CHAPTER 6

Transport and Housing Bureau
Civil Engineering and Development Department

Site formation and associated infrastructure works for development near Choi Wan Road and Jordan Valley

Audit Commission
Hong Kong
31 March 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. 76 of the Director of Audit contains 7 Chapters which are available on our website at https://www.aud.gov.hk

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SITE FORMATION AND ASSOCIATED INFRASTRUCTURE WORKS FOR DEVELOPMENT NEAR CHOI WAN ROAD AND JORDAN VALLEY

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SITE FORMATION AND ASSOCIATED INFRASTRUCTURE WORKS FOR DEVELOPMENT NEAR CHOI WAN ROAD AND JORDAN VALLEY

Executive Summary

1. In 1996, a site with an area of about 35 hectares (ha) near Choi Wan Road and Jordan Valley in East Kowloon was identified as a potential site for boosting housing supply. In October 1998, the feasibility of the proposed housing development at the site was confirmed. The Transport and Housing Bureau was the policy bureau for the planned development and the Civil Engineering and Development Department (CEDD) was the works agent responsible for carrying out site formation and associated infrastructure works for the development near Choi Wan Road and Jordan Valley (the Project).

2. Between June 1997 and July 2018, the Finance Committee (FC) of the Legislative Council and the Secretary for Financial Services and the Treasury (under delegated authority from FC) approved a total funding of $2,084 million for the Project. There were two consultancies for the Project (i.e. one for the planning and engineering feasibility study and another one for the site investigation, design and construction supervision work), which were awarded to the same consultant (Consultant X). Three works contracts (Contracts A to C) were awarded between November 2001 and January 2007 for implementing the Project. In the event, the Project was completed in October 2010 and the residential sites under the Project were used for public rental housing development. As of October 2020, the Government had incurred $2,057.4 million (99% of $2,084 million) for the Project. The Audit Commission (Audit) has recently conducted a review to examine CEDD's work in managing the implementation of the Project.

Contractual disputes under Contract A

3. Contract A mainly involved the excavation by blasting of about 9 million cubic metres of in-situ materials and formation of building platforms of about 20 ha

and associated slopes and retaining walls. In November 2001, CEDD awarded Contract A to Contractor A at a contract sum of $1,338 million. The contract works were completed in December 2006. There were contractual disputes under Contract A, comprising claims from Contractor A and counterclaims against Contractor A (Contract A disputes). In November 2018, CEDD entered into a settlement agreement with Contractor A, under which the Government paid $32 million to Contractor A to settle all disputes and all arbitrations (i.e. including claims from Contractor A and counterclaims against Contractor A) under Contract A on a non-admission of liability basis. The account of Contract A was finalised in February 2019 and the total contract expenditure was $1,701.9 million (paras. 2.2 to 2.4 and 2.7).

4. ***Scope for improvement in handling of disposal materials.*** Contract A disputes included Contractor A's claim relating to handling of disposal materials. Under Contract A, Contractor A was required to transport the excavated disposal materials from the development site to a site in Kai Tak (Kai Tak site) for delivery to 10 disposal sites. The disposal materials could be temporarily stockpiled at the Kai Tak site to suit Contractor A's disposal operation or the collection programme of disposal sites. Contractor A contended that CEDD was not able to arrange acceptance of disposal materials from disposal sites in a timely manner and claimed for additional payment for stockpiling and handling of disposal materials at the Kai Tak site. According to Consultant X, from early 2003 to May 2005, the demand for disposal materials produced under Contract A was continuously less than the supply, resulting in an accumulation of disposal materials in the stockpile areas at the Kai Tak site, and Contractor A's claim was considered valid. According to CEDD: (a) Contractor A's claim could have been mitigated if the forecast on the generation and demand of fill materials had been reviewed and updated to enhance accuracy and facilitate formulating the subsequent disposal arrangement in a timely manner; and (b) related control measures were subsequently enhanced in August 2011 (after the award of Contract A). In Audit's view, in implementing a works contract involving excavation and handling of disposal materials in future, CEDD needs to closely monitor the effectiveness of the enhanced control measures for the management of disposal materials (paras. 2.8 and 2.10 to 2.14).

5. ***Different interpretations of contract documents for valuation of concrete buttress works.*** Contract A disputes also included Contractor A's claim relating to the valuation of concrete buttress works (for slope stabilisation). The Bills of Quantities (BQ) items relating to the construction of concrete buttresses were grouped under a composite heading "In-situ Concrete (For baffle wall, debris trap and concrete

buttress)" with BQ rates for different types of concrete. Regarding the valuation of concrete buttress works involving one type of concrete, Contractor A disagreed with the BQ rate applied by Consultant X for measuring the concrete buttress works involving this type of concrete and claimed for additional payment on top of the amount certified by Consultant X. According to CEDD: (a) Contractor A's claim arose from different contractual interpretations on the applicability of particular BQ items in valuing the concrete buttress works involving this type of concrete; (b) the root cause was due to inconsistency between contract drawings (which showed another type of concrete for constructing concrete buttresses) and BQ; and (c) further guidelines on checking the completeness and accuracy of BQ and related documents were subsequently provided in 2014 (after the award of Contract A). In Audit's view, in preparing documents for a works contract in future, CEDD needs to take measures to critically vet contract documents (e.g. BQ items under a composite heading) in accordance with the related guidelines (paras. 2.8 and 2.15 to 2.19).

6. ***Inadequate quantity and unsatisfactory quality of rock materials delivered by Contractor A to Shek O Quarry.*** The counterclaims against Contractor A were related to the rock materials delivered by Contractor A to Shek O Quarry under a CEDD contract (Contract D) awarded to another contractor (Contractor D). Under Contract A, Contractor A was required to deliver by barges the disposal materials at the Kai Tak site to Shek O Quarry. According to a supplementary agreement entered into between CEDD and Contractor D in August 2001, CEDD shall give preference to Contractor D to import two-thirds of acceptable quality rock materials (which shall meet the requirements for use as aggregates in concrete production) from Contract A subject to a maximum limit of 5.5 million tonnes of rock materials. There were contractual disputes under Contract D relating to the quantity and quality of rock materials delivered by Contractor A to Shek O Quarry. Contractor D claimed for additional payment for the inadequate quantity and unsatisfactory quality of rock materials delivered by Contractor A to Shek O Quarry. In July 2015, the Government paid a lump sum to Contractor D in full and final settlement of the contractual disputes under Contract D. CEDD counterclaimed Contractor A for the damages claimed by Contractor D. The counterclaims were settled in November 2018 (see para. 3). According to CEDD, the root cause of Contractor D's claim arose from the inaccuracy of the estimation of the quantity of acceptable quality rock materials available from Contract A (paras. 2.22 to 2.26).

Other issues under Contract A

7. ***Scope for conducting more thorough pre-tender site investigations.*** In June 2005, FC approved an increase in the approved project estimate of the Project by $230 million to cover additional costs arising mainly from variations under Contract A due to unforeseeable geological conditions. Regarding the cost increase, the Transport and Housing Bureau and CEDD informed the Legislative Council in May 2005 that: (a) before the commencement of Contract A, site investigation had been carried out to ascertain the geological conditions of the site for the design of the Project; (b) during the construction stage of Contract A, unforeseeable soil and rock profiles in various areas within the development site were encountered, resulting in variations and additional works under Contract A; and (c) only 200 boreholes had been included in the original site investigation works for the Project involving a site of about 35 ha. According to CEDD, further guidelines on good site investigation practice and geotechnical works of public works projects were subsequently promulgated in 2017 and 2018 respectively (after the award of Contract A). In Audit's view, in implementing a works project involving a large-scale site in future, CEDD needs to take measures to ensure that its staff and consultants conduct thorough pre-tender site investigations in accordance with the related guidelines, and continue to explore new technologies and digital tools for conducting pre-tender site investigations (paras. 3.2 to 3.4).

8. ***Need to ensure compliance with control requirements on blasting activities.*** Audit noted that there were two flyrock incidents after the blasting activities at the works site under Contract A in February and June 2003 respectively. According to CEDD: (a) for the flyrock incident in February 2003, it caused damage to 8 windows in 5 flats at a private housing estate. It was believed that the incident was due to the unfavourable rock joints in the blasting area; (b) for the flyrock incident in June 2003, it caused minor injuries to 9 persons and damage to 4 vehicles and properties (e.g. the roof and railing of two bus shelters). The incident was likely due to unforeseeable unfavourable ground condition in the blasting area and some protective and precautionary measures specified in the method statement were not taken or not effectively taken by Contractor A for the rock blast; and (c) after the two flyrock incidents, relevant guidelines were amended in 2007 so that works projects involving blasting activities were subject to more tightened control. In Audit's view, in implementing a works project involving blasting activities (particularly at works sites in densely populated area) in future, CEDD needs to make continued efforts to ensure that its consultants and contractors comply with the control requirements on blasting activities (paras. 3.7 to 3.9).

Administration of Contracts B and C

9. Contract B mainly involved the construction of two slip road bridges and a footbridge (Footbridge A), and taking over and maintenance of the completed works (e.g. slopes) under Contract A in various specified portions of the development site. In December 2005, CEDD awarded Contract B to Contractor B at a contract sum of $129.3 million. The contract works were completed in March 2010 and the total contract expenditure was $135.8 million. Contract C mainly involved the construction of two footbridges (Footbridges B and C). In January 2007, CEDD awarded Contract C to Contractor C at a contract sum of $88 million. The contract works were completed in October 2010 and the total contract expenditure was $101.8 million (paras. 4.2, 4.3, 4.12 and 4.13).

10. ***Need to enhance the management of slope works.*** The works under Contract A included the formation of two slopes (Slopes A and B) and were substantially completed in December 2006. In March 2008, Contractor A passed Slopes A and B to Contractor B (being the works agent of CEDD) for maintenance prior to handing over to the future maintenance government departments. Audit noted that: (a) Consultant X made submissions to the Geotechnical Engineering Office of CEDD for final checking of the completed Slopes A and B in January and July 2008 respectively (i.e. more than one year after the substantial completion of Contract A); and (b) in the event, slope enhancement works for Slopes A and B were found required and implemented by Contractor B via two variation orders (VOs — later valued at a total cost of $1.3 million) issued in June and October 2008 respectively. In Audit's view, in implementing a works project involving slope works in future, CEDD needs to remind its staff and consultants to fully assess the conditions of slope works as early as practicable and take prompt follow-up actions as needed (paras. 4.8 and 4.9).

11. ***Scope for improvement in ordering works variations.*** For three VOs under Contract C issued between January 2009 and April 2010, Audit noted that: (a) the actual costs of these VOs increased by 280% to 327% as compared with the estimated costs; and (b) the actual costs of these VOs exceeded the approving authority of the officer approving their issuance. At the time of implementing Contract C, CEDD had no specific guidelines on this. According to CEDD, in May 2019 (after the award of Contract C), it promulgated guidelines for dealing with a variation with value exceeding its estimate made at the time of approval. Audit noted that, as of February 2021, the Project Administration Handbook for Civil Engineering Works

(Project Administration Handbook) issued by CEDD had not yet incorporated such guidelines (para. 4.16).

12. ***Discrepancies between BQ items and contract drawings.*** Contract drawings of Contract C required the use of two grades of steel for the steelwork of Footbridges B and C. However, according to Consultant X, only BQ items of one grade of steel which did not fulfil the requirement were included in Contract C. Consultant X considered that the steelwork of Footbridges B and C were omitted in BQ. In the event, CEDD paid $1.2 million to Contractor C for carrying out the works of the omitted items. CEDD subsequently provided in 2014 (after the award of Contract C) further guidelines on checking the completeness and accuracy of BQ and related documents. In Audit's view, in preparing documents for a works contract in future, CEDD needs to remind its staff and consultants to follow such guidelines (paras. 4.18 and 4.20).

Audit recommendations

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

Contractual disputes under Contract A

(a) **in implementing a works contract involving excavation and handling of disposal materials, closely monitor the effectiveness of the enhanced control measures for the management of disposal materials (para. 2.20(a));**

(b) **in preparing documents for a works contract, take measures to critically vet contract documents in accordance with the related guidelines (para. 2.20(b));**

(c) **in implementing a works contract involving excavation and delivery of excavated materials:**

(i) **remind CEDD staff and consultants to conduct thorough ground investigation at the detailed design stage in accordance with the related guidelines (para. 2.28(a)); and**

(ii) **closely monitor the quantity and quality of excavated materials delivered to specified disposal sites to ensure compliance with the related contract requirements (para. 2.28(b));**

Other issues under Contract A

(d) **in implementing a works project involving a large-scale site:**

(i) **take measures to ensure that CEDD staff and consultants conduct thorough pre-tender site investigations in accordance with the related guidelines (para. 3.10(a)(i)); and**

(ii) **continue to explore new technologies and digital tools for conducting pre-tender site investigations (para. 3.10(a)(ii));**

(e) **in implementing a works project involving blasting activities (particularly at works sites in densely populated area), make continued efforts to ensure that CEDD consultants and contractors comply with the control requirements on blasting activities (para. 3.10(b));**

Administration of Contracts B and C

(f) **in implementing a works project involving slope works, remind CEDD staff and consultants to fully assess the conditions of slope works as early as practicable and take prompt follow-up actions as needed (para. 4.10(b));**

(g) **in administration of a works contract:**

(i) **take measures to enhance the accuracy of cost estimate for works variations as far as practicable (para. 4.21(a)(i)); and**

(ii) **remind CEDD staff and consultants to follow CEDD guidelines for dealing with a variation with value exceeding its estimate made at the time of approval (para. 4.21(a)(ii));**

(h) **consider incorporating into the Project Administration Handbook CEDD guidelines for dealing with a variation with value exceeding its estimate made at the time of approval (para. 4.21(b)); and**

(i) **in preparing documents for a works contract, remind CEDD staff and consultants to follow the related guidelines on checking the completeness and accuracy of BQ and related documents (para. 4.21(c)).**

Response from the Government

14. The Director of Civil Engineering and Development agrees with the audit recommendations.

PART 1: INTRODUCTION

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

Background

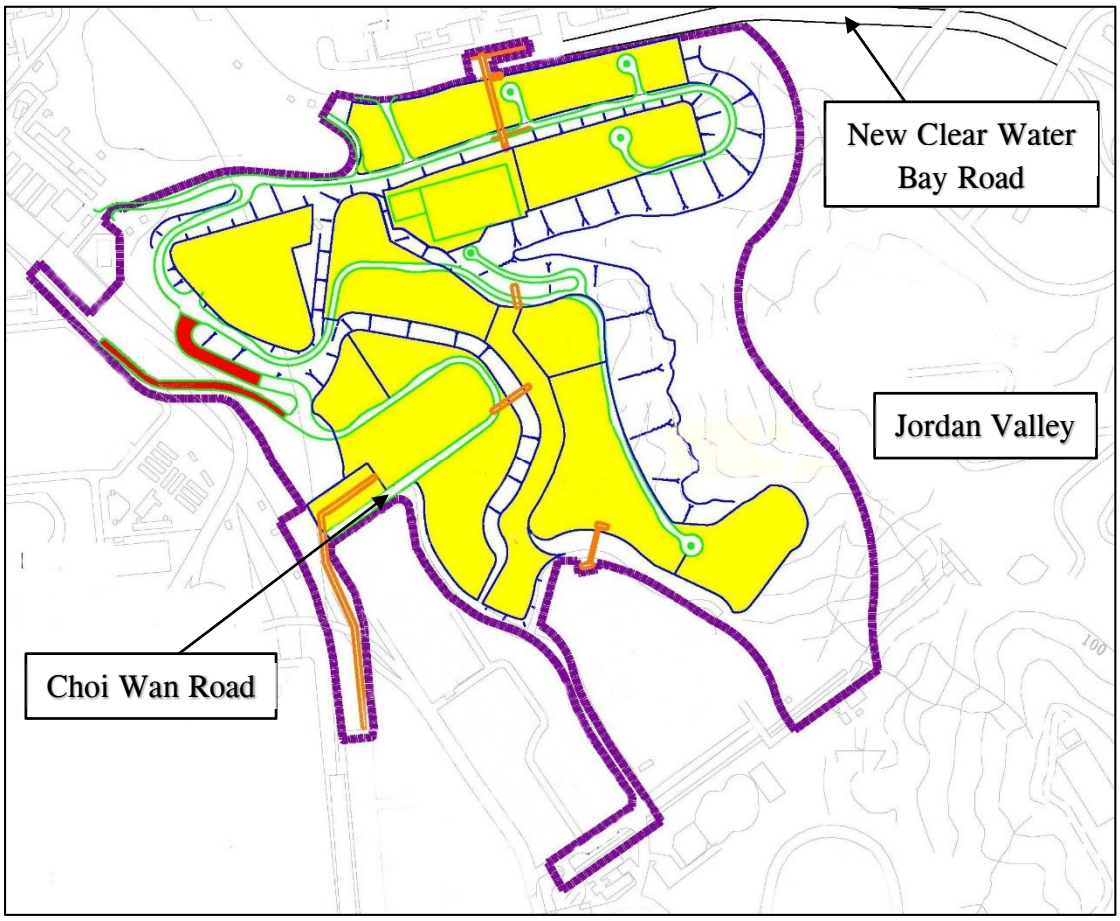
1.2 In 1996, a site (see Figure 1 for proposed site plan) with an area of about 35 hectares (ha) near Choi Wan Road and Jordan Valley in East Kowloon was identified as a potential site for boosting housing supply. Upon completion of the "Planning and Engineering Feasibility Study for Development near Choi Wan Road and Jordan Valley" in October 1998, the feasibility of the proposed housing development at the site was confirmed. The Transport and Housing Bureau (THB — Note 1) was the policy bureau for the planned development and the Civil Engineering and Development Department (CEDD — Note 2) was the works agent responsible for carrying out site formation works and providing associated infrastructure to serve the planned development at the site.

Note 1: *In July 2007, THB was formed to take over the policy responsibility for housing matters. Before July 2007, the policy responsibility rested with the then Housing, Planning and Lands Bureau (July 2002 to June 2007), the then Housing Bureau (July 1997 to June 2002) and the then Housing Branch (before July 1997). For simplicity, all previous policy bureaux and branch responsible for the policies on housing matters are also referred to as THB in this Audit Report.*

Note 2: *In July 2004, CEDD was formed by merging the then Civil Engineering Department and the then Territory Development Department. For simplicity, the then Civil Engineering Department is also referred to as CEDD in this Audit Report.*

Figure 1

Proposed site plan for development near Choi Wan Road and Jordan Valley



Legend:

- Proposed site boundary
- Proposed building platforms and district open space
- Proposed footbridges
- Proposed flyovers
- Proposed roads

Source: *CEDD records*

Implementation of site formation and associated infrastructure works for development near Choi Wan Road and Jordan Valley

1.3 The site formation and associated infrastructure works for the development near Choi Wan Road and Jordan Valley (hereinafter referred to as the Project) commenced in November 2001 and the Project was completed in October 2010.

According to the papers submitted by THB seeking funding approvals for the Project from the Finance Committee (FC) of the Legislative Council (LegCo) (approved by FC in March 2001 and June 2005 — see Table 1 in para. 1.4), the scope of works included the following:

(a) formation of about 20 ha of building platforms for housing development (Note 3), seven schools, district open space, and associated slopes and retaining walls;

(b) about 3,900 metres (m) of roadworks, including road junction improvement works;

(c) five footbridges (Note 4) and two flyovers;

(d) associated drainage and sewerage works;

(e) landscaping works; and

(f) environmental mitigation measures for the abovementioned works.

1.4 The Project was implemented under three project votes (hereinafter referred to as Project Votes A to C). The approved project estimate (APE) of these project votes totalled $2,084 million (see Table 1), comprising:

(a) a total funding of $2,069 million approved by FC between June 1997 and June 2005 for the planning and engineering feasibility study, site investigation, detailed design, and site formation and associated infrastructure works for the Project; and

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Note 3: *According to the funding paper (approved by FC in June 2005): (a) the proposed housing development had originally been scheduled for both public housing and private developments to accommodate a population of 35,000; and (b) the Government then decided that all residential sites were reserved for public housing development with population intake between 2008 and 2010 (revised from the original population intake date of 2006 onwards in the original programme of 2001).*

Note 4: *In the event, only three footbridges were constructed. The other two footbridges were not required after CEDD's reviews of the anticipated pedestrian flows.*

(b) an increase in APE of Project Vote C by $15 million approved by the Secretary for Financial Services and the Treasury (under delegated authority from FC) in July 2018.

Table 1

Funding approvals for the Project
(June 1997 to July 2018)

Date	Particulars	Approved amount ($ million)
Planning, investigation and detailed design		
Project Vote A		
June 1997	Planning and engineering feasibility study	16.0
Project Vote B		
July 1999	Site investigation and detailed design	43.7
Construction works		
Project Vote C		
March 2001	Site formation and associated infrastructure works	1,779.3
June 2005	Increase in APE to cover additional costs arising from variations due to unforeseeable geological conditions, design changes and additional resident site staff costs	230.0
July 2018	Increase in APE to cover additional costs of the works under the Project	15.0 (Note)
	Total	2,084.0

Source: *CEDD records*

Note: *Apart from this increase in APE which was approved by the Secretary for Financial Services and the Treasury under delegated authority from FC, all other funding (totalling $2,069 million) was approved by FC.*

1.5 In August 1997 and July 1999, CEDD awarded two consultancies for the Project (see Table 2) respectively, as follows:

(a) Consultancy X for the planning and engineering feasibility study; and

(b) Consultancy Y for the site investigation, design and construction supervision work of the Project which involved three works contracts (Contracts A to C — see para. 1.6).

Table 2

Consultancies for the Project
(October 2020)

Consultancy	Consultant	Particulars	Cost ($ million)
X (Awarded in August 1997)	X (Note)	Planning and engineering feasibility study	8.9
Y (Awarded in July 1999)	X (Note)	Site investigation, design and construction supervision work for Contracts A to C	25.0
		Total	33.9

Source: *CEDD records*

Note: *Consultancies X and Y were awarded to the same consultant (i.e. Consultant X).*

1.6 Between November 2001 and January 2007, CEDD awarded three works contracts (Contracts A to C) to three contractors for the implementation of the Project. Contracts A, B and C were completed in December 2006, March 2010 and October 2010 respectively, which were later than the respective original contract completion dates (see Table 3). In the event, the residential sites under the Project were used for public rental housing development (Note 5).

Table 3

Contracts awarded for the Project
(November 2001 to October 2010)

Contract	Works	Commencement date	Original contract completion date	Actual completion date	No. of months later than original contract completion date
A	Site formation and associated infrastructure works	19.11.2001	3.11.2005	30.12.2006	13.9
B	Remaining infrastructure works — Stage 1	21.12.2005	17.6.2009	11.3.2010	8.8
C	Remaining infrastructure works — Stage 2	13.1.2007	11.1.2010	25.10.2010	9.4

Source: CEDD records

Note 5: *The public rental housing development comprised three public rental housing estates, namely Choi Ying Estate, Choi Tak Estate and Choi Fook Estate. According to CEDD, close and frequent collaborations among various relevant parties were maintained to keep in view the scheduled handover dates of the residential sites, working towards the target population intake dates (i.e. between 2008 and 2010) as mentioned in the FC paper (see Note 3 to para. 1.3(a)). In the event, according to the Housing Department, the population intake date for Choi Ying Estate commenced in 2008 and that for Choi Tak Estate and Choi Fook Estate commenced in 2010 (i.e. meeting the target population intake dates).*

Project cost

1.7 The accounts of Contracts A, B and C (see Table 4) were finalised in February 2019, November 2011 and November 2012 respectively. The finalisation of account of Contract A (in February 2019) long after its completion (in December 2006) was mainly due to contractual disputes under Contract A, which involved two claims. Contractor A referred the two claims in dispute to arbitration in March and April 2015 respectively. The Government also counterclaimed Contractor A. In the event, the Government entered into a settlement agreement with Contractor A in November 2018, under which the Government paid $32 million to Contractor A to settle all the contractual disputes and arbitrations under Contract A on a non-admission of liability basis. As of October 2020, $2,057.4 million (99%) of APE totalling $2,084 million for the Project had been incurred. Of the $2,057.4 million:

(a) $1,855.6 million (90%) was related to expenditures for the Project under Contracts A to C (see Note 2 to Table 4); and

(b) the remaining $201.8 million (10%) mainly included resident site staff costs and consultancy fees (see Table 5).

Table 4

Contract expenditures
(October 2020)

Contract	Original contract sum (a) ($ million)	Total contract expenditure (b) ($ million)	Increase (c) = (b) − (a) ($ million)	Increase in provision for price fluctuation adjustment (Note 1) (d) ($ million)	Increase/ (decrease) after price fluctuation adjustment (e) = (c) − (d) ($ million)
A	1,338.0	1,701.9	363.9 (27.2%)	142.1 (10.6%)	221.8 (16.6%)
B	129.3	135.8	6.5 (5.0%)	9.8 (7.6%)	(3.3) (-2.6%)
C	88.0	101.8	13.8 (15.7%)	8.8 (10.0%)	5.0 (5.7%)
Overall	1,555.3	1,939.5 (Note 2)	384.2 (24.7%)	160.7 (10.3%)	223.5 (14.4%)

Source: *CEDD records*

Note 1: *The original contract sums of Contracts A to C included provisions for price fluctuation adjustments.*

Note 2: *Of the $1,939.5 million, $1,855.6 million was related to the Project, $77.5 million was related to entrustment works funded by other government departments and $6.4 million was related to works for public works regional laboratory funded by CEDD.*

Table 5

Other expenditures for the Project
(October 2020)

Item	Amount ($ million)
Resident site staff costs (Note) paid to Consultant X	134.8
Consultancy fees	33.9
Other costs	33.1
Total	201.8

Source: *CEDD records*

Note: *Consultants are required to employ resident site staff of different grades (e.g. professional grade and technical grade) for supervising contractors' works. The Government reimburses consultants for the personal emoluments of resident site staff and pays an on-cost to consultants to cover their costs in managing the resident site staff.*

Audit review

1.8 In November 2020, the Audit Commission (Audit) commenced a review to examine CEDD's work in managing the implementation of the Project. The audit review has focused on the following areas:

(a) contractual disputes under Contract A (PART 2);

(b) other issues under Contract A (PART 3); and

(c) administration of Contracts B and C (PART 4).

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

Acknowledgement

1.9 During the audit review, in light of the outbreak of coronavirus disease (COVID-19), the Government had implemented various special work arrangements and targeted measures for government employees, including working from home. Audit would like to acknowledge with gratitude the full cooperation of the staff of CEDD during the course of the audit review amid the COVID-19 epidemic.

PART 2: CONTRACTUAL DISPUTES UNDER CONTRACT A

2.1 This PART examines the administration of contractual disputes under Contract A by CEDD, focusing on:

(a) settlement of claims from Contractor A (paras. 2.8 to 2.21); and

(b) settlement of counterclaims against Contractor A (paras. 2.22 to 2.29).

Contract A

2.2 Contract A was a remeasurement contract (Note 6) covering the site formation and associated infrastructure works for the development site near Choi Wan Road and Jordan Valley. The contract works mainly included:

(a) excavation by blasting and other appropriate methods of about 9 million cubic metres (m^3) of in-situ materials;

(b) formation of building platforms of about 20 ha and associated slopes and retaining walls;

(c) construction of internal access roads and associated pedestrian network, and drainage and sewerage systems;

(d) provision and operation of crushing and screening plant to process the excavated materials to the required grading for off-site disposal;

(e) construction, operation and subsequent removal of:

Note 6: *Under a remeasurement contract, the costs of works are based on the actual quantities of works done to be remeasured and the prices of different works items as priced by the contractor in the Bills of Quantities (see Note 16 to para. 2.15(b)) according to the contract.*

(i) a fully enclosed conveyor belt system for the transfer of excavated materials to a site in Kai Tak (i.e. the former Kai Tak Airport); and

(ii) reception facilities, material stockpiles and barge loading facilities at the site in Kai Tak; and

(f) hard and soft landscaping works.

2.3 CEDD awarded Contract A to Contractor A in November 2001 at a contract sum of $1,338 million. The works commenced in November 2001 with a contract period of about 48 months. Consultant X was the Engineer responsible for supervising the contract works. In the event, the contract works were completed in December 2006, about 13.9 months (422 days) later than the original contract completion date of November 2005 with extensions of time (EOTs — Note 7) for the whole period granted to Contractor A (Note 8). The account of Contract A was finalised in February 2019 and the total contract expenditure was $1,701.9 million (see Table 6).

Note 7: *According to the General Conditions of Contract for Civil Engineering Works, regarding contract works commencement, completion and delays: (a) the works and any section thereof shall be completed within the time or times stated in the contract calculated from and including the date for commencement notified by the Engineer or such extended time as may be determined; (b) if the contractor fails to complete the works or any section of works within the time for completion or such extended time as may be granted, then the Employer shall be entitled to recover from the contractor liquidated damages for delay; and (c) if in the opinion of the Engineer, the cause of any delay to the progress of the works or any section of works is any of those stipulated in the General Conditions of Contract (e.g. inclement weather, a variation order issued by the Engineer, the contractor not being given possession of site, etc.), then the Engineer shall within a reasonable time consider whether the contractor is entitled to an EOT for completion of the works or any section thereof. According to the Project Administration Handbook for Civil Engineering Works issued by CEDD, an EOT for completion in effect deprives the Government of the right to liquidated damages for delay in completion of the works for the period of the extension and therefore has a financial implication.*

Note 8: *Of the 422 days of EOT granted, 211 days were due to inclement weather.*

Table 6

Total contract expenditure of Contract A
(February 2019)

Particulars	Amount ($ million)
1. Contract works completed	1,497.8
2. Payment for contract price fluctuation (Note)	172.1
3. Full and final settlement of contractual disputes (see paras. 2.4 to 2.7)	32.0
Total contract expenditure	1,701.9

Source: *CEDD records*

Note: *Of the $172.1 million payment for contract price fluctuation, $30 million was provision for price fluctuation adjustments included in the original contract sum.*

Contractual disputes

2.4 There were contractual disputes under Contract A, comprising claims from Contractor A (see paras. 2.8 to 2.20) and counterclaims against Contractor A (see paras. 2.22 to 2.28) (hereinafter collectively referred to as Contract A disputes). In the event, the Government paid $32 million to Contractor A for settlement of all Contract A disputes (covering both the claims and counterclaims) on a non-admission of liability basis (see paras. 2.5 to 2.7).

Settlement of contractual disputes

2.5 Between November 2014 and April 2015, Contractor A referred the claims in dispute to arbitration, and CEDD referred the counterclaims against Contractor A to another arbitration. By a Procedural Order issued by the arbitrator in January 2016, the two arbitrations were consolidated into one arbitration. In April 2018, CEDD sought the Financial Services and the Treasury Bureau (FSTB)'s approval (in accordance with the Stores and Procurement Regulations) for a strategy and bottom line to negotiate with Contractor A for settlement of the disputes. In July 2018, FSTB granted the approval.

2.6 In October 2018, after several rounds of negotiations, CEDD and Contractor A reached a consensus (which was subject to the Government's internal approval and the execution of a formal settlement agreement) to settle all disputes and all arbitrations under Contract A at a settlement sum of $32 million (inclusive of interest but exclusive of costs — Note 9) on a non-admission of liability basis. With the advice and support of the Legal Advisory Division (Works) (LAD) of the Development Bureau (DEVB) and an external legal team (Note 10), CEDD considered the settlement in the best interest to the Government.

2.7 In October 2018, CEDD sought FSTB's approval for full and final settlement of all Contract A disputes. In November 2018, FSTB approved the settlement. Accordingly, CEDD entered into a settlement agreement with Contractor A in the same month, under which the Government paid $32 million to Contractor A to settle all disputes and all arbitrations (i.e. including claims from Contractor A and counterclaims against Contractor A) under Contract A on a non-admission of liability basis (Note 11).

Note 9: *According to CEDD: (a) the settlement sum was a lump-sum figure (with no breakdown for individual claims and disputes produced by CEDD and Contractor A) to settle the disputes; and (b) it was common that breakdowns for individual claims and disputes were not included in the offer and settlement sums during negotiation.*

Note 10: *The external legal team, comprising external counsels, external solicitors, a quantum expert and a site formation engineering expert, was engaged by LAD to assist the arbitrations.*

Note 11: *According to CEDD, taking into account legal advice, the Government did not take any action against Consultant X as there was a lack of evidence supporting that Consultant X was negligent or had failed to exercise professional skill, care and diligence in performing its service for the disputes under Contract A.*

Settlement of claims from Contractor A

2.8 Consultant X certified that Contract A was substantially completed in December 2006. Contractor A disagreed with Consultant X's measurements and valuations regarding the following two claims:

(a) claim for additional payment for stockpiling and handling of disposal materials at a site in Kai Tak (Kai Tak site — see paras. 2.10 to 2.14); and

(b) claim for additional payment relating to the valuation of concrete buttress (Note 12) works (see paras. 2.15 to 2.19).

2.9 Contractor A disagreed with Consultant X's measurements and valuations, and referred the two claims in dispute to arbitration (see para. 2.5).

Scope for improvement in handling of disposal materials

2.10 Under Contract A, Contractor A was required to:

(a) carry out excavation of soft and rock materials at the development site to form building platforms;

(b) set up a crushing plant to crush and screen the excavated materials to produce different types of disposal materials according to their sizes; and

Note 12: *A concrete buttress provides structural support to improve local or overall slope stability. It is used to: (a) retain and protect areas of weak rock and support the overhang; and (b) prevent local toppling failure of the rock face.*

(c) transport the disposal materials by a conveyor belt system or its trucks (Note 13) from the development site to the Kai Tak site for delivery to 10 disposal sites as specified in Contract A, as follows:

(i) for 3 disposal sites (i.e. Shek O Quarry, Tseung Kwan O Area 137 and Lam Tei Quarry), the delivery of disposal materials was arranged by Contractor A's barges; and

(ii) for the remaining 7 disposal sites (Note 14), the disposal materials were delivered by barges provided by the contractors of the disposal sites.

The disposal materials could be temporarily stockpiled at the Kai Tak site to suit Contractor A's disposal operation or the collection programme of disposal sites. For material disposal at each disposal site, the tentative period, tentative average rate of acceptance/delivery (i.e. demand rate) and material specification were also specified in Contract A.

2.11 Contractor A contended that CEDD was not able to arrange acceptance of disposal materials (at the Kai Tak site) from disposal sites in a timely manner. As a result, Contractor A had incurred additional costs (such as additional manpower and plant) to store and handle the disposal materials, and claimed for additional payment for stockpiling and handling of disposal materials at the Kai Tak site.

Note 13: *A fully enclosed conveyor belt system was specified in the contract as the only means for transporting disposal materials from the development site to the Kai Tak site throughout the contract period, except at the beginning and the end of the works period when the conveyor belt system was not yet set up for use or had been demolished for the completion of contract works. During these two periods, Contractor A was allowed to transport the disposal materials by trucks.*

Note 14: *The 7 disposal sites were: (a) Infrastructure for Penny's Bay Development; (b) Central Reclamation Phase III; (c) Penny's Bay Reclamation 2; (d) Wan Chai Development II; (e) Ma Liu Shui Reclamation; (f) North Tsing Yi Reclamation; and (g) South East Kowloon Development.*

2.12 According to Consultant X's assessment on Contractor A's contention:

(a) from early 2003 to May 2005, the demand for disposal materials produced under Contract A was continuously less than the supply (Note 15). As a result, there was an accumulation of disposal materials in the stockpile areas at the Kai Tak site with a volume totalling 1.7 million m^3 as of May 2005. As the original stockpile areas given to Contractor A was insufficient to accommodate this quantity of disposal materials, additional stockpile areas were given to Contractor A. This apparent mismatch between material supply and demand appeared to form part of the basis of Contractor A's claim with the argument that it was outside Contractor A's original contemplation at the tender stage;

(b) CEDD, as the employer, needed to identify disposal sites to receive the excavated materials. Although the demand rates were only tentatively specified in Contract A, it was not unreasonable for Contractor A to expect CEDD to provide the necessary demand to collect disposal materials within a reasonable time; and

(c) Contractor A's claim for additional payment for temporary stockpiling and associated handling of disposal materials due to a lack of demand for disposal materials from the Kai Tak site by the disposal sites was considered valid.

In the event, the claim for stockpiling and handling of disposal materials at the Kai Tak site was settled in November 2018 (see para. 2.7).

Note 15: *According to CEDD: (a) between early 2003 and May 2005, the Wan Chai Development II (one of the disposal sites — see Note 14 to para. 2.10(c)(ii)) was a major disposal site for the disposal materials stockpiled at the Kai Tak site. However, due to an unforeseeable judicial review initiated in February 2003 against the proposed reclamation under the Wan Chai Development II, the reclamation programme was interrupted, resulting in a decrease in the demand for disposal materials produced under Contract A during that period; (b) additional stockpile areas at the Kai Tak site had been identified to avoid affecting the progress of transporting the disposal materials from the development site to the Kai Tak site; and (c) the decrease in the demand for disposal materials produced under Contract A could not have been contemplated by CEDD.*

2.13 In March 2021, CEDD informed Audit that:

(a) Contractor A's claim could have been mitigated if the forecast on the generation and demand of fill materials had been reviewed and updated to enhance accuracy and facilitate formulating the subsequent disposal arrangement in a timely manner; and

(b) in August 2011 (after the award of Contract A), DEVB Technical Circular (Works) No. 9/2011 on "Enhanced Control Measures for Management of Public Fill" was promulgated. The Technical Circular had enhanced the monitoring and control of the generation and demand of fill materials from public works projects, and required quarterly review and reporting on changes (with reasons) in the forecast on the generation and demand of fill materials on an individual project basis.

2.14 In Audit's view, in implementing a works contract involving excavation and handling of disposal materials in future, CEDD needs to closely monitor the effectiveness of the enhanced control measures for the management of disposal materials having regard to the lessons drawn from the claim for stockpiling and handling of disposal materials under Contract A.

Different interpretations of contract documents for valuation of concrete buttress works

2.15 Under Contract A:

(a) Contractor A was required to carry out excavation at the development site to form building platforms and associated slopes. As part of the slope formation and stabilisation works, concrete buttresses would be constructed to stabilise some of these slopes; and

(b) the Bills of Quantities (BQ — Note 16) items relating to the construction of concrete buttresses were grouped under a composite heading "In-situ Concrete (For baffle wall, debris trap and concrete buttress)" with BQ rates for different types of concrete, including:

(i) BQ rate of \$2,500 per m^3 for Concrete Grade 20/20 (Note 17); and

(ii) BQ rate of \$915 per m^3 for Concrete Grade 30/20 (see Note 17).

2.16 Regarding the valuation of concrete buttress works involving Concrete Grade 30/20, Contractor A and Consultant X had different views, as follows:

Contractor A's views

(a) Contractor A disagreed with the BQ rate (i.e. \$915 per m^3 — see para. 2.15(b)(ii)) applied by Consultant X for measuring the concrete buttress works involving Concrete Grade 30/20 and claimed for additional payment on top of the amount certified by Consultant X (i.e. \$8.3 million);

(b) according to Contractor A, concrete buttresses were constructed on formed slopes at discrete and isolated locations which might be located 30 m to 40 m above formation level. Hence, the placement of concrete to the buttresses required the use of expensive concrete pumps or cranage whereas baffle walls and debris traps did not;

Note 16: *According to the Project Administration Handbook for Civil Engineering Works issued by CEDD, BQ is a list of items giving brief identifying descriptions and estimated quantities of the works to be performed. BQ forms a part of the contract documents, and is the basis of payment to the contractor. The main functions of BQ are to allow a comparison of tender prices and provide a means of valuing the works.*

Note 17: *Concrete Grade 20/20 refers to concrete with compressive strength of 20 megapascals and made with stone aggregate having a nominal maximum size of 20 millimetres. Concrete Grade 30/20 refers to concrete with compressive strength of 30 megapascals and made with stone aggregate having a nominal maximum size of 20 millimetres. Concrete Grade 30/20 has a higher compressive strength and usually has a higher cost than Concrete Grade 20/20.*

(c) by reference to the different nature of concrete buttresses when compared with baffle walls and debris traps, and contract drawings (which showed that the construction of concrete buttresses involved Concrete Grade 20/20), Contractor A considered that:

(i) BQ item for Concrete Grade 20/20 was for the construction of concrete buttresses, and BQ item for Concrete Grade 30/20 was for the construction of baffle walls and debris traps. Contractor A priced the BQ items for different concrete grade on this basis; and

(ii) BQ item for Concrete Grade 30/20 was not for the construction of concrete buttresses. The rate for measuring concrete buttress works should be built up from BQ rate for Concrete Grade 20/20 (i.e. $2,500 per m^3 — see para. 2.15(b)(i)); and

Consultant X's views

(d) Consultant X considered that the BQ rate for Concrete Grade 30/20 (i.e. $915 per m^3 — see para. 2.15(b)(ii)) was applicable for measuring the concrete buttress works and certified an amount of $8.3 million.

2.17 Having considered opinions from the external legal team (see para. 2.6) and the validity of Contractor A's entitlement under Contract A, CEDD considered that Contractor A's claim (relating to the valuation of concrete buttress works) arose from different contractual interpretations on BQ items (see para. 2.16). In the event, the claim was settled in November 2018 (see para. 2.7). In March 2021, CEDD informed Audit that:

(a) Contractor A's claim arose from different contractual interpretations on the applicability of particular BQ items in valuing the concrete buttress works involving Concrete Grade 30/20; and

(b) the root cause was due to inconsistency between contract drawings and BQ.

2.18 According to the Project Administration Handbook for Civil Engineering Works (hereinafter referred to as the Project Administration Handbook) issued by CEDD, it is essential that the contract documents for each contract are prepared with great care and by an experienced professional who has thorough knowledge of the works to be constructed, and the documents forming a contract must be scrutinised for comprehensive coverage, accuracy and consistency with one another before tenders are invited. In this connection, in 2014 (after the award of Contract A), CEDD amended the Project Administration Handbook to provide further guidelines on checking the completeness and accuracy of BQ and related documents (see para. 4.20).

2.19 In Audit's view, in preparing documents for a works contract in future, CEDD needs to take measures to critically vet contract documents (e.g. BQ items under a composite heading) in accordance with the related guidelines with a view to minimising the risk of contractual disputes on valuation of works arising from different interpretations of contract documents.

Audit recommendations

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

(a) **in implementing a works contract involving excavation and handling of disposal materials in future, closely monitor the effectiveness of the enhanced control measures for the management of disposal materials having regard to the lessons drawn from the claim for stockpiling and handling of disposal materials under Contract A; and**

(b) **in preparing documents for a works contract in future, take measures to critically vet contract documents (e.g. BQ items under a composite heading) in accordance with the related guidelines with a view to minimising the risk of contractual disputes on valuation of works arising from different interpretations of contract documents.**

Response from the Government

2.21 The Director of Civil Engineering and Development agrees with the audit recommendations.

Settlement of counterclaims against Contractor A

2.22 Under Contract A, Contractor A was required to deliver by barges the disposal materials at the Kai Tak site to 3 disposal sites, including Shek O Quarry (see para. 2.10(c)). The tentative quantity and the quality of disposal materials to be delivered to Shek O Quarry were set out in Contract A.

2.23 The rehabilitation of Shek O Quarry was under a CEDD contract (Contract D) awarded to another contractor (Contractor D) in March 1994 (Note 18). According to a supplementary agreement entered into between CEDD and Contractor D in August 2001:

(a) Contractor D was granted permission to import rock materials produced under Contract A to Shek O Quarry; and

(b) CEDD shall give preference to Contractor D to import two-thirds of acceptable quality rock materials from Contract A subject to a maximum limit of 5.5 million tonnes of rock materials (Note 19). The rock materials shall meet the requirements for use as aggregates (Note 20) in concrete production.

Note 18: *Contract D was a revenue-earning contract, under which CEDD granted to Contractor D the sole and exclusive right to enter upon the quarry at Shek O for the purpose of quarrying, processing rock (e.g. for sale as aggregates) and quarry rehabilitation. Contractor D paid to the Government a lump sum of $25 million and such additional sums, if any, in accordance with the provisions of Contract D. In the event, Contract D was completed in December 2011 and the final contract sum paid to the Government was $67.6 million.*

Note 19: *Contractor D was required to pay a royalty of $5.5 per tonne on all rock materials imported from Contract A.*

Note 20: *Aggregates, which may be natural or recycled, are granular materials used for concrete production.*

2.24 There were contractual disputes under Contract D relating to the quantity and quality of rock materials delivered by Contractor A to Shek O Quarry, as follows:

(a) ***Inadequate quantity of rock materials delivered by Contractor A to Shek O Quarry.*** The salient points are as follows:

(i) under Contract A, the tentative quantity of rock materials to be delivered to Shek O Quarry would be 138,000 m^3 per quarter during the tentative period from the first quarter of 2002 to the fourth quarter of 2005 (or about 5.74 million tonnes — Note 21);

(ii) CEDD was responsible for making decisions for the allocation of disposal materials from Contract A to various disposal sites. In making its allocation decisions, CEDD made reference to the information provided by Consultant X (e.g. the quantity of rock materials available from Contract A). Consultant X was obliged to obtain instructions from CEDD and give corresponding instructions to Contractor A for the quantity of disposal materials to be delivered to different disposal sites;

(iii) during the construction stage of Contract A, due to the unforeseeable needs of disposal materials of a disposal site (i.e. Tseung Kwan O Area 137), CEDD gave top priority to that disposal site and a lower priority to other disposal sites (including Shek O Quarry) for delivery of disposal materials prior to November 2003;

Note 21: *According to CEDD records, the formula for converting the quantity of rock materials in terms of m^3 to tonnes was 138,000 m^3 per quarter × 16 quarters × density of 2.6 tonnes per m^3.*

(iv) in November 2003, CEDD decided to supply up to 5.5 million tonnes (i.e. the agreed quantity — Note 22) of acceptable quality rock materials from Contract A to Shek O Quarry (Note 23);

(v) as of October 2004, based on Consultant X's estimation of the remaining quantity of rock materials available from Contract A, CEDD was still expecting full delivery of the agreed quantity of rock materials to Shek O Quarry. However, in January 2005, Consultant X revised its estimate and predicted that only 95% of the agreed quantity (i.e. 5.2 million tonnes) of rock materials could be delivered to Shek O Quarry (Note 24); and

(vi) upon completion of the delivery of rock materials, Contractor D asserted that the total quantity of acceptable quality rock materials delivered by Contractor A to Shek O Quarry was less than 5.5 million tonnes (i.e. the quantity that it deemed to be entitled to receive); and

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Note 22: *According to CEDD, two-thirds of acceptable quality rock materials from Contract A was more than 5.5 million tonnes and hence, the agreed quantity of rock materials from Contract A delivering to Shek O Quarry should be 5.5 million tonnes.*

Note 23: *According to CEDD, Tseung Kwan O Area 137 had received enough disposal materials in December 2003.*

Note 24: *According to CEDD: (a) the actual quantity of rock materials delivered by Contractor A to Shek O Quarry was less than the agreed quantity of 5.5 million tonnes; and (b) it might not be appropriate to disclose the actual figure as there was dispute between the Government and Contractor D on it.*

(b) ***Unsatisfactory quality of rock materials delivered by Contractor A to Shek O Quarry.*** The salient points are as follows:

(i) under Contract A, the rock materials to be delivered to Shek O Quarry were rock materials for aggregates, with specification of Grade II Rock (Note 25) or better and nominal diameter less than 200 millimetres;

(ii) from early to mid-2003, Contractor D had raised seven complaints to CEDD and Contractor A about the presence of significant quantities of metal contaminants in the rock materials delivered by Contractor A to Shek O Quarry; and

(iii) Contractor A only installed a magnet in its plant for processing the excavated materials to improve the quality of disposal materials in May 2003 (i.e. 4 months after Contractor D had raised the quality issue).

2.25 In the event:

(a) Contractor D claimed for additional payment for the inadequate quantity and unsatisfactory quality of rock materials delivered by Contractor A to Shek O Quarry. In July 2015, the Government paid a lump sum to Contractor D in full and final settlement of the contractual disputes under Contract D; and

(b) CEDD counterclaimed Contractor A for the damages claimed by Contractor D. The counterclaims were settled in November 2018 (see para. 2.7).

Note 25: *According to the Guide to Rock and Soil Descriptions issued by CEDD: (a) decomposition grades of rock material are classified into Grades I to VI (with descending rock hardness); and (b) Grade II Rock is slightly decomposed rock material with the following characteristics: (i) not broken easily by geological hammer; (ii) making a ringing sound when struck by geological hammer; and (iii) with fresh rock colours generally retained but stained near joint surfaces.*

2.26 In March 2021, CEDD informed Audit that:

(a) the root cause of Contractor D's claim for additional payment (see para. 2.25(a)) arose from the inaccuracy of the estimation of the quantity of acceptable quality rock materials (i.e. Grade II Rock or better) available from Contract A. To ensure the accuracy of the estimation of the quantity of rock materials generated from a works contract, it was important to conduct sufficient ground investigation at the detailed design stage;

(b) after the award of Contract A:

(i) "Geoguide 2: Guide to Site Investigation" published by the Geotechnical Engineering Office (GEO) of CEDD was updated in 2017 to provide guidance on good site investigation practice for works departments to plan and carry out investigation of works sites; and

(ii) further guidelines on geotechnical works of public works projects were promulgated in DEVB Technical Circular (Works) No. 3/2018 of March 2018 on "Enhancing Cost Effectiveness of Geotechnical Works of Capital Works Projects". Under the Technical Circular, works departments were required to submit the ground investigation plan and the schematic design proposal with relevant information (e.g. ground investigation data) to GEO for review and comment; and

(c) resident site staff supervising the contract works were reminded to check frequently the quality of excavated materials against the requirements specified by disposal sites.

2.27 In Audit's view, in implementing a works contract involving excavation and delivery of excavated materials in future, CEDD needs to:

(a) remind its staff and consultants to conduct thorough ground investigation at the detailed design stage in accordance with the related guidelines with a view to enhancing the accuracy of the estimation of the quantity of excavated materials generated from the works contract; and

(b) closely monitor the quantity and quality of excavated materials delivered to specified disposal sites to ensure compliance with the related contract requirements.

Audit recommendations

2.28 **Audit has *recommended* that, in implementing a works contract involving excavation and delivery of excavated materials in future, the Director of Civil Engineering and Development should:**

(a) **remind CEDD staff and consultants to conduct thorough ground investigation at the detailed design stage in accordance with the related guidelines with a view to enhancing the accuracy of the estimation of the quantity of excavated materials generated from the works contract; and**

(b) **closely monitor the quantity and quality of excavated materials delivered to specified disposal sites to ensure compliance with the related contract requirements.**

Response from the Government

2.29 The Director of Civil Engineering and Development agrees with the audit recommendations.

PART 3: OTHER ISSUES UNDER CONTRACT A

3.1 Contract A's total contract expenditure was $1,701.9 million (accounting for 92% of the total contract expenditure of $1,855.6 million under the Project) (see para. 1.7(a)). Apart from the issue on contractual disputes (see PART 2), there were other issues relating to the administration of Contract A by CEDD. This PART examines the other issues under Contract A, focusing on:

(a) contract management (paras. 3.2 to 3.11); and

(b) post-completion review (paras. 3.12 to 3.16).

Contract management

Scope for conducting more thorough pre-tender site investigations

3.2 In June 2005, FC approved an increase in APE of Project Vote C by $230 million (see Table 1 in para. 1.4) from $1,779.3 million to $2,009.3 million to cover additional costs arising mainly from variations under Contract A due to unforeseeable geological conditions (Note 26). Regarding the cost increase, Audit noted that:

(a) in May 2005, THB and CEDD informed the Panel on Housing and the Public Works Subcommittee of FC of LegCo that:

(i) the scale of site formation works for the Project was substantial, involving the cutting of an existing huge slope of 110 m high and 1,000 m wide to form slope faces (of about 13 ha) and building platforms (of about 20 ha) within a site of about 35 ha. Before the commencement of Contract A, site investigation had been carried out to ascertain the geological conditions of the site for the design of the Project; and

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Note 26: *The increase in APE was also used to cover additional costs arising from changes to bridgework design of the remaining infrastructure works and additional resident site staff costs.*

(ii) during the construction stage of Contract A, unforeseeable soil and rock profiles in various areas within the development site were encountered. As a result, variations and additional works (Note 27) were required under Contract A, leading to an increase of estimated cost of about $213 million (Note 28); and

(b) in response to a LegCo Member's enquiry on whether the Government would review the criteria to determine the scope of site investigation works for future projects at a meeting of the Public Works Subcommittee in May 2005, CEDD said that:

(i) only 200 boreholes had been included in the original site investigation works for the Project involving a site of about 35 ha. The Government discovered the unforeseeable soil and rock profiles within the site only after the commencement of works; and

(ii) in conducting future site investigations for large-scale sites, the Government would employ geological experts and geological engineers to study the aerial photographs and the geological model of the site to determine the number and location of the boreholes for site investigation.

Note 27: *The variations and additional works included: (a) variations of bulk excavation for building platforms. The ratio of quantities of soft materials and rock had been found to be different from what CEDD originally provided for in Contract A. The proportion of soft materials increased from 16% to 27%, leading to an increase of estimated cost of about $159 million; (b) variations of trench excavation works in rock for drains and sewers. The quantity of such works had been found to be more than that originally provided for in Contract A, leading to an increase of estimated cost of about $23 million; and (c) additional slope improvement works (e.g. retaining walls, soil nails and spray concrete). These works were required to ensure slope stability, leading to an increase of estimated cost of about $31 million.*

Note 28: *According to CEDD, the actual cost increase under Contract A included: (a) $169 million due to increase in proportion of soft materials; (b) $18 million due to variations of trench excavation works in rock for drains and sewers; and (c) $24 million due to additional slope improvement works.*

3.3 In March 2021, CEDD informed Audit that, after the award of Contract A:

(a) Geoguide 2 (see para. 2.26(b)(i)) was updated in 2017 to provide further guidelines in the application of new technologies and digital tools (such as geophysical survey methods and geographical information system) to enhance site investigation works; and

(b) further guidelines on geotechnical works of public works projects were promulgated in 2018 (see para. 2.26(b)(ii)).

3.4 In Audit's view, in implementing a works project involving a large-scale site in future, CEDD needs to:

(a) take measures to ensure that its staff and consultants conduct thorough pre-tender site investigations in accordance with the related guidelines; and

(b) continue to explore new technologies and digital tools for conducting pre-tender site investigations with a view to providing better information on site conditions for design and tender purposes.

Need to ensure compliance with control requirements on blasting activities

3.5 The Mines Division under GEO of CEDD is responsible for regulating blasting activities under the Dangerous Goods Ordinance (Cap. 295). According to the Dangerous Goods (General) Regulations (Cap. 295B):

(a) no person shall carry out any blasting without the permission of the authority (i.e. the Commissioner of Mines). The Director of Civil Engineering and Development is also the Commissioner of Mines (Note 29); and

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Note 29: *The Commissioner of Mines is the specified authority under the Dangerous Goods Ordinance and related subsidiary legislations. The Mines Division exercises powers vested in the Commissioner of Mines and performs duties imposed on the Commissioner of Mines under the legislation.*

(b) when blasting is carried out, no blast shall be fired unless effective and adequate precautions are taken to prevent any fragments being projected in a dangerous manner.

3.6 For public works projects that involve blasting for rock excavation, the contractor shall obtain a blasting permit (Note 30) from the Commissioner of Mines via the Mines Division prior to commencement of the blasting works. To apply for a blasting permit, the contractor shall provide details on the nature of the works and a method statement on the blasting operations proposed to be carried out to the Mines Division for consideration. According to CEDD, the method statement should incorporate all the requirements defined in the blasting assessment report (Note 31) prepared by the consultants during the planning and design stages, and shall include, among others, details of protective measures against flyrock and safety precautionary measures (e.g. temporary closure of public road/area outside the site boundary). The method statement accepted by the Mines Division will form part of the conditions for the issue of the blasting permit.

3.7 Contract A involved the excavation of about 9 million m^3 of in-situ materials by blasting and other appropriate methods (see para. 2.2(a)). Audit noted that there were two flyrock incidents after the blasting activities at the works site under Contract A in February and June 2003 respectively. The salient points of the two flyrock incidents are as follows:

(a) ***Flyrock incident in February 2003.*** On 17 February 2003, some rock fragments were projected from a rock blast and caused damage to 8 windows in 5 flats at a private housing estate (located at about 115 m to the west of a blasting area, separated by Choi Wan Road). Several rock fragments were also found on the podium of the private housing estate. Fortunately, no person was injured in the incident. According to CEDD:

Note 30: *A blasting permit allows the contractor to use explosives at a works site for the carrying out of blasting.*

Note 31: *For public works projects, the project proponent should obtain GEO's agreement to a blasting assessment report at the planning and design stages. The purpose of the report is to identify all sensitive receivers, assess any adverse effects and risks arising from the transport, storage and use of explosives for blasting, and demonstrate the feasibility of carrying out the blasting works in a practical, safe and acceptable manner.*

(i) it was believed that the incident was due to the unfavourable rock joints (Note 32) in the blasting area. Some rock fragments were projected at an unexpected direction;

(ii) following the flyrock incident, the blasting activities in the concerned blasting area were suspended; and

(iii) upon its request, Contractor A proposed an extensive protective measures (covering two-thirds of the upper slope area by hanging steel wire meshes and surrounding the blasting area by 12 m high vertical screens) in order to avoid the recurrence of similar incidents. The proposed measures were acceptable to CEDD. Accordingly, the blasting activities in the concerned blasting area resumed from 10 March 2003; and

(b) ***Flyrock incident in June 2003.*** On 6 June 2003, a rock blast resulted in some rock fragments being projected over a distance of about 180 m to 230 m onto New Clear Water Bay Road, causing minor injuries to 9 persons and damage to 4 vehicles and properties (e.g. the roof and railing of two bus shelters). According to CEDD:

(i) the flyrock incident was likely due to unforeseeable unfavourable ground condition in the blasting area, where the blast holes were confined by fresh rock protrusion in an area of weathered and fractured rock, resulting in upward projection of rock fragments;

(ii) some protective and precautionary measures (closure of New Clear Water Bay Road to both traffic and pedestrians, and provision of vertical screens, top screens, steel cages, etc.) specified in the method statement were not taken or not effectively taken by Contractor A for the rock blast on 6 June 2003 as Contractor A had overestimated the distance between the blast location and New Clear Water Bay Road (Contractor A's estimated distance was over 200 m to 300 m while the actual distance was only about 180 m);

Note 32: *According to CEDD, rock joint is a fracture formed in tension in which any displacement is too small to be visible to the unaided eye.*

(iii) had Contractor A followed the measures specified in the method statement for the rock blast on 6 June 2003, the injuries and damage resulting from the flyrock incident would likely have been significantly reduced or even avoided; and

(iv) Contractor A was requested to take enhanced protective and precautionary measures for all future blasts and make improvements to the management of blasting works (Note 33).

3.8 In March 2021, CEDD informed Audit that:

(a) the Mines Division (as the regulatory body for blasting activities — see Note 29 to para. 3.5(a)) had kept under review the control requirements on blasting activities and updated the control requirements where necessary to safeguard public safety;

(b) after the two flyrock incidents (see para. 3.7), CEDD amended in 2007 the Project Administration Handbook and the relevant Mines Division Guidance Notes so that works projects involving blasting activities (particularly at works sites in densely populated area) were subject to more tightened control, including:

(i) enhanced requirements on the qualification of consultants' and contractors' site supervision personnel;

(ii) detailed assessment of potential hazards associated with the proposed blasting works prepared by a qualified competent person and approved by GEO; and

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Note 33: *According to CEDD: (a) after the occurrence of the flyrock incident on 6 June 2003, enhanced protective and precautionary measures were implemented for blasting activities under Contract A. These measures included: (i) provision of qualified supervising blasting engineer, geologist and blasting designer full-time resident on site; (ii) provision of vertical screens, full ground cover consisting of wire mesh protection mats, steel cages and securely-fix hanging screens; and (iii) clear of persons and vehicular traffic on adjacent roads during blasting activities; and (b) poor performance was reflected in relevant areas (i.e. standard of workmanship, site accident record, and provision and implementation of safe system of works) in Contractor A's performance report for the third quarter of 2003.*

(iii) enhanced requirements on the management of blasting-related site activities, and the implementation of the necessary protective and precautionary measures; and

(c) with the enhanced control requirements on blasting activities in place (see (b) above) and satisfactorily complied with, since July 2003 (after the two flyrock incidents) and up to December 2020, there had been no recurrence of similar flyrock incidents (i.e. causing injury to person and/or damage to vehicle/property).

3.9 In Audit's view, in implementing a works project involving blasting activities (particularly at works sites in densely populated area) in future, CEDD needs to make continued efforts to ensure that its consultants and contractors comply with the control requirements on blasting activities.

Audit recommendations

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

(a) **in implementing a works project involving a large-scale site in future:**

(i) **take measures to ensure that CEDD staff and consultants conduct thorough pre-tender site investigations in accordance with the related guidelines; and**

(ii) **continue to explore new technologies and digital tools for conducting pre-tender site investigations with a view to providing better information on site conditions for design and tender purposes; and**

(b) **in implementing a works project involving blasting activities (particularly at works sites in densely populated area) in future, make continued efforts to ensure that CEDD consultants and contractors comply with the control requirements on blasting activities.**

Response from the Government

3.11 The Director of Civil Engineering and Development agrees with the audit recommendations.

Post-completion review

3.12 According to the Project Administration Handbook:

(a) a post-completion review is a useful project management tool and shall be conducted upon the substantial completion of a major consultancy agreement or a major works contract on projects under the Public Works Programme. The emphasis and objective of the review are to gain maximum benefit from the experience accrued, rather than to apportion blame;

(b) there is no rigid definition for major projects or the minimum number of reviews to be undertaken by departments. As a broad guideline, post-completion reviews are generally not warranted for consultancy agreements and works contracts of a project which has a total cost less than $500 million or of a project which does not involve complicated technical and management issues. Based on the above guidelines, departments could select agreements/contracts to be reviewed at their discretion;

(c) indicators that a project involves complicated issues may include project involving:

(i) a claim of a substantial sum, say over $1 million; and

(ii) incidents that attract public attention;

(d) a post-completion review should be carried out within a reasonable period, say six months, after the substantial completion of a consultancy agreement or a works contract. However, in case there are on-going disputes with the service providers, it may be more appropriate to defer the review until the disputes are settled; and

(e) a post-completion review should be led by the officer in charge of the project and he or she should solicit input from the client and other project participants (such as the consultants, contractors and subcontractors) as appropriate. Upon the completion of a post-completion review, the department shall prepare a report documenting all concerned issues, findings, conclusions and recommendations for future reference by the department.

Need to timely conduct post-completion review

3.13 Audit noted that Contract A (which was substantially completed in December 2006) involved a total contract expenditure of $1,701.9 million (see para. 2.3) and contractual disputes settled at $32 million (see para. 2.7). While the contractual disputes with Contractor A were settled in November 2018, as of January 2021 (more than two years thereafter), CEDD had not yet conducted a post-completion review for Contract A (see para. 3.12(d)).

3.14 In February 2021, CEDD informed Audit that it was arranging a post-completion review for Contract A. As a post-completion review is a useful project management tool, Audit considers that CEDD needs to:

(a) complete the post-completion review for Contract A as soon as practicable; and

(b) remind its staff and consultants to conduct post-completion reviews on major works contracts in a timely manner.

Audit recommendations

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

(a) **complete the post-completion review for Contract A as soon as practicable; and**

(b) **remind CEDD staff and consultants to conduct post-completion reviews on major works contracts in a timely manner.**

Response from the Government

3.16 The Director of Civil Engineering and Development agrees with the audit recommendations. He has said that CEDD:

(a) completed the post-completion review for Contract A in March 2021; and

(b) will remind its staff and consultants to conduct post-completion reviews on major works contracts in a timely manner.

PART 4: ADMINISTRATION OF CONTRACTS B AND C

4.1 This PART examines the administration of Contracts B (paras. 4.4 to 4.11) and C (paras. 4.14 to 4.22) by CEDD.

Contract B

4.2 Contract B was a remeasurement contract. Its contract works mainly included:

(a) construction of two slip road bridges (one connecting the development site to Kwun Tong Road, and the other one connecting Choi Ha Road and Choi Wing Road);

(b) construction of a footbridge (Footbridge A — see Photograph 1) across Choi Wan Road and Kwun Tong Road;

(c) road junction improvement works at Ngau Tau Kok Road/Jordan Valley North Road, Ngau Tau Kok Road/Chun Wah Road and Chun Wah Road/Choi Ha Road;

(d) taking over and maintenance of the completed building platforms, roads, slopes, footpath and associated utilities under Contract A in various specified portions of the development site; and

(e) hard and soft landscaping works.

Photograph 1

Footbridge A
(February 2009)

Source: CEDD records

4.3 CEDD awarded Contract B to Contractor B in December 2005 at a contract sum of $129.3 million. The works commenced in December 2005 with a contract period of about 42 months. Consultant X was the Engineer responsible for supervising the contract works. In the event, the contract works were completed in March 2010, about 8.8 months (267 days) later than the original contract completion date of June 2009 with EOTs for the whole period granted to Contractor B (Note 34). The account of Contract B was finalised in November 2011 and the total contract expenditure was $135.8 million (see Table 7).

Note 34: *Of the 267 days of EOT granted, 96 days were due to inclement weather.*

Table 7

Total contract expenditure of Contract B
(November 2011)

Particulars	Amount ($ million)
1. Contract works completed	119.0
2. Payment for contract price fluctuation (Note)	16.8
Total contract expenditure	135.8

Source: *CEDD records*

Note: *Of the $16.8 million payment for contract price fluctuation, $7 million was provision for price fluctuation adjustments included in the original contract sum.*

Administration of Contract B

4.4 Audit noted that there was room for improvement in CEDD's administration of Contract B (see paras. 4.5 to 4.10).

Scope for enhancing pre-tender site investigations

4.5 Under Contract B, Contractor B was required to construct Footbridge A across Choi Wan Road and Kwun Tong Road, which would connect a building platform within the development site (now known as Choi Ying Estate) and the Kowloon Bay Mass Transit Railway Station. Regarding the construction of Footbridge A:

(a) pad footings were originally designed at two footing locations of Footbridge A (namely Locations A and B);

(b) during Contractor B's excavation works at Location A, a weak subsoil stratum was found. Further excavation works at Location A revealed that the weak subsoil stratum was not a thin layer;

(c) Consultant X considered that additional ground investigation works was necessary to obtain more information to facilitate a design review of the foundation works and issued a variation order (VO — Note 35) (VO A — later valued at a cost of about $71,000) to instruct Contractor B to carry out the related investigation works;

(d) the additional ground investigation works revealed that a similar problem (i.e. weak subsoil stratum) also occurred at Location B. Based on the additional ground investigation information, Consultant X carried out a design review of the foundation works and concluded that the use of mini-piles to substitute the pad footings at Locations A and B (the revised foundation works) was considered the most suitable solution to overcome the problem. VO B (later valued at a cost of $2 million) was issued to instruct Contractor B to carry out the revised foundation works; and

(e) Consultant X assessed that the revised foundation works at Locations A and B (relating to VOs A and B) had delayed the completion of construction of Footbridge A and had a knock-on effect on the completion of other works (e.g. roadworks and landscape works) in that area under Contract B. In the event, EOTs ranging from 112 to 171 days for completing various sections of works and a prolongation cost (Note 36) of $3.1 million were granted to Contractor B.

4.6 According to the Project Administration Handbook, a properly planned site investigation (including adequate supervision of the ground investigation and

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Note 35: *The Engineer shall order any variation to any part of the works that is necessary for the completion of the works. The Engineer shall have the power to order any variation that for any other reason shall in the Engineer's opinion be desirable for or to achieve the satisfactory completion and functioning of the works. The Engineer shall also determine the sum which in his opinion shall be added to or deducted from the contract sum as a result of issuing a VO.*

Note 36: *Prolongation costs are generally the time related costs (e.g. the costs of a contractor's site establishment, site overheads and general plant) that are typically affected by a delay to the critical path of construction works. Works contracts include provisions for granting EOTs for completion due to events covered by the contract provisions, such as additional works, inclement weather, etc. The Engineer would assess the actual situation of each case, with the prolongation costs calculated as the time related costs additionally incurred for the relevant delay duration of those events for which prolongation costs are grantable.*

laboratory testing) is essential to identify the geotechnical problems of a site and provide sufficient data for safe and economic design and construction. In March 2021, CEDD informed Audit that, after the award of Contract B, further guidelines on good site investigation practice and geotechnical works of public works projects were promulgated in 2017 and 2018 respectively (see para. 2.26(b)). In Audit's view, in implementing a works contract involving footbridge works in future, CEDD needs to take measures to ensure that its staff and consultants conduct pre-tender site investigations (particularly for works at critical locations) in accordance with the related guidelines.

Need to enhance the management of slope works

4.7 Under Contract B, Contractor B was required to:

(a) take over the completed building platforms, roads, slopes, footpath and associated utilities under Contract A in various specified portions of the development site from Contractor A (see para. 4.2(d));

(b) provide security and take care of the works completed by Contractor A under Contract A; and

(c) maintain and provide access for the use of Contractor A, government departments' contractors and others to or through these specified portions of the development site.

4.8 The works under Contract A included the formation of two slopes (Slopes A and B) and were substantially completed in December 2006 (see para. 2.3). In March 2008, Contractor A passed Slopes A and B to Contractor B (being the works agent of CEDD) for maintenance prior to handing over to the future maintenance government departments. Regarding the management of slope works for Slopes A and B, the salient points are as follows:

(a) in January and July 2008 (i.e. more than one year after the substantial completion of Contract A), Consultant X made submissions

(i.e. as-constructed geotechnical reports) to GEO for final checking of the completed Slopes A and B respectively (Note 37);

(b) during the final checking of the completed slopes, GEO raised concerns over the likelihood of minor rock fall from various bare rock portions of Slopes A and B;

(c) following a further review of the conditions of Slopes A and B, Consultant X considered that it was necessary to install hanging wire mesh at the concerned bare rock portions of Slopes A and B in order to alleviate the minor rock fall concern;

(d) as there were no contractual provisions for slope enhancement works under Contract B, Consultant X issued two VOs (later valued at a total cost of $1.3 million) in June and October 2008 respectively to instruct Contractor B to carry out the related works; and

(e) after the completion of the slope enhancement works, Consultant X made applications to GEO for the GEO Checking Certificates for Slopes and Retaining Walls (see Note 37) in respect of Slopes A and B in November and October 2008 respectively. GEO issued the GEO Checking Certificates for Slopes A and B in December and November 2008 respectively.

Note 37: *According to Environment, Transport and Works Bureau Technical Circular (Works) No. 20/2004 of July 2004 on "GEO Checking Certificate for Slopes and Retaining Walls": (a) for projects with the construction contract commencing after 30 September 2001, the project department/office responsible for design and construction of public geotechnical works shall obtain a GEO Checking Certificate for Slopes and Retaining Walls for all geotechnical features constructed or upgraded under the projects, before handing over the completed works to the party responsible for the future operation or maintenance; (b) the project department/office shall apply for a Checking Certificate at any point during the life of the project after the concerned geotechnical features have been constructed and GEO checking has been completed; and (c) the Engineer/Architect of the contract shall work in coordination with the project departments/offices to obtain a Checking Certificate as early as practicable and shall not withhold the issue of the Certificate of Completion for the works on the ground that the Checking Certificate is not available.*

4.9 Audit noted that Consultant X made submissions to GEO for final checking of the completed Slopes A and B more than one year after the substantial completion of Contract A (see para. 4.8(a)). In the event, slope enhancement works for Slopes A and B were found required and implemented (see para. 4.8 (c) and (d)). In Audit's view, in implementing a works project involving slope works in future, CEDD needs to remind its staff and consultants to fully assess the conditions of slope works as early as practicable and take prompt follow-up actions as needed.

Audit recommendations

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

(a) **in implementing a works contract involving footbridge works in future, take measures to ensure that CEDD staff and consultants conduct pre-tender site investigations (particularly for works at critical locations) in accordance with the related guidelines; and**

(b) **in implementing a works project involving slope works in future, remind CEDD staff and consultants to fully assess the conditions of slope works as early as practicable and take prompt follow-up actions as needed.**

Response from the Government

4.11 The Director of Civil Engineering and Development agrees with the audit recommendations.

Contract C

4.12 Contract C was a remeasurement contract. Its contract works mainly included:

(a) construction of two footbridges (Footbridges B and C). Footbridge B (see Photograph 2) connected the development site to the lower level open space

adjacent to Choi Ha Road, and Footbridge C (see Photograph 3) connected between the upper and lower newly formed building platforms;

(b) construction of a road section within the development site;

(c) road junction improvement works at Shun On Road/Sau Mau Ping Road, Hong Ning Road/Kung Lok Road, Tsui Ping Road/Hip Wo Street/Wan Hon Street and Choi Shek Lane/Kwun Tong Road;

(d) taking over and maintenance of building platforms, slopes, retaining walls, roads and associated soft landscape works, and drainage system completed under Contracts A and B in various specified portions of the development site; and

(e) hard and soft landscaping works.

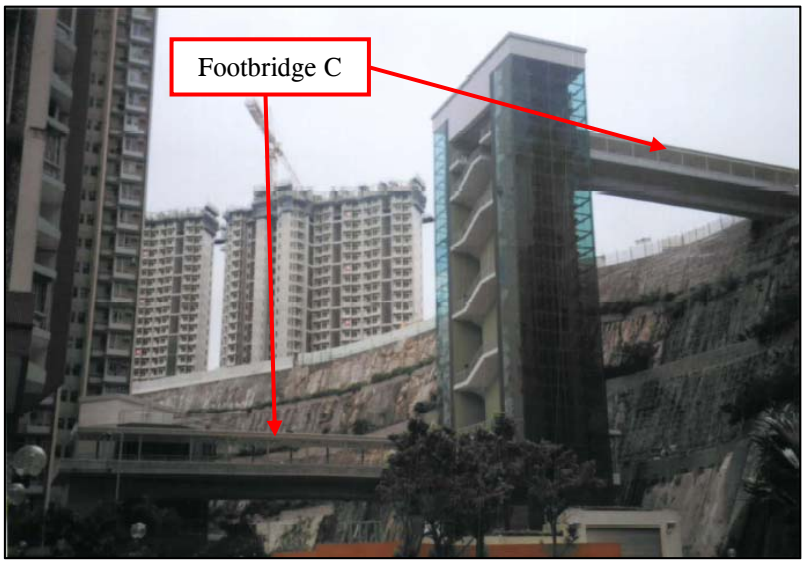
Photograph 2

Footbridge B
(July 2009)

Source: CEDD records

Photograph 3

Footbridge C
(July 2009)



Source: CEDD records

4.13 CEDD awarded Contract C to Contractor C in January 2007 at a contract sum of $88 million. The works commenced in January 2007 with a contract period of about 36 months. Consultant X was the Engineer responsible for supervising the contract works. In the event, the contract works were completed in October 2010, about 9.4 months (287 days) later than the original contract completion date of January 2010 with EOTs for the whole period granted to Contractor C (Note 38). The account of Contract C was finalised in November 2012 and the total contract expenditure was $101.8 million (see Table 8).

Note 38: *Of the 287 days of EOT granted, 99 days were due to inclement weather.*

Table 8

Total contract expenditure of Contract C
(November 2012)

Particulars	Amount ($ million)
1. Contract works completed	88.9
2. Payment for contract price fluctuation (Note)	12.9
Total contract expenditure	101.8

Source: *CEDD records*

Note: *Of the $12.9 million payment for contract price fluctuation, $4.1 million was provision for price fluctuation adjustments included in the original contract sum.*

Administration of Contract C

4.14 Audit noted that there was room for improvement in CEDD's administration of Contract C (see paras. 4.15 to 4.21).

Scope for improvement in ordering works variations

4.15 According to CEDD requirements:

(a) when the need to order a variation arises, consultants (when acting as the Engineer of a works contract) must assess its value in order to determine whether or not prior approval from CEDD is required (Note 39); and

(b) the value of the variation shall include the estimated cost of the varied works and any likely prolongation/disruption costs.

4.16 For three VOs (VOs C to E — see Table 9) under Contract C issued between January 2009 and April 2010, Audit noted that:

(a) the actual costs of the three VOs increased by 280% to 327% (see Table 9) as compared with the estimated costs; and

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Note 39: *According to Consultancy Y and the then prevailing CEDD requirements, regarding the VOs issued under Contract C, the approving authority for a proposed VO was determined based on the estimated cost for the proposed VO as follows:*

Estimated cost for proposed VO	***Approving authority***
$0.3 million or below	*Consultant X*
$1 million or below	*Officer at D1 rank*
$3 million or below	*Officer at D2 rank or above*
Exceeding $3 million	*Controlling Officer*

(b) the actual costs of the three VOs exceeded the approving authority of the officer approving their issuance (see Table 9). At the time of implementing Contract C, CEDD had no specific guidelines on this. According to CEDD, in May 2019 (after the award of Contract C), it promulgated guidelines for dealing with a variation with value exceeding its estimate made at the time of approval (Note 40). Audit noted that, as of February 2021, the Project Administration Handbook had not yet incorporated such guidelines.

Note 40: *According to CEDD guidelines, if the value of a variation exceeds its estimate made at the time of approval due to any reason other than contract price fluctuation, the following actions are required: (a) if the increase is due to a change in scope or a change in the nature of the original variation, the whole variation as changed shall be treated as a new variation and all necessary approvals as required should be obtained; and (b) if the increase is due to any other reasons (e.g. under-estimation, remeasurement and change in rates), the public officer of appropriate rank should be notified (via the original approving officer) with explanations of such increase. If the increased value of the variation is still within the approval limit of the original approving officer, only notification to the original approving officer is required.*

Table 9

Three VOs issued under Contract C with significant cost increase (November 2012)

VO	Date of issue	Works	Estimated cost (a) ($)	Actual cost (Note 1) (b) ($)	Cost increase (c) = (b) – (a) ($)
C	11.2.2010	Extension of works site	280,000	1,196,368	916,368 (327%) (Note 2)
D	16.4.2010	Slope works	280,000 ┐	1,492,890	1,099,890 (280%) (Note 3)
E	13.1.2009	Slope works	113,000 ┘ 393,000		

Source: *CEDD records*

Note 1: *VOs D and E were combined for valuation by Consultant X. The actual costs of VOs C to E (about $1.2 million for VO C and about $1.5 million for VOs D and E) exceeded the approving authority of the officer approving their issuance (i.e. Consultant X whose financial authority was up to $0.3 million).*

Note 2: *In August 2008, Consultant X issued VO C to Contractor C to extend the works site under a section of works of Contract C. Since the issuance of VO C in August 2008, Consultant X had revised VO C four times (between April 2009 and February 2010) to instruct Contractor C to take up the maintenance (and related works) of additional and enlarged portions of the development site. In the event, Contractor C had taken up eight additional portions of the development site for maintenance, leading to the cost increase for VO C.*

Note 3: *According to CEDD, the cost increase for VOs D and E was mainly due to the changes in quantities and rates of the no-fines concrete (i.e. concrete of high water permeability).*

4.17 In Audit's view, in administration of a works contract in future, CEDD needs to:

(a) take measures to enhance the accuracy of cost estimate for works variations as far as practicable; and

(b) remind its staff and consultants to follow its guidelines for dealing with a variation with value exceeding its estimate made at the time of approval (see para. 4.16(b)).

In this connection, Audit considers that there is merit for CEDD to consider incorporating into the Project Administration Handbook its guidelines for dealing with a variation with value exceeding its estimate made at the time of approval (see para. 4.16(b)).

Discrepancies between BQ items and contract drawings

4.18 Contract drawings of Contract C required the use of steel of Grade 55C and Grade S355 for the steelwork of Footbridges B and C. However, according to Consultant X, only BQ items of steel of Grade 43 which did not fulfil the requirement were included in Contract C. Consultant X considered that the steelwork of Footbridges B and C were omitted in BQ. In the event, CEDD paid $1.2 million to Contractor C for carrying out the works of the omitted items (Note 41).

4.19 According to the Project Administration Handbook, the documents forming a contract must be scrutinised for comprehensive coverage, accuracy and consistency with one another before tenders are invited. Audit noted that there were discrepancies between BQ items and contract drawings of Contract C relating to the steelwork of Footbridges B and C, leading to omission of related works items in BQ.

Note 41: *An omitted item refers to the omission of an appropriate item in BQ for the works which are shown/provided in the contract drawings or specifications. According to the General Conditions of Contract for Civil Engineering Works, for an omitted item: (a) the contractor is required to carry out the works of the omitted item; and (b) the Engineer shall correct any such omission, and ascertain and certify the value of the works actually carried out.*

4.20 In 2014 (after the award of Contract C), CEDD amended the Project Administration Handbook to provide further guidelines on checking the completeness and accuracy of BQ and related documents, including:

(a) introduction of a pre-tender cross-checking procedure in the preparation of BQ;

(b) conduct of spot-checking on the quantities of some selected cost significant items by project office if resources permit; and

(c) convening a meeting chaired by a project officer at a rank not lower than D1 to vet BQ and Particular Preamble (Note 42) prepared and to ensure that all the checking and cross-checking procedures have been duly completed and documented.

In Audit's view, in preparing documents for a works contract in future, CEDD needs to remind its staff and consultants to follow the related guidelines on checking the completeness and accuracy of BQ and related documents.

Audit recommendations

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

(a) **in administration of a works contract in future:**

(i) **take measures to enhance the accuracy of cost estimate for works variations as far as practicable; and**

Note 42: *The Standard Method of Measurement for Civil Engineering Works lays down the method and criteria for the measurement of civil engineering works undertaken for the Government. Any methods of measurement which are not in accordance with or included in the Standard Method of Measurement for Civil Engineering Works shall be stated in a Particular Preamble to BQ.*

(ii) **remind CEDD staff and consultants to follow CEDD guidelines for dealing with a variation with value exceeding its estimate made at the time of approval;**

(b) **consider incorporating into the Project Administration Handbook CEDD guidelines for dealing with a variation with value exceeding its estimate made at the time of approval; and**

(c) **in preparing documents for a works contract in future, remind CEDD staff and consultants to follow the related guidelines on checking the completeness and accuracy of BQ and related documents.**

Response from the Government

4.22 The Director of Civil Engineering and Development agrees with the audit recommendations.

Acronyms and abbreviations

APE	Approved project estimate
Audit	Audit Commission
BQ	Bills of Quantities
CEDD	Civil Engineering and Development Department
DEVB	Development Bureau
EOTs	Extensions of time
FC	Finance Committee
FSTB	Financial Services and the Treasury Bureau
GEO	Geotechnical Engineering Office
ha	Hectares
LAD	Legal Advisory Division (Works)
LegCo	Legislative Council
m	Metres
m^3	Cubic metres
THB	Transport and Housing Bureau
VO	Variation order