

CHAPTER 4

**Environmental Protection Department
Civil Engineering and Development Department**

**Management of abandoned construction
and demolition materials**

**Audit Commission
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MANAGEMENT OF ABANDONED CONSTRUCTION AND DEMOLITION MATERIALS

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MANAGEMENT OF ABANDONED CONSTRUCTION AND DEMOLITION MATERIALS

Executive Summary

1. Construction and demolition (C&D) activities give rise to abandoned C&D materials, comprising inert C&D materials (e.g. rocks, rubble and soil) which can be reused as fill materials in reclamation and site formation projects (hereinafter referred to as fill materials) and non-inert C&D materials (e.g. waste bamboos, timber and other organic substances) which need to be disposed of (hereinafter referred to as non-inert construction waste).

2. Under the Waste Disposal (Designated Waste Disposal Facility) Regulation (Cap. 354L), abandoned C&D materials may be disposed of at: (a) two public fill banks managed by the Civil Engineering and Development Department (CEDD) for receiving fill materials; (b) two fill material transfer facilities managed by the CEDD for receiving fill materials which would be transported to the two public fill banks; (c) two sorting facilities managed by the CEDD for receiving abandoned C&D materials containing more than 50% of fill materials by weight (hereinafter referred to as the inert-content requirement); (d) three landfills, namely the Southeast New Territories (SENT) Landfill, the Northeast New Territories (NENT) Landfill and the West New Territories (WENT) Landfill managed by the Environmental Protection Department (EPD) for receiving abandoned C&D materials containing not more than 50% of fill materials by weight; and (e) seven Outlying Islands Transfer Facilities (OITFs) managed by the EPD for receiving abandoned C&D materials containing any proportion of fill materials which would be transported to WENT Landfill.

3. In 2014, of the 21 million tonnes (Mt) of abandoned C&D materials generated, 19.56 Mt (93%) were fill materials for reuse and 1.44 Mt (7%) were mixed C&D materials (containing both fill materials and non-inert construction waste) which were disposed of at landfills. The 1.44 Mt of mixed C&D materials

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accounted for 27% of the 5.42 Mt of the total waste being disposed of at landfills in the year. According to the EPD, SENT Landfill and NENT Landfill could only cope with the territory-wide disposal need up to late 2020s. The Audit Commission (Audit) has recently conducted a review to examine the Government's efforts in managing abandoned C&D materials.

Construction Waste Disposal Charging Scheme

4. Since January 2006, a charging scheme for disposal of abandoned C&D materials (hereinafter referred to as the charging scheme) has been in force, under which the charge rates per tonne of abandoned C&D materials are \$27 for disposal at public fill banks and fill material transfer facilities, \$100 for disposal at sorting facilities, and \$125 for disposal at landfills and OITFs (paras. 2.4, 2.5 and 2.16).

5. ***Significant under-recovery of cost.*** In 2003, during the deliberation of the charging scheme, the Government informed the Legislative Council that the levels of charges under the charging scheme were based on the user-pay principle, and full recovery of the capital and recurrent costs of the facilities deployed for disposal of abandoned C&D materials. However, Audit noted that the charge rates under the charging scheme had not been revised from January 2006 to August 2016, resulting in significant under-recovery of costs of providing services for disposal of abandoned C&D materials. For example, in 2014-15, only 33%, 44% and 63% of the costs of providing disposal services at sorting facilities, public fill banks and landfills were respectively recovered from the charges. From 2006-07 to 2014-15, the estimated unrecovered cost totalled \$3,811 million. The charge rates will be revised from April 2017 (paras. 2.8 to 2.11 and 2.17).

6. ***Annual review of the costs and charge rates not conducted.*** According to Financial Circular No. 6/2006, Controlling Officers should generally review fees and charges and, where necessary, revise them on an annual basis. However, Audit examination revealed that, despite repeated requests from the Financial Services and the Treasury Bureau (FSTB) from mid-2006 to mid-2014, the EPD and the CEDD had not conducted any review of the charge rates and related costs of disposal of abandoned C&D materials and provided the FSTB with the review results during the period (paras. 2.18 and 2.21).

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7. ***Inadequate enforcement actions under the charging scheme.*** Under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N), a main contractor who undertakes construction works under a contract having a value of \$1 million or above shall, within 21 days after being awarded the contract, make an application to the EPD to establish a billing account, which would enable the EPD to charge the contractor for disposal of abandoned C&D materials in respect of the contract. Contractors are not allowed to dispose of C&D materials at government facilities without establishing a billing account. Hence, contractors not having established a billing account may resort to illegal dumping. During the period December 2005 to December 2015, of the 19,453 applications for establishing billing accounts, 2,724 (14%) did not meet the 21-day requirement. However, the EPD had only taken prosecution actions in 338 cases. For the remaining 2,386 (2,724 less 338) cases, applicants on average took 78 days (ranging from 22 days to 5.8 years) to make applications after award of the pertinent works contracts (paras. 1.6 and 2.26 to 2.30).

Measures to increase reuse of fill materials

8. Abandoned C&D materials meeting the inert-content requirement (i.e. containing more than 50% of fill materials by weight) would be accepted at sorting facilities and processed to recover fill materials for reuse. The residue would be disposed of at landfills. The CEDD has adopted a screening methodology (based on the weight ratio of a load of abandoned C&D materials) to determine whether a vehicle should be allowed to dispose of a load of abandoned C&D materials at a sorting facility (paras. 3.3 to 3.6).

9. ***Many vehicle loads of abandoned C&D materials being disposed of at sorting facilities not meeting the inert-content requirement.*** Under the inert-content requirement, only abandoned C&D materials containing more than 50% of fill materials by weight would be accepted at sorting facilities. From 2006 to 2015, on an annual basis, only 2% to 6% of vehicle loads of abandoned C&D materials were not accepted at sorting facilities on the grounds that they did not meet the inert-content requirement. However, surveys of the EPD and the CEDD during the period 2006 to 2014 revealed that, on an annual basis, 18% to 56% of vehicle loads of the materials accepted at sorting facilities did not meet the inert-content requirement. During the period 2006 to 2015, on average only 28%

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(ranging from 14% to 44%) of the annual quantities of abandoned C&D materials accepted at the sorting facilities were recovered as fill materials, indicating that the inert-content of many vehicle loads accepted might not meet the inert-content requirement (paras. 1.4(c) and 3.8 to 3.13).

Measures to prevent and detect illegal dumping

10. The number of public reports on illegally dumped C&D materials had increased by 328% from 1,517 in 2005 to 6,499 in 2015. In 2015, 6,300 tonnes of illegally dumped C&D materials were cleared by government departments. In August 2015, the EPD commenced a trial scheme to install surveillance camera systems at 12 black-spot locations for detecting illegal dumping activities. During the trial-scheme period August 2015 to February 2016, the 12 camera systems captured images of 998 cases involving illegal dumping of waste by vehicles, of which 170 (17%) related to illegal dumping of C&D materials. As of July 2016, of the 170 cases, the EPD had taken prosecution actions on 46 cases and investigations on 2 cases were in progress (paras. 4.7 and 4.16 to 4.18).

11. *Inadequacies in taking enforcement actions.* Regarding the remaining 122 (170 less 46 less 2) cases, the EPD did not take prosecution actions on 80 cases because the images of the vehicle registration marks captured by the cameras were unclear, some due to the quality of the cameras installed. For the remaining 42 cases, the lack of prosecution actions was attributed to: (a) letters sent to the vehicle owners concerned according to addresses provided by the Transport Department (TD) being returned unclaimed; (b) the pertinent vehicle owners or drivers not providing details of the cases; (c) long lapse of time taken in handling the cases; and (d) the responsible drivers claiming that the waste dumping was carried out under instructions of persons hiring the delivery services (paras. 4.18 and 4.20 to 4.31).

Way forward

12. *Need to formulate long-term plan for exporting surplus fill materials.* From 2007 to 2014, owing to the fact that local works projects could not fully utilise fill materials generated in Hong Kong, a total of 73.67 Mt of fill materials had been delivered to Taishan on the Mainland, representing 59% of the total 125.65 Mt of

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fill materials generated during the period. However, as the quantity of fill materials for export to Taishan is subject to agreement between the Environment Bureau and the related Mainland authority on a yearly basis, there is a risk that Taishan may not be able to absorb all surplus fill materials generated in Hong Kong in a given year and in the long term (paras. 5.6 and 5.7).

Audit recommendations

13. **Audit recommendations are made in the respective sections of this Audit Report. Only the key ones are highlighted in this Executive Summary. Audit has *recommended* that the Government should:**

Construction Waste Disposal Charging Scheme

- (a) **take measures to ensure that fees and charges are revised in a timely manner (para. 2.36(a));**
- (b) **take measures to ensure that annual reviews of fees and charges are conducted and the review results are forwarded to the FSTB in a timely manner (para. 2.36(b));**
- (c) **issue specific guidelines on factors for consideration in taking prosecution actions against persons not complying with the 21-day statutory requirement on applying for establishing a billing account for disposal of abandoned C&D materials (para. 2.37(a));**

Measures to increase reuse of fill materials

- (d) **conduct a review of the screening methodology adopted for accepting vehicle loads of abandoned C&D materials at sorting facilities with a view to complying with the inert-content requirement as far as possible (para. 3.27(a));**

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Measures to prevent and detect illegal dumping

- (e) **take measures with a view to ensuring that surveillance camera systems installed for collecting evidence for prosecution purposes are capable of capturing clear images of registration marks of vehicles involved in illegal dumping of waste (para. 4.33(a));**
- (f) **forward cases where letters sent to vehicle owners using addresses provided by the TD are returned unclaimed to the TD for follow-up actions (para. 4.33(e));**
- (g) **seek legal advice on ways and means to take prosecution actions against the responsible persons involved in illegal waste dumping cases who do not provide case details (para. 4.33(f)); and**

Way forward

- (h) **explore destinations other than Taishan for receiving surplus fill materials generated in Hong Kong (para. 5.10).**

Response from the Government

14. The Government agrees with the audit recommendations.

PART 1: INTRODUCTION

1.1 This PART describes the background to the audit and outlines the audit objectives and scope.

Background

1.2 Construction and demolition (C&D) activities, such as site clearance, excavation, building, refurbishment, renovation, demolition and road works give rise to abandoned C&D materials, which comprise:

- (a) inert C&D materials, including rocks, rubble, boulders, earth, soil, sand, concrete, asphalt, bricks, tiles, masonry and used bentonite, which can be reused as fill materials in reclamation and site formation projects (hereinafter referred to as fill materials); and
- (b) non-inert C&D materials, including waste bamboos, timber, packaging materials and other organic substances which cannot be reused as fill materials and need to be disposed of (hereinafter referred to as non-inert construction waste).

1.3 In 2014, of the 21 million tonnes (Mt) of abandoned C&D materials generated, 19.56 Mt (93%) were fill materials which were reused or stockpiled for future reuse and 1.44 Mt (7%) were mixed C&D materials (containing both fill materials and non-inert construction waste — Note 1) which were disposed of at landfills.

Note 1: *According to the Environmental Protection Department, abandoned C&D materials being disposed of at landfills comprised both fill materials and non-inert construction waste because mixed C&D materials containing 50% or less of fill materials by weight could only be disposed of at landfills.*

Handling of abandoned C&D materials

1.4 Under the Waste Disposal (Designated Waste Disposal Facility) Regulation (Cap. 354L) of the Waste Disposal Ordinance (Cap. 354), abandoned C&D materials may be disposed of at the following government facilities:

- (a) ***two public fill banks.*** Two public fill banks, namely the Tseung Kwan O Fill Bank located in Tseung Kwan O Area 137 and the Tuen Mun Fill Bank located in Tuen Mun Area 38, were set up to stockpile surplus fill materials for future reuse. The two public fill banks together had a storage capacity of 23.3 Mt as of mid-2016. They are managed by the Civil Engineering and Development Department (CEDD) and they only accept fill materials for disposal;
- (b) ***two fill material transfer facilities.*** Fill materials may also be disposed of at fill material transfer facilities managed by the CEDD, namely the Chai Wan Public Fill Barging Point and the Mui Wo Temporary Public Fill Reception Facility. Fill materials disposed of at these facilities will be transported to the two public fill banks for future reuse;
- (c) ***two sorting facilities.*** Two sorting facilities set up in Tuen Mun and Tseung Kwan O (each of which is located within the boundary of the respective public fill bank) are managed by the CEDD, which only accept abandoned C&D materials containing more than 50% of fill materials by weight (hereinafter referred to as the inert-content requirement). Abandoned C&D materials accepted will be processed to recover fill materials as far as practicable which will be delivered to the two public fill banks for future reuse, and the residue to landfills for disposal;

- (d) ***three landfills.*** Three landfills are managed by the Environmental Protection Department (EPD), namely the Southeast New Territories (SENT) Landfill occupying an area of 100 hectares (ha — Note 2) in Tseung Kwan O, the Northeast New Territories (NENT) Landfill occupying an area of 61 ha in Ta Kwu Ling and the West New Territories (WENT) Landfill occupying an area of 110 ha in Nim Wan. Abandoned C&D materials to be disposed of at the three landfills must not contain more than 50% of fill materials by weight; and
- (e) ***seven Outlying Islands Transfer Facilities (OITFs).*** Seven OITFs managed by the EPD are located in Cheung Chau, Hei Ling Chau, Ma Wan, Mui Wo, Peng Chau, Sok Kwu Wan and Yung Shue Wan. These facilities accept abandoned C&D materials containing any proportion of fill materials, which would be transported to WENT Landfill for disposal.

1.5 After making an application to the CEDD, any person may take any quantity of fill materials from the public fill banks for reuse. For a public works project, no fee is levied on taking fill materials for reuse. However, a public works contractor needs to assess and deduct any resulting cost saving from the contract price. For a non-public works project, a contractor needs to pay for the cost of loading the materials onto vehicles and for transporting the materials from public fill banks to the contractor's works sites and the CEDD's administration cost.

Note 2: *One ha (or 10,000 square metres) of land is approximately the size of a standard football pitch.*

Introduction

1.6 Since January 2006, upon implementation of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N) of the Waste Disposal Ordinance, the charge rate for:

- (a) fill materials being disposed of at public fill banks and fill material transfer facilities has been \$27 per tonne; and
- (b) abandoned C&D materials being disposed of at:
 - (i) sorting facilities has been \$100 per tonne; and
 - (ii) landfills and OITFs has been \$125 per tonne.

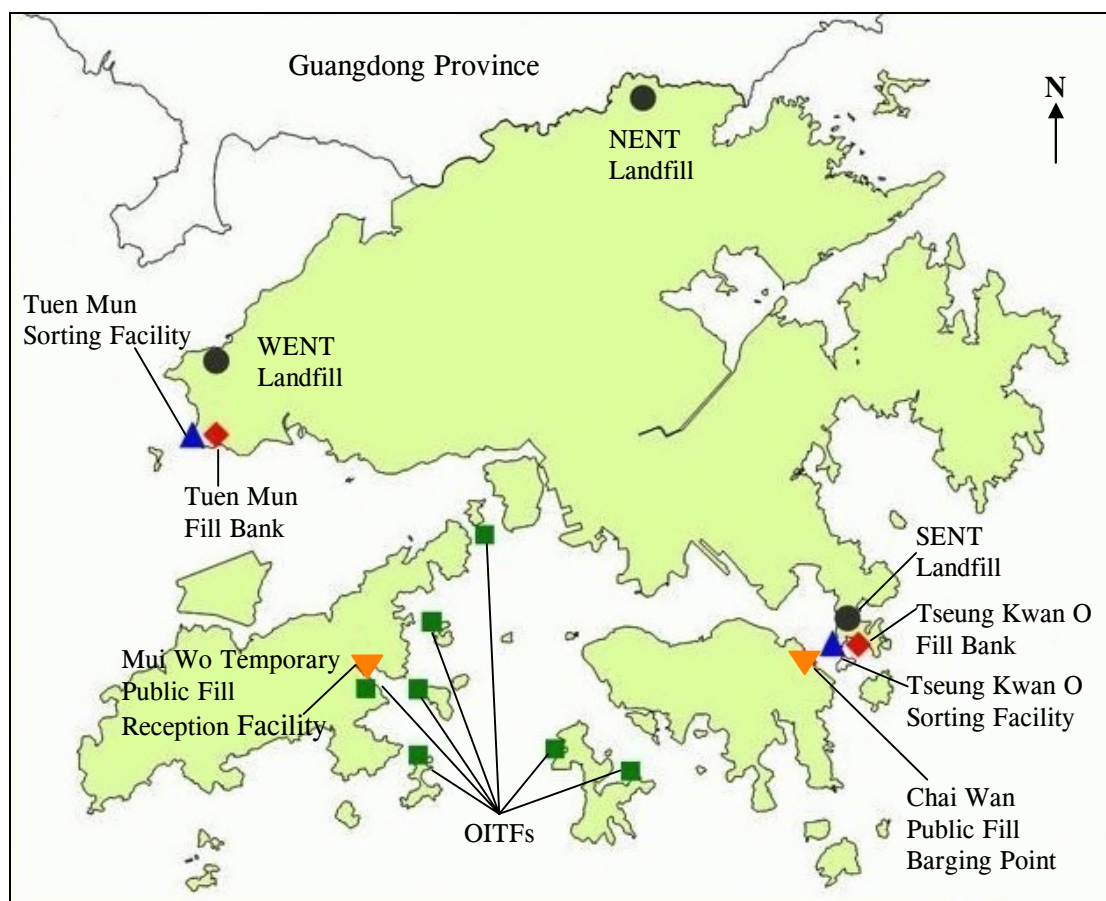
1.7 According to the CEDD, locally generated fill materials were mainly reused in local reclamation projects until early 2000s, and since then major reclamation projects in Hong Kong have mostly been suspended. As a result, fill materials generated from C&D activities in recent years could not be fully utilised by local works projects. After obtaining the agreement of the related Mainland authority, since 2007, some fill materials stockpiled at public fill banks have been exported to Taishan (Note 3) on the Mainland for use in a reclamation project. The cost of transporting fill materials to Taishan is borne by the CEDD (Note 4).

Note 3: *Taishan is a county in Guangdong Province located in the southwest of Jiangmen, and is 140 kilometres west of Hong Kong.*

Note 4: *According to the CEDD, this cost information was not available because it formed part of the total operation cost of managing fill materials.*

1.8 Figure 1 shows the locations of government facilities for receiving abandoned C&D materials.

Figure 1
Government facilities for receiving abandoned C&D materials



Source: EPD records

Remarks: The seven OITFs are located in Cheung Chau, Hei Ling Chau, Ma Wan, Mui Wo, Peng Chau, Sok Kwu Wan and Yung Shue Wan.

Introduction

1.9 According to the EPD, construction activities as reflected by related expenditures had increased significantly in the past ten years. Details are shown in Table 1.

Table 1
Construction expenditure (at September 2015 prices)
(2005-06 to 2014-15)

Construction expenditure (\$ billion)	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Public sector	53.5	46.9	47.0	46.6	56.8	73.7	81.6	89.1	95.9	96.0
Private sector	85.3	93.2	96.4	94.3	80.2	78.6	89.0	106.9	106.6	119.4
Total	138.8	140.1	143.4	140.9	137.0	152.3	170.6	196.0	202.5	215.4

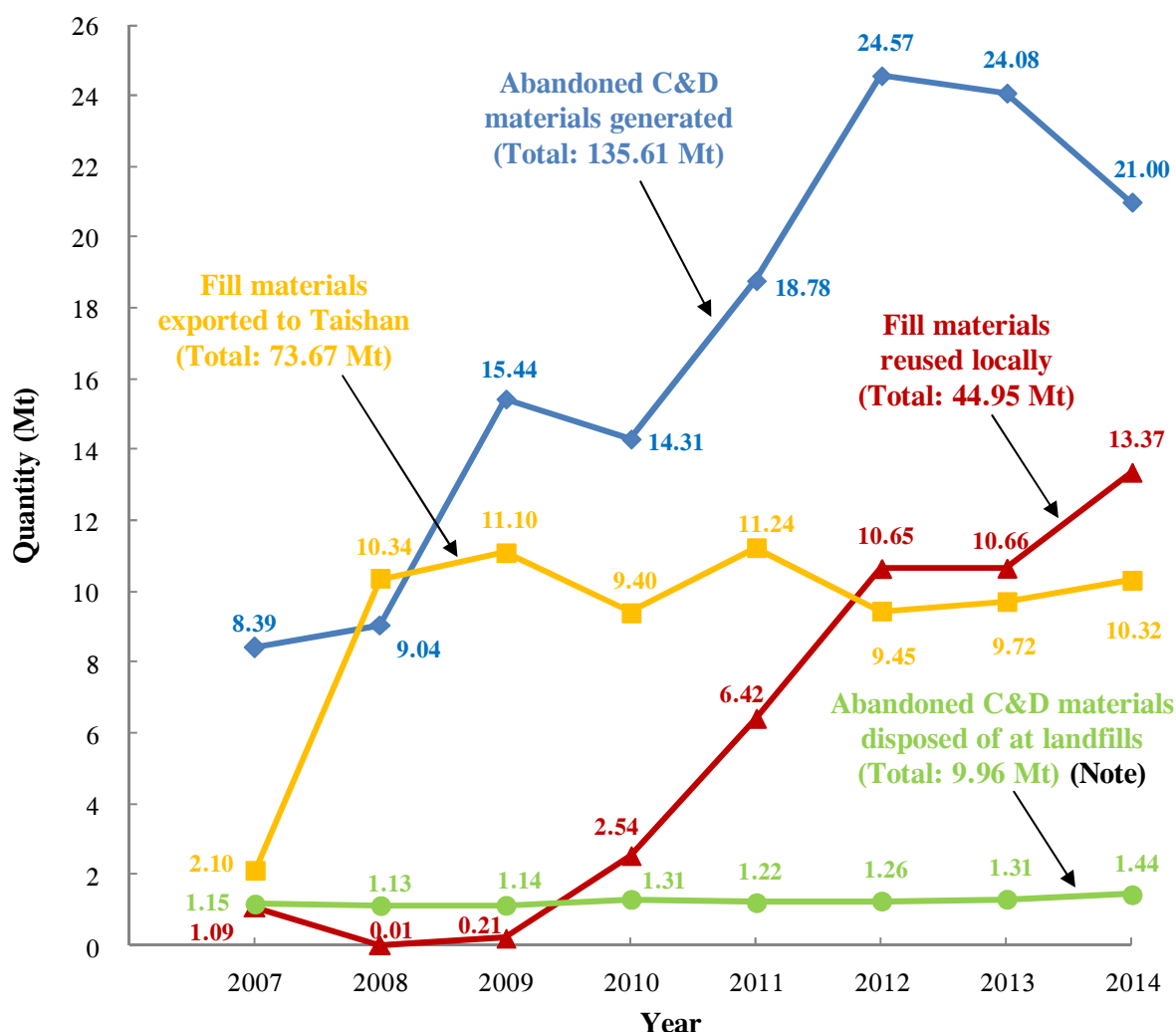
Source: EPD records

Remarks: According to the EPD, the data are published on the Construction Industry Council website. The Council was established in 2007 under the Construction Industry Council Ordinance (Cap. 587). The Council consists of a chairman and 24 members representing various sectors of the industry (including not more than 3 public officers) appointed by the Secretary for Development.

1.10 Figure 2 shows the quantities of abandoned C&D materials generated, fill materials being reused locally and exported to Taishan, and abandoned C&D materials being disposed of at landfills from 2007 to 2014.

Figure 2

Generation and disposal of abandoned C&D materials (2007 to 2014)



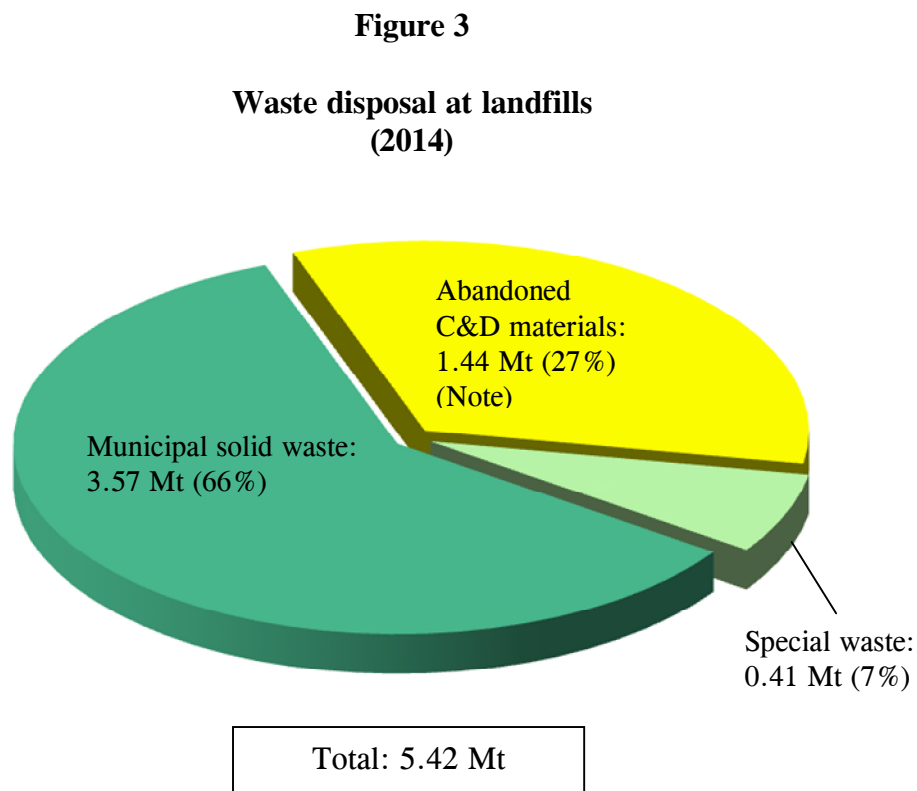
Source: CEDD and EPD records

Note: The quantities also included waste concrete (totalling 1.68 Mt, or 17% of the total 9.96 Mt from 2007 to 2014) generated from concrete batching plants, and cement plaster/mortar plants not being set up inside construction sites. Such waste concrete was not subject to charges (see para. 1.6(b)(ii)).

Remarks: In a year, the sum of quantities of fill materials being reused locally, fill materials being exported to Taishan and abandoned C&D materials being disposed of at landfills may not equal to that of abandoned C&D materials generated because some fill materials might be stockpiled at (or taken out from) public fill banks during the year. Fill materials being reused locally might be taken from public fill banks or from other works sites directly. Appendix A shows the changes of quantities of fill materials stockpiled at public fill banks from 2007 to 2014.

Introduction

1.11 As shown in Figure 2, the quantity of abandoned C&D materials had increased by 150% from 8.39 Mt in 2007 to 21 Mt in 2014. Moreover, although the quantity of abandoned C&D materials being disposed of at landfills expressed as a percentage of the total quantity of the materials generated had decreased from 14% ($1.15 \div 8.39 \times 100\%$) in 2007 to 7% ($1.44 \div 21 \times 100\%$) in 2014, it accounted for 27% of the total waste (of 5.42 Mt) having been disposed of at landfills in 2014. Details are shown in Figure 3.



Source: EPD records

Note: See Note to Figure 2 in paragraph 1.10.

1.12 In December 2014, the EPD estimated that the SENT, NENT and WENT Landfills would reach their original design capacities by 2015, 2016-17 and 2018-19 respectively. In addition to abandoned C&D materials, the three landfills also accept municipal solid waste and special waste for disposal, except that from January 2016, SENT Landfill only receives abandoned C&D materials. Municipal solid waste is generated from homes, schools, public buildings, shops, restaurants, offices, hotels, factories and other businesses, whereas special waste comprises dredged mud, dewatered sludge from sewage treatment plants, livestock waste, clinical waste and chemical waste. In October 2016, the EPD informed the Audit Commission (Audit) that:

- (a) the estimated serviceable life of the landfills would depend on the actual population growth, the level of economic and major construction activities, the effectiveness of waste reduction initiatives and the timely provision of other waste treatment facilities;
- (b) with the funding approval of the Finance Committee (FC) of the Legislative Council (LegCo) in December 2014 for the SENT Landfill extension and the NENT Landfill extension, the EPD estimated that the landfills could cope with the territory-wide disposal need up to late 2020s; and
- (c) for the proposed extension works to WENT Landfill (subject to the FC's funding approval), its estimated serviceable life after implementing the extension works would be available upon completion of the relevant consultancy study.

Government objectives and actions to achieve the objectives

1.13 The Government's objectives on management of abandoned C&D materials are to:

- (a) minimise the generation of abandoned C&D materials;
- (b) maximise the reuse of fill materials; and
- (c) minimise the disposal of abandoned C&D materials at landfills.

Introduction

1.14 In August 2002, for the purpose of minimising the generation of abandoned C&D materials and maximising the reuse of fill materials, Environment, Transport and Works Bureau Technical Circular No. 33/2002 was issued which promulgated that, for public works projects that were expected to generate more than 50,000 cubic metres (m³) of abandoned C&D materials or required importing fill materials in excess of 50,000 m³, works departments should draw up a C&D Material Management Plan at the early design stage for compliance by works contractors in carrying out the works.

1.15 Since January 2006, after implementation of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation, charges have been imposed on disposal of abandoned C&D materials (see para. 1.6). In 2014-15, the government revenue arising from such charges amounted to \$511 million.

Responsible government bureaux and departments

1.16 The Environment Bureau (ENB — Note 5) and the EPD are responsible for, inter alia, formulating and implementing waste management policies and strategies, enforcing environmental legislation, and providing disposal facilities for abandoned C&D materials. The EPD is headed by the Permanent Secretary for the Environment who also assumes the office of the Director of Environmental Protection. The Environmental Compliance Division, the Environmental Infrastructure Division and the Waste Management Policy Division of the EPD are responsible for management of abandoned C&D materials. Appendix B shows an extract of the organisation chart of the EPD.

1.17 Under the policy directives of the ENB/EPD, the Fill Management Division of the CEDD is responsible for management of public fill banks, fill material transfer facilities and abandoned C&D material sorting facilities. Appendix C shows an extract of the organisation chart of the CEDD.

Note 5: *In 2001, the then Environment and Food Bureau was responsible for policy issues on environmental matters. In July 2002, the then Environment, Transport and Works Bureau was formed to take over the environment portfolio from the Environment and Food Bureau. In April 2005, the Environment Branch of the then Environment, Transport and Works Bureau, which was responsible for environmental policy issues, merged with the EPD. In July 2007, the ENB was formed to oversee the formulation and implementation of policies on environmental protection and energy.*

1.18 In 2016-17, the estimated recurrent expenditure of the EPD's waste management programme was \$2,589 million, which covered the costs of managing municipal solid waste, abandoned C&D materials and special waste. In the same year, the CEDD's estimated expenditure on managing abandoned C&D materials totalled \$1,178 million.

Audit review

1.19 In 1997 and 2002, Audit completed two reviews to examine government actions on management of abandoned C&D materials. The review results were included in the following reports:

- (a) Chapter 8 of the Director of Audit's Report No. 28 of February 1997 entitled Beneficial use of construction waste for reclamation; and
- (b) Chapter 9 of the Director of Audit's Report No. 38 of March 2002 entitled Management of construction and demolition materials.

The Public Accounts Committee of LegCo conducted public hearings to examine the findings included in the above two reports.

1.20 As shown in Appendix A, of the total 135.61 Mt of abandoned C&D materials generated from 2007 to 2014, 125.65 Mt (93%) were fill materials, of which 44.95 Mt (36%) were reused in local works projects and 73.67 Mt (59%) were exported to Taishan. Fill materials that were not reused locally were transported to the public fill banks for stockpiling pending future reuse within or outside Hong Kong. Given the limited storage capacity of public fill banks (as of end 2014, 16.9 Mt (76%) of the total capacity of 22.3 Mt was used), locally generated fill materials must be either reused by local works projects or exported outside Hong Kong.

Introduction

1.21 Of the total 135.61 Mt of abandoned C&D materials generated from 2007 to 2014, 9.96 Mt (7%) were disposed of at landfills. They accounted for 25% of the 40.55 Mt of waste being disposed of at landfills during the period. Given that increases in the quantity of abandoned C&D materials being disposed of at landfills would have significant impacts on the serviceable lives of the landfills, it is important that effective measures are taken to reduce the generation of abandoned C&D materials and their disposal at landfills.

1.22 Against the above background, in April 2016, Audit commenced a review to examine the Government's efforts in managing abandoned C&D materials. The review focused on the following areas:

- (a) Construction Waste Disposal Charging Scheme (PART 2);
- (b) measures to increase reuse of fill materials (PART 3);
- (c) measures to prevent and detect illegal dumping (PART 4); and
- (d) way forward (PART 5).

Audit has identified areas where improvements can be made by the Government in the above areas, and has made recommendations to address the issues.

Acknowledgement

1.23 Audit would like to acknowledge with gratitude the full cooperation of the staff of the ENB, the Financial Services and the Treasury Bureau (FSTB), the CEDD and the EPD during the course of the audit review.

PART 2: CONSTRUCTION WASTE DISPOSAL CHARGING SCHEME

2.1 This PART examines the implementation of the Construction Waste Disposal Charging Scheme from January 2006 for the purpose of reducing disposal of abandoned C&D materials, particularly at landfills.

The charging scheme

2.2 In May 1995, the Waste Disposal (Charges for Disposal of Waste) Regulation (Cap. 354K) under the Waste Disposal Ordinance was enacted under which abandoned C&D materials, and commercial and industrial waste being disposed of at landfills would be charged at a rate of \$43 per tonne. However, owing to objections of the trade against the landfill charging scheme, the Government announced in June 1995 that the scheme would be suspended until the Government reaching an agreement with the trade.

2.3 In May 2002 and April 2003, the then Environment and Food Bureau (see Note 5 to para. 1.16) informed the LegCo Panel on Environmental Affairs (EA Panel) that, after consultations with the stakeholders, the Government would propose introducing a charging scheme for disposal of abandoned C&D materials (hereinafter referred to as the charging scheme) at public fill banks, fill material transfer facilities, sorting facilities, landfills and OITFs.

2.4 In April 2003, the then Environment, Transport and Works Bureau (ETWB — see Note 5 to para. 1.16) informed the EA Panel that the proposed differential charges under the charging scheme would have the following structure:

- (a) \$27 per tonne for abandoned C&D materials containing entirely fill materials being disposed of at public fill banks and fill material transfer facilities;

Construction Waste Disposal Charging Scheme

- (b) \$100 per tonne for abandoned C&D materials containing more than 50% of fill materials by weight being disposed of at sorting facilities; and
- (c) \$125 per tonne for abandoned C&D materials containing not more than 50% of fill materials by weight being disposed of at landfills and those containing any proportion of fill materials being disposed of at OITFs.

2.5 In January 2005, the Waste Disposal (Charges for Disposal of Construction Waste) Regulation was enacted, which set out details of the charging scheme, including the charge rates stated in paragraph 2.4. According to the EPD, at that time, the charge rates were set in accordance with the user-pay principle and full recovery of the capital and recurrent costs. The charging scheme was implemented in January 2006.

2.6 According to information provided by the then ETWB to the EA Panel in April and October 2003, the objectives of introducing the charging scheme were to provide economic incentives to producers of abandoned C&D materials to:

- (a) reduce generation of abandoned C&D materials; and
- (b) encourage them to practise sorting of abandoned C&D materials to increase reuse of fill materials, reduce disposal of the materials and conserve the valuable landfill space.

2.7 After the implementation of the charging scheme, the percentage of the quantity of abandoned C&D materials being disposed of at landfills against the total quantity generated had decreased from 17% in 2005 to 14% in 2006 and 2007, and further to 7% in 2009. These statistics showed that the charging scheme was very effective in the initial years of its implementation in reducing the quantity of abandoned C&D materials disposed of at landfills. Details are shown in Table 2.

Construction Waste Disposal Charging Scheme

Table 2

**Quantities of abandoned C&D materials
generated and disposed of at landfills
(2005 to 2014)**

Abandoned C&D materials (Mt)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total quantity generated (a)	14.16	10.91	8.39	9.04	15.44	14.31	18.78	24.57	24.08	21.00
Total quantity disposed of at landfills (b) (Note)	2.39	1.51	1.15	1.13	1.14	1.31	1.22	1.26	1.31	1.44
Percentage (c) = (b) ÷ (a) × 100%	17%	14%	14%	13%	7%	9%	6%	5%	5%	7%

Source: EPD records

Note: See Note to Figure 2 in paragraph 1.10. Also, the quantities of abandoned C&D materials being disposed of at landfills included those of non-inert construction waste sorted from sorting facilities (see para. 1.4(c)).

Significant under-recovery of cost

2.8 In April and November 2003, during deliberation of the charging scheme, the then ETWB informed the EA Panel that the levels of charges under the charging scheme were based on the user-pay principle, and full recovery of the capital and recurrent costs of the facilities deployed for disposal of abandoned C&D materials.

2.9 Furthermore, as promulgated in Financial Circular No. 6/2006 on Fees and Charges:

- (a) charge rates should be set at a level aiming at the attainment of full-cost recovery; and

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- (b) Directors of Bureaux and Controlling Officers should ensure that the charge-rate structure and levels are conducive to achieving the full-cost recovery target when preparing proposals for charge-rate reviews.

2.10 However, Audit examination revealed that the charge rates under the charging scheme had not been revised during the period January 2006 to August 2016. Owing to increasing costs of operating government waste disposal facilities, the cost recovery rates had decreased significantly in the past ten years. In 2014-15, only 44%, 33% and 63% of the costs of disposal services at public fill banks, sorting facilities and landfills were respectively recovered through related charges. From 2006-07 to 2014-15, the estimated unrecovered cost totalled \$3,811 million (\$2,941 million + \$664 million + \$206 million). Details are shown in Appendices D to F.

2.11 Audit considers it unsatisfactory that the charge rates under the charging scheme had not been revised from January 2006 to August 2016, resulting in significant under-recovery of costs of providing disposal services for abandoned C&D materials.

2.12 In Audit's view, the significant under-recovery of costs of providing disposal service for abandoned C&D materials at government waste disposal facilities through charges is at variance with:

- (a) the Government's statement made to LegCo in 2003 that the charges under the charging scheme were based on the user-pay principle, and full recovery of the capital and recurrent costs of the facilities (see para. 2.8); and
- (b) Financial Circular No. 6/2006 which promulgated that charge rates should be set at a level aiming at the attainment of full-cost recovery (see para. 2.9(a)).

2.13 In October 2016, the EPD informed Audit that:

- (a) the reasons for not proposing to revise the charge rates in the past years included the award of a new contract for transporting fill materials to Taishan on the Mainland, because this would affect the total operation cost, and the overall freeze of government fees and charges from mid-July 2008 to end of March 2010; and
- (b) although the effectiveness of the charging scheme had somewhat diminished due to lack of revisions of the charge rates, the charging scheme was still an effective tool in reducing the quantities of abandoned C&D materials being disposed of at landfills, as reflected by the low percentage of the quantity of abandoned C&D materials being disposed of at landfills against the total quantity generated (see Table 2 in para. 2.7).

2.14 The lack of revisions to the charge rates in the past years to recover the costs incurred had reduced the effectiveness of the charging scheme on providing economic incentives for producers of abandoned C&D materials to reduce generation of such materials and practise waste sorting (see para. 2.6).

2.15 In Audit's view, the EPD, in collaboration with the CEDD, needs to take measures to ensure that, where applicable, fees and charges are revised in a timely manner, having regard to the user-pay and full-cost recovery principles, the resulting environmental implications, and impact on the trade and other relevant stakeholders.

Recent developments

2.16 In December 2015, the EPD informed the EA Panel that:

- (a) having regard to the established fees and charges policy and the user-pay principle, it would propose the following increases in the charge rates under the charging scheme:

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- (i) fill-material charge from \$27 per tonne to \$71 per tonne (a 163% increase);
 - (ii) sorting charge from \$100 per tonne to \$175 per tonne (a 75% increase); and
 - (iii) landfill charge from \$125 per tonne to \$200 per tonne (a 60% increase); and
- (b) it would further review the charge rates under the charging scheme taking into account the development of the municipal solid waste charging scheme.

2.17 In May 2016, the ENB published in Government Gazette the charge-rate revisions to take effect from April 2017. According to the ENB, after implementation of the increases in the charge rates and based on the forecasted costs for 2017-18, the fill-material charge and the landfill charge would attain full-cost recovery and the sorting charge would attain a cost recovery rate of 66%. The sorting charge was set at a level to maintain the current difference of \$25 lower than the landfill charge for the purpose of promoting the use of sorting facilities.

Annual review of the costs and charge rates not conducted

2.18 According to Financial and Accounting Regulations (Note 6), Controlling Officers are responsible for ensuring that the fees and charges relating to services for which they are responsible are regularly reviewed and updated. Moreover, Financial Circular No. 6/2006 on Fees and Charges stipulated that Director of Bureaux and Controlling Officers should:

- (a) generally review fees and charges and, where necessary, revise them on an annual basis; and

Note 6: *The Regulations are promulgated by the Financial Secretary under the Public Finance Ordinance (Cap. 2) for the safety, economy and advantage of public moneys and government property.*

- (b) prepare fee proposals and submit them sufficiently early to the FSTB with a view to reviewing the fees on time. The fee proposals should be supported by costing statements duly prepared and vetted in accordance with the Costing Manual published by the Director of Accounting Services.

2.19 In mid-July 2008, the Chief Executive of the Hong Kong Special Administrative Region announced that the Government would freeze fees and charges affecting the general public's daily lives (Note 7). Furthermore, the Financial Secretary announced in February 2009 that the freeze would be extended to 31 March 2010, and he reminded government bureaux and departments that they should continue conducting reviews of all fees and charges in accordance with Financial Circular No. 6/2006 during the freeze period.

2.20 In this connection, Audit noted that, from 2004 to 2015, the FSTB had requested the EPD and the CEDD on the following occasions to provide it with the review results of the charge rates under the charging scheme and fee proposals with supporting costing statements:

- (a) in August 2004, the FSTB requested the EPD and the CEDD to conduct a review of the charge rates after the first year of implementation of the charging scheme so as to ascertain the actual cost recovery rate and to facilitate fee reviews in future;
- (b) between May 2006 and July 2008, the FSTB had sent repeated requests and reminders to the EPD and the CEDD on the review results on the charge rates;
- (c) between August 2008 and March 2010 (the freeze period for fees and charges — see para. 2.19), the FSTB had issued repeated reminders to the CEDD and the EPD for carrying out reviews of the charge rates;

Note 7: *These fees and charges included three broad groups of government fees and charges, namely those collected for services for personal use, services related to occupational registration and examination, and services related to business activities.*

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- (d) in October 2008, the EPD informed the FSTB that the estimated cost of handling fill materials was about \$75 per tonne, and it would review the charge rate for handling fill materials in 2010 after the award of a new contract for delivering fill materials to Taishan on the Mainland (see para. 1.7). The FSTB responded that as the estimated cost of \$75 per tonne was nearly three times the charge rate of \$27 per tonne for fill materials, the ENB/EPD should conduct the review immediately;
- (e) in March and October 2009, the EPD forwarded to the FSTB the fee proposals and costing statements for the landfill operation. The EPD advised that the landfill charge would affect the general public's daily lives and accordingly proposed to freeze the charge rate at its prevailing level. The EPD also advised the FSTB that, given the differential pricing strategy under the charging scheme, the three disposal charges should be reviewed as a package;
- (f) in February 2010, the EPD and the CEDD informed the FSTB that the review of the fill-material charge would have to take into account various factors including the exploration of a secondary receptor site for surplus fills on the Mainland other than Taishan, the availability of which would affect the overall cost of the delivery scheme;
- (g) between April 2010 (i.e. after the fee freeze period) and October 2014, the FSTB had again sent repeated requests and reminders to the CEDD and the EPD on the review results on the charge rates;
- (h) in end October 2014, the EPD provided the FSTB with information on the full costs of the operations at government facilities for receiving abandoned C&D materials (see para. 1.4); and
- (i) in October 2015, the EPD provided the FSTB with the fee proposals together with costing statements, the required supporting schedules and details of calculation of the operations at government facilities for receiving abandoned C&D materials.

2.21 Audit considers it unsatisfactory that, despite the FSTB's repeated requests since May 2006, the EPD and the CEDD had not provided the FSTB with information on the full cost of the operations at government facilities for receiving abandoned C&D materials until October 2014 (see para. 2.20(b) to (h)). The lack of annual review of the charge rates from 2007 to October 2014 was at variance with Financial Circular No. 6/2006 which stipulated that Controlling Officers should review charge rates on an annual basis (see para. 2.18(a)).

2.22 In this connection, Audit notes that under Financial Circular No. 6/2016, which supersedes Financial Circular No. 6/2006, for reviews of fees and charges, Controlling Officers are required to submit duly prepared and vetted costing statements in accordance with the Costing Manual issued by the Director of Accounting Services on an annual basis. In Audit's view, the EPD, in collaboration with the CEDD, needs to conduct annual reviews of fees and charges against the costs of the disposal services for abandoned C&D materials and submit the review results to the FSTB in a timely manner according to requirements stipulated in Financial Circular No. 6/2016.

2.23 Furthermore, upon the enactment of the charging scheme in January 2005, the then ETWB informed LegCo that the Government would review the charging scheme six months after its implementation and at regular intervals afterwards, and it would submit detailed review reports to the LegCo Secretariat in due course.

2.24 In March 2007, the EPD submitted a progress report on implementing the charging scheme to the EA Panel. The progress report covered the methodology adopted for accepting waste loads at sorting facilities and the fee collection mechanism. However, the progress report did not cover the charge rates under the charging scheme.

2.25 Audit noted that, despite the significant under-recovery of costs of the disposal services for abandoned C&D materials from 2006 to 2014, the EPD had not informed LegCo of the review results of the charge rates. Audit considers that the EPD needs to make improvement in this area.

Inadequate enforcement actions under the charging scheme

2.26 Under Section 9 of Waste Disposal (Charges for Disposal of Construction Waste) Regulation, a main contractor (Note 8) who undertakes construction works under a contract having a value of \$1 million or above shall, within 21 days after being awarded the contract, make an application to the EPD to establish a billing account solely in respect of that contract. Contractors are not allowed to dispose of C&D materials at government facilities without establishing a billing account. Any person failing to comply with the 21-day requirement without reasonable excuse may commit an offence, and may be liable to a maximum fine of \$50,000 and, in the case of a continuing offence, to a further daily fine of \$1,000.

2.27 According to the EPD's prosecution procedures:

- (a) for an application exceeding the 21-day application requirement, the responsible EPD officer needs to consider taking prosecution actions under Section 9 of Waste Disposal (Charges for Disposal of Construction Waste) Regulation. He needs to seek endorsement from a Principal Environmental Protection Officer in charge of the case for taking or not taking prosecution actions on the case;
- (b) for a case having sufficient evidence for taking prosecution actions, the officer would forward the case to EPD Central Prosecution Unit (CPU) for taking prosecution actions; and
- (c) in order to meet the six-month time limit (under section 26 of the Magistrates Ordinance (Cap. 227)) for taking prosecution actions, cases warranting prosecution actions should be forwarded to the CPU at least three months before expiry of the six-month statutory time limit (counting from the time of receiving an application).

Note 8: *Under the Regulation, only the main contractor (not any subcontractor) of a contract may establish a billing account for disposal of C&D materials for that contract.*

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2.28 From December 2005 (commencement of receiving applications) to December 2015, the EPD had received a total of 19,453 applications from main contractors for establishing billing accounts for works contracts with a value of \$1 million or above. During the ten-year period, 2,724 (14%) of the 19,453 applications did not meet the 21-day requirement and the EPD had taken prosecution actions in only 338 cases (12% of the 2,724 cases). Of these 338 cases, as of July 2016, 333 cases had been convicted, with fines ranging from \$800 to \$20,000, and 5 cases had been acquitted.

2.29 Contractors who do not timely apply for establishing billing accounts for disposal of abandoned C&D materials at government facilities may resort to illegal dumping of such materials and evading payment of charges. Audit noted that the EPD had not issued specific guidelines on factors for consideration in taking prosecution actions against persons not complying with the 21-day statutory requirement. With a view to ensuring that prosecution actions are taken on a consistent and justifiable basis, the EPD needs to issue specific guidelines on this issue.

2.30 Furthermore, Audit examination revealed that, of the 2,724 cases not meeting the 21-day application requirement, prosecution actions were taken against 338 cases (12%). Details of the remaining 2,386 cases (88%) are shown in Table 3:

Table 3
Non-compliance cases
(December 2005 to December 2015)

Number of days after contract award	Number of days exceeding 21-day requirement	Cases	
		Number	Percentage
22 to 71 days	1 to 50 days	1,784	75%
72 to 121 days	51 to 100 days	271	11%
122 to 2,127 days (5.8 years)	101 to 2,106 days	331	14%
Total		2,386	100%

Source: EPD records

Applicants of these 2,386 cases on average took 78 days to make applications after award of the pertinent works contracts.

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2.31 Audit examination of ten cases revealed that there was room for improvement in taking enforcement actions under the charging scheme (see paras. 2.32 to 2.35).

2.32 ***Long time taken to take prosecution action.*** Audit noted that in one case, the contractor (Contractor A) submitted an account opening application in December 2007 to the EPD which was 87 days after award of the related contract. In March 2008, the EPD asked Contractor A to explain for the late application. In May 2008, the EPD interviewed Contractor A. In June 2008, the case was forwarded to the CPU for taking prosecution action, which was just three days before the expiry of the six-month statutory time limit (see para. 2.27(c)). In the event, there was insufficient time to prepare the summons application and, as a result, prosecution action was not taken in the case. According to the EPD, this was an isolated case since the commencement of receiving applications for establishing billing accounts in December 2005.

2.33 In Audit's view, the EPD needs to take measures to ensure that prosecution actions are taken in a timely manner in compliance with the six-month statutory time limit.

2.34 ***Proper endorsement not obtained for not taking prosecution actions.*** Audit noted that in another case, the contractor (Contractor B) submitted an account opening application in June 2011 to the EPD which was 1,280 days after award of the related contract in December 2007. The EPD decided not to take prosecution action in this case. However, the decision not to take prosecution action was endorsed by the responsible Senior Environmental Protection Officer instead of the responsible Principal Environmental Protection Officer, contrary to the requirement stipulated in the EPD's prosecution procedures (see para. 2.27(a)).

2.35 In Audit's view, the EPD needs to remind its staff of the need to obtain endorsement from appropriate EPD officers for not taking prosecution actions for non-compliance with the 21-day statutory requirement.

Audit recommendations

2.36 Audit has *recommended* that, in managing the charging scheme, the Director of Environmental Protection, in collaboration with the Director of Civil Engineering and Development, should:

- (a) take measures to ensure that, where applicable and taking into account relevant factors, fees and charges are revised in a timely manner;
- (b) take measures to ensure that annual reviews of fees and charges are conducted and the review results are forwarded to the FSTB in a timely manner in accordance with Financial Circular No. 6/2016; and
- (c) conduct periodic reviews of the charging scheme and, where appropriate, keep LegCo informed of the review results.

2.37 Audit has also *recommended* that the Director of Environmental Protection, in relation to enforcement actions under the charging scheme, should:

- (a) issue specific guidelines on factors for consideration in taking prosecution actions against persons not complying with the 21-day statutory requirement on applying for establishing a billing account for disposal of abandoned C&D materials;
- (b) take measures to ensure that prosecution actions are taken in a timely manner in compliance with the six-month statutory time limit; and
- (c) remind EPD staff of the need to obtain endorsement from appropriate EPD officers for not taking prosecution actions against cases of non-compliance with the 21-day statutory requirement.

Response from the Government

2.38 The Director of Environmental Protection and the Director of Civil Engineering and Development agree with the audit recommendations in paragraph 2.36. The Director of Environmental Protection has said that, having regard to the cost recovery principle and user-pay principle, and the fact that there is an increasing quantity of abandoned C&D materials being disposed of at landfills in tandem with the rising level of construction works, the charge rates of the charging scheme need to be adjusted.

2.39 The Director of Environmental Protection agrees with the audit recommendations in paragraph 2.37.

PART 3: MEASURES TO INCREASE REUSE OF FILL MATERIALS

3.1 This PART examines measures taken by the Government to increase the reuse of fill materials by local works projects.

Handling of fill materials

3.2 Fill materials sorted from abandoned C&D materials were either reused in local works projects or exported to Taishan. During the eight years from 2007 to 2014, of the total 135.61 Mt of abandoned C&D materials generated (see Appendix A), 125.65 Mt (93%) were fill materials for reuse and 9.96 Mt (7%) were mixed abandoned C&D materials for disposal at landfills. Of the 125.65 Mt of fill materials, 44.95 Mt (36%) were reused locally and 73.67 Mt (59%) were exported to Taishan, and the remaining 7.03 Mt (5%) of fill materials were stockpiled at the two public fill banks.

Many vehicle loads of abandoned C&D materials disposed of at sorting facilities not meeting the inert-content requirement

3.3 Under the Waste Disposal (Designated Waste Disposal Facility) Regulation, abandoned C&D materials meeting the inert-content requirement (see para. 1.4(c)) may be disposed of at two sorting facilities (at a lower charge rate than that at landfills — see para. 1.6) located in Tuen Mun and Tseung Kwan O managed by the CEDD. According to the CEDD, abandoned C&D materials of a low inert content are not accepted for disposal at the sorting facilities as this arrangement would result in:

- (a) higher operation costs due to deployment of additional labour and plant resources for separating the non-inert construction waste from mixed construction waste;
- (b) increased wear and tear of the mechanical sorting plants and reduced efficiency of the sorting operations; and
- (c) low recovery of fill materials for reuse.

Measures to increase reuse of fill materials

3.4 At the sorting facilities, abandoned C&D materials would be processed to screen out fill materials as far as practicable which would be delivered to public fill banks for reuse whereas the residue (i.e. non-inert construction waste) would be delivered to landfills for disposal. Vibratory and rotary screens, magnetic separators, density separators and handpicking were adopted in the sorting processes. Abandoned C&D materials disposed of at the two sorting facilities are charged at the rate of \$100 per tonne.

3.5 In December 2013, the CEDD engaged a contractor (Contractor C) through open tender for providing sorting services at the two sorting facilities for a three-year period (Note 9). The sorting equipment and facilities were procured and installed at government expenses. The estimated contract cost was \$146.89 million and the estimated quantity of abandoned C&D materials processed at the facilities was 1.31 Mt (or an average \$112 per tonne of abandoned C&D materials processed).

3.6 When a vehicle loaded with abandoned C&D materials arrived at a sorting facility, the total gross weight of the vehicle (comprising the weight of both the vehicle and the load) would be obtained from a weighbridge, and the weight of the abandoned C&D materials would be obtained by netting off the vehicle weight from the total gross weight. The criteria adopted for accepting loads of abandoned C&D materials at different disposal facilities (hereinafter referred to as the screening methodology) were published in the gazette under the Waste Disposal (Designated Waste Disposal Facility) Regulation. According to the screening methodology gazetted in 2005 and adopted by the EPD for landfill operations and the CEDD for operations at sorting facilities and public fill banks:

Note 9: *Three contracts were awarded through open tender for provision of similar sorting services from November 2005 to December 2013.*

- (a) for a vehicle having a demountable skip (Note 10), if the weight ratio (net weight of waste divided by the permitted gross vehicle weight of the vehicle) was equal to or less than 0.25 (suggesting that the inert content of the waste did not meet the inert-content requirement), the load of abandoned C&D materials should not be accepted for disposal at sorting facilities and should be disposed of at landfills; and
- (b) for a vehicle not having a demountable skip, the relevant weight ratio was 0.20.

3.7 In June 2008, the EPD took actions to enhance the screening methodology. Under the enhanced methodology, a vehicle loaded with abandoned C&D materials consisting entirely of bamboos, plywood or timber would not be accepted for disposal at the sorting facilities. In December 2010, the EPD further enhanced the screening methodology by using laser sensors to measure the height of the waste load of a vehicle arriving at a sorting facility. Information on the height of a waste load provides additional information for estimating the volume and density of the waste load. Based on the measurements of laser sensors, the weight of the waste load and the permitted gross weight of a vehicle arriving at a sorting facility, a computer would carry out computations and generate information on whether the waste load should be accepted for disposal at the sorting facility.

3.8 Table 4 shows that, on an annual basis, over 90% of vehicle loads of abandoned C&D materials had been accepted for disposal at the sorting facilities from 2006 to 2015.

Note 10: *For sizes of skips range from 4 to 7 metres in length, 2 to 3 metres in width and 1.5 to 3 metres in height and their volumes range from 12 m³ to 63 m³.*

Measures to increase reuse of fill materials

Table 4
Vehicle loads accepted and
not accepted for disposal at sorting facilities
(2006 to 2015)

Year	Vehicle loads				
	Total	Accepted		Not accepted	
	(No.)	(No.)	(Percentage)	(No.)	(Percentage)
2006	171,685	168,265	98 %	3,420	2 %
2007	108,950	106,690	98 %	2,260	2 %
2008	96,501	94,285	98 %	2,216	2 %
2009	99,924	97,579	98 %	2,345	2 %
2010 (Note)	103,061	100,005	97 %	3,056	3 %
2011	72,925	68,522	94 %	4,403	6 %
2012	80,299	75,720	94 %	4,579	6 %
2013	98,102	92,196	94 %	5,906	6 %
2014	111,290	105,384	95 %	5,906	5 %
2015	128,139	122,099	95 %	6,040	5 %

Source: CEDD records

Note: In December 2010, the EPD further revised the screening methodology for accepting waste loads at waste disposal facilities (see para. 3.7).

3.9 Audit noted that, although abandoned C&D materials being disposed of at the two sorting facilities needed to meet the inert-content requirement (i.e. containing more than 50% of fill materials by weight), the quantities of fill materials sorted from abandoned C&D materials at the two sorting facilities were significantly lower than 50% of those of the total abandoned C&D materials from 2006 to 2015. Details are shown in Table 5.

Table 5

**Fill materials recovered from abandoned C&D materials at sorting facilities
(2006 to 2015)**

Year	Total quantity handled	Quantity of non-inert waste sorted		Quantity of fill materials recovered	
	('000 tonne)	('000 tonne)	(Percentage)	('000 tonne)	(Percentage)
2006	1,389	960	69 %	429	31 %
2007	920	677	74 %	243	26 %
2008	761	600	79 %	161	21 %
2009	761	609	80 %	152	20 %
2010 (Note)	789	680	86 %	109	14 %
2011	410	237	58 %	173	42 %
2012	439	247	56 %	192	44 %
2013	505	303	60 %	202	40 %
2014	578	413	71 %	165	29 %
2015	683	468	69 %	215	31 %
Overall	7,235	5,194	72 %	2,041	28 %

Source: CEDD records

Note: See Note to Table 4.

3.10 As shown in Table 5, the percentages of fill materials being recovered from abandoned C&D materials were much lower than the inert-content requirement (i.e. containing more than 50 % of fill materials by weight).

3.11 Furthermore, between 2006 and 2014, the EPD and the CEDD had carried out 19 surveys to ascertain the extent of compliance with the inert-content requirement by vehicle loads of abandoned C&D materials accepted for disposal at the sorting facilities. About 140 to 260 vehicle loads were sampled in each survey. In each of the surveys, each selected vehicle load of abandoned C&D materials was sorted into fill materials and non-inert construction waste to determine whether the vehicle load met the inert-content requirement. Table 6 shows the percentages of sampled vehicle loads complying with the inert-content requirement in the 19 surveys conducted between 2006 and 2014.

Measures to increase reuse of fill materials

Table 6

**Percentages of sampled vehicle loads
meeting the inert-content requirement at the sorting facilities
(2006 to 2014)**

Date of survey	Percentage of number of vehicle loads	
	Meeting inert-content requirement	Not meeting inert-content requirement
Jun 2006	61 %	39 %
Sep 2006	79 %	21 %
Nov 2006	76 %	24 %
Jan 2007	69 %	31 %
May 2007	65 %	35 %
Jul 2007	58 %	42 %
Sep 2007	50 %	50 %
Nov 2007	54 %	46 %
Apr 2008	52 %	48 %
Aug 2008	60 %	40 %
Jan 2009	52 %	48 %
Sep 2009	44 %	56 %
May 2011 (Note)	82 %	18 %
Nov 2011	78 %	22 %
Jun 2012	72 %	28 %
Nov 2012	69 %	31 %
Apr 2013	68 %	32 %
Oct 2013	65 %	35 %
Nov 2014	48 %	52 %
Overall	63 %	37 %

Source: CEDD and EPD records

Note: See Note to Table 4.

Remarks: According to the CEDD, the skip volumes and waste mix were different among the sampled vehicles.

3.12 In September and October 2016, the CEDD and the EPD informed Audit that:

CEDD

- (a) a certain portion of inert content of the abandoned C&D materials inevitably could not be recovered during the sorting process due to contamination (e.g. sanitary ware and steel being bound to concrete) and had to be disposed of at landfills. As a result, the quantity of fill materials sorted from abandoned C&D materials would be lower than that of the inert content of the materials accepted for disposal at sorting facilities; and

EPD

- (b) as regards the survey results shown in Table 6, after the adoption of the revised screening methodology in December 2010, the average compliance rate of the inert-content requirement was about 70%. In this connection, the EPD considered that the current arrangement was effective and the arrangement had been well received and accepted by the trade.

3.13 As shown in Tables 5 and 6, after adoption of the revised screening methodology in December 2010, the percentage of fill materials being recovered from abandoned C&D materials had increased from 14% in 2010 to 42% in 2011 and further to 44% in 2012. Similarly, the percentage of sampled vehicle loads meeting the inert-content requirement had increased from 44% in September 2009 to 82% in May 2011 and 78% in November 2011. These statistics show that the revised screening methodology adopted in December 2010 was effective in the initial years of adoption in screening out waste loads not meeting the inert-content requirement from being accepted for disposal at sorting facilities.

3.14 However, Audit noted that the percentage of fill materials being recovered from abandoned C&D materials had decreased from 44% in 2012 to 31% in 2015, and the percentage of sampled vehicle loads meeting the inert-content requirement had decreased from 82% in May 2011 to 48% in November 2014. The significant decreases in the percentages show that the effectiveness of the revised screening methodology has diminished, which is a cause for concern.

Measures to increase reuse of fill materials

3.15 According to the surveys conducted from 2006 to 2014, on average 37% of the total number of sampled vehicle loads of abandoned C&D materials accepted for disposal at the sorting facilities in fact did not meet the inert-content requirement. Notwithstanding that the acceptance of vehicle loads of abandoned C&D materials containing high proportion of non-inert substances at the sorting facilities may help retrieve fill materials from the materials that would otherwise be disposed of at landfills, this practice would:

- (a) undermine the effectiveness of the differential pricing strategy under the charging scheme; and
- (b) reduce the total charge collected under the charging scheme, as the charge of disposing of a tonne of abandoned C&D material at sorting facilities was \$25 lower than that for disposing of the materials at landfills.

3.16 In Audit's view, the EPD, in collaboration with the CEDD, needs to conduct a review of the screening methodology adopted for accepting vehicle loads of abandoned C&D materials at sorting facilities with a view to complying as far as possible with the inert-content requirement.

Inconsistent published statistics

3.17 Furthermore, Audit noted that the quantities of fill materials being disposed of at public fill banks between 2007 and 2014 as reflected in the CEDD's Controlling Officer's Reports were different from those of the EPD as published in its annual reports of "Monitoring of Solid Waste in Hong Kong". Details are shown in Table 7.

Measures to increase reuse of fill materials

Table 7
Fill materials disposed of at public fill banks
(2007 to 2014)

Quantity (Mt)	2007	2008	2009	2010	2011	2012	2013	2014	Overall
According to CEDD records (a)	6.50	7.90	14.00	10.50	11.40	13.10	12.90	12.30	88.60
According to EPD records (b)	6.51	6.96 (Note)	6.93 (Note)	10.46	11.37	12.83	12.93	12.56	80.55
Difference (c)=(a) – (b)	(0.01)	0.94	7.07	0.04	0.03	0.27	(0.03)	(0.26)	8.05
Percentage (c) ÷ (a) × 100%	(0.2%)	11.9%	50.5%	0.4%	0.3%	2.1%	(0.2%)	(2.1%)	9.1%

Source: Audit analysis of CEDD and EPD records

Note: According to the CEDD and the EPD, the EPD's statistics for 2008 and 2009 respectively had not accounted for 0.93 Mt and 7.16 Mt of fill materials having been delivered to Taishan. The related quantities were accounted for in other years.

3.18 In September and October 2016, the CEDD, the EPD and the FSTB informed Audit that:

CEDD

- (a) the verification process of the year-end fill quantities could only be completed in February of the following year after the completion of necessary topographical surveys of the stockpiled fill materials at the two public fill banks, and the record reconciliation process of the actual quantity of fill materials being reused among public works projects. In view of the time schedule for compiling the statistics, the year-end statistics shown in the CEDD Controlling Officer's Reports were based on the provisional year-end statistics which were considered sufficiently accurate (with differences in a range of 0.2% to 2.1%);

Measures to increase reuse of fill materials

EPD

- (b) the data of a year as shown in the EPD's report of "Monitoring of Solid Waste in Hong Kong" were based on the actual data from January to December of a year provided by the CEDD. Owing to the different timing in publishing the CEDD's Controlling Officer's Report and the EPD's report, there was inevitably a need for the CEDD to use provisional statistics and the EPD to use the actual statistics;

FSTB

- (c) while the cut-off date for Controlling Officers to submit to the FSTB the draft Estimates would normally fall in November/December, Controlling Officers were allowed to update the actual statistical data (covering the whole calendar year) in Controlling Officer's Reports by early January. The CEDD should endeavour to update the actual statistical data for December as far as practicable before the deadline in early January; and
- (d) in the event that it was still not possible for the CEDD to provide the actual statistics by early January, it might consider adding a remark like "provisional actual subject to adjustment" against the pertinent data. This practice was being adopted by some government departments.

3.19 Audit considers that different quantities of fill materials being disposed of at public fill banks published by the CEDD and the EPD may cause confusions to the public and undermine reliability of published data. Therefore, the CEDD needs to take measures to make improvement in this area.

Low demand for Grade 200 recycled rock fill

3.20 From November 2006 to November 2013, the CEDD had awarded three contracts (Contracts D to F) through open tender for providing management services at the two public fill banks located in Tuen Mun and Tseung Kwan O, with Contract D covering a 37-month period from November 2006 to December 2009, Contract E covering a 50-month period from December 2009 to January 2014, and

Contract F covering a 40-month period from January 2014 to April 2017. Under Contracts D to F, the contractors also needed to provide crushing facilities (with a capacity to process 800 tonnes of fill materials a day) at Tseung Kwan O Fill Bank to crush fill materials into Grade 200 recycled rock fill materials of the size of 200 millimetres in diameter or smaller for use by public works projects requiring such recycled rock fill materials.

3.21 Upon receiving requests from government works departments (or their contractors) for Grade 200 recycled rock fill materials, a fill-bank contractor would carry out the crushing process at the Tseung Kwan O Fill Bank and provide the requested quantities free of charge. Under Contract F covering the period January 2014 to April 2017, Contractor F would be paid \$5.12 for each tonne of fill materials dispatched from the public fill banks, and he would be paid \$19.05 for each tonne of Grade 200 recycled rock fill materials produced and loaded onto the vehicle of the collector.

3.22 Audit noted that the quantities of Grade 200 rock fill materials produced by the crushing facilities were about 50,000 tonnes in 2012, 20,000 tonnes in 2013, 50,000 tonnes in 2014 and 40,000 tonnes in 2015 (totalling 160,000 tonnes), which were significantly lower than the maximum annual capacity of the crushing facility of 196,800 tonnes (800 tonnes \times 246 working days in a year). The annual demand for Grade 200 recycled rock fill materials were 60,000 tonnes in 2012, 120,000 tonnes in 2013, 20,000 tonnes in 2014 and 60,000 tonnes in 2015 (totalling 260,000 tonnes). The high demand for 120,000 tonnes in 2013 was met from the 20,000 tonnes produced in the year and 100,000 tonnes of stock kept at the site. In September and October 2016, the CEDD informed Audit that:

- (a) the production quantities of Grade 200 recycled rock fill materials relied very much on the quantity of large-size rock pieces being disposed of at public fill banks, and the supply of rock pieces was unsteady. The need for Grade 200 recycled rock fill materials was dependent on the market demand and the nature of construction projects being implemented at the time;
- (b) the feeding chamber and horsepower of the crushing plant needed to be sufficiently large to handle rock pieces of different sizes and hardness, and the crushing plant so chosen was commonly available in the market; and

Measures to increase reuse of fill materials

- (c) the CEDD needed to ensure that the crushing plant had reasonable production capacity so as to meet the demand for Grade 200 recycled rock fill materials. Site records showed that on some occasions the capacity of the crushing plant could barely be sufficient to meet the urgent requests.

3.23 Audit considers that the CEDD needs to conduct a review to ascertain the reasons for the low demand for Grade 200 recycled rock fill materials by public works projects, and take necessary measures to meet the need of the users. The CEDD also needs to consider allowing private works projects to apply to collect at the public fill banks Grade 200 recycled rock fill materials for use on a cost-recovery basis. These two measures would help increase the quantities of fill materials used by both public and private works projects.

Need to encourage public organisations undertaking infrastructure projects to maximise reuse of fill materials

3.24 Under ETWB Technical Circular No. 33/2002 on “Management of construction and demolition material including rock” issued in August 2002, for a public works project that would generate more than 50,000 m³ of abandoned C&D materials or that would require importing fill materials in excess of 50,000 m³:

- (a) a C&D Material Management Plan should be drawn up at the early design stage to make estimates of the total quantity of abandoned C&D materials generated and reused by the project, and the quantity of imported fill materials;
- (b) the Management Plan should be vetted by a departmental vetting committee (chaired by a directorate officer) prior to the upgrading of the project to Category A in the Public Works Programme;
- (c) based on information included in the Management Plan, the works contractor should prepare a Waste Management Plan with estimates of the total quantity of abandoned C&D materials generated and reused by the project, and the quantity of imported fill materials; and

Measures to increase reuse of fill materials

- (d) the Public Fill Committee, chaired by the Director of Civil Engineering and Development, should monitor the implementation of the C&D Material Management Plan and the Waste Management Plan of related projects on a half-year basis.

In April 2015, the contents of ETWB Technical Circular No. 33/2002 were incorporated into the CEDD's Project Administration Handbook.

3.25 Furthermore, under Works Bureau Technical Circular No. 4/98 on "Use of public fill in reclamation and earth filling projects" issued in March 1998, for a public works project that might need imported fill materials (such as natural sand) of 300,000 m³ or more, the project proponent should:

- (a) at the early planning stage, examine and consider measures to maximise the use of fill materials; and
- (b) seek endorsement of the Public Fill Committee (see para. 3.24(d)) on the quantity of imported fill materials before inviting tenders for the works contracts.

3.26 The measures promulgated in ETWB Technical Circular No. 33/2002 and Works Bureau Technical Circular No. 4/98 would help reduce the generation of abandoned C&D materials and increase reuse of fill materials generated by public works projects. In Audit's view, with a view to fully reaping the benefits of these measures, the EPD and the CEDD need to take measures to encourage public organisations undertaking infrastructure projects, such as airport, railway and housing projects, to implement measures on reducing the generation of abandoned C&D materials and increasing the reuse of fill materials generated by the projects.

Audit recommendations

3.27 Audit has *recommended* that the Director of Environmental Protection, in collaboration with the Director of Civil Engineering and Development, should:

- (a) conduct a review of the screening methodology adopted for accepting vehicle loads of abandoned C&D materials at sorting facilities with a view to complying with the inert-content requirement as far as possible; and
- (b) take measures to encourage public organisations undertaking infrastructure projects, such as airport, railway and housing projects, to implement measures on reducing the generation of abandoned C&D materials and increasing the reuse of fill materials generated by the projects.

3.28 Audit has *recommended* that the Director of Civil Engineering and Development should:

- (a) clearly state in the Controlling Officer's Report that the quantity of fill materials being disposed of at public fill banks is provisional subject to adjustment; and
- (b) in collaboration with the Director of Environmental Protection:
 - (i) conduct a review to ascertain the reasons for the low demand for Grade 200 recycled rock fill materials by public works projects, and take necessary measures to meet the need of the users; and
 - (ii) consider allowing private works projects to apply to collect at the public fill bank Grade 200 recycled rock fill materials for use on a cost-recovery basis.

Response from the Government

3.29 The Director of Environmental Protection agrees with the audit recommendations in paragraph 3.27. He has said that, regarding the effectiveness of the screening methodology adopted at sorting facilities, the EPD will monitor the situation to see whether there is a need to make any adjustments in the future.

3.30 The Director of Civil Engineering and Development agrees with the audit recommendations in paragraphs 3.27 and 3.28. As regards the audit recommendation in paragraph 3.27(b), he has said that the CEDD has asked the relevant public organisations, including the Airport Authority, the MTR Corporation Limited and the Urban Renewal Authority to implement measures on reducing the generation of abandoned C&D materials and increasing the reuse of fill materials generated by the projects. Representatives of these public organisations have attended meetings of the Public Fill Committee on a need basis to provide updated information on generation of abandoned C&D materials and demand for fill materials by their projects.

PART 4: MEASURES TO PREVENT AND DETECT ILLEGAL DUMPING

4.1 This PART examines measures taken by the Government to prevent and detect illegal dumping of C&D materials on government land, focusing on the trip-ticket system and a trial scheme on detecting illegal dumping of abandoned C&D materials.

Background

4.2 Under the following ordinances, a person may commit an offence if he dumps waste on government land without the Government's prior approval:

- (a) section 16A of the Waste Disposal Ordinance administered by the EPD, under which a person committing an offence of illegal waste disposal for the first time may be fined up to \$200,000 and imprisoned for up to six months, and for the subsequent times may be fined up to \$500,000 and imprisoned for up to six months. In addition, an offender is liable to a fine of \$10,000 for each day during which it is proved to the satisfaction of the court that the offence has continued;
- (b) sections 4 and 9A of the Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK) of the Public Health and Municipal Services Ordinance (Cap. 132) administered by the Food and Environmental Hygiene Department (FEHD), under which a person committing an offence of illegal waste disposal may be fined up to \$25,000 and imprisoned for up to six months; and

- (c) section 3 of the Fixed Penalty (Public Cleanliness Offences) Ordinance (Cap. 570) administered by seven government departments (Note 11), under which a person committing an offence related to illegal dumping of waste may be fined a fixed penalty of \$1,500. (The title of the Ordinance was amended to “Fixed Penalty (Public Cleanliness and Obstruction) Ordinance” with effect from September 2016.)

4.3 In 2001, during deliberation of the Fixed Penalty (Public Cleanliness Offences) Bill, the Government informed LegCo that if the volume of illegally disposed waste was larger than 0.2 m³ (roughly the size of a fruit carton box), the offender would be prosecuted by summons (such as under section 16A of the Waste Disposal Ordinance or sections 4 and 9A of the Public Cleansing and Prevention of Nuisances Regulation — see para. 4.2(a) and (b)) instead of a fixed penalty notice.

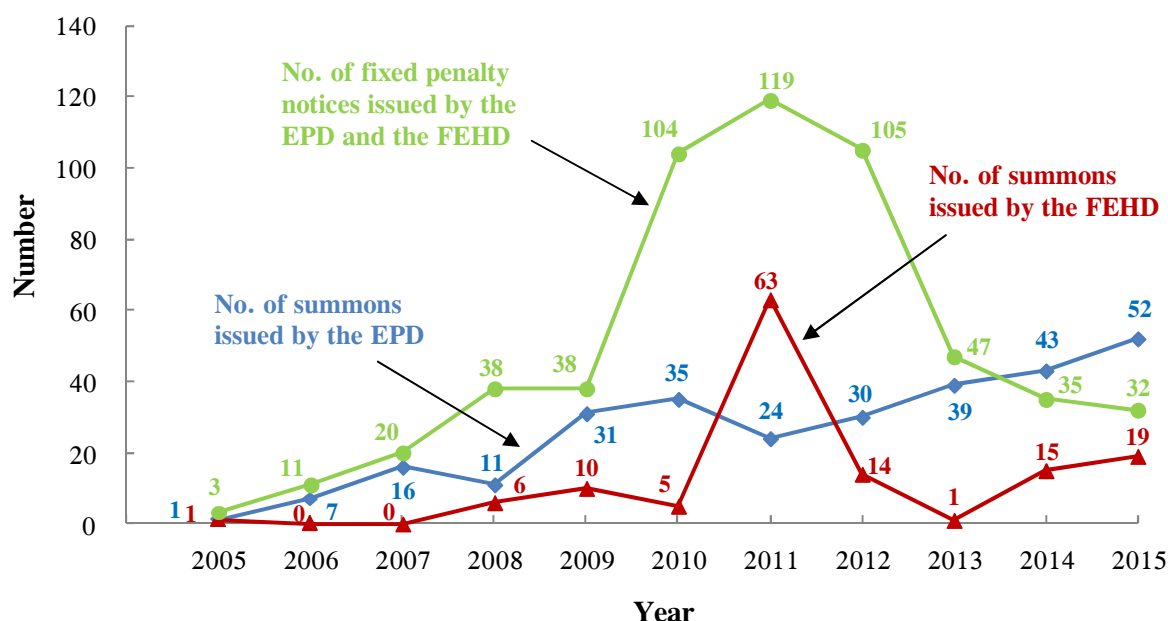
4.4 Since 2008, the EPD has co-ordinated annual inter-departmental meetings with nine other government departments (Note 12) involved in dealing with illegal dumping of C&D materials and obtained related statistics from them. Figure 4 shows the number of prosecutions involving illegal dumping of C&D materials on government land by summons issued by the EPD under section 16A of the Waste Disposal Ordinance, by summons issued by the FEHD under sections 4 and 9A of the Public Cleansing and Prevention of Nuisances Regulation, and by fixed penalty notices issued by the EPD and the FEHD under section 3 of the Fixed Penalty (Public Cleanliness Offences) Ordinance from 2005 to 2015.

Note 11: *The seven government departments are the Agriculture, Fisheries and Conservation Department, the EPD, the FEHD, the Hong Kong Police Force, the Housing Department, the Leisure and Cultural Services Department and the Marine Department.*

Note 12: *The nine government departments are the Agriculture, Fisheries and Conservation Department, the Buildings Department, the CEDD, the Drainage Services Department, the FEHD, the Highways Department, the Home Affairs Department, the Lands Department and the Planning Department.*

Figure 4

Number of prosecution actions taken against illegal dumping of C&D materials on government land (2005 to 2015)



Source: EPD records

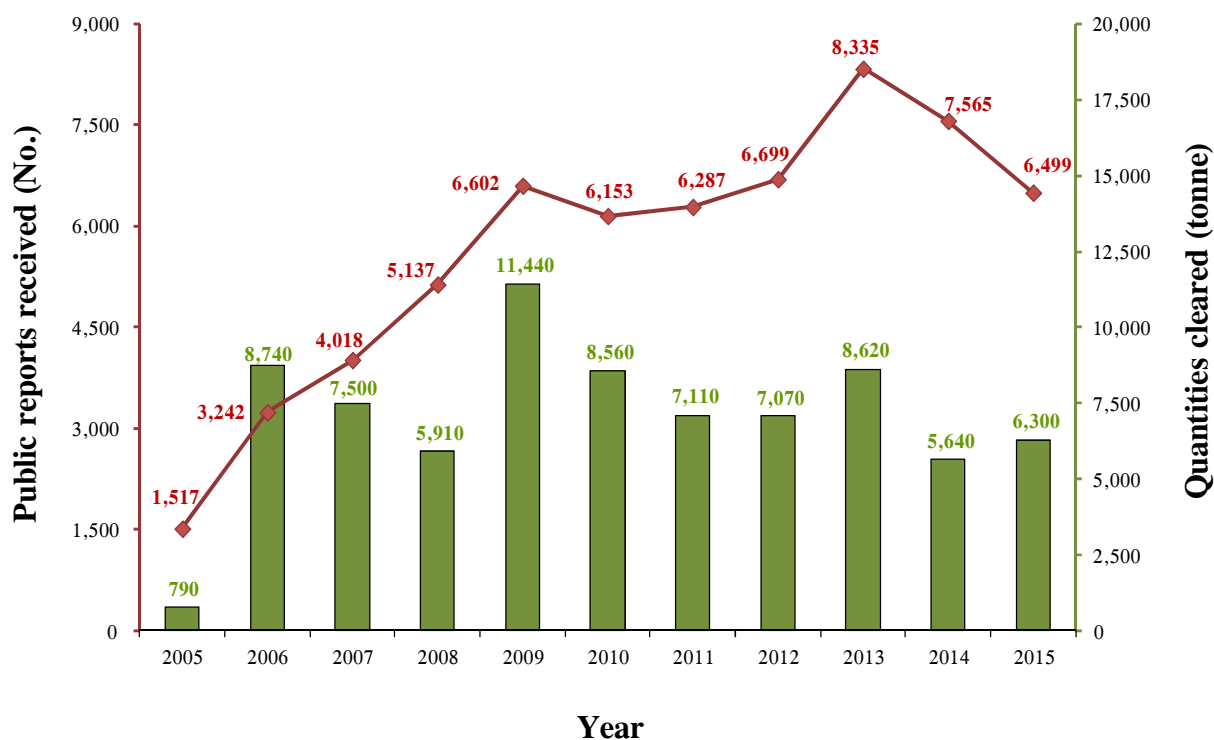
4.5 From 2013 to 2015, of the total 134 (39 + 43 + 52) prosecutions taken under section 16A of the Waste Disposal Ordinance by the EPD, as of July 2016, 132 (99%) cases had been convicted, with fines ranging from \$1,000 to \$25,000, and summons issued for 2 (1%) cases had been withdrawn.

4.6 Moreover, during the same period, of the total 35 (1 + 15 + 19) prosecutions taken under sections 4 and 9A of the Public Cleansing and Prevention of Nuisances Regulation by the FEHD, as of July 2016, 32 (91%) cases had been convicted, with fines ranging from \$1,500 to \$5,000, and 3 (9%) cases were in progress.

4.7 Subsequent to the implementation of the Construction Waste Disposal Charging Scheme in January 2006 (see para. 1.15), there have been significant increases in the number of public reports on illegal dumping of C&D materials and in the quantities of such materials found and cleared by government departments. Details are shown in Figure 5.

Figure 5

**Public reports received and illegally dumped C&D materials
cleared by government departments
(2005 to 2015)**



Legend: ◆ Public reports received (Note)
■ Illegally dumped C&D materials found and cleared

Source: EPD records

Note: According to the EPD, an illegal dumping incident may attract more than one public report. However, the EPD did not have statistics on such duplicated reports.

4.8 The Highways Department (HyD) and the Lands Department (LandsD) are the major government departments responsible for clearing illegally dumped C&D materials on government land. In 2015, of the total 6,300 tonnes of illegally dumped C&D materials cleared by government departments, 5,380 (85%) tonnes and 886 (14%) tonnes were respectively cleared by the HyD and the LandsD. According to the HyD, illegally dumped C&D materials cleared by its contractors in 2015 were mainly disposed of at public fill banks (2,769 tonnes or 51%) and sorting facilities (2,512 tonnes or 47%), with a minor portion being disposed of at landfills (99 tonnes or 2%).

Trip-ticket system

4.9 The Government has implemented a trip-ticket system for disposal of abandoned C&D materials for public works projects. According to Development Bureau Technical Circular (Works) No. 6/2010 on Trip Ticket System for Disposal of C&D Materials issued in 2010, the key features of the system for a public works project include:

- (a) **Site control.** A public works contractor would prepare a site organisational chart showing the manpower resources and duties of each staff for implementation of the system, and appoint experienced persons to oversee each site exit. Video recording system would be installed at each site exit to monitor vehicles entering and leaving the site. Subject to approval of the project department, a contractor may adopt alternative methods for site control instead of that specified in the trip-ticket system;
- (b) **Delivery control.** A driver of a vehicle loaded with C&D materials departing from a construction site of a public works project needs to obtain a trip ticket from the contractor. In the case where the abandoned C&D materials would be delivered to a government waste disposal facility (such as a public fill bank), a disposal ticket issued by the EPD would serve as the trip ticket for the delivery. Before the departure of the vehicle, the site supervisory staff would check the quantity of abandoned C&D materials (in terms of quarter-loaded, halved-loaded or fully-loaded) stated in the disposal records compiled by the contractor against the estimated volume of abandoned C&D materials loaded onto the vehicle; and
- (c) **Disposal record control.** Upon arriving at a designated waste disposal facility as specified in the trip ticket, the abandoned C&D materials would be weighed and the weight would be registered in the EPD's transaction record, and the trip ticket would be stamped. The site supervisory staff would check the load weight of abandoned C&D materials registered in the transaction record, which would be available on EPD website, against that stated in the disposal records compiled by the contractor, and take follow-up actions if discrepancies are found.

- 4.10 The objectives of the trip-ticket system are to prevent and detect:
- (a) unauthorised loading of any substance onto vehicles carrying abandoned C&D materials of public works projects en route to designated disposal destinations; and
 - (b) illegal dumping of abandoned C&D materials en route to designated disposal destinations.

Need to expand trip-ticket system to works projects undertaken by public organisations

4.11 Non-public works projects are not required to adopt the trip-ticket system. Under the charging scheme, the EPD would issue C&D material disposal tickets for both public and non-public works projects to record the account numbers of the projects for charging purposes. When a vehicle loaded with abandoned C&D materials arrives at a government waste disposal facility, the driver would provide a disposal ticket (without information on weight of the C&D materials) to the staff of the disposal facility. Based on the account information stated in the disposal ticket, the cost of the disposal (according to the weight of the abandoned C&D materials) would be charged to the related account and the disposal ticket would be stamped. According to the EPD, this system would generate records on the movement of abandoned C&D materials between the place of generation and the place of disposal.

4.12 Audit noted that the trip-ticket system for public works projects required the keeping of disposal records at project works sites (for checking against the actual quantities of C&D materials being disposed of at government waste disposal facilities). The disposal records would help to prevent and detect unauthorised loading of any substance onto vehicles carrying abandoned C&D materials of public works projects, and illegal dumping of abandoned C&D materials en route to designated disposal destinations (see para. 4.10). Audit considers that the EPD needs to, in collaboration with relevant government policy bureaux and departments, promote the adoption of this system in relevant works projects undertaken by public organisations.

Audit recommendation

4.13 Audit has *recommended* that, in taking actions to prevent and detect illegal dumping of C&D materials, the Director of Environmental Protection, in collaboration with relevant government bureaux and departments, should take measures to promote the adoption of the trip-ticket system in relevant works projects undertaken by public organisations.

Response from the Government

4.14 The Director of Environmental Protection agrees with the audit recommendation.

Trial scheme on detecting illegal dumping of abandoned C&D materials

4.15 Since 2008, the EPD had coordinated with related government departments to draw up a list of black spots on illegal dumping of abandoned C&D materials (hereinafter referred to as the black-spot list). In December 2009, the EPD installed two closed circuit television (CCTV) surveillance camera systems at two locations (Locations A and B, which were serious black spots on the same road at that time) to monitor and collect evidence on illegal dumping of C&D materials. In March 2014, the EPD installed an additional surveillance camera system at another location (Location C) along the same road of Locations A and B. Subsequently, the illegally dumped C&D materials found on the pertinent road had decreased from 1,038 m³ in 2009 to 39 m³ in 2010 and further to 2 m³ in 2015. The total capital and installation cost of the three CCTV camera systems was \$1.55 million and the maintenance cost was \$0.79 million in 2015. The installation and maintenance of the camera systems were undertaken by the Electrical and Mechanical Services Trading Fund (EMSTF — Note 13).

Note 13: *The EMSTF was set up in August 1996 under the Trading Funds Ordinance (Cap. 430) to manage and account for the operation of certain services of the Electrical and Mechanical Services Department. The services provided by the EMSTF include operation and maintenance of electrical, mechanical, electronic and building services systems and equipment.*

Measures to prevent and detect illegal dumping

4.16 As of August 2015, based on information of the EPD and that provided by nine other government departments (see para. 4.4), the EPD compiled a black-spot list comprising 41 locations. In the same month, as an initiative launched under the Keep Clean Hong Kong 2015 Campaign (Note 14), the EPD commenced a trial scheme to install surveillance camera systems at 12 of the 41 black-spot locations, as follows:

- (a) at a location (Location D) where the EPD purchased and installed a system at a total cost of \$21,600 by a contractor (engaged by quotation); and
- (b) at 11 locations (Locations E to O) where the EPD hired services from a supplier (appointed by quotation) for supply and maintenance of systems for five to seven months up to February 2016 at a total cost of \$1,164,000. The systems, which were owned and operated by the service supplier, were dismantled upon expiry of the trial scheme in February 2016 in accordance with the service contract.

4.17 According to the EPD, the trial surveillance camera system was launched to test the performance and effectiveness of simple and low-cost cameras for comparison with CCTV systems at different environmental settings (such as lighting conditions, shooting angles and distances) for identifying cost-effective arrangements for detecting illegal dumping activities.

4.18 During the trial-scheme period from August 2015 to February 2016, the 12 camera systems captured images of 998 cases involving illegal dumping of waste by vehicles, of which 170 (17%) related to C&D materials. The progress of enforcement actions taken on the 170 cases as of July 2016 was as follows:

- (a) 46 (27%) cases: prosecution actions had been taken;
- (b) 2 (1%) cases: investigations were in progress;

Note 14: *The Campaign was launched by the Government in August 2015 for the purposes of fortifying public awareness and promoting concerted community efforts to improve environmental hygiene.*

Measures to prevent and detect illegal dumping

- (c) 80 (47%) cases: prosecution actions were not taken due to unclear images of vehicle registration marks having been captured by the cameras (see paras. 4.20 and 4.21);
- (d) 42 (25%) cases: despite vehicle registration marks had been clearly captured by the systems, prosecution actions were not taken for the following reasons:
 - (i) 14 cases: vehicle owners could not be contacted (see paras. 4.22 to 4.25);
 - (ii) 19 cases: case details were not provided by vehicle owners or drivers (see paras. 4.26 to 4.29);
 - (iii) 5 cases: there was a long lapse of time and inadequate evidence (see para. 4.30); and
 - (iv) 4 cases: responsible drivers claimed that the waste dumping was carried out under the instruction of persons who had hired the delivery service (see para. 4.31).

4.19 Of the 46 cases where prosecution actions had been taken (see para. 4.18(a)), as of July 2016, 11 cases had been issued with fixed penalty notices (each with a fine of \$1,500) and 35 cases being prosecuted by summons had been convicted, with fines ranging from \$2,000 to \$15,000.

Unclear vehicle registration marks captured by cameras

4.20 For the 80 cases occurring at 8 locations where prosecution actions were not taken due to images of registration marks of the related vehicles captured by the cameras were unclear (see para. 4.18(c)), according to the EPD, the reasons for the problem included:

- (a) poor lighting condition at the locations which adversely affected the clarity of the images taken;

- (b) limitation due to quality of the cameras installed (e.g. low image resolution); and
- (c) the registration marks of the vehicles involved being out of the shooting range of the cameras.

4.21 Audit noted that the images of the vehicle registration marks of the vehicles involved in all the 24 illegal waste dumping cases (1 case involving C&D materials) captured by the camera systems at a location, and in 20 of the 22 illegal waste dumping cases (2 cases involving C&D materials) at another location, were unclear, adversely affecting the prosecution actions. In Audit's view, the EPD needs to take measures with a view to ensuring that surveillance camera systems installed for collecting evidence for prosecution purposes are capable of capturing clear images of registration marks of vehicles involved in illegal dumping of waste.

Vehicle owners could not be contacted for taking prosecution actions

4.22 For the 14 cases where the images of the vehicle registration marks of the related vehicles had been clearly captured by the camera systems but the vehicle owners could not be contacted for taking prosecution actions (see para. 4.18(d)(i)), the EPD had sent letters by registered mail to the vehicle owners according to addresses provided by the Transport Department (TD) requesting them to provide related information. However, all the letters sent in respect of these 14 cases were returned unclaimed. According to the EPD, the unclaimed letters might be attributed to the named persons not residing at the addresses, intentionally not claiming the letters or not being in Hong Kong during the period. In 6 of the 14 cases, the EPD requested the Immigration Department (ImmD) to provide the addresses of the persons involved for further investigation. In the event, addresses of 5 of the 6 cases provided by the ImmD were the same as the addresses provided by the TD. For the remaining case where the address provided by the ImmD was different from that provided by the TD, the EPD could not take further action because by the time the new information was received, the six-month time limit for taking prosecution actions under the Magistrates Ordinance was nearly expired. In Audit's view, the EPD needs to take measures with a view to ensuring that prosecution actions relating to illegal dumping of waste are taken within six months (from the time of committing the offence) according to the Magistrates Ordinance.

Measures to prevent and detect illegal dumping

4.23 Audit noted that the EPD had only sought assistance from the ImmD in 6 of the 14 cases where letters sent to vehicle owners according to addresses provided by the TD were returned unclaimed. In Audit's view, the EPD needs to issue guidelines on procedures for handling cases of illegal dumping of waste.

4.24 Audit also noted that, in handling speeding and red-light jumping cases with images captured by surveillance cameras where the vehicle owners could not be contacted according to addresses provided by the TD, the Hong Kong Police Force (Police) would seek to obtain the addresses of the vehicle owners from the ImmD, the Water Supplies Department, the Correctional Services Department, the Hospital Authority, utilities companies and insurance companies of the registered vehicles. In Audit's view, the EPD needs to strengthen efforts on contacting the vehicle owners involved in illegal waste dumping cases with reference to the good practices of the Police.

4.25 Moreover, under the Road Traffic Ordinance (Cap. 374), a vehicle owner is required to notify the TD within 72 hours of his change of address (Note 15). In Audit's view, for cases where letters sent to vehicle owners using addresses provided by the TD are returned unclaimed, the EPD needs to forward these cases to the TD for follow-up actions, such as to investigate if the vehicle owners had committed an offence under the Road Traffic Ordinance for not timely notifying the TD of changes of addresses.

Details not provided by vehicle owners or drivers

4.26 For the 19 cases where case details were not provided by the vehicle owners or the drivers (see para. 4.18(d)(ii)), the EPD did not take further actions.

4.27 Audit noted that in four cases, a camera system captured images of illegal dumping of C&D materials, which involved three vehicles registered under the same owner. The vehicle owner agreed to attend an interview but repeatedly postponed the interview. The EPD subsequently served a notice under section 23B of the

Note 15: *According to the Road Traffic Ordinance, any person without reasonable excuse fails to notify the TD within 72 hours of his change of address commits an offence and is liable to a fine of \$2,000.*

Waste Disposal Ordinance (Note 16) on the vehicle owner and required him to provide the driver information. The vehicle owner attended an interview with the EPD but said that he could not recognise the drivers involved in the four cases as shown in the video recording. According to the EPD, as there was insufficient evidence to establish an offence having been committed by the vehicle owner, no further prosecution action could be taken and the cases were closed.

4.28 In another case, a camera system captured images of a case relating to illegal dumping of C&D materials. The responsible driver identified by the vehicle owner refused to provide further information or attend an interview when contacted by the EPD. According to the EPD, as there was insufficient evidence to establish an offence having been committed by the driver, no further prosecution action could be taken and the case was closed.

4.29 In Audit's view, the EPD needs to seek legal advice on ways and means to take prosecution actions in illegal waste dumping cases if the vehicle owners and/or responsible drivers involved do not provide details of the cases.

Long lapse of time and inadequate evidence

4.30 Audit noted that in three cases, the responsible drivers claimed that the waste dumping was based on the advice of staff at the FEHD's refuse collection points (3 of the 5 cases in para. 4.18(d)(iii)). However, the FEHD informed the EPD that it could not identify the staff claimed by the drivers. According to the FEHD, it was only informed of the other two cases four months after their occurrence and the quality of the images provided by the EPD was not good enough for identifying the staff involved. In Audit's view, the EPD needs to notify the FEHD of related incidents for taking follow-up actions on a timely basis.

Note 16: *Under section 23B of the Waste Disposal Ordinance, the EPD may serve a notice on a person and require him to provide information. A person who fails without reasonable excuse to comply with the requirement or make any statement which he knows to be incorrect in a material respect commits an offence and is liable to a fine of \$100,000.*

Responsible drivers claiming that the waste dumping was carried out under instruction

4.31 A camera system captured images of four cases relating to illegal dumping of C&D materials (see para. 4.18(d)(iv)), which involved the same vehicle. At an interview, the vehicle owner, who was also the responsible driver, claimed that she only provided delivery services to her clients. She also provided the EPD with the contact number of the same client in the four cases. The EPD made several attempts to contact the said client but in vain. According to the EPD, as there was insufficient evidence in ascertaining the identity of the offender, no further prosecution action could be taken and the cases were closed. In Audit's view, the EPD needs to seek legal advice on the ways and means to take prosecution actions in illegal waste dumping cases where responsible drivers involved claim that they only act according to instructions of persons who have hired the delivery services.

Prosecution actions not taken on illegal dumping of waste by hand delivery or by cart

4.32 From August to October 2015 (Note 17), the camera systems installed at 12 locations under the trial scheme (see para. 4.16) had captured images of a total of 128 cases involving illegal dumping of C&D materials (Note 18), comprising 37 (29%) cases involving dumping by vehicles and 91 (71%) cases by hand delivery or by cart. According to the EPD, owing to difficulties in identifying the persons involved in illegal dumping of waste by hand delivery or by cart, the EPD did not take prosecution actions for the 91 cases. In Audit's view, the EPD, in collaboration with relevant government departments, needs to strengthen actions to detect and prevent illegal dumping of waste on government land, such as enhancing patrolling inspections at black spots of illegal dumping of waste by hand delivery or by cart.

Note 17: *In November 2015, the EPD ceased to keep records of cases of the illegal dumping activities captured by surveillance camera systems where no vehicle was involved.*

Note 18: *During the period, the camera systems also captured images of a total of 978 cases involving illegal dumping of other waste, comprising 166 (17%) of cases involving dumping by vehicles and 812 (83%) cases by hand delivery or by cart.*

Audit recommendations

4.33 **Audit has *recommended* that, in managing surveillance camera systems to detect illegal dumping of C&D materials in future, the Director of Environmental Protection should:**

- (a) take measures with a view to ensuring that surveillance camera systems installed for collecting evidence for prosecution purposes are capable of capturing clear images of registration marks of vehicles involved in illegal dumping of waste;**
- (b) take measures with a view to ensuring that prosecution actions relating to illegal dumping of waste are taken within the six-month time limit;**
- (c) issue guidelines on procedures for handling cases of illegal dumping of waste with images captured by surveillance camera systems;**
- (d) strengthen efforts on contacting the vehicle owners involved in illegal waste dumping cases with reference to the good practices of the Police in handling speeding and red-light jumping cases;**
- (e) forward cases where letters sent to vehicle owners using addresses provided by the TD are returned unclaimed to the TD for follow-up actions for any offence related to not timely notifying the TD of changes of addresses;**
- (f) seek legal advice on ways and means to take prosecution actions against the responsible persons involved in illegal waste dumping cases who do not provide case details;**
- (g) for cases where the responsible drivers claim that the waste dumping is based on the advice of site staff of the FEHD or its contractors, notify the FEHD of the incidents for taking follow-up actions on a timely basis; and**

Measures to prevent and detect illegal dumping

- (h) **in collaboration with relevant government departments, strengthen actions to detect and prevent illegal dumping of waste on government land, including that by hand delivery and by cart.**

Response from the Government

4.34 The Director of Environmental Protection agrees with the audit recommendations. He has said that the EPD will:

- (a) for paragraph 4.33(a), enhance the technical specifications of surveillance camera systems to facilitate collection of evidence for prosecution purposes and procure better quality equipment in future, subject to resources availability and value for money considerations;
- (b) for paragraph 4.33(b), remind all frontline staff of the six-month time limit for taking prosecution actions relating to illegal dumping of waste;
- (c) for paragraph 4.33(c), follow up the issuance of guidelines on procedures in handling cases of illegal dumping of waste in the review of the trial scheme on surveillance camera systems;
- (d) for paragraph 4.33(d), make checking with the ImmD as a standard practice in contacting the vehicle owners involved;
- (e) for paragraph 4.33(e), include a procedure in the enforcement guidelines with a view to ensuring that cases where letters sent to vehicle owners using addresses provided by the TD being returned unclaimed are forwarded to the TD for follow-up actions. Cases identified in the trial scheme have been forwarded to the TD for follow-up actions;
- (f) for paragraph 4.33(f), follow up with the Department of Justice in relation to ways and means in taking prosecution actions against the responsible persons involved in illegal waste dumping cases;

Measures to prevent and detect illegal dumping

- (g) for paragraph 4.33(g), timely notify the FEHD for checking and taking follow-up actions with contractors or their employees for cases where the responsible drivers claim that the waste dumping is based on the advice of site staff or contractors; and
- (h) for paragraph 4.33(h), strengthen actions to detect and prevent illegal dumping of waste. Follow-up actions will be subject to the priorities of the government departments concerned.

4.35 The Commissioner for Transport has said that, regarding paragraph 4.33(e), the TD welcomes the recommendation for the EPD to forward cases (where the address records of vehicle owners are suspected to be incorrect) to the TD for follow-up actions, and such a practice has been adopted by some government departments using address records of the TD.

PART 5: WAY FORWARD

5.1 This PART examines the major problems on management of abandoned C&D materials and the way forward.

The problems

5.2 Abandoned C&D materials generated had increased by 150% from 2007 to 2014. During the eight-year period, 93% of the abandoned C&D materials generated were fill materials for reuse and 7% were mixed C&D materials having been disposed of at landfills. Of the 125.65 Mt of fill materials generated during the period, 36% were reused in local works projects and 59% were exported to the Mainland. Therefore, the reuse of the vast quantities of fill materials generated from C&D activities in the future is dependent on the quantities of fill materials utilised by local works projects and the continuance of exporting surplus fill materials outside Hong Kong.

5.3 Furthermore, disposal of abandoned C&D materials accounted for 27% of the total waste being disposed of at the three landfills in 2014. However, according to the EPD, SENT Landfill and NENT Landfill could only cope with the territory-wide disposal need up to late 2020s.

Way forward

Need to reduce disposal of abandoned C&D materials at landfills

5.4 Given the scarcity of landfill space, Audit considers that the EPD needs to liaise with related government departments and other stakeholders to strengthen actions to reduce disposal of abandoned C&D materials at landfills.

5.5 In this connection, Audit noted that the charge rates of the charging scheme would be revised in April 2017 which would provide additional economic incentives to producers of abandoned C&D materials to reduce generation of such materials and practise waste sorting to reduce disposal of abandoned C&D materials at landfills.

Need to formulate long-term plan for exporting surplus fill materials

5.6 In view of the fact that local works projects could not fully absorb fill materials generated for reuse, in 2004 after discussions, the then ETWB signed an agreement with the related Mainland authority under which surplus fill materials of Hong Kong could be transported for use by works projects on the Mainland. In January 2006, a reclamation project in Taishan was designated as the project for receiving surplus fill materials from Hong Kong. From 2007 to 2014, a total of 73.67 Mt of fill materials had been transported from Hong Kong for reuse by the Taishan project, representing 59% of the total 125.65 (44.95 + 73.67 + 16.9 – 9.87 — see Appendix A) Mt of fill materials generated during the period. Accordingly, Taishan had been an important destination for receiving locally generated fill materials in recent years.

5.7 Audit noted that the quantity of fill materials for export to Taishan was subject to agreement between the ENB and the related Mainland authority on a yearly basis. For 2016, it was agreed that Taishan would receive 13 Mt of fill materials from Hong Kong. There is a risk that the Taishan project may not be able to absorb all surplus fill materials generated in Hong Kong in a given year and in the long term. In Audit's view, for long-term planning purposes, the ENB, in collaboration with the CEDD, needs to explore destinations other than Taishan for receiving surplus fill materials generated in Hong Kong.

5.8 In addition, given the high delivery cost involved in exporting fill materials outside Hong Kong, the EPD, in collaboration with the CEDD, also needs to further strengthen measures to encourage local reuse of fill materials generated in Hong Kong.

Need to formulate plan for installing surveillance camera systems to prevent and detect illegal dumping of C&D materials

5.9 Audit noted that the trial scheme commencing in August 2015 on installing surveillance camera systems to prevent and detect illegal dumping of C&D materials was completed in February 2016 (see paras. 4.16 to 4.18). According to the EPD, it commenced a review in February 2016 to examine, among other things, the technical and legal constraints encountered in the trial scheme, with a view to drawing up measures to tackle the problems identified. In Audit's view, the EPD needs to complete the review of the trial scheme on a timely basis and,

Way forward

based on the review results, formulate strategies and implementation plans for installing surveillance camera systems to prevent and detect illegal dumping of C&D materials.

Audit recommendations

5.10 **Audit has *recommended* that the Secretary for the Environment should, in collaboration with the Director of Civil Engineering and Development, explore destinations other than Taishan for receiving surplus fill materials generated in Hong Kong.**

5.11 **Audit has *recommended* that the Director of Environmental Protection should:**

- (a) **in collaboration with the Director of Civil Engineering and Development, further strengthen measures to encourage local reuse of fill materials generated in Hong Kong; and**
- (b) **complete the review of the trial scheme on installing surveillance camera systems on a timely basis and, based on the review results, formulate strategies and implementation plans for installing the systems to prevent and detect illegal dumping of C&D materials.**

Response from the Government

5.12 The Secretary for the Environment agrees with the audit recommendation in paragraph 5.10.

5.13 The Director of Environmental Protection agrees with the audit recommendations in paragraph 5.11.

5.14 The Director of Civil Engineering and Development agrees with the audit recommendations in paragraphs 5.10 and 5.11(a).

**Changes of quantities of fill materials
stockpiled at public fill banks
(2007 to 2014)**

Quantity (Mt)	2007	2008	2009	2010	2011	2012	2013	2014	Overall
Fill materials stockpiled at year beginning	9.87	13.92	11.48	14.47	15.53	15.43	18.64	21.03	9.87
<i>Add:</i> Abandoned C&D materials generated	8.39	9.04	15.44	14.31	18.78	24.57	24.08	21.00	135.61
<i>Less:</i> Fill materials reused locally (Note)	(1.09)	(0.01)	(0.21)	(2.54)	(6.42)	(10.65)	(10.66)	(13.37)	(44.95)
Fill materials exported to Taishan	(2.10)	(10.34)	(11.10)	(9.40)	(11.24)	(9.45)	(9.72)	(10.32)	(73.67)
Abandoned C&D materials disposed of at landfills	(1.15)	(1.13)	(1.14)	(1.31)	(1.22)	(1.26)	(1.31)	(1.44)	(9.96)
Fill materials stockpiled at year end	13.92	11.48	14.47	15.53	15.43	18.64	21.03	16.90	16.90
Total storage capacity of public fill banks	22.9	19.2	19.2	19.2	19.2	21.9	22.3	22.3	

Source: CEDD and EPD records

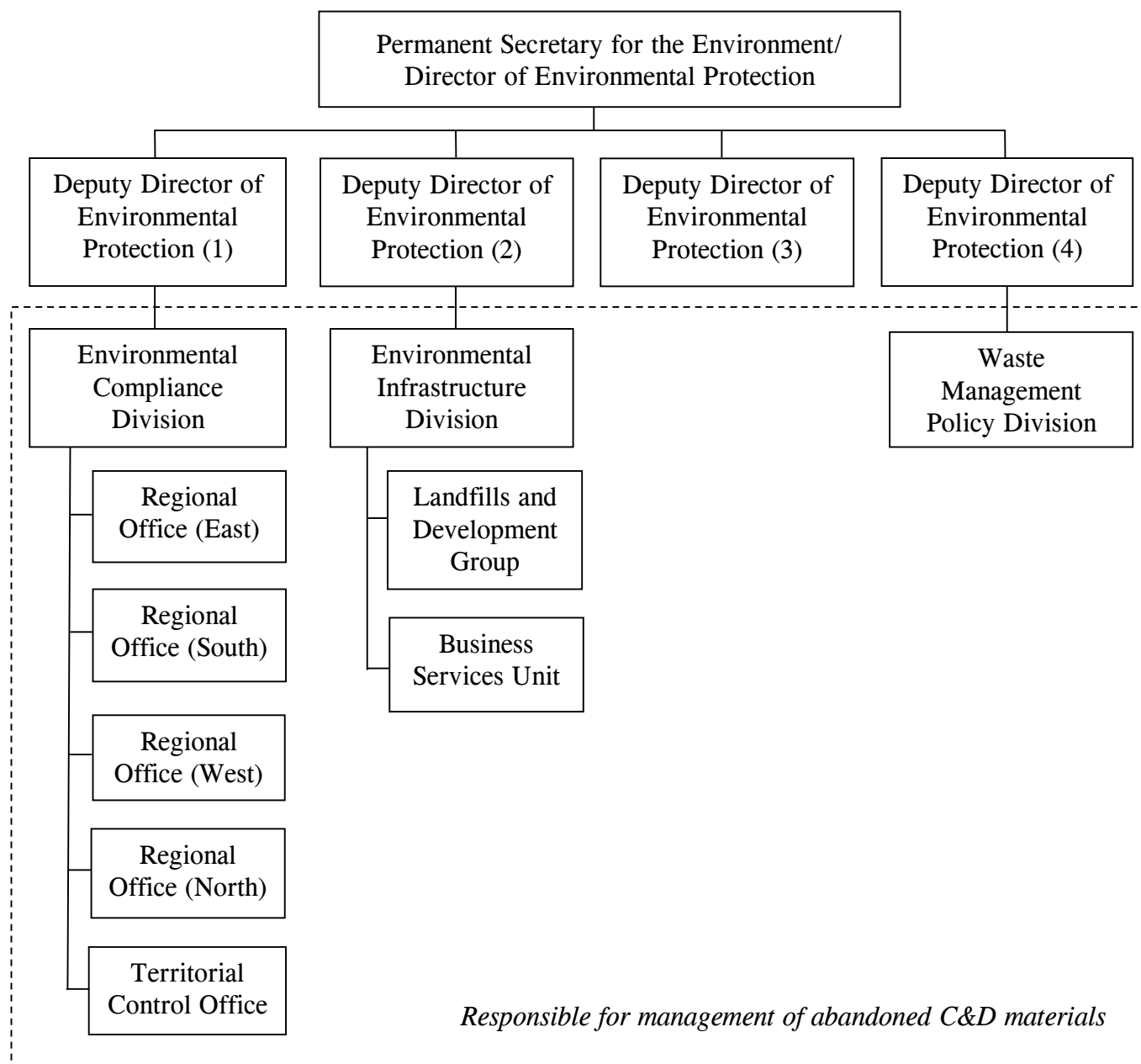
Note: The data for fill materials reused locally comprised the following two components:

- (a) *Fill materials reused directly (i.e. fill materials directly delivered from a works site to another works site for reuse without delivering them to public fill banks); and*
- (b) *Fill materials taken from public fill banks.*

Details are as follows:

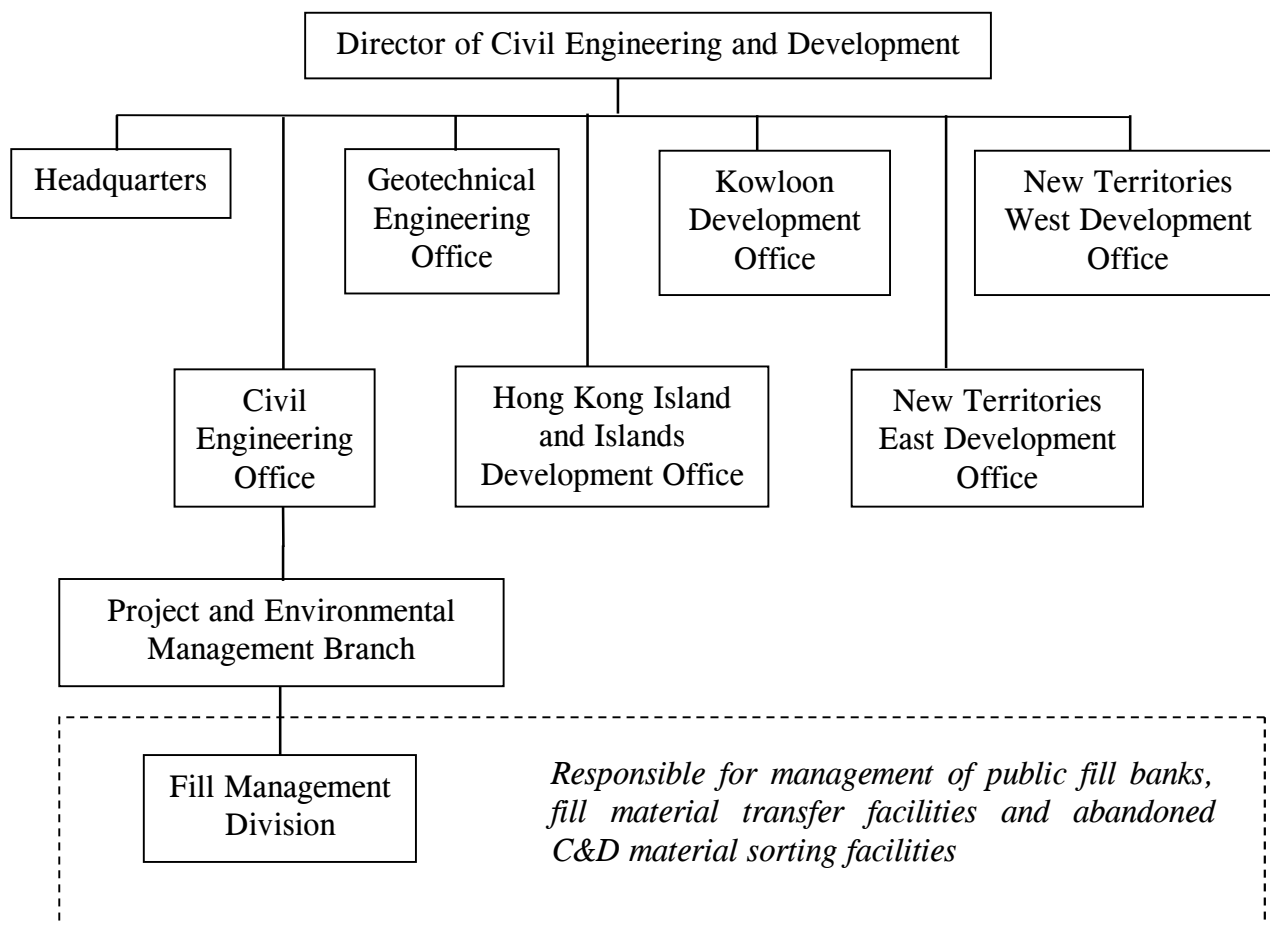
Quantity (Mt)	2007	2008	2009	2010	2011	2012	2013	2014	Total
(a) Fill materials reused directly	0.72	0.01	0.21	2.54	6.19	10.48	9.84	7.01	37.00
(b) Fill materials taken from public fill banks	0.37	—	—	—	0.23	0.17	0.82	6.36	7.95
Total	1.09	0.01	0.21	2.54	6.42	10.65	10.66	13.37	44.95

**Environmental Protection Department:
Organisation chart (extract)
(31 July 2016)**



Source: EPD records

**Civil Engineering and Development Department:
Organisation chart (extract)
(31 July 2016)**



Source: CEDD records

**Cost recovery of fill-material charge
(2006-07 to 2014-15)**

Financial year	Quantity received (Note 1) (a) (Mt)	Quantity subjected to charge (Note 2) (b) (Mt)	Cost per tonne (Note 3) (c)	Charge rate per tonne (d)	Cost recovery rate (e) = (d) ÷ (c) × 100% (Percentage)	Estimated cost under-recovered (f) = (b) × [(c) – (d)] (Million)
2006-07	6.06	1.07	\$43	\$27	63 %	\$17.12
2007-08	6.27	3.38	\$63		43 %	\$121.68
2008-09	6.80	4.84	\$61		44 %	\$164.56
2009-10	6.77	5.84	\$64 (Note 4)		42 %	\$216.08
2010-11	10.35	8.91	\$66		41 %	\$347.49
2011-12	11.20	11.37	\$66		41 %	\$443.43
2012-13	12.64	13.45	\$58		47 %	\$416.95
2013-14	12.73	13.35	\$85		32 %	\$774.30
2014-15	12.39	12.56	\$62		44 %	\$439.60
Total						\$2,941.21

Source: Audit analysis of CEDD and EPD records

Note 1: These refer to quantities of fill materials being received at public fill banks in calendar years. For simplicity, these quantities were taken as those being received in financial years in this table. These quantities only included fill materials being directly disposed of at public fill banks but excluded that being sorted from sorting facilities, because charges had been levied on abandoned C&D materials being disposed of at the sorting facilities.

Note 2: According to the EPD, the variances between the data in columns (a) and (b) were due to:

- (a) some types of fill materials were exempted from the charges (e.g. fill materials generated from works projects where the related works contracts had been awarded on a date which was earlier than 1 December 2005); and*
- (b) the charge for fill materials delivered by an approved vessel to a public fill bank was based on the maximum allowable loading of the vessel instead of the actual weight of the fill materials delivered. Therefore, for a vessel not carrying a full load of fill materials, the quantity of fill materials subject to charge would be greater than the actual quantity of the materials being delivered to public fill banks.*

Note 3: These costs were based on the costing statements prepared by the CEDD.

Note 4: According to the CEDD, costing statement for 2009-10 was not prepared. The average of the costs of 2008-09 and 2010-11 was taken as the estimated cost of 2009-10.

**Cost recovery of sorting charge
(2006-07 to 2014-15)**

Financial year	Quantity received (Note 1) (a) (Mt)	Quantity subjected to charge (Note 2) (b) (Mt)	Cost per tonne (Note 3) (c)	Charge rate per tonne (d)	Cost recovery rate (e) = (d) ÷ (c) × 100% (Percentage)	Estimated cost under-recovered (f) = (b) × [(c)-(d)] (Million)
2006-07	1.46	0.28	\$140	\$100	71 %	\$11.20
2007-08	0.89	0.46	\$180		56 %	\$36.80
2008-09	0.76	0.59	\$200		50 %	\$59.00
2009-10	0.75	0.63	\$248 (Note 4)		40 %	\$93.24
2010-11	0.76	0.69	\$296		34 %	\$135.24
2011-12	0.42	0.41	\$229		44 %	\$52.89
2012-13	0.44	0.44	\$242		41 %	\$62.48
2013-14	0.50	0.50	\$295		34 %	\$97.50
2014-15	0.58	0.58	\$299		33 %	\$115.42
Total						\$663.77

Source: Audit analysis of CEDD and EPD records

Note 1: These refer to quantities of abandoned C&D materials being received at sorting facilities in calendar years. For simplicity, these quantities were taken as those being received in financial years in this table.

Note 2: See Note 2(a) to Appendix D.

Note 3: See Note 3 to Appendix D.

Note 4: See Note 4 to Appendix D.

**Cost recovery of landfill charge
(2006-07 to 2014-15)**

Financial year	Quantity received (Note 1) (a) (Mt)	Quantity subjected to charge (Note 2) (b) (Mt)	Cost per tonne (Note 3) (c)	Charge rate per tonne (d)	Cost recovery rate (e) = (d) ÷ (c) × 100% (Percentage)	Estimated cost under-recovered (f) = (b) × [(c)-(d)] (Million)
2006-07	0.55	0.09	\$135	\$125	93 %	\$0.90
2007-08	0.48	0.18	\$142		88 %	\$3.06
2008-09	0.53	0.28	\$145		86 %	\$5.60
2009-10	0.53	0.34	\$154		81 %	\$9.86
2010-11	0.63	0.40	\$147		85 %	\$8.80
2011-12	0.98	0.75	\$168		74 %	\$32.25
2012-13	1.01	0.75	\$179		70 %	\$40.50
2013-14	1.01	0.75	\$191		65 %	\$49.50
2014-15	1.03	0.75	\$199		63 %	\$55.50
Total						\$205.97

Source: Audit analysis of EPD records

Note 1: These refer to quantities of abandoned C&D materials being received at landfills in calendar years. For simplicity, these quantities were taken as those being received in financial years in this Table. These quantities only included abandoned C&D materials being directly disposed of at landfills but excluded that being sorted from sorting facilities, because charges had been levied on abandoned C&D materials being disposed of at the sorting facilities.

Note 2: See Note 2(a) to Appendix D. Moreover, some waste concrete being disposed of at landfills was not subject to charge (see Note to Figure 2 in para. 1.10) and its quantities were excluded from the calculation.

Note 3: These costs were based on the costing statements prepared by the EPD.

Acronyms and abbreviations

Audit	Audit Commission
C&D	Construction and demolition
CCTV	Closed circuit television
CEDD	Civil Engineering and Development Department
CPU	Central Prosecution Unit
EA Panel	Panel on Environmental Affairs
EMSTF	Electrical and Mechanical Services Trading Fund
ENB	Environment Bureau
EPD	Environmental Protection Department
ETWB	Environment, Transport and Works Bureau
FC	Finance Committee
FEHD	Food and Environmental Hygiene Department
FSTB	Financial Services and the Treasury Bureau
ha	hectare
HyD	Highways Department
ImmD	Immigration Department
LandsD	Lands Department
LegCo	Legislative Council
m ³	cubic metre
Mt	million tonnes
NENT	Northeast New Territories
OITFs	Outlying Islands Transfer Facilities
Police	Hong Kong Police Force
SENT	Southeast New Territories
TD	Transport Department
WENT	West New Territories