

CHAPTER 1

Transport and Housing Bureau Highways Department

Highways Department: Maintenance of public footpaths

**Audit Commission
Hong Kong
30 November 2021**

This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.

Report No. 77 of the Director of Audit contains 8 Chapters which are available on our website at <https://www.aud.gov.hk>

Audit Commission
26th floor, Immigration Tower
7 Gloucester Road
Wan Chai
Hong Kong

Tel : (852) 2829 4210
Fax : (852) 2824 2087
E-mail : enquiry@aud.gov.hk

HIGHWAYS DEPARTMENT: MAINTENANCE OF PUBLIC FOOTPATHS

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HIGHWAYS DEPARTMENT: MAINTENANCE OF PUBLIC FOOTPATHS

Executive Summary

1. The Highways Department (HyD) is responsible for conducting inspections, planning and managing the maintenance programme, supervising maintenance works and handling public complaints about public footpaths. As of June 2021, the total length of public footpaths maintained by HyD was approximately 2,600 kilometres. According to the management and maintenance (M&M) provisions of HyD's local road maintenance contracts, contractors are required to conduct inspections and routine maintenance works for road surfaces and related street furniture (e.g. railings, street name plates and traffic signs) of public roads (including footpaths) and will be paid a monthly fee. According to HyD, in 2020-21, the M&M payment under the local road maintenance contracts included \$18 million for public footpaths. For non-routine maintenance and rehabilitation works not covered by the M&M provisions, HyD may issue works orders and pay the contractors to carry out such works. In 2020-21, works orders at a total cost estimate of \$151 million were issued for non-routine maintenance and rehabilitation works of public footpaths. The Audit Commission (Audit) has recently conducted a review to examine issues relating to maintenance of public footpaths by HyD with a view to identifying areas for improvement.

Inspection and routine maintenance works

2. According to HyD, inspection and routine maintenance works under the local road maintenance contracts mainly comprise road routine inspections, road detailed inspections, the associated rectification works on the defects covered by the M&M provisions and cleansing of street furniture. From April 2020 to March 2021, HyD administered six local road maintenance contracts (para. 2.2).

3. *Need to enhance checking on the submission of inspection reports.* According to contract provisions, the contractors are required to conduct routine inspections and detailed inspections on all roads within designated contract areas maintained by HyD. Audit analysed the Electronic Maintenance Management System

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(EMMS — a database established by the contractors for maintaining records of inspection and routine maintenance works) records of 101,566 inspection reports submitted by the contractors for the period from April 2020 to March 2021 and revealed the following areas for improvement (paras. 1.5(b) and 2.5):

- (a) ***Inadequate coverage of inspections.*** From April 2020 to March 2021, of the 3,312 public roads maintained by HyD, 15 roads had not been inspected nor included in the inspection programmes submitted by the contractors. For 3 roads, the contractors only submitted detailed inspection reports but not routine inspection reports during the period (para. 2.5(a)); and
 - (b) ***Inadequacies in submitting inspection reports.*** For 15,997 (16%) inspection reports, the submission dates were not recorded in EMMS. According to HyD, in two contracts, there were system bugs in EMMS, and in another contract, the contractor would usually submit hard copies of inspection reports to HyD first and upload the reports to EMMS by batches at a later time (para. 2.5(b)).
4. ***Need to improve the monitoring of routine maintenance.*** According to contract provisions, majority types of defects require rectification within 48 hours. Audit examination of EMMS records of 513 completion reports submitted by the contractors in 12 districts (for the inspections carried out in June 2020) found that in 32 (6%) cases, the defect rectification works were not completed within the stipulated time limits with delays ranging from 1 to 48 days (averaging 8 days). Of these 32 cases, the contractors did not have valid reason for not completing the works within time limits in 31 cases (paras. 2.6 and 2.7).
5. ***Independent checking on contractors' work.*** Payments for M&M works were performance-linked. HyD conducts Engineer's audits (EAs) and Engineer's inspections (EIs) for measuring and monitoring the contractors' performance in routine inspections, detailed inspections and cleansing of street furniture (paras. 1.7 and 2.12). Audit examination revealed the following areas for improvement:
- (a) ***EAs.*** Audit scrutinised the records of the 12 districts (see paragraph 4) for EAs from July to December 2020 and found that:

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- (i) in 11 cases, HyD had informed the contractors more than 24 hours before conducting EAs, contrary to the requirement stipulated in the contracts (para. 2.13(a)); and
 - (ii) in 166 cases, there was no documentary record of notifying the contractors of the EA results (para. 2.13(c)(iii)); and
- (b) **EIs.** HyD's computer system did not maintain sufficient information (the number of active sites undergoing maintenance works) for ascertaining the extent of compliance on the frequency of conducting EIs (at least once a week) as stipulated in HyD's guidelines (para. 2.14(a)).
6. ***Need to make use of EMMS for maintaining comprehensive inspection and maintenance records.*** According to contract provisions, maintenance history to be kept in EMMS includes those maintenance works carried out by the contractors or records of previous maintenance works supplied by HyD. Audit noted that some maintenance records for public roads such as completion reports for rectification of defects under EAs were not centrally kept in EMMS, which might not facilitate the compilation of maintenance records for planning rehabilitation works (paras. 2.21 to 2.23).
7. ***Audit's field inspections on footpaths.*** In July and August 2021, Audit conducted two rounds of field inspections to 35 footpaths in five districts which were subject to routine inspection once every seven days. Audit found that 183 defects (97% of 189 defects identified during the first round of Audit's field inspections) had not been identified in the routine inspections conducted by the contractors. Of the 183 defects, 14 (8%) defects might cause dangers to road users (paras. 2.29 and 2.30).
8. ***Non-compliance with routine inspection frequency.*** According to contract provisions, for 774 footpaths of high significance (e.g. located within areas of pedestrianisation scheme), contractors are required to conduct routine inspections with higher frequency (every 7 days or 1 month). Audit noted that the frequencies of these routine inspections had not been fully complied with in 16 (2%) of the 774 footpaths (para. 2.33).

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Non-routine maintenance and rehabilitation works

9. *Administration of non-routine maintenance works for public footpaths.* HyD issues works orders to the contractors for carrying out non-routine maintenance works (including rectification of defects not covered by M&M provisions or other repair works) as and when necessary. Under the six local road maintenance contracts administered by HyD as of March 2021, 2,447 works orders at a total cost estimate of \$151 million relating to non-routine maintenance works of public footpaths were issued during the period from April 2020 to March 2021 (paras. 3.3, 3.4 and 3.6). Audit examination of the works orders revealed the following areas for improvement:

- (a) *Implementation progress of works orders not timely recorded.* HyD adopts a web-based application, namely the Maintenance Accounting and Information System (MAINS), to handle the administration of the works order process and related payments. As of June 2021, Audit analysis of the MAINS records showed that the actual dates of completion for 310 (13% of 2,447) works orders were not available in MAINS. According to HyD, 289 (93% of 310) works orders had been completed on time but their actual completion dates had not been inputted into MAINS because compilation of works orders documents for finalisation and payment purpose was still in progress (paras. 3.4 and 3.6); and
- (b) *Need to strengthen the monitoring and checking of works.* Audit selected 120 works orders (i.e. 5% of the 2,447 works orders) for examination and revealed the following areas for improvement:
 - (i) *Late submission of reports on completion of works by contractors.* Of the 120 works orders, contrary to contract provisions, the contractors failed to submit the reports within two days after completion of works for 91 (76%) works orders, with delays ranging from 1 to 145 days (averaging 20 days) (para. 3.10(b)); and
 - (ii) *Delay in checking completion of works by HyD.* According to HyD's Maintenance Administration Handbook (MAH), after the contractors reported completion of works, HyD will arrange its staff to check whether the works have been satisfactorily completed within two working days from the date of receipt of the reports on completion of works from the contractors. Of the 120 works orders, the dates of checking by HyD staff concerned were not stated in the

Executive Summary

reports on completion of works in 18 (15%) works orders. For the remaining 102 (85%) works orders, there were delays in checking by HyD staff in 41 (40% of 102) works orders, with delays ranging from 1 to 84 working days (averaging 17 working days) (para. 3.10(c)).

10. ***Need to ensure timely submission of dimension books by contractors.*** According to MAH, the contractor shall submit a dimension book for a works order to HyD within 90 days of completion of the works. HyD shall check the accuracy of the measurements in the dimension books before making a final payment and finalising the works order. As of June 2021, 497 works orders relating to non-routine maintenance works of public footpaths for three completed local road maintenance contracts had not yet been finalised. Among these, the dimension books of 360 (72%) works orders (with a total cost estimate of \$54 million) were still outstanding from the contractors, with delays in submission ranging from 1 to 2,050 days (averaging 353 days) (paras. 3.11 to 3.13).

11. ***Planning of rehabilitation works for public footpaths.*** From April 2015 to March 2021, HyD approved 228 rehabilitation projects for public footpaths (including reconstruction or relaying of paving blocks on footpaths), with a total approved estimate of \$286 million, which was funded by a Block Vote under the Capital Works Reserve Fund (CWRP). Audit examination of 20 projects (each with approved estimate of \$3 million or above, totalling \$72 million) revealed the following areas for improvement (paras. 3.17 and 3.18):

- (a) ***Delays in completing rehabilitation projects.*** As of June 2021, 6 of the 20 projects had been completed and 14 projects were in progress. For the 6 completed projects, there were delays ranging from 1 to 12 months (averaging 6 months) in completing 4 (67%) projects. For the rehabilitation project with the longest delay of 12 months, HyD took a longer-than-expected time to coordinate/liaise with local schools and residents on the temporary traffic arrangement for the footpath reconstruction works. Audit found that HyD had not carried out public consultation on the temporary traffic arrangement at the planning stage before seeking funding approval (para. 3.18(a));

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- (b) ***Over-estimation of project costs.*** Audit comparison of the approved estimates with the actual expenditures incurred up to June 2021 for the 6 completed projects (see (a)) revealed that the project costs had been over-estimated in all cases, ranging from 27% to 200% (para. 3.18(b)); and
- (c) ***Delays in releasing unused funds from completed rehabilitation projects.*** According to HyD guidelines, upon completion of the works funded by the Block Vote under CWRP, accounts should be finalised and approval to delete the items from the Block Vote should be sought as early as practicable. Audit noted that HyD took 5 to 31 months to delete the 6 completed projects (see (a)) from the Block Vote after making final payment to the contractors. Furthermore, in 4 (67% of 6) completed projects, as of June 2021 (i.e. 12 to 24 months after respective approvals to delete the projects from the Block Vote were obtained), HyD staff had not yet released the unused funds in MAINS, resulting in \$5 million unused funds being locked up (para. 3.18(c)).

Other related issues

12. ***Design and choice of paving materials.*** According to HyD, most of the footpaths in Hong Kong are paved with either concrete or paving blocks. Audit's field inspections in July and August 2021 found that 13 footpath locations paved with paving blocks and situated at the vehicular over-runs had been damaged (including damaged paving blocks and loosened paving blocks), which might pose a safety threat to pedestrians. In Audit's view, HyD needs to review the design of paving materials for footpath locations subject to heavy loading (paras. 4.2 and 4.5).

13. ***Provision of pedestrian railings.*** In the 2017 Policy Address, the Government pledged to encourage people to walk more and rely less on motorised transport to foster a pedestrian-friendly environment. To pursue the policy objective of enhancing walkability, the Transport Department (TD) reviewed the provision of pedestrian railings and issued guidelines in 2017. In November 2019, in order to reduce street cluttering and release more road space for pedestrians on footpaths, TD promulgated a "minimal approach" in the provision of pedestrian railings, which aimed at stripping away excessive railings not bringing value to the policy of enhancing walkability of the pedestrian environment (paras. 4.12 to 4.14 and 4.16). Audit examination of TD's work on decluttering of excessive pedestrian railings revealed the following areas for improvement:

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- (a) ***Need to improve recording of the work of reviewing and decluttering existing pedestrian railings.*** To take forward the change in policy over the provision of pedestrian railings, TD in consultation with HyD would draw up a priority list for review on whether existing pedestrian railings should be retained or removed. Since the third quarter of 2019, TD has commenced reviewing the pedestrian railings across the territory and progressively arranged with HyD to remove unnecessary railings. According to TD, it does not maintain a dedicated database to record the review of railing provisions. Audit considers that TD should consider improving the recording of the work of reviewing and decluttering existing pedestrian railings to facilitate management monitoring and review (e.g. by compiling a list of locations in which the railings have been reviewed or removed without compromising safety on a yearly basis) (para. 4.18); and
- (b) ***Challenges encountered in removing excessive railings.*** Audit's research on the Internet found that some proposals submitted by TD to remove railings had not materialised. According to TD, during consultation there were different views on whether railings should be retained or removed. Audit noted that it might be necessary to retain existing railings in locations where the pedestrian flow and vehicular traffic were high. Audit also found that at some road sections in which railings had been removed, there was jaywalking of pedestrians (paras. 4.19 and 4.20).

Audit recommendations

14. **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:**

- (a) **the Director of Highways should:**

Inspection and routine maintenance works

- (i) **ascertain the reasons for the omissions by contractors to conduct road inspections and exercise due care in vetting the inspection programmes submitted by contractors to ensure that all public roads maintained by HyD are covered by contractors' inspections (para. 2.10(a) and (b));**

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- (ii) take measures to rectify the system bugs in EMMS of the two local road maintenance contracts, and in administering local road maintenance contracts in future, consider requiring the contractors to submit the inspection reports and upload them to EMMS in a timely manner (para. 2.10(c)(i) and (d));
- (iii) take measures to ensure compliance with contract requirements on defect rectifications by contractors (para. 2.10(c)(ii));
- (iv) remind HyD staff to strictly follow HyD's requirements on conducting EAs and notify the contractors of the EA results in a timely manner (para. 2.16(a) and (b));
- (v) compile statistics for monitoring the compliance with the requirements of conducting EIs (para. 2.16(c));
- (vi) enhance the functions of EMMS for maintaining comprehensive inspection and maintenance records for public roads (para. 2.26(b));
- (vii) take measures to improve the routine inspections of footpaths and ensure that the contractors comply with the routine inspection frequency for footpaths of high significance (para. 2.34(a) and (c));

Non-routine maintenance and rehabilitation works

- (viii) take measures to ensure that information on the implementation progress of works orders is input into MAINS in a timely manner (para. 3.15(a));
- (ix) take measures to ensure that reports on completion of works under works orders are timely submitted by contractors and remind HyD staff to conduct checking on works completion within the time limit stipulated in MAH (para. 3.15(d) and (e));
- (x) step up measures to ensure timely submission of dimension books by contractors (para. 3.15(f));

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- (xi) **in implementing rehabilitation projects in future, consult the relevant stakeholders on temporary traffic/pedestrian arrangement at the planning stage (para. 3.19(a));**
- (xii) **take measures to improve the accuracy of project estimates for rehabilitation projects as far as practicable (para. 3.19(b));**
- (xiii) **promptly release unused funds from rehabilitation projects upon the completion of works and finalisation of project accounts (para. 3.19(c)); and**

Other related issues

- (xiv) **review the design of paving materials for footpath locations subject to heavy loading (para. 4.10(a)); and**
- (b) **the Commissioner for Transport should:**
- (i) **consider improving the recording of the work of reviewing and decluttering existing pedestrian railings to facilitate management monitoring and review (para. 4.23(a)); and**
 - (ii) **in planning the decluttering of existing pedestrian railings to improve walkability in future, step up efforts in demonstrating to the public the enhanced benefits of appropriately removing pedestrian railings without compromising safety and take measures to minimise the risk of jaywalking where appropriate (para. 4.23(b)).**

Response from the Government

15. The Director of Highways and the Commissioner for Transport agree 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 According to the 2017 Policy Address, the Government would continue to take forward “Walk in HK” and encourage people to walk more so as to reduce the use of mechanised transport for short-distance commuting, with a view to helping alleviate traffic congestion and improve air quality, and developing Hong Kong into a walkable city. In 2020, the Government finalised the overall walkability strategy for Hong Kong, with a view to developing Hong Kong into a walkable city of world-class quality. To enhance walkability in Hong Kong, the Government has been implementing measures for four main strategies, including a main strategy namely “Make it safe” by providing a safe and quality walking environment (Note 1). From time to time, there were media reports on public footpath defects including uneven surfaces, loosened or damaged paving blocks, causing potential safety hazards to pedestrians (especially the elderly, children and persons with disabilities). In this connection, better maintenance of public footpaths would promote safer walking routes as perceived by the pedestrians.

Note 1: *Other main strategies include:*

- (a) “Make it smart”, by providing user-friendly information on walking routes;*
- (b) “Make it connected”, by enhancing pedestrian networks; and*
- (c) “Make it enjoyable”, by making walking a pleasant experience.*

Introduction

1.3 The Highways Department (HyD) is responsible for conducting inspections, planning and managing the maintenance programme, supervising maintenance works and handling public complaints about public footpaths (Note 2). As of June 2021, the total length of public footpaths maintained by HyD was approximately 2,600 kilometres (km). From time to time, HyD received complaints about damaged footpaths and cases of compensation claims against the Government on sustained injuries. Table 1 shows the number of complaints received and cases in which members of the public alleged having sustained injuries and lodged claims for compensation from January 2016 to July 2021.

Note 2: *Different types of footpaths are also maintained by other government departments, including:*

- (a) village footpaths on government land in rural area constructed and maintained by the Home Affairs Department or other government departments;*
- (b) footpaths within country parks constructed and maintained by the Agriculture, Fisheries and Conservation Department;*
- (c) footpaths constructed and maintained by the Water Supplies Department for providing access to waterworks facilities and also used by local residents; and*
- (d) footpaths constructed by other government departments (e.g. footpaths constructed by the Architectural Services Department within the site boundaries of government buildings).*

Table 1

**Complaints about damaged footpaths and
cases in which members of the public alleged having
sustained injuries and lodged claims for compensation
(January 2016 to July 2021)**

	2016	2017	2018	2019	2020	2021 (Up to July)
	(Number)					
Complaints about damaged footpaths	5,446	5,635	5,584	6,273	4,430	3,262
Cases in which members of the public alleged having sustained injuries and lodged claims for compensation	20	28	21	25	32	21

Source: HyD records

Remarks: According to HyD, during the period from 2016 to 2021 (up to July), the areas of footpaths maintained by HyD had been on an increasing trend, increasing from 8,145,536 square metres in 2016 by 5% to 8,579,645 square metres in 2021 (up to July).

1.4 Footpath maintenance works can be broadly classified into the following types:

- (a) **Corrective repair.** This type of maintenance works originates from defects found in regular inspections or reported to HyD as a result of complaints or referrals received. Usually, such works tackle the defects at an isolated spot. They require less planning and are less costly as compared with other types of maintenance works. As some defects may pose safety threat to pedestrians, it is therefore important that corrective repair works are carried out promptly;
- (b) **Preventive maintenance.** This type of maintenance works prevents defects from occurring and is usually carried out in a routine or cyclic manner (e.g. painting of traffic sign posts on footpaths); and

Introduction

- (c) **Rehabilitation.** This type of maintenance works restores the serviceability and structural conditions of footpaths. It is also of a preventive nature but usually of a larger scale and involves more resources than that of (b) above. Common examples include reconstruction of footpaths, and relaying of paving blocks on footpaths. Minor improvement works, such as addition of street furniture (see para. 1.5), may also be carried out in conjunction with rehabilitation works.

Maintenance of public footpaths

1.5 **Inspection and routine maintenance works.** Under HyD's local road maintenance contracts (Note 3) with management and maintenance (M&M) provisions, contractors are required to conduct routine duties such as inspections and routine maintenance works for road surfaces and related street furniture of public roads comprising carriageways, footpaths and cycle tracks under the designated areas. Street furniture installed on footpaths and cycle tracks includes railings, street name plates and traffic signs (see Photographs 1(a) to (c) for examples). Other street furniture (e.g. traffic barriers) is installed on carriageways (Note 4). M&M works are funded by Head 60 (HyD) of the General Revenue Account (GRA). The salient features of the M&M provisions are summarised as follows:

- (a) the contractors are required to conduct regular inspections on the public roads to identify any defects. Based on the inspection frequencies stipulated in the contracts, HyD and the contractors will agree on the programmes of these inspections at the beginning of the contracts, with regular updates. The contractors are also required to carry out rectification works on the "small" defects as defined in the contract (e.g. rectifying defective area in a footpath not exceeding 10 square metres (m²) in size at one location) with the costs of works being covered in the monthly fee (see (d));

Note 3: *These contracts do not cover maintenance of the public lighting system, which falls within the scope of other HyD maintenance contracts. In 2015, the Audit Commission completed a review of the management of public lighting system and reported the results in Chapter 8 of the Director of Audit's Report No. 65 of October 2015.*

Note 4: *According to HyD, street furniture is essential for ensuring uninterrupted traffic flow and road safety.*

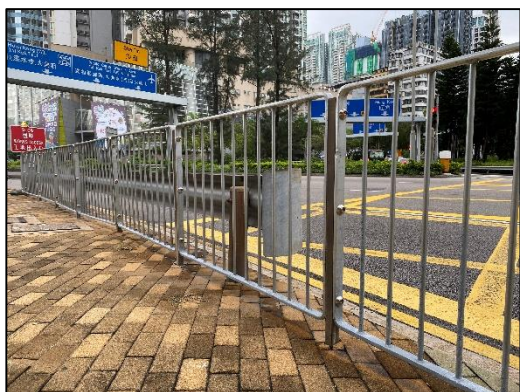
- (b) as part of the M&M works, the contractors are required to establish an effective Electronic Maintenance Management System (EMMS), which facilitates planning, programming, inventory data collection, maintenance history recording, data storage, complaint handling, preparing management reports and retrieval of all aspects of inspection and maintenance works (Note 5);
- (c) to ensure the quality of services and measure the contractors' performance, HyD staff conduct independent checking of their work, and of selected public roads maintained by them (see para. 1.7); and
- (d) the contractors are entitled to a monthly fee for each type of services provided under M&M provisions. Payment deductions will be made if performance standards are not achieved.

Note 5: *According to contract provisions, the contractors should allow HyD unrestricted 24-hour access to EMMS for auditing and monitoring purpose and migrate the system to HyD upon expiry of the respective contract periods. HyD shall then become the absolute and exclusive owner of all records and the related intellectual property rights.*

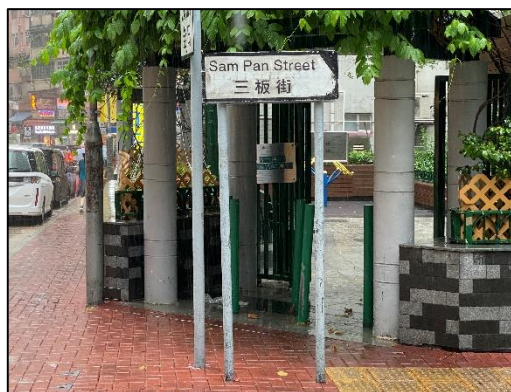
Photographs 1(a) to (c)

Examples of street furniture maintained by HyD

(a) Railing



(b) Street name plate



(c) Traffic sign



Source: Photographs taken by Audit Commission staff in June 2021

Remarks: The design standards of footpaths (and related street furniture) are promulgated in the Transport Department's Transport Planning and Design Manual.

1.6 *Non-routine maintenance and rehabilitation works for public footpaths.*

In addition, HyD may instruct the contractors to carry out non-routine maintenance and rehabilitation works not covered by the M&M provisions, including rectification of “large” defects (e.g. rectifying defective area in a footpath exceeding 10 m² in size at one location), reconstruction of footpaths and installation of new street furniture. HyD has to separately issue works orders and pay the contractors for such works. Depending on the nature of the maintenance works, payments for the works orders are funded by different funding sources, as follows:

- (a) for recurrent maintenance works (e.g. rectification of “large” defects or other repair works not covered by M&M provisions including small-scale preventive maintenance works and small-scale footpath repaving), they are funded by Head 60 (HyD) of GRA; and
- (b) for non-recurrent maintenance works (e.g. reconstruction of footpaths or larger-scale footpath repaving under HyD’s rehabilitation projects) or minor improvement works, they are funded by Head 706 (Highways) Subhead 6100TX block allocation (Highways works, studies and investigations for items in Category D of the Public Works Programme (Note 6)) of the Capital Works Reserve Fund (CWRF).

Independent checking on contractors’ work

1.7 Payments for M&M works are performance-linked. A contractor’s performance is measured on a quarterly basis according to contract provisions. HyD has adopted independent checking procedures in monitoring the contractor’s performance:

- (a) ***Engineer’s audits (EAs)***. HyD staff carry out EAs, on a sample basis, on M&M works performed by the contractors. An inspection conducted by a contractor is regarded as defective if an EA has identified more than one defect (as defined in the contract specifications) not included in the inspection report of the contractor. Monthly payments for the M&M works will be progressively reduced if more defective inspections are found. Unless prior arrangement for gaining access is required, HyD shall only give no more than 24 hours’ notice to a contractor before carrying out EAs, but the contractor will not be advised of the nature and exact location of the works to be audited by HyD staff; and

Note 6: *Category D projects under the block vote (Head 706 (Highways), Subhead 6100TX) are minor works items each costing not more than \$50 million.*

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- (b) ***Engineer's inspections (EIs).*** HyD staff also select sites to conduct visits during the execution of works to ascertain whether the contractors have carried out M&M works (i.e. inspection and routine maintenance works) in accordance with the contracts (Note 7). For non-compliance observed during EIs, HyD will issue a default notice (DN — Note 8) to the contractor and a fixed sum will be deducted from the contract payments. In addition, EIs also cover:
- (i) M&M works items not covered by EAs; and
 - (ii) some aspects of the contractor's performance which cannot be ascertained from the EAs, such as temporary supply of lighting, signing and guarding which will be removed after completion of works.

No prior notice or only short notice of an EI is given to the contractors.

HyD's Regional Offices

1.8 Through administering the local road maintenance contracts (see para. 1.5) within their respective designated geographic area, the two Regional Offices of HyD (i.e. Urban and New Territories Offices) are responsible for the maintenance of public footpaths. An extract of the organisation chart of HyD as at 30 April 2021 and the management structure of a Regional Office are shown at Appendices A and B respectively. As at 30 April 2021, 251 staff under the

Note 7: *For inspections conducted by the contractors, HyD conducts EIs to check whether inspections are carried out in accordance with the monthly programme submitted by the contractors. For routine maintenance works carried out by the contractors for rectification of defects identified during their inspections, HyD conducts EIs to active sites of maintenance works.*

Note 8: *DN refers to a notice given by HyD to the contractor for works undertaken by the contractor not in compliance with the specifications of the contract. It shows the type of non-compliance observed by HyD's supervisory staff (e.g. inspection not carried out as programmed) and the amount to be deducted from payments to the contractor.*

two Regional Offices were responsible for the maintenance of public footpaths among other assets (Note 9).

Financial provision

1.9 The maintenance of public footpaths is under the programme area “District and Maintenance Works” of HyD. According to HyD, in 2020-21, the payment to contractors for inspection and routine maintenance of all public roads (comprising carriageways, footpaths and cycle tracks) was \$68.3 million, including \$18 million for public footpaths. In 2020-21, works orders with a total cost estimate of \$151 million relating to non-routine maintenance and rehabilitation works of public footpaths were issued (Note 10).

Audit review

1.10 In 2011, the Audit Commission (Audit) completed a review of “Maintenance of public roads”. The results were included in Chapter 5 of the Director of Audit’s Report No. 57 of October 2011. In May 2021, Audit commenced a review to examine issues relating to the maintenance of public footpaths by HyD, focusing on:

Note 9: *The 251 staff were also responsible for the maintenance of other public roads including carriageways and cycle tracks. According to HyD, as these staff were multi-tasked, it is not possible to provide a breakdown of staff resources solely for the work on maintenance of public footpaths.*

Note 10: *According to HyD, the total cost estimates of works orders issued in 2019-20 and 2020-21 were significantly higher than those in previous financial years because a large amount of repair and maintenance works were carried out in 2019-20 and 2020-21 to reinstate the public footpaths and facilities damaged during the social unrest in 2019. Based on HyD’s records, the total cost estimates of works orders for non-routine maintenance and rehabilitation of public footpaths from 2016-17 to 2020-21 were:*

<i>Financial year</i>	<i>2016-17</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>
<i>Cost estimate (\$ million)</i>	56	54	52	140	151

Introduction

- (a) inspection and routine maintenance works (PART 2 — Note 11);
- (b) non-routine maintenance and rehabilitation works (PART 3); and
- (c) other related issues (PART 4).

Audit has found room for improvement in the above areas and has made a number of recommendations to address the issues.

General response from the Government

1.11 The Secretary for Transport and Housing has said that:

- (a) the Transport and Housing Bureau (THB) attaches great importance to the inspection and maintenance of public footpaths, as such works are vital to keep the footpaths in good condition and provide a safe walking environment for pedestrians. THB welcomes the audit recommendations, and supports the proposed follow-up actions of HyD and the Transport Department (TD); and
- (b) THB will continue to oversee the work of HyD and TD to ensure that the departments will take appropriate follow-up actions as undertaken in their responses to the audit recommendations, including strengthening the supervision over contractors' performance, and enhancing maintenance record management such as through digitalisation.

1.12 The Director of Highways and the Commissioner for Transport agree with the audit recommendations.

Note 11: *Audit examination of the inspection and routine maintenance works has covered public roads (comprising carriageways, footpaths and cycle tracks) and the related street furniture since these works are carried out holistically by HyD.*

Acknowledgement

1.13 Audit would like to acknowledge with gratitude the full cooperation of the staff of HyD and TD during the course of the audit review.

PART 2: INSPECTION AND ROUTINE MAINTENANCE WORKS

2.1 This PART examines HyD's monitoring of the inspection and routine maintenance works, focusing on:

- (a) checking of contractors' inspection reports and works completion reports (paras. 2.5 to 2.11);
- (b) independent checking on contractors' work (paras. 2.12 to 2.17);
- (c) record keeping of inspection and maintenance works (paras. 2.18 to 2.27);
and
- (d) Audit's field inspections on footpaths (paras. 2.28 to 2.35).

2.2 As mentioned in paragraph 1.5, HyD administers local road maintenance contracts with M&M provisions to conduct inspection and routine maintenance for public roads under designated areas (see Table 2). As of April 2021, 3,312 public roads (Note 12) in Hong Kong were maintained by HyD. According to HyD, inspection and routine maintenance works under the local road maintenance contracts (Note 13) mainly comprise:

Note 12: *The 3,312 public roads comprise permanent roads with road name, excluding temporary roads, side lanes and back lanes.*

Note 13: *Other work includes inspection and maintenance of road markings and studs of carriageways.*

Inspection and routine maintenance works

- (a) **Road routine inspections.** According to the Road Inspection Manual (RIM — Note 14) issued by HyD, routine inspections are designed to identify all defects likely to create danger or serious inconvenience to users of the network (Note 15). Such defects should require urgent attention and be made safe or repaired within 48 hours. Contractors are required to conduct routine inspections on all roads within designated contract areas maintained by HyD (Note 16);

- (b) **Road detailed inspections.** According to RIM and contract provisions, detailed inspections are designed to record all types of defects likely to require routine maintenance including minor defects which are unlikely to pose danger or serious inconvenience to users. Nevertheless, any imminent or immediate hazards identified should also be noted. Contractors are required to conduct detailed inspections on all roads within designated contract areas maintained by HyD (Note 17);

- (c) **Routine maintenance works.** The contractors are required to undertake the associated rectification works on the “small” defects (see para. 1.5(a)) as identified in the road routine inspections (see (a)) and road detailed inspections (see (b)) as specified in the contracts, with the costs of works being covered in the monthly payments to the contractors; and

Note 14: *RIM recommends the procedures for and frequencies of inspections used to determine routine maintenance works, which are necessary for maintaining and restoring the road network to serviceable and safe conditions. Routine maintenance works do not deal with the replacement or renewal of those parts of the road which, in the long term, become unserviceable because of general deterioration. Related works would be dealt with properly within planned maintenance or rehabilitation projects.*

Note 15: *According to RIM, examples of defects that should normally be identified and reported in a road routine inspection include missing paving blocks and damaged street furniture protruding into footpaths.*

Note 16: *For carriageways, the frequencies of road routine inspections depend on road types, i.e. weekly for trunk roads and once every one to six months for other roads. For footpaths and cycle tracks, the frequencies of road routine inspections are monthly or once every three months in general.*

Note 17: *Road detailed inspections are conducted for all road types once every six months.*

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- (d) *Cleansing of street furniture.* The contractors are required to carry out scheduled cleansing of street furniture, including railings, barriers, traffic signs and posts, street name plates and posts, visitor and pedestrian directional signs, etc. The contractors shall provide adequate lighting, signing and guarding and sufficient protection for labour and plant engaged in the cleansing operation.

For each local road maintenance contract, HyD has issued guidelines to provide a reference to its maintenance staff in carrying out their work, including the requirements on checking contractors' inspection reports and works completion reports.

Inspection and routine maintenance works

Table 2

**Local road maintenance contracts administered by HyD
(September 2021)**

Contract	Designated contract area	Contract period	Estimated contract sum (Note 1) (\$ million)
<i>Completed contract</i>			
A	New Territories West	1.4.2015 – 31.3.2021 (6 years)	632
B	Hong Kong Island	1.4.2017 – 31.3.2021 (4 years) (Note 2)	598
<i>Ongoing contract</i>			
C	Tai Po and North Districts	1.4.2016 – 31.3.2022 (6 years)	371
D	Sha Tin, Sai Kung and Islands Districts	1.4.2018 – 31.3.2024 (6 years)	418
E	Kowloon East	1.4.2018 – 31.3.2024 (6 years)	483
F	Kowloon West	1.4.2020 – 31.3.2026 (6 years)	809
G	Hong Kong Island	1.4.2021 – 31.3.2025 (4 years)	1,099
H	Tuen Mun and Yuen Long Districts	1.4.2021 – 31.3.2026 (5 years)	795
I	Tsuen Wan and Kwai Tsing Districts	1.4.2021 – 31.3.2027 (6 years)	733

Inspection and routine maintenance works

Table 2 (Cont'd)

Source: HyD records

Note 1: According to HyD, the estimated contract sum refers to the estimation of the total expenditure of the contract during the entire contract period, taking into account the percentage of adjustments submitted by the contractor in its tender against the pre-tender estimate of the rates of the works prepared by the Government.

Note 2: Contract B was terminated in March 2021, two years before its original completion date of March 2023. According to HyD, as the pertinent contractor's performance was unsatisfactory, it had exercised the option to terminate the contract after the initial period of four years in accordance with the contract terms (see para. 2.3 for details). In February 2021, HyD awarded a new contract (Contract G) to another contractor for the provision of M&M services of public roads on the Hong Kong Island from April 2021 to March 2025.

2.3 Early termination of Contract B. In April 2020, HyD exercised the option under the contract terms to terminate Contract B in March 2021, two years before its original completion date of March 2023 (see Note 2 to Table 2 in para. 2.2). In response to Audit's enquiry, in August and November 2021, HyD said that:

- (a) the early termination of Contract B was mainly due to the adverse performance of the contractor, and unsatisfactory capability of the contractor arising from charges laid by the Independent Commission Against Corruption relating to suspected misconduct in preparing inspection reports; and
- (b) it had implemented the following additional measures:
 - (i) requiring the contractor of Contract B to upload real-time inspection photographs taken on spot with date and time captured via

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“controlled” mobile phones (Note 18) since early 2018, which could minimise the chance of improper data manoeuvring. Site photographs taken during inspections would be uploaded to a designated network storage in which the photographs could be verified by both the contractor and HyD;

- (ii) extending the additional measure in (i) to HyD’s other local road maintenance contracts (including Contracts A, C, D and E) in April 2019 and incorporating the additional requirement in tendering for new local road maintenance contracts (including Contracts F to I, tenders of which were invited in or after the fourth quarter of 2019); and
- (iii) conducting additional checking on the inspection reports submitted by the contractor of Contract B by computer software in early 2019 to ensure that the contractor did not use any duplicated photographs to defraud HyD.

2.4 ***Payment to contractors.*** The contractors are entitled to a monthly fee for each type of services provided under the M&M provisions. The amounts of payments would be calculated according to the contractors’ performance standard (see para. 1.7) and the number of DN’s issued in a month. To process the contractor’s payment application, a quarterly summary of performance standard would be prepared for relevant items of inspection and routine maintenance works. In 2020-21, the actual payments to contractors for routine inspections and associated maintenance works, detailed inspections and associated maintenance works, and cleansing of street furniture for all public roads (comprising carriageways, footpaths and cycle tracks) were \$34.4 million, \$19.8 million and \$14.1 million respectively. According to HyD, the payments to contractors for the above works for public footpaths are estimated to be \$9.3 million, \$5.3 million and \$3.8 million respectively.

Note 18: *The “controlled” mobile phones were required to install with the following categories of applications:*

- (a) *“mobile device management” to control the phone settings, and prevent them from being altered;*
- (b) *“photograph capturing” to take photographs with time stamp imprinted ability; and*
- (c) *“photograph synchronisation” to synchronise the captured photographs to cloud storage.*

Checking of contractors' inspection reports and works completion reports

Need to enhance checking on the submission of inspection reports

2.5 ***Inspections conducted by contractors.*** According to HyD's guidelines, Inspector of Works (IOW) grade staff of HyD are responsible for checking the submission of inspection reports by the contractors within the stipulated time limits and will take appropriate action if any inspection reports are not submitted on time. To evaluate HyD's monitoring of inspections of public roads conducted by the contractors, Audit analysed EMMS records of 101,566 inspection reports submitted by the contractors for the routine inspections and detailed inspections of public roads conducted during the period from April 2020 to March 2021 (see para. 2.2). Audit examination revealed scope for improvement in the following areas:

- (a) ***Inadequate coverage of inspections.*** There were inadequacies in the coverage of inspections, as follows:
 - (i) ***Omissions of inspections.*** According to contract provisions, the contractors are required to conduct routine inspections and detailed inspections for all public roads within designated contract areas maintained by HyD. Based on the street names, Audit's analysis found that, of the 3,312 public roads maintained by HyD (see para. 2.2), routine inspections and detailed inspections had not been conducted for 110 (3%) roads from April 2020 to March 2021. According to HyD, after checking, it identified that 95 roads (including extended sections of main roads) had been inspected together with the main roads nearby and included in the same inspection reports. The remaining 15 roads (which included some minor rural roads in Outlying Islands and some rear lanes near main public roads) had not been inspected nor included in the inspection programmes submitted by the contractors in the concerned period; and
 - (ii) ***Omissions of routine inspections.*** For 3 public roads (in 2 contracts), the contractors only submitted detailed inspection reports but not routine inspection reports. There might be omissions in conducting routine inspections.

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According to contract provisions, the contractors are required to submit programmes for conducting inspections to HyD for endorsement. In Audit's view, HyD needs to ascertain the reasons for the omissions by contractors to conduct road inspections and consider the need for issuing DNs accordingly. There is also a need for HyD to exercise due care in vetting the inspection programmes submitted by contractors to ensure that all public roads maintained by HyD are covered by contractors' inspections; and

- (b) ***Inadequacies in submitting inspection reports.*** According to contract provisions, the contractors are required to submit to HyD routine inspection reports within 24 hours of the inspections, and detailed inspection reports within 48 hours of the inspections. Audit examination of EMMS records found that in 15,997 cases (16% of 101,566 inspection reports received by HyD for the inspections of public roads conducted during the period from April 2020 to March 2021), the pertinent submission dates were not recorded in EMMS. For the 85,569 inspection reports with submission dates recorded in EMMS, there were 30,887 (36% of 85,569) cases of delay in submitting inspection reports by the contractors. According to HyD, there was no missing of inspection reports. The actual submission dates for the cases in two contracts were either not shown or wrongly shown on EMMS because of system bugs, and for another contract, EMMS had wrongly captured "the date of uploading inspection reports to EMMS" as "the submission date of the inspection reports". HyD further advised that the contractor of the latter contract would usually submit hard copies of inspection reports to HyD first and upload the reports in full to EMMS by batches at a later time and they were all traceable. In October and November 2021, HyD conducted checking of the 46,884 (15,997 + 30,887) reports and found that there were 1,436 (1.4% of 101,566) cases of delay in submitting inspection reports by the contractors. In Audit's view, HyD needs to:

- (i) take measures to rectify the system bugs in EMMS of the two contracts to ensure that the actual submission dates of inspection reports are shown in EMMS; and
- (ii) in administering local road maintenance contracts in future, consider requiring the contractors to submit the inspection reports and upload them to EMMS in a timely manner.

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Need to improve the monitoring of routine maintenance

2.6 ***Defect rectification works by contractors.*** According to contract provisions, contractors are required to undertake the rectification works on the “small” defects as specified in the contracts, with the costs being covered in the monthly payments to the contractors (see para. 1.5(a)). Unless otherwise specified in the contracts or agreed by HyD, majority types of defects require rectification within 48 hours. After the defects are rectified, the contractors are required to submit completion reports within two working days in the format agreed by HyD, which should contain adequate photographs showing the conditions before and after the rectification works, for HyD’s IOW grade staff’s checking. In case there are any defects that have not been rectified within the time limits, HyD will issue DNs to the contractors for deduction of contract payments.

2.7 ***Defects identified from inspections by contractors.*** Completion reports for rectifications of “small” defects identified from road routine inspections and road detailed inspections were recorded in EMMS. Audit examination of EMMS records of 513 completion reports submitted by the contractors for the inspections carried out in June 2020 in 12 districts selected for examination (Note 19) found that in 32 (6%) cases, the defect rectification works were not completed within the stipulated time limits with delays ranging from 1 to 48 days (averaging 8 days). According to HyD, of the 32 cases, the contractors did not have valid reason for not completing the works within time limits in 31 cases. Audit considers that HyD needs to take measures (e.g. issuing DNs) to ensure compliance with contract requirements on defect rectifications by contractors.

2.8 ***Defects identified from other sources.*** Defects may also be identified during EIs by HyD staff or referrals from other sources (Note 20). In such case, written notification would be issued to the contractors (i.e. Notification Forms) to instruct them to rectify the defects. Contractors are required to acknowledge receipt and report the completion of rectification works on the Notification Forms. After receiving the Notification Forms from contractors, an IOW grade staff would endorse

Note 19: *The 12 districts selected for Audit examination included Central, Wan Chai, Kowloon Bay, Kowloon City, Sham Shui Po, Mong Kok, Sai Kung, Tseung Kwan O, Tuen Mun, Yuen Long, Tai Po and North.*

Note 20: *Other sources include referrals of complaints from the public, and reports from third parties or other government departments.*

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and indicate on the Notification Forms the compliance of stipulated time limits. Should there be any non-compliance with the stipulated time limits, a DN would be issued. Audit examination of 1,159 Notification Forms issued to contractors in October 2020 in the 12 districts (see Note 19 to para. 2.7) identified room for improvement, as follows:

- (a) in 2 cases, while the defect rectification works were not completed within the stipulated time limits (with delays of 2 and 3 days), they were indicated by HyD staff as completed without delays (see para. 2.6). As the contractors did not have valid reason for not completing the defect rectification works within time limits, DNs were issued to the contractors in October 2021;
- (b) in 7 cases, there were inadequacies in the documentation of the Notification Forms (e.g. types of defects or rectification time limits were not properly stated on the Notification Forms concerned);
- (c) in 28 cases, the Notification Forms were endorsed by HyD staff more than 30 days after completion of defect rectification works; and
- (d) in 30 cases, the Notification Forms were not properly endorsed by HyD staff (e.g. endorsement dates not specified).

2.9 In October and November 2021, HyD informed Audit that:

- (a) work-from-home arrangement had been implemented for government employees in light of the coronavirus disease (COVID-19) epidemic in seven months during the period from April 2020 to March 2021. Only emergency works and essential public services could be maintained during that period;
- (b) during the period from April 2020 to March 2021, HyD's manpower resources were largely focusing on planning and administering the repair works for the damages caused to footpaths, street furniture and carriageways arising from the social unrest in 2019; and
- (c) the factors mentioned in (a) and (b) had greatly affected the response time of HyD staff in filing formal records and carrying out the checking,

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documentation, supervision and endorsement of the works related to maintenance of public footpaths. In particular, the work-from-home arrangement had significant impact on HyD's response time as HyD's current workflow in relation to completion reports and Notification Forms were based on hard copies of the relevant documents.

Audit considers that HyD needs to strengthen checking on the completion reports of rectification works submitted by contractors. There is also a need for HyD to take measures to improve the documentation of Notification Forms.

Audit recommendations

2.10 **Audit has *recommended* that the Director of Highways should:**

- (a) **ascertain the reasons for the omissions by contractors to conduct road inspections and consider the need for issuing DNs accordingly;**
- (b) **exercise due care in vetting the inspection programmes submitted by contractors to ensure that all public roads maintained by HyD are covered by contractors' inspections;**
- (c) **take measures to:**
 - (i) **rectify the system bugs in EMMS of the two local road maintenance contracts to ensure that the actual submission dates of inspection reports are shown in EMMS; and**
 - (ii) **ensure compliance with contract requirements on defect rectifications by contractors (e.g. issuing DNs);**
- (d) **in administering local road maintenance contracts in future, consider requiring the contractors to submit the inspection reports and upload them to EMMS in a timely manner; and**
- (e) **strengthen checking on the completion reports of rectification works submitted by contractors and take measures to improve the documentation of Notification Forms.**

Response from the Government

2.11 The Director of Highways agrees with the audit recommendations. He has said that:

- (a) the 15 roads not having been inspected as mentioned in paragraph 2.5(a)(i) are equivalent to 0.5% of 3,312 roads maintained by HyD. These roads might have been overlooked by the contractors and hence have not been put under their inspection programmes. HyD has ascertained that most of the omitted roads are minor roads in rural areas and rear lanes which are very infrequently used by the public. When the omissions were brought to the attention of HyD in September 2021, it immediately required the concerned contractors to include these 15 omitted roads into the inspection programmes and carry out inspections for those roads. HyD has issued DNs to the relevant contractors for the omitted inspections in accordance with the established contract requirements;
- (b) HyD has prepared the master lists for the public roads which are maintained by HyD under all local road maintenance contracts, for checking against the inspection programmes submitted by contractors. HyD has also reminded its staff to exercise due care in vetting the inspection programmes submitted by contractors;
- (c) HyD has instructed the contractors concerned to rectify the system bugs in EMMS. While it is HyD's current practice to rely on the date/time stamped on the hard copies of the inspection reports for checking the timeliness of the submissions, HyD also agrees that it is a good practice to record the submission dates of inspection reports in EMMS by electronic means for greater administrative efficiency;
- (d) for the identified cases where the contractors had not completed the defect rectification works within the required time limits, HyD has issued DNs to the contractors concerned;
- (e) HyD has instructed the contractors to timely upload the inspection reports to EMMS. Furthermore, in a previous internal review exercise in 2020, HyD also identified the problem that there was a time lag between contractor's submission of inspection reports in hard copies and its uploading of soft copies of the inspection reports to EMMS as the existing

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workflow on submission of inspection reports is in form of hard copies first, followed by uploading of the inspection reports to EMMS by batches at a later time. In order to enhance the workflow on submission of inspection reports, HyD has already required the contractors of two new contracts (tenders of which were invited in October 2021) to submit inspection reports only in soft copies via EMMS and the reports should be digitally signed by organisational e-certificate. This will become a standing practice for the submission of inspection reports in all future local road maintenance contracts of HyD; and

- (f) HyD has started to include a standing discussion item in recent monthly progress meetings with the contractors in order to closely monitor the timeliness of submission of completion reports on rectification works. HyD has also stepped up regular technical audits (see para. 3.5) conducted on local road maintenance contracts to strengthen its checking on the completion reports of rectification works submitted by contractors. Furthermore, HyD has also reminded its staff to strictly follow the requirements for completing and endorsing the Notification Forms in a timely manner.

Independent checking on contractors' work

2.12 HyD conducts EAs and EIs for measuring and monitoring the contractors' performance (see para. 1.7) in road routine inspections, road detailed inspections and cleansing of street furniture, as follows:

- (a) **EAs.** To measure the performance standards achieved by the contractors before making payments, upon receipt of inspection reports, HyD will select samples for checking. All observed defects will be recorded in EA checklists which should be signed by the concerned contractors' representatives immediately after conducting EAs. HyD's guidelines (see para. 2.2) have stipulated the sample size (e.g. 3% of the number of road routine inspection reports received in each three-month period) for conducting EAs; and
- (b) **EIs.** For M&M works items, EIs are generally carried out during execution of works. For non-compliance observed during EIs, HyD will issue DNs to the contractors for deduction of contract payments. According to HyD's guidelines (see para. 2.2):

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- (i) HyD staff should conduct EIs on at least one active site in a week as far as practicable for the maintenance works on rectifying defects identified during road routine inspections and road detailed inspections;
- (ii) for cleansing of street furniture, HyD staff should conduct inspections on cleansing operations by carrying out EIs, using real-time video call checking via mobile phones, or checking the records of cleansing works provided by the contractors as and when required based on the latest programmes of the cleansing work; and
- (iii) each IOW grade staff should check at least 25% of the EI results submitted to him each month.

HyD uses a computer system, namely the Mobile Data Collection System (MDCS), for keeping site check record forms (including record forms for the EIs carried out for works covered by M&M provisions) and for recording supervisory checks conducted by IOW grade staff. According to HyD, MDCS is also used for regular compilation of statistics on the frequencies of EIs and supervisory checks.

Scope for improvement in conducting EAs and EIs

2.13 ***EAs.*** To evaluate the effectiveness of EAs conducted by HyD in measuring the performance standard achieved by contractors (see para. 1.7(a)), Audit scrutinised HyD's records of the 12 districts (see Note 19 to para. 2.7) for EAs on road routine inspections and road detailed inspections from July to December 2020. Audit examination revealed the following issues:

- (a) ***Advance notice of EAs given to contractors contrary to contract requirement.*** According to the contracts, unless prior arrangement for gaining access would be required, HyD normally would give not more than

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24 hours' notice to the contractors before carrying out EAs (Note 21). Audit found that in 4 districts, there was no record kept on the time of informing the contractors. According to HyD, for the 4 districts without keeping paper records on the time of informing the contractors, HyD had notified the contractors (face-to-face during visits by the contractors' staff or by other electronic means such as instant messenger, email or telephone) of the date and time of scheduled EAs not more than 24 hours before conducting EAs. For the remaining 8 districts, in 11 cases, HyD had informed the contractors more than 24 hours before conducting EAs, ranging from 3 to 20 days;

- (b) ***No documentation of justifications for skipping samples selected for conducting EAs.*** HyD had developed a computer programme to select samples for conducting EAs on a random basis. According to HyD's guidelines, officers should follow the sequence of the samples on the list in conducting EAs. In case there are justified reasons to skip certain samples on the list, officers should document their justifications for record purpose. Audit found that in 8 cases, some samples on the list were skipped without documentation of the justifications; and
- (c) ***Inadequacies in endorsing EA results.*** According to HyD's guidelines, EA checklists would be used for determining the performance standard achieved by contractors through calculating the percentage of defective inspections (see para. 1.7(a)) identified from EAs. Contractors may appeal to the EA results by producing evidence such as video or photographic records to demonstrate that the defects are beyond their responsibilities. All appeals against the EA results should be raised within a period of 14 days from the date the EA results are passed to the contractors. Audit found room for improvement in endorsing the EA results, as follows:

Note 21: *The purpose of the contract requirement on notifying the contractors (not more than 24 hours) before conducting EA is to inform them of the date and time for EAs and facilitate them to arrange staff to be present on site/prepare the necessary equipment (e.g. working tools such as shovel and crowbar) for EAs. The presence of contractors during EAs could avoid any disagreement on the EA results. In accordance with HyD's internal instructions, the contractors would only be notified of the exact sites or locations selected for EAs not more than two hours before conducting EAs.*

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- (i) ***Delay in endorsing EA results.*** In 585 cases, the EA checklists were endorsed by HyD Engineers concerned more than 30 days after conducting EAs;
- (ii) ***EA results not properly endorsed.*** In 2 cases, the EA checklists were not properly signed by the responsible IOWs (e.g. sign-off dates not specified). Furthermore, in 67 cases, the EA checklists were not properly endorsed by HyD Engineers concerned; and
- (iii) ***Contractors not notified of EA results or notified with delay.*** In 166 cases, there was no documentary record of notifying the contractors of the EA results. In 673 cases, HyD only notified the contractors of the EA results more than 30 days after conducting the EAs.

According to HyD, the time taken by its staff in endorsing the EA checklist and notifying the contractors of the EA results had been adversely affected by the work-from-home arrangement for government employees arising from the COVID-19 epidemic (see para. 2.9(a)) as HyD's current workflow in endorsing EA checklist and notifying the contractors of EA results are based on hard copies of the relevant documents. In Audit's view, HyD needs to remind its staff to strictly follow its requirements on conducting EAs. HyD also needs to conduct checking and notify the contractors of the EA results in a timely manner.

2.14 ***EIs.*** Audit examination revealed the following areas for improvement in conducting EIs:

- (a) ***EIs conducted for road routine inspections and road detailed inspections.*** MDCS captures the statistics on EIs conducted for routine inspections and detailed inspections. However, as there is no information on the number of active sites undergoing maintenance works for each week, Audit is unable to ascertain the extent of HyD's compliance on the frequency of conducting EIs (at least once a week) as stipulated in the guidelines (see para. 2.12(b)(i)). Audit sample check of MDCS records in the 12 districts (see Note 19 to para. 2.7) from April 2020 to March 2021 found that there were no records showing that EIs had been conducted in Kowloon City District and Sai Kung District;

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- (b) ***EIs conducted for cleansing of street furniture.*** There is no stipulated inspection frequency for conducting EIs on the cleansing operations (see para. 2.12(b)(ii)). Audit analysis of MDCS records in the 12 districts (see Note 19 to para. 2.7) from April 2020 to March 2021 found that EIs had only been conducted in 3 districts (namely Central District, Mong Kok District and Tai Po District), with no records showing that EIs had been conducted for the remaining 9 districts; and

- (c) ***Supervisory checks.*** MDCS provides data for compilation of statistics on the compliance of supervisory checks conducted by its IOW grade staff. Audit examination of HyD's statistics from April 2020 to March 2021 revealed that while all the IOW grade staff of the New Territories Regional Office complied with the 25% checking requirement (see para. 2.12(b)(iii)), there were 48 cases (Note 22) of non-compliance in the Urban Regional Office.

2.15 In November 2021, HyD informed Audit that:

- (a) HyD had actually conducted EIs for routine inspections and detailed inspections in Kowloon City District and Sai Kung District, but the relevant records had not been uploaded to MDCS; and

- (b) for the 9 districts with no records showing that EIs had been conducted for cleansing of street furniture, HyD had requested the contractors to submit photographs with date/time stamp for checking that the contractors had carried out cleansing of street furniture in compliance with the contract requirements during the period covered in Audit's analysis.

In Audit's view, HyD needs to compile statistics for monitoring the compliance with the requirements of conducting EIs as promulgated in the guidelines. There is also a need for HyD to remind its staff to strictly follow its requirements on conducting EIs and supervisory checks.

Note 22: *Each case refers to a non-compliance by an IOW grade staff in a month.*

Audit recommendations

- 2.16 **Audit has recommended that the Director of Highways should:**
- (a) **remind HyD staff to strictly follow HyD's requirements on conducting EAs, including:**
 - (i) **issuing notifications to contractors not more than 24 hours before conducting EAs and keeping record on the time of informing the contractors;**
 - (ii) **documenting the justifications for skipping samples selected for conducting EAs; and**
 - (iii) **endorsing EA results properly;**
 - (b) **check and notify the contractors of the EA results in a timely manner;**
 - (c) **compile statistics for monitoring the compliance with the requirements of conducting EAs as promulgated in the guidelines; and**
 - (d) **remind HyD staff to strictly follow HyD's requirements on conducting EAs and supervisory checks.**

Response from the Government

2.17 The Director of Highways agrees with the audit recommendations. He has said that:

- (a) HyD has started to send regular reminders to its staff to ensure that they will strictly follow the requirements when conducting EAs, EIs and supervisory checks in future;
- (b) regarding Audit's finding in paragraph 2.13(b), HyD had reviewed the 8 non-compliant cases and found that the pertinent footpaths had already been converted into planter area or the road had been occupied by

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construction works of another party, etc. Therefore, these footpaths/roads were skipped from the list of conducting EAs;

- (c) HyD has started updating its internal guidelines to set time limit(s) to ensure that its staff will endorse EA checklist and/or notify the contractors of EA results in a timely manner; and
- (d) with a view to more effectively managing the workflow of submissions and checking for supervising M&M works (which include the process of EA and EI) and enhancing record-keeping, HyD has started to develop a new digital management system to further digitise the supervision of the road maintenance works. The new system can be used to compile statistics regularly for monitoring the compliance with the requirements of conducting EIs.

Record keeping of inspection and maintenance works

2.18 *HyD's records relating to inspection and maintenance works.* HyD keeps records relating to inspection and maintenance works, as follows:

- (a) *Contractors' inspections.* Contractors' inspection reports (with photographic records and location of defects identified) (see para. 2.5) are kept in EMMS. The relevant completion reports (with photographs showing the conditions before and after rectification works) for rectification of "small" defects covered by M&M provisions are also kept in EMMS (see para. 2.7);
- (b) *Notification Forms.* For defects identified by HyD staff from other sources, written Notification Forms would be issued to the contractors to instruct them to rectify the defects (see para. 2.8). While Notification Forms are not kept in EMMS, HyD staff under different districts would keep their own registers (in spreadsheet format) for recording the Notification Forms issued (in paper form);
- (c) *EAs.* EA checklists, which are in paper form, are used to record the results of EAs conducted. Photographs of the defects observed during EAs would be attached to the EA checklists where practicable. The records related to EAs are not kept in EMMS, but maintained by HyD in hardcopy files; and

- (d) ***Works orders for non-routine maintenance.*** For works orders issued for non-routine maintenance of public roads, including rectification of “large” defects or other repair works not covered by M&M provisions, the relevant works orders are kept in a web-based application, namely the Maintenance Accounting and Information System (MAINS) (see para. 3.4).

Need to standardise registers of Notification Forms

2.19 ***Notification Forms.*** HyD keeps records of the defects identified from other sources and the relevant rectification works in paper form (i.e. Notification Forms) (see para. 2.18(b)). Audit noted that registers in spreadsheet format were maintained by HyD for the Notification Forms issued. Audit examination of the relevant registers for the 12 districts (see Note 19 to para. 2.7) from April 2020 to March 2021 (see Table 3) found that:


- (a) in 4 districts, more than one register were maintained by HyD staff; and
- (b) as HyD staff in each district designed their own template for the register, the format of registers varied among the 12 districts. In 2 districts, the registers did not include a field for recording the details of defect items, while in 4 districts, the registers did not include a field for recording the time limits for rectification works.

Inspection and routine maintenance works

Table 3

**Notification Form registers maintained
in the 12 districts selected for examination
(April 2020 to March 2021)**

District	Number of registers maintained	Number of Notification Forms issued	Details of defect items recorded	Record of rectification time limits
Tuen Mun	2	591	Yes	No
Yuen Long	4	4,317	Yes	No
North	1	255	Yes	Yes
Tai Po	1	647	Yes	Yes
Sai Kung	1	247	Yes	Yes
Tseung Kwan O	1	128	No	No
Central	1	65	Yes	Yes
Wan Chai	3	219	No	No
Kowloon Bay	1	690	Yes	Yes
Kowloon City	1	338	Yes	Yes
Mong Kok	1	1,804	Yes	Yes
Sham Shui Po	3	1,940	Yes	Yes
Total	20	11,241		

Legend:  Shaded boxes indicate inconsistencies in Notification Form registers

Source: *Audit analysis of HyD records*

2.20 In November 2021, HyD informed Audit that:

- (a) all key and necessary attributes including the “details of defect items recorded” and “time of completion of rectification works” had been entered into the Notification Forms which were properly filed; and
- (b) the prime purpose of the registers was to assist the responsible officers to keep track of the cases until they were closed. This purpose could be achieved without entering those details into the Notification Form registers.

In Audit’s view, recording details of defect items and records of rectification time limits in the Notification Form registers would facilitate HyD’s planning of maintenance programme and monitoring of the timeliness of the rectification works by the contractors. There is merit for HyD to standardise the registers of Notification Forms with a view to improving efficiency.

Need to make use of EMMS for maintaining comprehensive inspection and maintenance records

2.21 According to contract provisions:

- (a) contractors are required to establish, maintain and migrate an effective EMMS to facilitate planning, programming, inventory data collection, maintenance history recording, data storage, complaint handling, preparing management reports and retrieval of all aspects of the maintenance, inspection, remedial and repair works (see para. 1.5(b));
- (b) generally, maintenance history to be kept in EMMS includes those maintenance works carried out by the contractors (whether the works are within or outside the scope of M&M provisions) or records of previous maintenance works supplied by HyD; and
- (c) contractors shall also provide an enquiry function on road inspection reports (e.g. routine inspections and detailed inspections), defects reported from various sources and defects rectification reports (from road inspection reports or defects reported from various sources) in EMMS.

Inspection and routine maintenance works

2.22 For the four types of records relating to the inspection and maintenance works (see para. 2.18):

- (a) ***Contractors' inspections.*** Records of “small” defects covered by M&M provisions identified during contractors’ inspections and related rectification works are kept in EMMS;

- (b) ***Notification Forms and EAs.*** Audit examined EMMS records of the 12 districts (see Note 19 to para. 2.7) under the six local road maintenance contracts maintained by HyD as of March 2021 (see Contracts A to F of Table 2 in para. 2.2) and found that the relevant completion reports for rectification of defects under Notification Forms and EAs were not kept in EMMS. According to HyD, these completion reports were kept in the form of hard copy in files, and it was currently not a requirement under the existing contracts to keep these documents in EMMS. With a view to more effectively managing the workflow of submissions and checking of the M&M works, HyD has started to develop a new digital management system for supervision of the road maintenance works; and

- (c) ***Works orders for non-routine maintenance.*** According to HyD, the maintenance history for the works orders issued for non-routine maintenance works would be kept in EMMS after completion of works. Audit sample check of EMMS records under the six local road maintenance contracts maintained by HyD as of March 2021 (see Contracts A to F of Table 2 in para. 2.2) found that EMMS had not always kept the maintenance records of each and every works order related to non-routine maintenance works. According to HyD, sample checks had been conducted on a monthly basis to measure the contractors’ performance in respect of submission of maintenance records to EMMS before payments were made to the contractors. For cases identified with missing maintenance records on EMMS during the checking, payments will be deducted from the contractors in accordance with the performance-linked payment deduction mechanism stipulated in the contracts.

2.23 Audit noted that some maintenance records for public roads such as completion reports for Notification Forms and EAs were not centrally kept in EMMS, which might not facilitate the compilation of maintenance records for planning rehabilitation works. In Audit’s view, there is merit for HyD to enhance the functions

of EMMS for maintaining comprehensive inspection and maintenance records for public roads.

Need to standardise registers of DNs

2.24 For DNs issued to contractors for any non-compliance issues identified, HyD staff under different districts would keep their own registers (in spreadsheet format) for recording the DNs issued (in paper form). Audit examination of the relevant DN registers relating to road routine inspections, road detailed inspections and cleansing of street furniture for the 12 districts (see Note 19 to para. 2.7) from April 2020 to March 2021 (see Table 4) found that the amounts of deductions and details of non-compliance were not recorded in the DN registers in 3 districts.

2.25 In order to facilitate HyD's monitoring of the issuance of DNs to contractors, there is a need for HyD to take measures to standardise DN registers with a view to improving efficiency.

Table 4

**DN registers maintained in the 12 districts
selected for examination
(April 2020 to March 2021)**

District	Number of DN issued	Amounts of deductions recorded	Details of non-compliance recorded (Note)
Tuen Mun	10	Yes	Yes
Yuen Long	130	Yes	No
North	16	Yes	Yes
Tai Po	25	No	No
Sai Kung	7	No	No
Tseung Kwan O	3	No	No
Central	35	Yes	No
Wan Chai	19	Yes	Yes
Kowloon Bay	15	Yes	No
Kowloon City	0	Not applicable	Not applicable
Mong Kok	3	Yes	No
Sham Shui Po	5	Yes	Yes
Total	268		

Legend:  Shaded boxes indicate inconsistencies in DN registers

Source: *Audit analysis of HyD records*

Note: *According to HyD, while details of non-compliance were recorded in DN registers maintained by 4 districts, it is not a requirement for capturing such details because the purpose of DN registers is to keep track of DN and the total amounts of deductions for interim payment certification.*

Audit recommendations

- 2.26 **Audit has *recommended* that the Director of Highways should:**
- (a) **standardise the registers of Notification Forms with a view to improving efficiency;**
 - (b) **enhance the functions of EMMS for maintaining comprehensive inspection and maintenance records for public roads; and**
 - (c) **take measures to standardise DN registers with a view to improving efficiency.**

Response from the Government

2.27 The Director of Highways agrees with the audit recommendations. He has said that:

- (a) HyD currently keeps the individual Notification Forms and DNs (both in hard copy) under the local road maintenance contracts in files. Retrieval of information related to Notification Forms and DNs can be performed readily by searching the relevant files. To further improve efficiency, HyD has started to update its guidelines to standardise the registers of Notification Forms and DNs; and
- (b) in two HyD's new contracts with tenders invited in October 2021, HyD has already required the contractors to enhance the functions of EMMS to record completion reports for rectification of defects under Notification Forms and EAs.

Audit's field inspections on footpaths

2.28 Damages of footpaths can pose safety risks to users. For example, missing paving blocks and stepping (see Note 23 and Photograph 2(e) in para. 2.30 for an example) can cause injury to pedestrians.

Need to improve the routine inspections of footpaths

2.29 In July and August 2021, Audit conducted field inspections to 35 footpaths in five districts (Note 24) which were subject to routine inspection once every seven days (Note 25). These 35 footpaths are managed under two local road maintenance contracts (Contracts E and F of Table 2 in para. 2.2) by HyD's Urban Regional Office. Two rounds of field inspections were conducted in July 2021 (27th and 28th) and August 2021 (3rd and 4th) respectively.

2.30 *A notable number of defects not identified by the contractors.* With reference to the contract provisions on the types of defects to be identified by the contractors in a routine inspection, Audit prepared a checklist for assessing the conditions of footpaths during Audit's field inspections. Audit found that a notable number of defects (see Photographs 2(a) to (f) for examples) had not been identified in the routine inspections conducted by the contractors (Table 5 shows the details), as follows:

- (a) 189 defects were identified during the first round of Audit's field inspections in July 2021;

Note 23: *Stepping refers to difference in levels between adjacent paving blocks on a footpath, which might be caused by defects in the pavement substructure (i.e. the bedding and the base of the footpaths).*

Note 24: *The number of footpaths covered in Audit's field inspections for Sham Shui Po, Mong Kok, Yau Ma Tei, Kowloon Bay and Kowloon City was 4, 6, 12, 4 and 9 respectively.*

Note 25: *According to HyD, in determining the inspection frequency, it takes into account factors including pedestrian flow, number of past incidents and inspection history.*

Inspection and routine maintenance works

- (b) 6 defects (3% of 189 defects identified by Audit in (a)) were recorded in the routine inspection reports for the respective footpaths submitted by the contractors in the following 7-day period; and

- (c) 183 defects (97% of 189 defects) identified during the first round of Audit's field inspections in July 2021 were found to remain unrectified during the second round of Audit's field inspections in August 2021. In September and October 2021, HyD informed Audit that, of the 183 defects:
 - (i) 14 (8%) defects which might cause dangers to road users would immediately be rectified; and

 - (ii) 169 (92%) defects which were unlikely to pose danger and serious inconvenience to road users did not require immediate rectification, and would be repaired within planned programmes of work, with priority depending on the degree of deficiency, traffic and site characteristics. According to HyD, under the current inspection mechanism, these defects were not required to be recorded in the routine inspection reports and should only be recorded in the detailed inspection reports.

Inspection and routine maintenance works

Table 5

**Audit's field inspections of 35 footpaths
(July and August 2021)**

Type of defects	Number of defects identified	
	First round of Audit's field inspections (27 and 28 Jul 2021)	Second round of Audit's field inspections (3 and 4 Aug 2021)
1. Defect in footpaths which includes missing, loose or damaged blocks/slabs/kerb/tactile tile/covers	94	91
2. Defect which includes missing or damaged railings	39	39
3. Defective (i.e. loose/missing) sign posts/plates	20	20
4. Pavers with stepping/depression greater than 10 millimetres (mm), cracks greater than 2 mm or gaps/joints wider than 10 mm	27	24
5. Uneven surfacing	9	9
Total	189	183

Source: *Audit's field inspections*

Photographs 2(a) to (f)

Examples of defects found in Audit's field inspections

(a) Missing paving block at Jordan Road



(b) Damaged tactile tiles at Hoi Bun Road



(c) Damaged railings at Hoi Bun Road



(d) Defective traffic sign plate at Hoi Bun Road



(e) Stepping of paving blocks greater than 10 mm at South Wall Street



(f) Gap wider than 10 mm between paving blocks at Battery Street



Source: Audit field inspections on 27 and 28 July 2021

Inspection and routine maintenance works

2.31 In November 2021, HyD informed Audit that:

- (a) HyD would select some footpaths inspected by the contractors for EAs to ensure efficient use of public resources. If HyD found during EAs that the contractors had failed to identify defects on the footpaths, deduction would be imposed on the contractors' monthly payments in accordance with the contract provisions. Full checking on the contractors' inspections would entail a lot of resources; and
- (b) to ensure efficient use of public funds, the existing EA mechanism was a prudent and cost-effective way for ensuring the contractors' quality of works.

2.32 The notable number of defects identified by Audit suggested room for improvement in the quality of routine inspections. In Audit's view, defects in public footpaths should be identified and rectified in a timely manner so as to enhance the safety of footpaths. Audit considers that HyD needs to:

- (a) take measures to improve the routine inspections of footpaths, taking into account the findings of Audit's field inspections; and
- (b) take appropriate follow-up actions on the defects identified by Audit and consider the need for issuing DNs on the defects which have not been identified by the contractors without reasonable excuses.

Non-compliance with routine inspection frequency

2.33 For certain footpaths of high significance (e.g. located within areas of pedestrianisation scheme — Note 26), contractors are required to conduct routine inspections with higher frequency in accordance with the contracts. According to contract provisions, designated paver footways and footways under the pedestrianisation scheme are subject to higher routine inspection frequencies of every

Note 26: *Since 2000, TD has been implementing pedestrianisation schemes in several areas, including Causeway Bay, Central, Mong Kok, Tsim Sha Tsui, Jordan, Sham Shui Po, Stanley and Shek Wu Hui to improve pedestrian safety and mobility, to promote walking as a transport mode, to discourage access for non-essential vehicles and to improve overall pedestrian environment.*

Inspection and routine maintenance works

7 days or 1 month, as compared with other footways of which the routine inspection frequencies are 1 or 3 months (see Note 16 to para. 2.2(a)). However, Audit noted that the frequencies of these routine inspections had not been fully complied with (see Table 6). According to the checking conducted by HyD, non-compliance with the routine inspection frequency of footpaths (with higher frequency of 7 days/1 month) occurred because the contractors concerned had either misinterpreted the relevant contract requirements or not included the pertinent footpaths into the inspection programmes due to oversight. In Audit's view, HyD needs to take measures to ensure that the contractors comply with the routine inspection frequency for footpaths of high significance.

Table 6

**Non-compliance with routine inspection frequency on footpaths
as stated in contracts
(April 2020 to March 2021)**

Type of footpath	Inspection frequency required by contract	Footpaths falling into the category (a) (Number)	Footpaths with non-compliance in routine inspection frequency	
			(b) (Number)	(c) = $\frac{(b)}{(a)} \times 100\%$
Designated paver footway	7 days	227	5	2%
	1 month	488	2	1%
Footway under pedestrianisation scheme	7 days	18	1	6%
	1 month	41	8	20%
Overall		774	16	2%

Source: Audit analysis of HyD records

Audit recommendations

- 2.34 **Audit has *recommended* that the Director of Highways should:**
- (a) **take measures to improve the routine inspections of footpaths;**
 - (b) **take appropriate follow-up actions on the defects identified by Audit and consider the need for issuing DNs on the defects which have not been identified by the contractors without reasonable excuses; and**
 - (c) **take measures to ensure that the contractors comply with the routine inspection frequency for footpaths of high significance.**

Response from the Government

2.35 The Director of Highways agrees with the audit recommendations. He has said that:

- (a) HyD will review whether the scope of routine inspections of footpaths can be further enhanced;
- (b) regarding the 14 defects identified by Audit requiring immediate rectification, HyD has immediately requested the contractors to rectify the defects and has issued DNs to the concerned contractors. For the remaining 169 defects which did not require immediate rectification, HyD is keeping close monitoring of their conditions and will arrange immediate rectification works when necessary; and
- (c) HyD has reminded the concerned contractors to comply with the inspection frequency requirements for footpaths of high significance. DNs have been issued to the contractors for the non-compliance identified. HyD will also review whether the wording of contract provisions can be enhanced in future contracts for better clarity.

PART 3: NON-ROUTINE MAINTENANCE AND REHABILITATION WORKS

3.1 This PART examines HyD’s management of non-routine maintenance and rehabilitation works, focusing on:

- (a) administration of non-routine maintenance works for public footpaths (paras. 3.2 to 3.16); and
- (b) planning of rehabilitation works for public footpaths (paras. 3.17 to 3.20).

Administration of non-routine maintenance works for public footpaths

3.2 Other than the routine maintenance works covered under M&M provisions of the local road maintenance contracts, HyD may instruct contractors to carry out non-routine maintenance works, including rectification of “large” defects or other repair works (see para. 1.6). HyD has to separately issue works orders and pay the contractors for such works.

3.3 According to HyD, the spending of funds for maintenance works is properly planned at the beginning of each financial year. Chief Engineers are responsible for setting overall objectives and priorities in the spending of funds. Senior Engineers, Engineers and Chief Technical Officers are responsible for preparing a maintenance plan with details of funds required for each district, after fully considering the maintenance requirements of all components of the road network and balancing the various types of works required for optimal utilisation of funds. Depending on the nature of the maintenance works, payments for the works orders are funded by different funding sources, as follows:

- (a) for recurrent maintenance works (e.g. rectification of “large” defects or other repair works not covered by M&M provisions including small-scale preventive maintenance works and small-scale footpath repaving), they are funded by Head 60 (HyD) of GRA; and

Non-routine maintenance and rehabilitation works

- (b) for non-recurrent maintenance works (e.g. reconstruction of footpaths or larger-scale footpath repaving under HyD's rehabilitation projects) or minor improvement works, they are funded by Head 706 (Highways) Subhead 6100TX block allocation (Highways works, studies and investigations for items in Category D of the Public Works Programme) of CWRP.

3.4 HyD issues works orders to instruct contractors for carrying out non-routine maintenance works as and when necessary. Prior to the issue of a works order, a Works Supervisor (WS) prepares a cost estimate, which is checked by an IOW and endorsed by the approving authority (e.g. Engineers). In accordance with HyD's Maintenance Administration Handbook (MAH), HyD's WSs, under the direction of IOWs, are responsible for the day-to-day site supervision of maintenance works under the works orders, and compiling documentary records of their observations (e.g. site diary). The documentary records are subject to spot checking by supervisory staff (e.g. Engineers and IOWs) and HyD's technical audits (see para. 3.5). HyD adopts a web-based application, namely MAINS, to handle the administration of the works order process and related payments.

3.5 *Technical audits by HyD.* HyD's MAH sets out guidelines applicable to the administration and supervision of works orders issued under the local road maintenance contracts. In order to improve the quality of maintenance works and to ensure compliance with the laid-down requirements in MAH, HyD's Contract Advisory Unit is responsible for carrying out technical audits on the local road maintenance contracts on an annual basis, including selecting sample works orders issued for non-routine maintenance works to check whether the documentary records are properly prepared (Note 27).

Note 27: *In order to enhance the works quality, technical audits are conducted to assess compliance with contract terms or related guidelines on other main areas, including general contract management issues and contractors' work under M&M provisions. During the period from December 2020 to March 2021, HyD's Contract Advisory Unit issued technical audit reports for each of the six local road maintenance contracts (i.e. Contracts A to F in Table 2 in para. 2.2). Some of the deficiencies on works orders administration mentioned in paragraphs 3.8 to 3.10 have been identified in the technical audits.*

Implementation progress of works orders not timely recorded in MAINS

3.6 Under the six local road maintenance contracts administered by HyD as of March 2021 (i.e. Contracts A to F in Table 2 in para. 2.2), a total of 2,447 works orders (with a total cost estimate of \$151 million — see Note 10 to para. 1.9) relating to non-routine maintenance works of public footpaths were issued during the period from April 2020 to March 2021. As of June 2021, for the 2,447 works orders, Audit analysis of the MAINS records showed that the actual dates of completion for 310 (13% of 2,447) works orders were not available in MAINS. In October 2021, HyD informed Audit that:

- (a) upon checking, of the 310 works orders identified:
 - (i) 289 (93%) works orders had been completed on time but their actual completion dates had not been input into MAINS because compilation of works orders documents for finalisation and payment purpose was still in progress. HyD had observed similar problem in an internal review previously and engaged an information technology consultant in August 2021 to enhance MAINS in order to ensure that the actual completion dates of the works orders are timely reflected in MAINS. The enhancements were expected to be completed by the first quarter of 2022; and
 - (ii) 9 (3%) works orders had delays up to 30 days, and 12 (4%) works orders had delays over 30 days and up to six months; and
- (b) HyD had also conducted manual checking of the remaining 2,137 (2,447 less 310) works orders and found that:
 - (i) 2,084 (97.6%) works orders had been completed on time; and
 - (ii) 45 (2%) works orders had delays up to 30 days, and 8 (0.4%) works orders had delays over 30 days and up to six months.

3.7 In Audit's view, HyD needs to take measures to ensure that information on the implementation progress of works orders is input into MAINS in a timely manner.

Non-routine maintenance and rehabilitation works

Non-compliance with requirements of issuing covering works orders

3.8 According to MAH, normally, a works order is issued before the commencement of works. However, under emergency situation (e.g. receipt of complaints and public safety), HyD can give verbal instructions to the contractors for carrying out works before a written works order is issued. A covering works order should then be issued to confirm the verbal instructions. During the period from April 2020 to March 2021, 162 covering works orders (7% of the 2,447 works orders issued during the same period (see para. 3.6)) relating to non-routine maintenance works of public footpaths were issued. Audit examination of these 162 covering works orders found that:

- (a) according to MAH, covering works orders should be issued within the shortest possible time subsequent to the verbal instructions and in any event within seven days of the issue of the verbal instructions. Of the 162 covering works orders, 16 (10%) covering works orders were issued more than seven days subsequent to the issuance of the verbal instructions;
- (b) according to MAH, the justifications for issuing covering works orders should be recorded. Of the 162 covering works orders, justifications for issuing covering works orders were not recorded in 4 (2%) covering works orders; and
- (c) according to MAH, the time of giving verbal instructions should be clearly recorded in the covering works orders. Of the 162 covering works orders, the time of giving verbal instructions was not recorded in 26 (16%) covering works orders.

3.9 In Audit's view, HyD needs to remind its staff to fully comply with the requirements as set out in MAH in issuing covering works orders.

Need to strengthen the monitoring and checking of works

3.10 To review HyD's monitoring and checking of contractors' works, Audit selected 120 works orders (i.e. 5% of the 2,447 works orders (see para. 3.6)) relating to non-routine maintenance works of public footpaths issued during the period from April 2020 to March 2021 for examination and found room for improvement as follows:

Non-routine maintenance and rehabilitation works

- (a) ***Hidden works not recorded in accordance with requirements of MAH.*** Hidden works are works the measurement of which cannot be verified after the works concerned are covered up or put out of view (Note 28). As such, hidden works records shall be prepared by the contractors and then checked and agreed on site by WSs before the hidden works are covered up or removed as far as practical. As IOWs are responsible for selecting samples of hidden works records checked by WSs for further checking, WSs shall pass the signed hidden works records to IOWs immediately and before the hidden works are put out of view so that IOWs can decide whether they would carry out site checking. According to MAH, all hidden works records shall record the measured dimensions of the hidden works but not the computed final quantity. For example, the measured dimensions of 1 metre (m) × 2 m × 3 m should be recorded instead of the computed final quantity of 6 cubic metres. Of the 120 works orders, hidden works were recorded in 80 (67%) works orders. Audit examination of these 80 works orders found that:
- (i) 11 (14%) works orders did not involve hidden works records in accordance with the requirements of MAH because HyD staff could measure dimensions (e.g. area of repaved footpath) on site subsequently. Hence, these records should not be considered as hidden works records because by definition, hidden works were only works the measurement of which cannot be verified after the works concerned are covered up or put out of view; and
 - (ii) hidden works records of 3 (4%) works orders were found to be recorded by computed final quantity (instead of the measured dimensions), contrary to the requirements.

In Audit's view, HyD needs to remind its contractors to submit hidden works records in accordance with the requirements of MAH where appropriate;

Note 28: *An example of hidden works relating to non-routine maintenance works of public footpaths is the construction of railings. As the footings of railings would be covered up after works completion, contractors are required to maintain evidence (e.g. photographs) showing the excavated holes for all the footings. Measurement of the depth of the excavation shall also be shown in selected locations.*

Non-routine maintenance and rehabilitation works

- (b) ***Late submission of reports on completion of works by contractors.*** According to contract provisions, contractors shall report in writing to HyD (i.e. in the form of report on completion of works) within two days of claimed date of completion when the works stipulated in the works order are completed. Of the 120 works orders, the contractors failed to submit the reports within two days after completion of works for 91 (76%) works orders, with delays ranging from 1 to 145 days (averaging 20 days). Without reports on completion of works, HyD could not certify the works completion under the terms and conditions of the contracts. In Audit's view, HyD needs to take measures to ensure that reports on completion of works under works orders are timely submitted by the contractors; and
- (c) ***Delay in checking completion of works by HyD.*** According to MAH, after the contractors reported completion of the works under a works order (see (b)), HyD will then arrange its IOW grade staff to check whether the works have been satisfactorily completed within two working days from the date of receipt of the reports on completion of works from contractors. After checking, the IOW shall either recommend to the Engineer or Chief Technical Officer that the works have been satisfactorily completed, or inform the contractors that outstanding works are required to be completed. Of the 120 works orders, the dates of checking by the IOWs concerned were not stated in the reports on completion of works in 18 (15%) works orders. For the remaining 102 (85%) works orders, the IOWs concerned failed to check whether the works have been satisfactorily completed within two working days from the date of receipt of the reports on completion of works from the contractors in 41 (40% of 102) works orders, with delays ranging from 1 to 84 working days (averaging 17 working days). Delays in checking completion of works for the works orders might affect quality assurance. In Audit's view, HyD needs to remind its staff to conduct checking on works completion within the time limit stipulated in MAH.

Need to ensure timely submission of dimension books by contractors

3.11 Before the issue of a works order, HyD prepares a cost estimate of the order (see para. 3.4). During the progress of works, the contractor can apply for interim payments for the completion of part of a works order. The aggregate interim payments for any works order shall not exceed 90% of its cost estimate. According

Non-routine maintenance and rehabilitation works

to MAH, the contractor shall submit a dimension book (Note 29) for a works order to HyD within 90 days of completion of either the date of completion of the works order, or the date specified for completion of the works order, whichever is earlier. HyD shall check the accuracy of the measurements in the dimension book before making a final payment and finalising the works order.

3.12 In the 2011 audit review (see para. 1.10), Audit found that there were delays in finalisation of works orders for completed local road maintenance contracts. As of June 2021, works under the three local road maintenance contracts (Contracts A, B and J) had been completed but the accounts had not yet been finalised. In this audit review, Audit reviewed HyD's progress in finalising works orders under these three contracts. From April 2015 to June 2021, there were a total of 6,403 completed works orders relating to non-routine maintenance works of public footpaths issued under these three completed local road maintenance contracts. As of June 2021, 497 (8%) works orders with a total cost estimate of \$68 million had not yet been finalised (see Table 7).

Note 29: *A dimension book contains records of the works done for a works order and their respective quantities and measurements, which are subject to verification and agreement by HyD.*

Non-routine maintenance and rehabilitation works

Table 7

**Progress of finalising completed works orders relating to
non-routine maintenance works of public footpaths
(June 2021)**

Contract	Contract completion date	Number of completed works orders relating to non-routine maintenance works of public footpaths (a)	Number of completed works orders not yet finalised (b)	Percentage $(c) = \frac{(b)}{(a)} \times 100\%$
A	31 Mar 2021	3,535	182	5%
B	31 Mar 2021	1,833	302	16%
J (Note)	31 Mar 2020	1,035	13	1%
Overall		6,403	497	8%

Source: *Audit analysis of HyD records*

Note: *Contract J involved the provision of inspection and routine maintenance works for public roads in the Kowloon West area.*

3.13 According to HyD records, the main reason for the delay in finalising the 497 completed works orders relating to non-routine maintenance works of public footpaths was late submission of dimension books by the contractors. Audit examination revealed that, of the 497 works orders, dimension books were still outstanding from the contractors for 360 (72%) works orders (with a total cost estimate of \$54 million) as of June 2021. There were delays ranging from 1 to 2,050 days (averaging 353 days) in the submission of dimension books by the contractors. Ageing analysis of these 360 works orders showed that the dimension books of 141 (39% of 360) works orders had been overdue for over one year (see Table 8).

Non-routine maintenance and rehabilitation works

Table 8

**Ageing analysis of overdue dimension books
(June 2021)**

Contract	Contract completion date	Number of completed works orders with dimension books overdue			
		≤1 year	> 1 to ≤ 2 years	> 2 years	Total
A	31 Mar 2021	70	15	18	103
B	31 Mar 2021	146	92	7	245
J	31 Mar 2020	3	7	2	12
Total		219	114	27	360

141 (39% of 360)

Source: Audit analysis of HyD records

3.14 The 2011 audit review highlighted that late submission of dimension books was one of the reasons for delays in finalising works orders. After a lapse of 10 years, Audit noted that the problem still existed. This is not satisfactory because if the dimension books are submitted a long time after works completion, it would affect the finalisation of contract accounts. According to HyD, since 2011, it has put in place a measure under its local road maintenance contracts to recover from the contractor all previous interim payments paid under a works order (see para. 3.11) if the contractor fails to submit the dimension book within 90 days of the date of completion of the works order without justified reasons. For cases identified with delays in submission of dimension books, previous interim payments made had been recovered from the contractors accordingly. In Audit's view, HyD needs to step up measures to ensure timely submission of dimension books by contractors with a view to expediting the finalisation of works orders.

Audit recommendations

3.15 **Audit has recommended that the Director of Highways should:**

Non-routine maintenance and rehabilitation works

- (a) **take measures to ensure that information on the implementation progress of works orders is input into MAINS in a timely manner;**
- (b) **remind HyD staff to fully comply with the requirements as set out in MAH in issuing covering works orders;**
- (c) **remind HyD's contractors to submit hidden works records in accordance with the requirements of MAH where appropriate;**
- (d) **take measures to ensure that reports on completion of works under works orders are timely submitted by contractors;**
- (e) **remind HyD staff to conduct checking on works completion within the time limit stipulated in MAH; and**
- (f) **step up measures to ensure timely submission of dimension books by contractors.**

Response from the Government

3.16 The Director of Highways agrees with the audit recommendations. He has said that:

- (a) HyD has taken follow-up actions to ensure that the actual completion dates of works orders are timely recorded in MAINS (see para. 3.6(a)(i));
- (b) HyD has reminded its staff to fully comply with the requirements as set out in MAH in issuing covering works orders and its contractors to submit hidden works records in accordance with the requirements of MAH;
- (c) with a view to managing the workflow of submissions and checking for supervising non-routine maintenance works more effectively and enhancing record keeping, HyD has started to develop a new digital management system for supervision of the road maintenance works. The proposed system will cover procedures related to hidden works records and reports on completion of works;

Non-routine maintenance and rehabilitation works

- (d) as regards the late submission of reports on completion of works under works orders not covered by M&M provisions, HyD has duly reflected contractors' pertinent unsatisfactory performance in the contractors' performance reports. HyD has also reminded its contractors to ensure that the reports on completion of works under works orders are timely submitted;
- (e) HyD has reminded its staff to conduct checking on works completion within the time limit stipulated in MAH; and
- (f) HyD has started to include a standing discussion item in recent monthly progress meetings with the contractors in order to closely monitor the progress of contractors' submission of dimension books for completed works orders.

Planning of rehabilitation works for public footpaths

3.17 The two Regional Offices of HyD are responsible for identifying public footpaths that require rehabilitation works (e.g. reconstruction or relaying of paving blocks on footpaths). The two Regional Offices collect information from various sources, including regular inspections by the contractors, demand from local stakeholders (e.g. through sending representatives to attend District Council meetings) and complaints from members of the public, for planning the rehabilitation projects. According to HyD, after assessing the need for rehabilitation works, its Senior Engineer will prepare a technical paper and a funding paper setting out the project proposal and other key information, including the justifications for the rehabilitation works (Note 30), the project scope and nature, the financial implications (both capital and recurrent expenditures involved), the scheduled commencement and completion dates and any important relevant background information, for Chief Engineer's approval. Upon obtaining approval, HyD will issue works orders to instruct contractors for carrying out the related works. In the six-year period from April 2015 to March 2021, HyD approved 228 rehabilitation projects for public footpaths, with a total approved estimate of \$286 million, which was funded by Head 706 (Highways) Subhead 6100TX block allocation (Highways works, studies and investigations for

Note 30: *A common reason for rehabilitation is the deteriorated condition of footpaths (e.g. broken, slippery, worn, uneven, cracked and subsided surfaces) as a result of wear and tear together with repeated trenching works by utilities undertakers, which may impose potential safety hazard to pedestrians.*

Non-routine maintenance and rehabilitation works

items in Category D of the Public Works Programme) of CWRP (see para. 3.3(b)). Table 9 shows the position of these 228 projects as of June 2021.

Table 9

**Progress of rehabilitation projects
for public footpaths
(June 2021)**

Project status	Number of projects
Works completed	121
Works in progress	105
Works not yet carried out	2
Total	228

Source: Audit analysis of HyD records

Scope for improving the rehabilitation works for public footpaths

3.18 Of the 228 rehabilitation projects for public footpaths approved from April 2015 to March 2021, Audit selected 20 projects for examination. The approved estimate of each of these 20 projects was \$3 million or above (Note 31), totalling \$72 million. Audit examination of these 20 projects found the following issues:

- (a) ***Delays in completing rehabilitation projects.*** Among the 20 rehabilitation projects, as of June 2021, 6 projects had been completed and 14 projects were in progress. For the 6 completed projects, there were delays ranging

Note 31: *Approved estimates of the 228 rehabilitation projects for public footpaths are as follows:*

<i>Approved estimate</i>	<i>Number of projects</i>
<i>< \$1 million</i>	<i>117</i>
<i>≥ \$1 million to < \$2 million</i>	<i>64</i>
<i>≥ \$2 million to < \$3 million</i>	<i>27</i>
<i>≥ \$3 million</i>	<i>20</i>
<i>Total</i>	<i>228</i>

Non-routine maintenance and rehabilitation works

from 1 to 12 months (averaging 6 months) in completing 4 (67%) projects. For the rehabilitation project with a delay of 12 months (being the longest delay among the 4 projects), which involved relaying paving blocks on a public footpath in Kowloon City District, the scheduled completion date was September 2017. According to HyD, works had been carried out in 5 sections to suit the temporary traffic arrangement, with the first works order issued in December 2016. While the first two sections of works (covering a total of 2,300 m² of footpaths) had been completed before the scheduled completion date of the project (i.e. September 2017), HyD had only commenced the remaining three sections of works (covering a total of 2,000 m² of footpaths) starting from November 2017. In the event, the required works under the project were only completed in September 2018. According to HyD, the delay was due to the longer-than-expected time required for the coordination/liaison with local schools and residents in the formulation of temporary traffic arrangement for the footpath reconstruction works (many run-in/out of the private building blocks in that area). In this connection, Audit noted that HyD had not carried out public consultation on the temporary traffic arrangement at the planning stage before seeking funding approval. While noting that the arrangement of splitting the works into sections had mitigated the nuisance caused by the works to a certain extent, Audit considers that the closure of different sections of the public footpath for a total period of 21 months (i.e. from December 2016 to September 2018) would bring inconvenience to the local residents and the public in the vicinity. In Audit's view, in implementing rehabilitation projects in future, HyD needs to consult the relevant stakeholders on temporary traffic/pedestrian arrangement at the planning stage;

- (b) ***Over-estimation of project costs.*** According to HyD, in preparing the funding paper for a proposed rehabilitation project, its Senior Engineer will duly consider the financial implication of the project, before deriving a project estimate for the Chief Engineer's approval (see para. 3.17). Audit comparison of the approved estimates with the actual expenditures incurred up to June 2021 for the 6 completed rehabilitation projects revealed that the project costs had been over-estimated in all cases, ranging from 27% to 200% (see Table 10). Over-estimation of project costs could lead to unnecessary lock-up of funds available for funding other rehabilitation projects. In Audit's view, HyD needs to take measures to improve the accuracy of project estimates for rehabilitation projects as far as practicable; and

Non-routine maintenance and rehabilitation works

Table 10

**Comparison of approved estimates and actual expenditures
incurred for the 6 completed rehabilitation projects
(June 2021)**

Rehabilitation project	Approved estimate (a) (\$'000)	Actual expenditure incurred (b) (\$'000)	Over-estimation	
			(c) = (a) - (b) (\$'000)	(d) = $\frac{(c)}{(b)} \times 100\%$ (Percentage)
1	3,260	1,990	1,270	64%
2	3,200	2,300	900	39%
3	3,140	1,988	1,152	58%
4	3,120	2,195	925	42%
5	3,100	1,035	2,065	200% (Note)
6	4,450	3,517	933	27%

Source: Audit analysis of HyD records

Note: According to HyD, the over-estimation of the approved estimate for Project 5 was mainly attributed to the fact that after funding approval, rehabilitation works could not be carried out at a part of the footpath as planned because that part was occupied by the site hoarding of an adjacent private building development site. As a result, there was a substantial reduction of the area of footpath to be repaved under the rehabilitation works. Rehabilitation works to the affected part of the footpath will only be carried out in future after completion of the private building development.

- (c) **Delays in releasing unused funds from completed rehabilitation projects.** According to HyD guidelines, upon completion of the works funded by Head 706 (Highways) Subhead 6100TX block allocation (see para. 3.3(b)), accounts should be finalised and approval to delete the items from block vote 6100TX should be sought as early as practicable to enable more effective monitoring and control of expenditures. Officers shall regularly review whether commitment can be released by deleting completed items to avoid unnecessary lock-up of resources. Audit examination revealed that HyD took 5 to 31 months to delete the 6 completed projects (see (b) above)

Non-routine maintenance and rehabilitation works

from the block vote after making final payment to the contractors. Furthermore, for 4 (67% of 6) completed projects, as of June 2021 (i.e. 12 to 24 months after respective approvals to delete the projects from block vote 6100TX were obtained), HyD staff had not yet released the unused funds in MAINS (see para. 3.4), resulting in \$5 million unused funds being locked up. In Audit's view, HyD needs to promptly release unused funds from rehabilitation projects upon the completion of works and finalisation of project accounts.

Audit recommendations

- 3.19 **Audit has recommended that the Director of Highways should:**
- (a) **in implementing rehabilitation projects in future, consult the relevant stakeholders on temporary traffic/pedestrian arrangement at the planning stage;**
 - (b) **take measures to improve the accuracy of project estimates for rehabilitation projects as far as practicable; and**
 - (c) **promptly release unused funds from rehabilitation projects upon the completion of works and finalisation of project accounts.**

Response from the Government

3.20 The Director of Highways agrees with the audit recommendations. He has said that:

- (a) HyD will review the checklist of block vote paper to include identification of the key stakeholders (e.g. hospitals and schools) for the works at the planning stage. HyD staff will consult and communicate with the key stakeholders identified on the works arrangement as early as practicable before works commencement. HyD has started to update its guidelines to take forward this proposal;

Non-routine maintenance and rehabilitation works

- (b) HyD has started to update its guidelines to require its staff to improve the accuracy of project estimates for future rehabilitation projects as far as practicable; and

- (c) since 2019, HyD has further enhanced its requirements on cost control of block vote items by requiring individual project offices to regularly review whether the committed funds can be released from the existing block vote items to avoid unnecessary lock-up of funds. HyD will continue to remind its staff to promptly release unused funds upon completion of works and finalisation of project accounts.

PART 4: OTHER RELATED ISSUES

4.1 This PART examines other issues relating to the maintenance of public footpaths, focusing on:

- (a) design and choice of paving materials (paras. 4.2 to 4.11); and
- (b) provision of pedestrian railings (paras. 4.12 to 4.24).

Design and choice of paving materials

4.2 According to HyD, most of the footpaths in Hong Kong are paved with either concrete or paving blocks, while the remaining ones are paved with other materials such as bitumen. Concrete is a simple, flexible and cheap material for the construction of footpaths, but excessive noise and construction waste are generated during and after breaking of concrete footpaths for trench openings, causing a lot of inconvenience and nuisance to the general public. Since the 1980s, after conducting studies for laying paving blocks on footpaths, HyD has promulgated specifications and standard drawings to promote the use of paving blocks on footpaths.

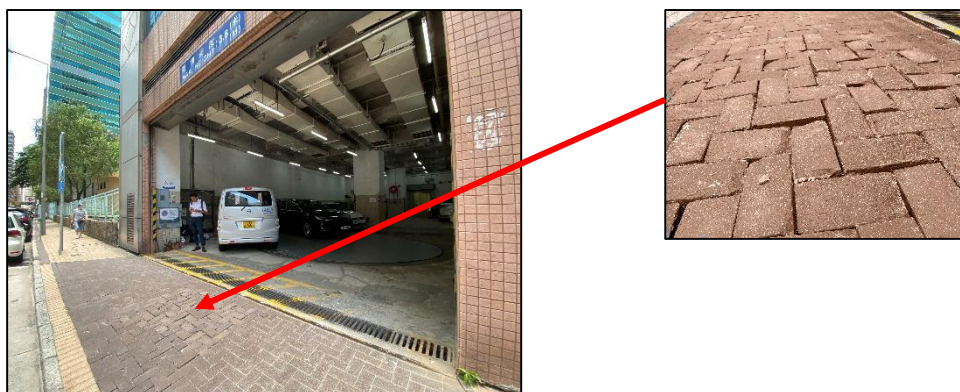
4.3 According to HyD, about 29,200 m² of footpath sections paved with paving blocks were damaged during the period of social unrest in 2019. In order to expedite the remedial works, HyD repaired the damaged footpath sections by temporarily patching them with concrete/bituminous materials. The remedial works were completed in early 2020. Taking into consideration that the patched areas were unsightly, in early 2021, HyD commenced the works of converting those footpath sections back to paving blocks. In October 2021, Audit made enquiry with HyD on the progress of the conversion works. In response, HyD said that, as of end November 2021, over 99% of the conversion works had been completed, with the remaining works expected to be completed before the end of 2021.

Need to review design of paving materials for footpath locations subject to heavy loading

4.4 According to HyD’s “Guidance Notes on Design and Construction of Pavements with Paving Units” issued in November 2020, some special considerations are required to be taken into account when designing pavements laying with paving units for areas subject to heavy loading or abnormal operational conditions. To avoid cracking or breaking of paving blocks which are exposed to vehicular traffic, heavy duty paving blocks as specified in Highways Department Standard Drawings (Note 32) and as required under the General Specification for Civil Engineering Works shall be used. However, paving blocks may not be suitable for use in footpaths located within industrial areas subject to frequent parking and loading/unloading activities as they are susceptible to damage and might require frequent maintenance. Photograph 3 shows an example of a damaged footpath section located at the entrance of a carpark, probably caused by excessive loading applied on the paving blocks by heavy vehicles.

Photograph 3

An example of a damaged footpath section located at the entrance of a carpark



Source: Photograph taken by Audit staff on 9 July 2021

Note 32: *Highways Department Standard Drawings also provide other construction details for pavements using paving units with vehicular over-runs.*

4.5 Audit's field inspections in July and August 2021 (see para. 2.29) identified locations in which adoption of paving blocks might not be suitable. Of the 35 footpaths inspected by Audit, 13 footpath locations were paved with paving blocks and situated at the vehicular over-runs. Audit found that they had been damaged (including damaged paving blocks and loosened paving blocks), which might pose a safety threat to pedestrians. In November 2021, HyD informed Audit that:

- (a) after the 13 footpath locations had been brought to its attention, HyD issued Notification Forms to instruct the contractors to rectify the footpaths at those locations; and
- (b) on-site performance of the heavy duty paving blocks (see para. 4.4) currently in use showed that they were susceptible to damage and might require frequent maintenance.

In Audit's view, HyD needs to review the design of paving materials for footpath locations subject to heavy loading with a view to minimising the damages caused to those locations.

***Need to conduct site trials for new eco-pavers
as soon as practicable***

4.6 With a view to promoting the development of recycling outlets for waste glass containers, the Environmental Protection Department (EPD) engaged a local university which successfully used the granules from crushed glass beverage bottles for production of concrete paving blocks (i.e. eco-pavers) in 2004. Since October 2010, HyD has stipulated in its local road maintenance contracts that priority should be given to eco-pavers containing recycled glass for paving concrete block footpaths. In order to explore the potential outlets for the reuse of recycled glass materials recovered under the proposed Producer Responsibility Scheme on glass beverage containers (Note 33), EPD further engaged a local university to study the possible increase in glass cullet content in eco-pavers in 2016. The study findings confirmed the technical feasibility to increase the content of glass cullet in eco-pavers

Note 33: *According to EPD, the Government has implemented the Producer Responsibility Scheme on glass beverage containers progressively and completed the drafting of the required subsidiary legislation to provide for the operation details of the scheme, which would be submitted to the Legislative Council for scrutiny in due course.*

Other related issues

without affecting their physical performance while meeting the relevant technical requirements currently adopted in public works projects. A production trial carried out between 2017 and early 2018 suggested that the content of glass cullet in eco-pavers for footpaths could be increased from the current 25% to 35% (hereinafter referred to as the new eco-pavers).

4.7 Since 2018, EPD has discussed with HyD regarding the use of a reasonable amount of new eco-pavers on a pilot basis for monitoring and reviewing the actual performance before full-scale implementation. It was anticipated to take about one and a half years for administering the variation on new specifications, for suppliers to produce the new eco-pavers and for EPD and HyD to monitor the site performance before the new eco-pavers can be promulgated across the board.

4.8 *Site trials for new eco-pavers.* In November 2018, the two Regional Offices commenced arranging site trials, including the locations and programmes, for the new eco-pavers. Subsequently, 12 sites (6 in the Urban Region, 2 in the New Territories East Region and 4 in the New Territories West Region) were identified for conducting site trials. However, as of June 2021, Audit noted that HyD had not yet commenced the site trials. In response to Audit's enquiry on the latest progress of conducting the site trials, in October 2021, HyD said that:

- (a) it was not suitable to conduct site trials for new eco-pavers in 2019 due to the social unrest. In 2020, priority was accorded to carry out urgent repair works for rectifying the damages arising from the social unrest (see para. 4.3). In 2021, the preparation of the site trials for new eco-pavers had resumed in good progress. For example, relevant quotations and contract variation for eco-pavers for 5 sites in Urban Region and 2 sites in New Territories West Region had been completed as of September 2021; and
- (b) except for 1 site trial within the New Territories East Region which the Regional Office decided not to proceed with as the site was eventually considered not suitable and there were sufficient site trial locations in other districts, site trials for the remaining 11 sites would commence progressively from late 2021 after the completion of the more urgent repair works of converting footpath sections temporarily patched with concrete/bituminous materials back to paving blocks (see para. 4.3). The

site trials were anticipated to complete progressively from the fourth quarter of 2021 to the first quarter of 2022.

4.9 Audit notes that HyD has accorded priority to carry out urgent repair works of footpaths and only commenced preparation of site trials for new eco-pavers in 2021. In Audit's view, HyD needs to conduct site trials for new eco-pavers as soon as practicable.

Audit recommendations

4.10 Audit has *recommended* that the Director of Highways should:

- (a) **review the design of paving materials for footpath locations subject to heavy loading; and**
- (b) **conduct site trials for new eco-pavers as soon as practicable.**

Response from the Government

4.11 The Director of Highways agrees with the audit recommendations. He has said that HyD:

- (a) will review the design of paving materials for footpath locations which are subject to heavy loading. The review is expected to be completed by mid-2022; and
- (b) is conducting site trials for new eco-pavers according to the planned schedule for completion in the first quarter of 2022.

Provision of pedestrian railings

4.12 In the 2017 Policy Address, the Government pledged to encourage people to walk more and rely less on motorised transport, and to foster a pedestrian-friendly environment (see para. 1.2). Pedestrian railings have traditionally been used for improving safety by guiding pedestrians to cross the roads and to prevent them from

Other related issues

inadvertently moving away from footpaths onto carriageways. To pursue the policy objective of enhancing walkability, TD has reviewed the provision of pedestrian railings and issued guidelines from 2017 to 2020.

4.13 *2017 guidelines for provision of pedestrian railings.* To foster a pedestrian-friendly environment, in 2017, TD and HyD reviewed the provision and design of pedestrian railings and formulated guidelines on the proper use of railings with due consideration given to alternative measures (Note 34). According to the Joint Circular on “Guidelines for the Provision and Design of Pedestrian Railings” issued by TD and HyD in July 2017:

- (a) railings are not designed to protect pedestrians from vehicular impact but to control and guide pedestrians for road safety and traffic management purposes. They are used across a wide range of sites including road junctions, pedestrian crossings, transport interchanges, school entrances/exits, central reserves and pedestrian refuge islands;
- (b) overuse of railings could cause public inconvenience and adverse effects on streetscape and footway capacity. For example, railings should not be provided at roadside planters;
- (c) TD is responsible for considering the need, purpose and type of railings on public roads and HyD as well as other works departments are responsible for the design and erection of railings;
- (d) TD is also responsible for conducting regular reviews on local area under their purview to determine whether existing railings should be maintained, removed or replaced, with due considerations on compliance with prevailing guidelines, effectiveness of the railings, public/local views, changes of site characteristics and accident records; and

Note 34: *These include: (a) footway improvement; (b) relocation of public transport services points, pedestrian crossing, or installation of a new crossing to better serve the pedestrian routing; (c) provision of planters; and (d) use of bollards with/without chain.*

- (e) in order to take forward the reviews mentioned in (d), Regional Offices of TD should consult their HyD counterparts to draw up a priority list for the review, with priority given to areas with busy pedestrian traffic.

4.14 ***2019 minimal approach.*** In November 2019, in order to reduce street cluttering and release more road space for pedestrians on footpaths, TD further reviewed the guidelines related to the provision and design of pedestrian railings. Following the review, TD decided to adopt a “minimal approach” in the provision of pedestrian railings. Under the “minimal approach”, there should be a presumption against installation of pedestrian railings unless a clear need can be established after alternative engineering measures have been considered and found not feasible or applicable for controlling and guiding pedestrians for road safety and traffic management purposes. In November 2019, TD issued a memorandum “Guidelines for provision and design of pedestrian railings — minimal approach” to government works departments, setting out arrangements to minimise the provision of pedestrian railings (or limit the length of railings) at pedestrian crossings. Details are elaborated in Appendix C.

4.15 In January 2020, in order to deal with the problem on the damage of pedestrian railings resulting from the social unrest in Hong Kong, HyD proposed to enhance the pedestrian railing designs by different options, including enhancement on bolts and nuts, and use of bollard and chain for control purpose.

4.16 ***Supplementary guidelines issued in 2020.*** In October 2020, TD issued supplementary guidelines on provision of pedestrian railings. According to the supplementary guidelines, the adoption of a “minimal approach” on the provision of pedestrian railings in future aimed at stripping away excessive railings not bringing value to the policy of enhancing walkability of the pedestrian environment. In this regard, alternative engineering measures should be explored to safeguard the safety of pedestrians. The salient points of the supplementary guidelines are elaborated in Appendix D.

Decluttering of excessive pedestrian railings

4.17 ***Traditional view on functions of railings.*** Audit noted that pedestrian railings were traditionally used for road safety and traffic management by controlling and guiding pedestrians to cross the roads and preventing them from inadvertently

Other related issues

moving away from footpaths onto carriageways (see para. 4.12). According to TD's "Road Crossing Code" (Note 35):

- (a) guard rails and pedestrian barriers are often provided at place stepping onto or crossing the road would be difficult or dangerous; and
- (b) guard rails are also provided to guide pedestrian to a nearby crossing place if the traffic may be particularly busy or there may be a hidden hazard.

With the implementation of the "minimal approach", pedestrian railings should not be provided unless a clear need for it has been established. Instead, introducing alternative measures to reduce traffic flows and speeds may be helpful in reviewing the need for pedestrian railings.

4.18 *Need to improve recording of the work of reviewing and decluttering existing pedestrian railings.* To take forward the change in policy over the provision of pedestrian railings, TD in consultation with HyD would draw up a priority list for review on whether existing pedestrian railings should be retained or removed (see para. 4.13(e)). Since the third quarter of 2019, TD has commenced reviewing the pedestrian railings across the territory and progressively arranged with HyD to remove unnecessary railings. In response to Audit's request for providing the priority list and related database for examination, in August and October 2021, TD said that:

- (a) it had followed the Joint Circular No. 3/2017 on "Guidelines for the Provision and Design of Pedestrian Railings" issued by TD and HyD in 2017 (see para. 4.13) for reviewing the provision of pedestrian railings. Instead of reviewing the railing provision and implementing the railing reconfiguration works throughout the territory in one go, in accordance with the Joint Circular, priorities were given to areas with busy pedestrian traffic with due consideration to public views, occurrence of traffic accidents, planning for traffic improvement works and change of pedestrian/traffic flow etc. Furthermore, TD would also conduct reviews upon receipt of complaints, occurrence of traffic accidents and planning for traffic improvement works. In general, TD would seek the comments from

Note 35: *TD's "Road Crossing Code" is a guide for pedestrian crossing at all roads. Pedestrians should follow the code when there is a need to cross or step onto a roadway even if using a pedestrian crossing.*

relevant government departments (including HyD) and carry out local consultation before requesting HyD to carry out the proposed modification works for the railings; and

- (b) it did not maintain a dedicated database to record the review of railing provisions. Since provision of railings was highly related to the specific characteristics of a street as well as the pedestrian behaviour, it was more appropriate to file the records relating to the review of railing provisions under the individual street/road files. TD considered it ineffective and duplication of effort for creating a separate database to record the review of railing since all relevant records on review of railing provisions, including the received complaints, accident records, planning of traffic improvement works etc. were filed under TD's electronic document electronic system and could be retrieved readily. Examples of removing excessive railings were shown in Photographs 4(a) to (f).

In October 2021, TD further provided a list of pedestrian railings in Central and Western District which had been reviewed or considered to be excessive to Audit for review. As mentioned by TD in (b) above, the relevant records on the work of reviewing and decluttering existing pedestrian railings can be retrieved easily. In Audit's view, TD should consider improving the recording of the work of reviewing and decluttering existing pedestrian railings to facilitate management monitoring and review (e.g. by compiling a list of locations in which the railings have been reviewed or removed without compromising safety on a yearly basis).

Photographs 4(a) to (f)

Examples of excessive railings removed

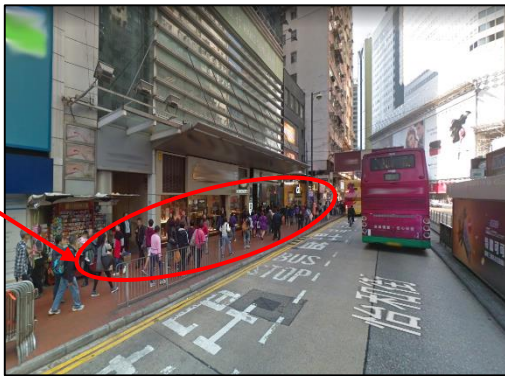
(a) At Causeway Road



(b) At Yee Wo Street



(c) At Yee Wo Street



(d) At Lai Tak Tsuen Road



Excessive railings removed

Excessive railings removed

(e) At Hollywood Road



(f) At Caine Road



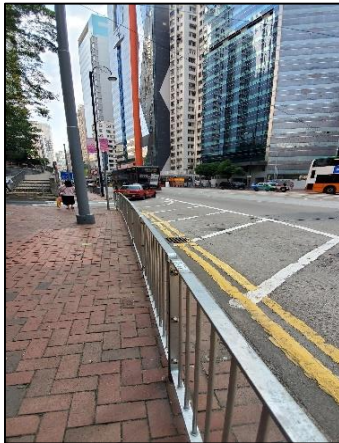
Source: TD records

4.19 *Audit's research.* Audit's research on the Internet found that TD had submitted proposals on removing railings to the District Councils for public consultation. Audit noted that some proposals to remove railings had not materialised (see Photographs 5(a) to (d) for examples). According to TD, during consultation, there were different views on whether railings should be retained or removed.

Photographs 5(a) to (d)

Examples of proposals to remove railings that had not materialised

(a) Railings at King's Road near Shell Street



(b) Railings at King's Road near Lau Li Street



(c) Railings at Des Voeux Road West near Eastern Street



(d) Railings at Des Voeux Road West near Western Street



Source: Photographs taken by Audit staff on 27 September 2021

Other related issues

4.20 **Jaywalking.** Audit noted that, in some locations where the pedestrian flow and vehicular traffic were high (see Photographs 6(a) and (b) for examples) or the risk of jaywalking was high (see Photograph 7 for an example), it might be necessary to retain existing railings. According to HyD, during the period of social unrest in 2019, 60 km of railings were damaged. Among these, 50 km of railings had been reinstated. For the remaining 10 km of railings, they had not been reinstated to improve walkability. Audit noted that at some road sections in which railings had been removed, there was jaywalking of pedestrians (see Photographs 8(a) and (b) for examples). The reasons for jaywalking might be due to unavailability of pedestrian crossings (Note 36) in the vicinity, insufficient capacity of the footpaths or pedestrian habits.

Photographs 6(a) and (b)

Examples of locations with high pedestrian flow and vehicular traffic

(a) Railings provided at pedestrian crossing at Wan Chai Road near Wood Road

(b) Railings provided at pedestrian crossing at Hennessy Road near Canal Road West

Railings



Railings



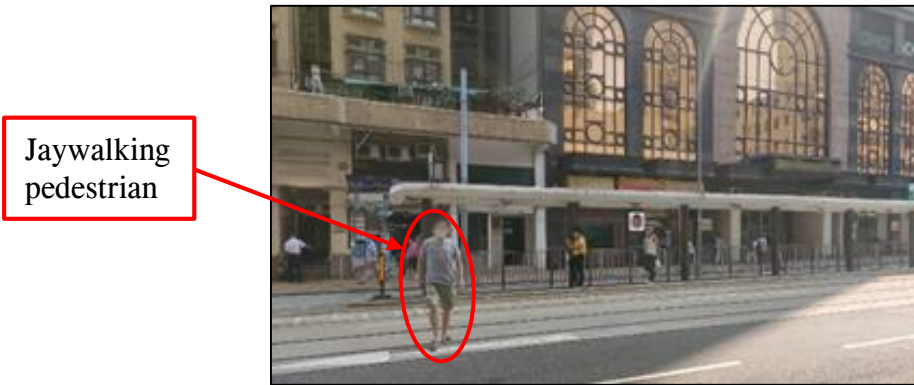
Source: Photographs taken by Audit staff on 30 August and 24 September 2021

Note 36: According to TD, the provision of appropriate pedestrian crossing facilities can enhance the safety of pedestrians by encouraging them to stay on footpaths and only cross the road at appropriate crossing place. It is a delicate act of balancing the needs of motorists and pedestrians, and reducing the risk of road accidents. Whilst minimising vehicular traffic delay is an important consideration in designing pedestrian crossings given Hong Kong's heavy traffic volume particularly in the urban areas, various pedestrian-friendly measures have been introduced to enhance walkability.

Photograph 7

An example of a location with risk of jaywalking

At Des Voeux Road West near Water Street



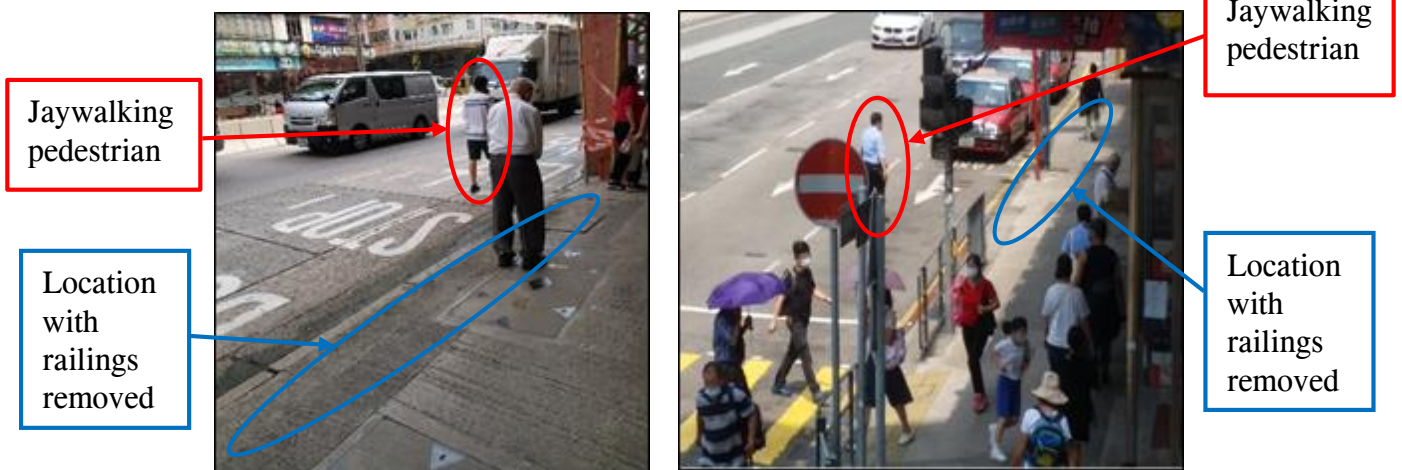
Source: Photograph taken by Audit staff on 28 September 2021

Photographs 8(a) and (b)

Examples of jaywalking at locations with railings removed

(a) At Yen Chow Street near Fuk Wing Street

(b) At Yen Chow Street near Fuk Wa Street



Source: Photographs taken by Audit staff on 28 September 2021

Other related issues

4.21 In October 2021, TD informed Audit that:

- (a) it had attached great importance to the public engagement on walkability enhancement. The benefits of enhancing walking environment by removing excessive railings have been explained in previous consultation exercises. In view of the lopsided feedback from the public objecting to the proposed removal of railings, TD had considered the public/local views and retained the concerned railings;
- (b) there were multiple reasons for jaywalking on street and not necessarily relating to the unavailability of pedestrian crossings in the vicinity or insufficient capacity of the footpaths or removal of railings. To tackle the jaywalking issue, more effort should be put on enforcement and education; and
- (c) it had followed the Joint Circular for reviewing the provision of pedestrian railings (see para. 4.13).

4.22 In April 2021, in the examination of 2021-22 draft estimates, TD informed the Legislative Council that, in pursuing the policy objective of enhancing walkability, it would take forward various walkability enhancement measures, such as decluttering of non-essential traffic signs and railings territory-wide. Audit's findings in paragraphs 4.19 and 4.20 highlighted the challenges encountered by TD and the special traffic circumstances in Hong Kong in implementing the decluttering of pedestrian railings as appropriate. In planning the decluttering of existing pedestrian railings to improve walkability in future, TD needs to:

- (a) step up efforts in demonstrating to the public the enhanced benefits of appropriately removing pedestrian railings without compromising safety; and
- (b) attach utmost importance to pedestrian safety and take measures to minimise the risk of jaywalking where appropriate (e.g. conducting publicity campaign to deter jaywalking).

Audit recommendations

- 4.23 **Audit has recommended that the Commissioner for Transport should:**
- (a) **consider improving the recording of the work of reviewing and decluttering existing pedestrian railings to facilitate management monitoring and review (e.g. by compiling a list of locations in which the railings have been reviewed or removed without compromising safety on a yearly basis); and**
 - (b) **in planning the decluttering of existing pedestrian railings to improve walkability in future:**
 - (i) **step up efforts in demonstrating to the public the enhanced benefits of appropriately removing pedestrian railings without compromising safety; and**
 - (ii) **attach utmost importance to pedestrian safety and take measures to minimise the risk of jaywalking where appropriate (e.g. conducting publicity campaign to deter jaywalking).**

Response from the Government

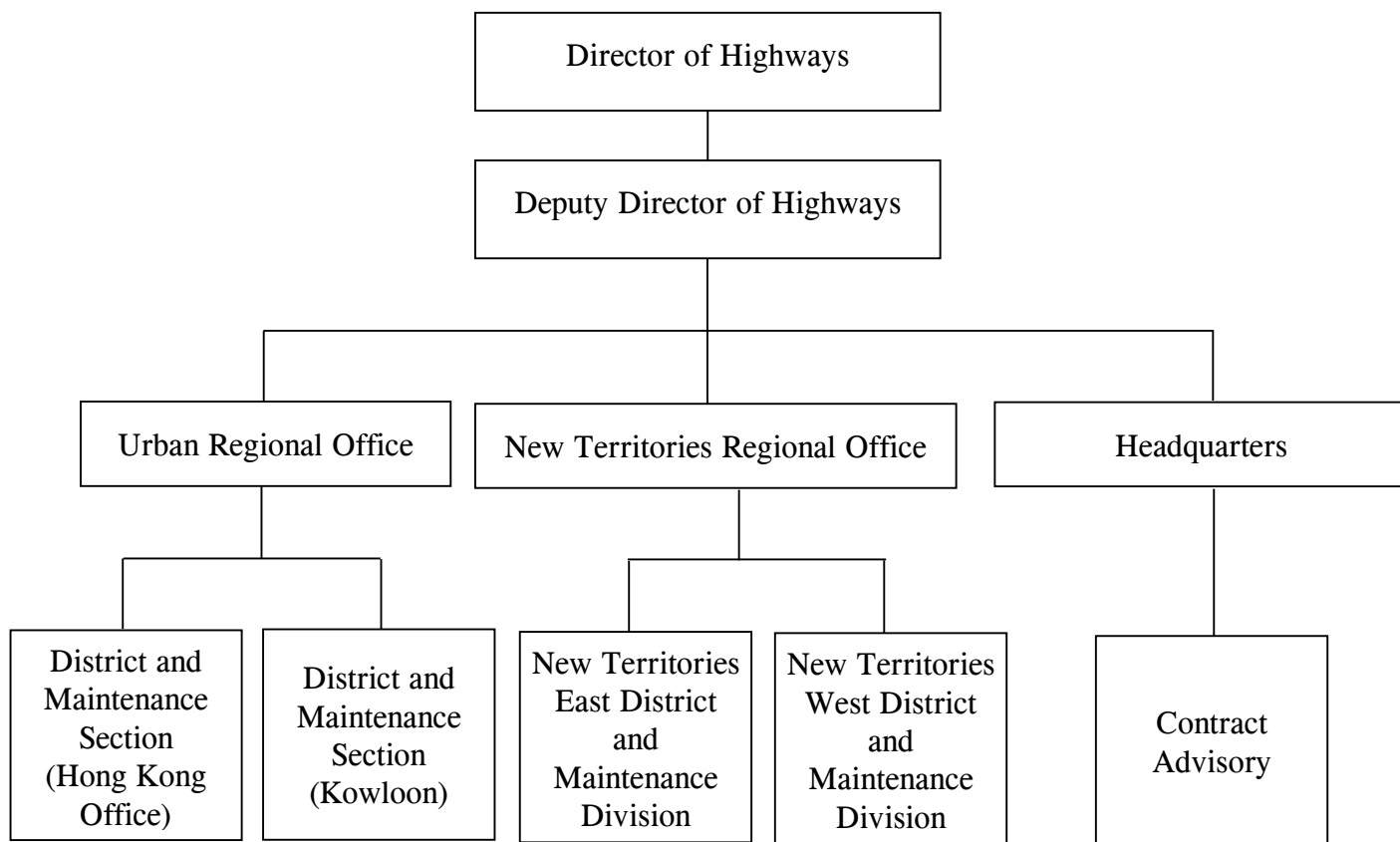
4.24 The Commissioner for Transport agrees with the audit recommendations. She has said that TD will:

- (a) compile lists of locations where provision of railings have been reviewed (i.e. to remove, install or revise the design of railings without compromising safety) on a yearly basis to facilitate management monitoring and review of railing provisions;
- (b) step up efforts in demonstrating to the public the enhanced benefits of appropriately removing railings without compromising safety through appropriate consultation, lobbying, site meeting etc. with a view to consolidating public support to the railings decluttering proposals; and

Other related issues

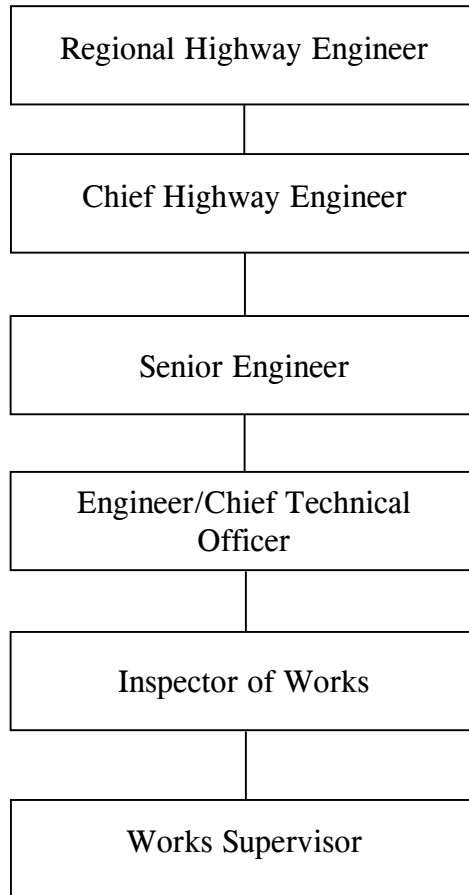
- (c) continue to work with the Road Safety Council and the Hong Kong Police Force to promote road safety to pedestrians through various means and channels such as social media platforms, publicity video clips and leaflets. Recent examples of publicity/education activities related to jaywalking included sharing safety tips for crossing roads in Road Safety Bulletin (50th issue), and promoting pedestrians' road safety awareness and observing traffic rules via the Road Safety Council's social media platforms. In addition, at the regular working group meetings under the Road Safety Council, TD will continue to share information on accident blackspots (including those related to pedestrians) for the Hong Kong Police Force's consideration when prioritising enforcement actions and publicity/education activities at district levels.

**Highways Department:
Organisation chart (extract)
(30 April 2021)**



Source: HyD records

Management structure of a Regional Office



Source: HyD records

Arrangements to minimise the provision of pedestrian railings at pedestrian crossings under the “minimal approach”

Under the “minimal approach”:

- (a) for signal controlled pedestrian crossings (Note 1) (see Photograph (a) for an example), if physical barriers already exist at central reserve for at least 6 m or on either side of the crossings, erecting railings to channel pedestrians to the crossings and to discourage jaywalking is generally unnecessary (see Figure (a) for an illustration). Should the need for railings of guidance type (bollards with chains) be established after considering alternative engineering measures, the length of railings provided should be limited to 6 m on either side of the crossings; and
- (b) for uncontrolled cautionary crossings (Note 2) (see Photograph (b) for an example), if the location is clearly indicated by the presence of central refuges or road markings, the length of railings of guidance type (bollards with or without chains) can be reduced to 3 m on either side of the crossings (see Figure (b) for an illustration).

Source: TD records

Note 1: According to TD, signal controlled pedestrian crossings are provided with traffic signals for pedestrian delineated by road studs and yellow striped markings.

Note 2: According to TD, uncontrolled cautionary crossings are normally indicated by dropped kerbs.

Photographs (a) and (b)

Examples of at-grade pedestrian crossings

(a) Signal controlled pedestrian crossing

(b) Uncontrolled cautionary crossing



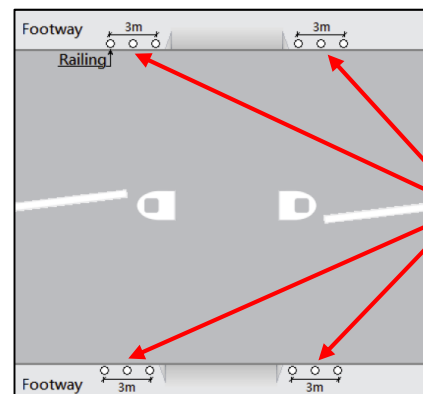
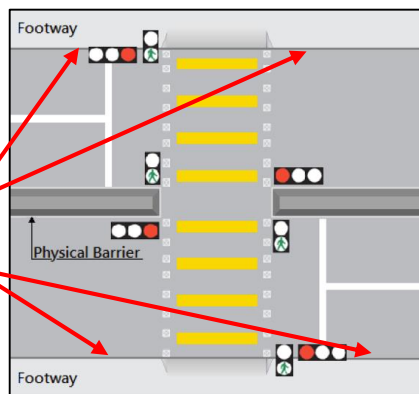
Figures (a) and (b)

Guiding principles under “minimal approach”

(a) Signal controlled pedestrian crossing

(b) Uncontrolled cautionary crossing

Erecting railings to discourage jaywalking is generally unnecessary or limited to 6 m on either side of the crossings.



Railings can be reduced to 3 m on either side of the crossings.

Source: TD records

**Salient points of the supplementary guidelines
on provision of pedestrian railings issued by
the Transport Department in 2020**

According to the supplementary guidelines:

- (a) ***Impacts on walkability.*** Railings have traditionally been used for improving safety by guiding pedestrians to cross the roads and to prevent them from inadvertently moving away from the footway onto carriageway. However, members of the public have increasingly questioned whether the current provision of pedestrian railings is excessive. Proliferation of pedestrian railings is perceived as getting pedestrians off the carriageways to avoid obstruction to traffic. The need for pedestrian railings should therefore be carefully examined to minimise adverse impacts on walkability;
- (b) ***Excessive provision of pedestrian railings.*** Pedestrians' natural tendency is to continue along the most direct route as their desire lines to minimise effort and time. Railings often block pedestrians' desire lines and force them to detour, reducing the attractiveness of walking. Railings could be visually intrusive and give rise to an unpleasant sense of confinement. Railings also reduce the effective width of footways, making them less convenient and uncomfortable for pedestrians. Railings often attract chaining of unauthorised objects such as bicycles and trolleys to them, which is unsightly and will further clutter up the footways. Without railings, the entire streetscape can be appreciated as a place rather than primarily as the thoroughfare;
- (c) ***Road safety.*** Most if not all of the above adverse impacts on walkability have often been taken as necessary trade-offs for road safety, as it has been generally accepted that separation of pedestrians from vehicular traffic is necessary for preventing accidents involving pedestrians. A recent research undertaken in the United Kingdom showed that removal of pedestrian railings could result in significant reduction in collisions at the study sites involving pedestrians who were killed or seriously injured. The research suggested that:

Appendix D
(Cont'd)
(para. 4.16 refers)

- (i) pedestrian railings may give drivers a “tunnel vision”, in particular at narrow footways, and a feeling that pedestrians are safely segregated from vehicles, engendering their confidence in driving at higher speed. Consequences of any accidental collisions will hence be more serious. Also, some pedestrians inevitably attempt to bypass crowded footways by walking outside the railings onto the carriageway. Removing the railings allows pedestrians to safely return to the footway faster; and

- (ii) whilst the overseas research may not be directly applicable to the local conditions, it does serve to caution us that our attention should not only be put on segregation and guiding pedestrians away from their desire lines to safety, but should attempt to find effective solutions that address pedestrian behaviour and local traffic conditions (see Note 34 to para. 4.13); and

- (d) ***Use of pedestrian railings as a last resort.*** Installation of railings is not necessarily the best choice for improving pedestrian safety at all locations. For example, if the footpaths have a high safety risk due to insufficient capacity to accommodate pedestrians (e.g. with a width of 2 m or less), alternative engineering measures such as footway widening should first be considered, while pedestrian railings should only be taken as a last resort.

Source: TD records

Acronyms and abbreviations

Audit	Audit Commission
CWRF	Capital Works Reserve Fund
DN	Default Notice
EA	Engineer's audit
EI	Engineer's inspection
EMMS	Electronic Maintenance Management System
EPD	Environmental Protection Department
GRA	General Revenue Account
HyD	Highways Department
IOW	Inspector of Works
km	Kilometres
m	Metres
m ²	Square metres
mm	Millimetres
MAH	Maintenance Administration Handbook
MAINS	Maintenance Accounting and Information System
MDCS	Mobile Data Collection System
M&M	Management and maintenance
RIM	Road Inspection Manual
TD	Transport Department
THB	Transport and Housing Bureau
WS	Works Supervisor