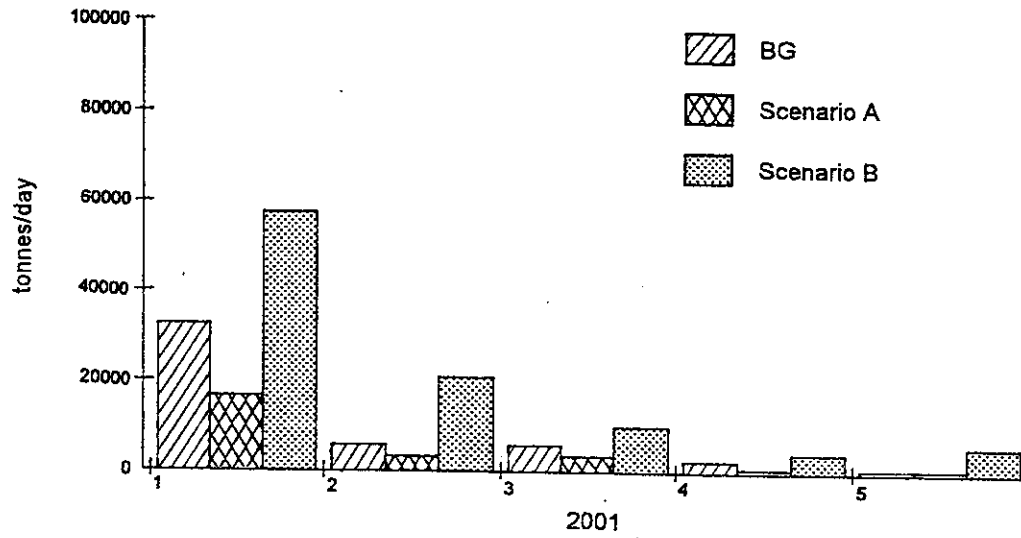
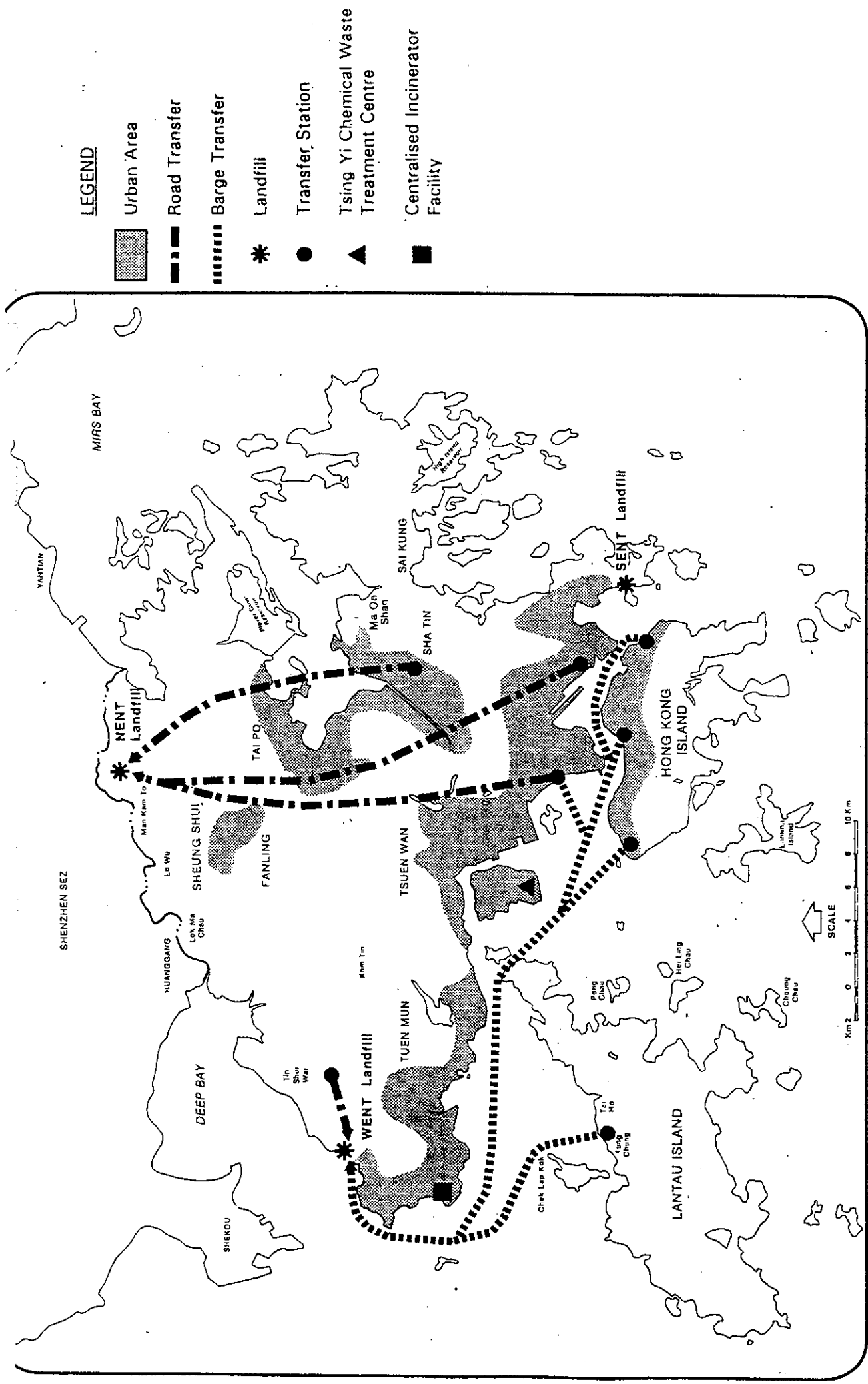
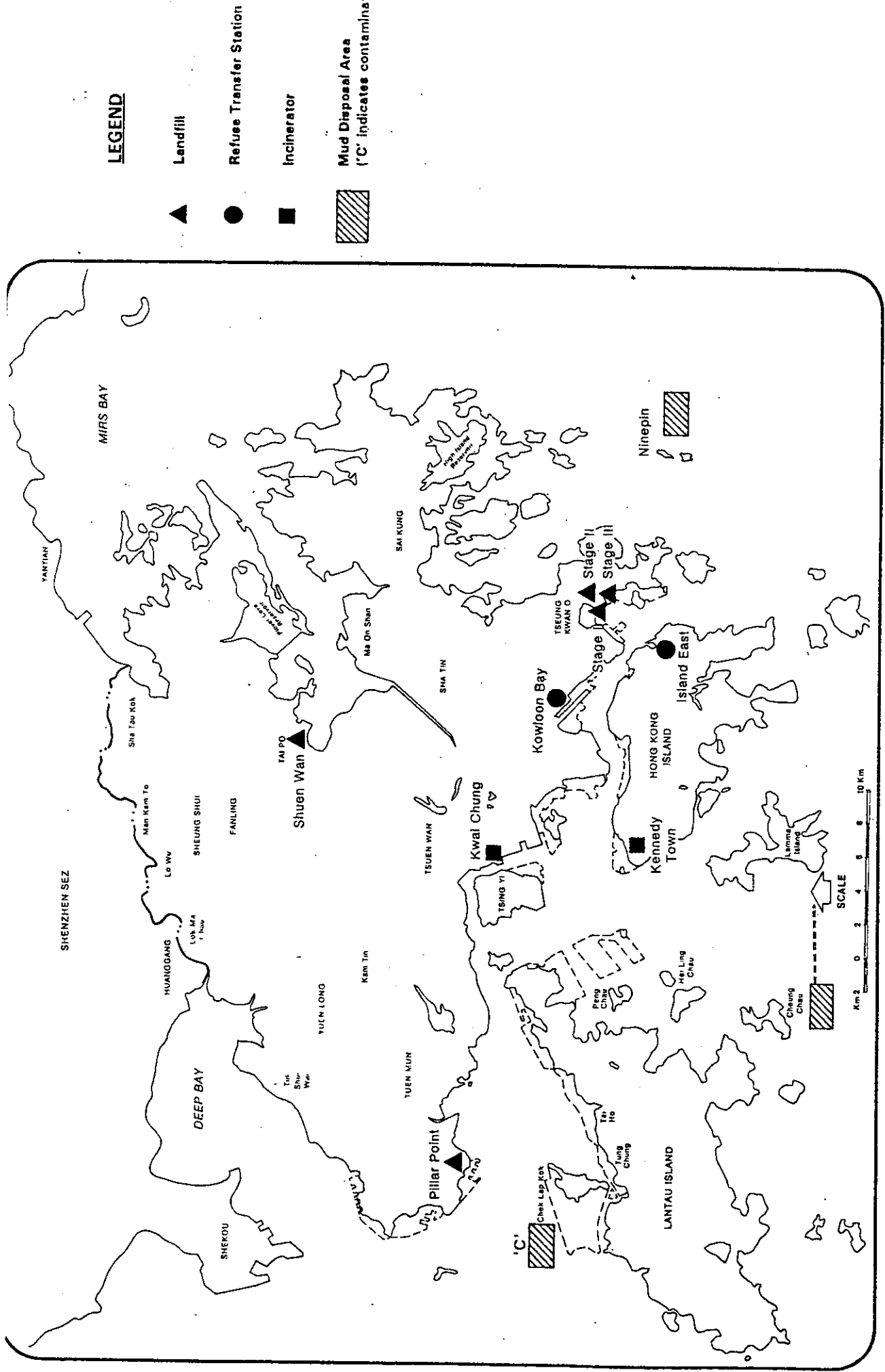


Figure 7.3 Summary of Construction Waste Arising by Sub-Region

TERRITORIAL DEVELOPMENT STRATEGY REVIEW ENVIRONMENTAL PROFILES
 FUTURE MUNICIPAL WASTE DISPOSAL STRATEGY





LEGEND

- ▲ Landfill
- Refuse Transfer Station
- Incinerator
- ▨ Mud Disposal Area ('C' indicates contaminants)

**TERRITORIAL DEVELOPMENT STRATEGY REVIEW ENVIRONMENTAL PROFILES
LOCATION OF EXISTING WASTE TREATMENT AND DISPOSAL FACILITIES**