For discussion **PWSC(2018-19)24**
on 26 and 28 May 2018

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE
Civil Engineering – Drainage and erosion protection
172CD – Rehabilitation of underground stormwater drains
108CD – West Kowloon drainage improvement – inter-reservoirs transfer scheme

Members are invited to recommend to the Finance Committee –

(a) the upgrading of part of **172CD**, entitled "Rehabilitation of underground stormwater drains stage 1" to Category A at an estimated cost of $122.8 million in money-of-the-day (MOD) prices;

(b) the upgrading of **108CD** to Category A at an estimated cost of $1,222 million in MOD prices; and

(c) the retention of the remainder of **172CD** in Category B.

/PROBLEM …..

PROBLEM

There are urgent needs to rehabilitate some of the ageing underground stormwater drains in different regions of the territory and to implement the inter-reservoirs transfer scheme (IRTS) from the Kowloon Byewash Reservoir to the Lower Shing Mun Reservoir to improve flood protection for the areas of Sham Shui Po, Cheung Sha Wan and Lai Chi Kok up to the required standard.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for Development, proposes to upgrade the following projects to Category A –

(a) part of **172CD** at an estimated cost of $122.8 million in MOD prices for the condition survey and rehabilitation of ageing underground stormwater drains in different regions of the territory; and

(b) **108CD** at an estimated cost of $1,222 million in MOD prices for the construction of the IRTS.

PROJECT SCOPE AND NATURE

3. Details of the above proposals are provided at Enclosures 1 and 2 respectively.

Development Bureau
May 2018

172CD – Rehabilitation of underground stormwater drains

PROJECT SCOPE AND NATURE

The part of **172CD** which we propose to upgrade to Category A, (Stage 1 Works), comprises –

(a) the condition survey of about 35 kilometres (km) of underground stormwater drains and associated manholes distributed throughout the territory;

(b) the rehabilitation of about 11 km of underground stormwater drains distributed throughout the territory; and

(c) ancillary works[1].

2. Location plans showing the proposed Stage 1 Works are at Annex 1 to Enclosure 1.

3. Subject to the funding approval of the Finance Committee, we plan to commence the proposed Stage 1 Works in the fourth quarter of 2018 for completion in the fourth quarter of 2022.

4. We will retain the remainder of **172CD** in Category B, which comprises the condition survey of about 133 km and rehabilitation of about 30 km of underground stormwater drains throughout the territory. We will seek funding for the remainder of **172CD** at a later stage after completion of the detailed design of the remaining works.

/JUSTIFICATION …..

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[1] Ancillary works include manhole rehabilitation, temporary closure and reinstatement of carriageways/footpaths/open space necessary for completion of the proposed Stage 1 Works.

JUSTIFICATION

5. There are about 2 400 km underground stormwater drains in Hong Kong. Routine inspection and maintenance are conducted on these drains, and repairs will be made when defects are detected. As many of these drains have been in service for many years and are suffering from ageing and deterioration at an increasing rate, it is necessary to carry out detailed surveys using more sophisticated techniques to ensure that defects can be timely detected and thoroughly rectified. In the past few years, there have been incidents of ageing pipe collapse, resulting in road subsidence and hence disruptions to traffic and nuisance to public. Such incidents are expected to become more frequent as the drains age further.

6. The "Enhanced Management of Underground Sewer and Drain Networks - Feasibility Study" (the Study) has evaluated the risks of failure of the existing underground stormwater drains in 2015. The Study categorised one group of underground stormwater drains as confirmed to have high risks of structural failure, requiring priority rehabilitation, while another group of underground stormwater drains is predicted to have high risks of structural failure but their conditions and need for rehabilitation would have to be verified by further on-site surveys. In this regard, a territory-wide replacement and rehabilitation (R&R) programme has been formulated. The details of the R&R programme are outlined in Annex 2 to Enclosure 1.

7. **172CD** forms part of the R&R programme and covers the condition surveys of about 168 km and rehabilitation of about 41 km of underground stormwater drains. The proposed part of **172CD** to be upgraded includes the condition surveys for 35 km among the 168 km and the rehabilitation of about 11 km among the 41 km of underground stormwater drains that have been confirmed by past inspection records as having high risks of structural failure. The rehabilitation works involve the installation of internal lining through the drains. Trenchless technologies will be employed as far as possible to reduce road excavation works and minimise traffic impact.

8. Other than the above proposed works, we will continue to schedule regular inspection plans to monitor the conditions of underground stormwater drains throughout the territory and review the R&R need according to the prevailing conditions of stormwater drains.

/FINANCIAL …..

FINANCIAL IMPLICATIONS

9. We estimate the cost of the proposed Stage 1 Works to be $122.8 million in MOD prices (please see paragraph 11 below), broken down as follows –

			$ million (in MOD prices)
(a)	Condition survey of stormwater drains		40.0
(b)	Rehabilitation of stormwater drains		51.8
(c)	Ancillary works		3.1
(d)	Environmental mitigation measures		0.6
(e)	Consultants' fees for		0.8
	(i) contract administration	0.5	
	(ii) management of resident site staff (RSS)	0.3	
(f)	Remuneration of RSS		15.8
(g)	Contingencies		10.7
	Total		122.8

10. We propose to engage consultants to undertake contract administration and site supervision of the project. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Annex 3 to Enclosure 1.

11. Subject to funding approval, we will phase the expenditure as follows –

/**Year** …..

Year	$ million (MOD)
2018 – 2019	2.1
2019 – 2020	8.9
2020 – 2021	9.9
2021 – 2022	24.6
2022 – 2023	44.6
2023 – 2024	11.0
2024 - 2025	10.9
2025 – 2026	10.8
	122.8

12. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2018 to 2026. We will deliver the proposed Stage 1 Works under a New Engineering Contract (NEC)[2] form of contract with provision for price adjustment.

13. We estimate the additional annual recurrent expenditure arising from the Stage 1 Works to be $920,000.

PUBLIC CONSULTATION

14. We consulted 18 Committees of the District Councils during the period from November 2017 to March 2018 as listed in Annex 4 to Enclosure 1. The Committees supported the proposed Stage 1 Works.

/15. …..

[2] NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

15. We consulted the Legislative Council Panel on Development on 27 March 2018 and Members supported the proposed Stage 1 Works. Supplementary information on whether the Drainage Services Department (DSD) had made use of the technologies adopted for the Water Intelligent Network to monitor the conditions of underground stormwater drains was provided to the Panel on 9 May 2018.

ENVIRONMENTAL IMPLICATIONS

16. The proposed Stage 1 Works is not a designated project under the Environmental Impact Assessment Ordinance (EIAO) (Cap.499). DSD completed a Preliminary Environmental Review (PER) for the proposed Stage 1 Works in April 2018. The PER concluded and the Director of Environmental Protection agreed that the proposed Stage 1 Works would not have any long-term adverse environmental impacts. We have included in paragraph 9(d) a sum of $600,000 (in MOD prices) in the project estimate for implementation of the necessary environmental mitigation measures.

17. For short-term environmental impacts during construction, we will control environmental nuisance to within established standards and guidelines through the implementation of appropriate pollution control measures in the contract including the use of temporary noise barriers and silenced construction equipment to reduce noise impact. We will carry out regular site inspections to ensure these pollution control measures and good site practices will be properly implemented on site.

18. At the planning and design stages, we have considered measures to reduce generation of construction waste wherever possible including the use of trenchless construction method to avoid excavation works as far as practicable. In addition, we will request the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to the public fill reception facilities (PFRF)[3]. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

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[3] PFRF are specified in Schedule 4 of Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in PFRF requires a licence issued by the Director of Civil Engineering and Development.

19. At the construction stage, we will require the contractor to submit for approval a plan setting out waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

20. We estimate that the proposed Stage 1 Works will generate 2 100 tonnes of construction waste. Of these, we will reuse 400 tonnes (19%) of inert construction waste on site, deliver 200 tonnes (10%) of inert construction waste to PFRF for subsequent reuse and 1 500 tonnes (71%) of non-inert construction waste at landfills for disposal. The total cost for disposal of construction waste at PFRF and landfill sites is estimated to be $320,000 (based on a unit charge rate of $71 per tonne for disposal at PFRF and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

21. The proposed Stage 1 Works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

22. The proposed Stage 1 Works will only involve government land. No land resumption is required.

TRAFFIC IMPLICATIONS

23. We have conducted a traffic impact assessment concluding that the proposed Stage 1 Works will not cause significant traffic impact to the surrounding road network. In addition, we will implement temporary traffic arrangement (TTA) to maintain the traffic flow during construction. The TTA will be removed when there is no construction activity.

/BACKGROUND …..

BACKGROUND INFORMATION

24. We upgraded **172CD** to Category B in September 2015.

25. In May 2017, we engaged consultants to carry out site investigation, surveys, impact assessments and detailed design for **172CD**. The total estimated cost was $15.5 million in MOD prices. We have charged this amount to block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme". We have substantially completed the detailed design of the proposed Stage 1 Works mentioned in paragraph 1 above.

26. The proposed works will not involve any tree removal or planting proposals.

27. We estimate that the proposed Stage 1 Works will create about 25 jobs (20 for labourers and 5 for professional or technical staff), providing a total employment of 1 000 man-months.

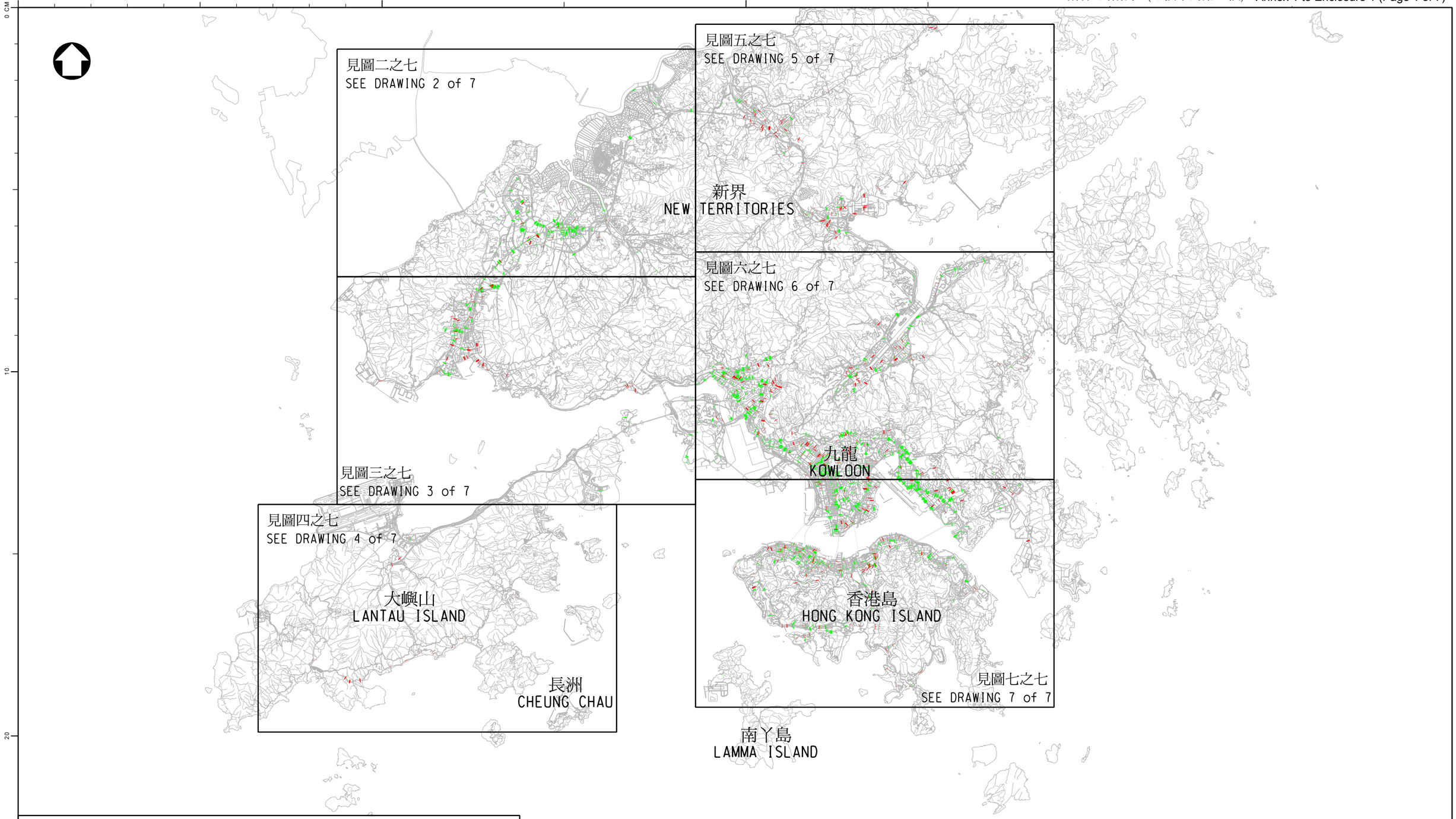

圖 例 LEGEND :

- 擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY
- 擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖一之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS – STAGE 1 (DRAWING 1 OF 7)

版 no.	日期 date	修改項目 description	簡簽 initial

繪畫 drawn	SIGNED H.Y. LEE	日期 date 14 MAR 2018	圖則編號 drawing no. DPM/4172CD/1004
核對 checked	SIGNED K.Y. CHEN	日期 date 14 MAR 2018	比例 scale 1:200000
批核 approved	SIGNED K.W. FUNG	日期 date 14 MAR 2018	
部門 office	工程管理部 PROJECT MANAGEMENT DIVISION		

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

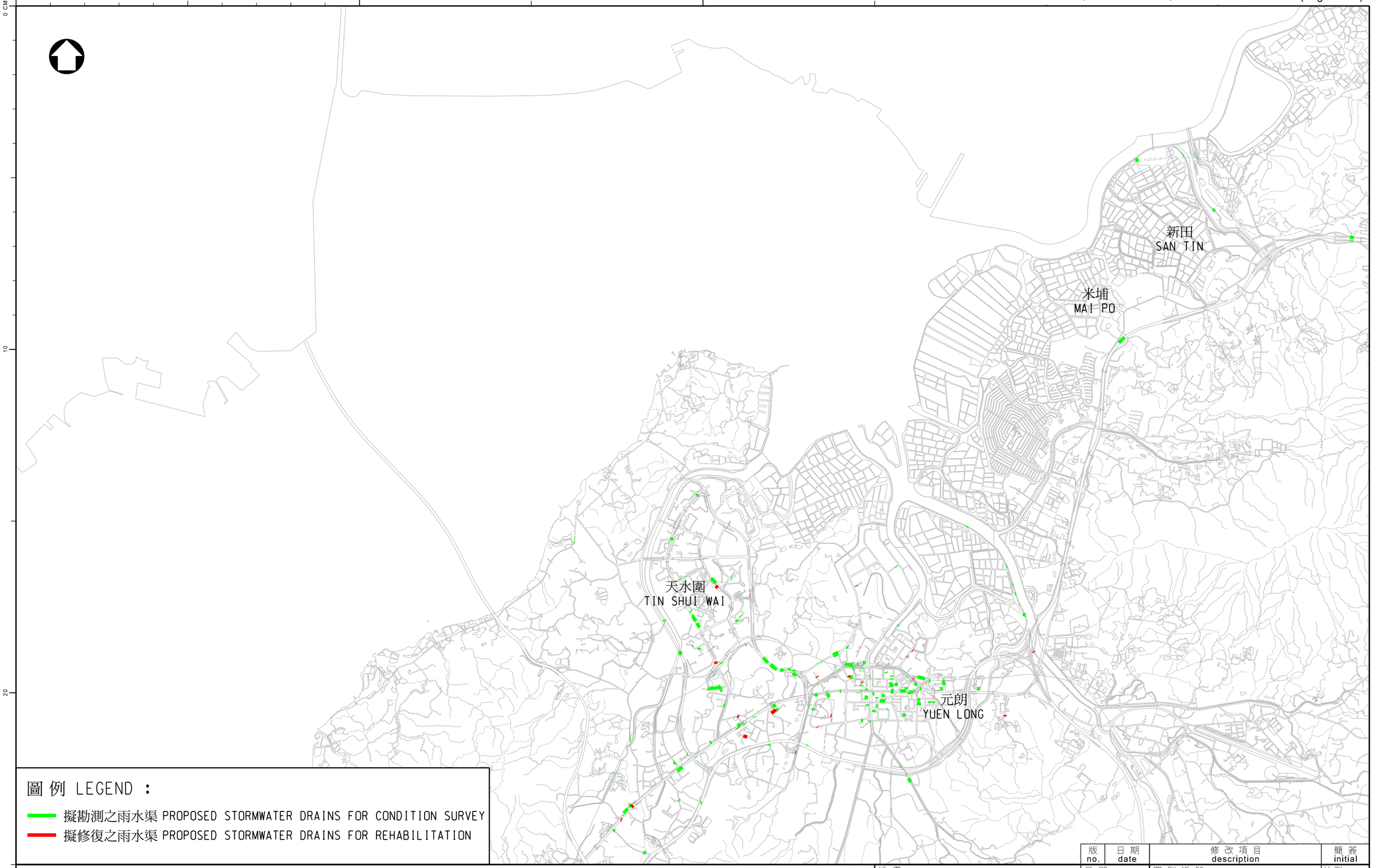

圖 例 LEGEND :

擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY

擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

版 no.	日 期 date	修 改 項 目 description	簡 簽 initial

圖 則 名 稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖二之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS - STAGE 1 (DRAWING 2 OF 7)

繪 畫 drawn	*SIGNED* K.S. LEUNG	日 期 date 12 MAR 2018
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批 核 approved	*SIGNED* K.W. FUNG	日 期 date 12 MAR 2018
部 門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION	

圖 則 編 號 drawing no. DPM/4172CD/1005

比例 scale 1:50000

香 港 特 別 行 政 區 政 府 渠 務 署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

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屯門
TUEN MUN

掃管笏
SO KWUN WAT

深井
SHAM TSENG

馬灣
MA WAN

青衣
TSING YI

竹篙灣
PENNY'S BAY

圖 例 LEGEND :

擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY

擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

版 no.	日 期 date	修 改 項 目 description	簡 簽 initial

圖 則 名 稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖三之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS - STAGE 1 (DRAWING 3 OF 7)

繪 畫 drawn	*SIGNED* K.S. LEUNG	日 期 date 12 MAR 2018
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批 核 approved	*SIGNED* K.W. FUNG	日 期 date 12 MAR 2018
部 門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION	

圖 則 編 號 drawing no. DPM/4172CD/1006

比例 scale 1:50000

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DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

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東涌
TUNG CHUNG

大嶼山
LANTAU ISLAND

梅窩
MUI WO

長沙
CHEUNG SHA

水口
SHUI HAU

長洲
CHEUNG CHAU

圖 例 LEGEND :

擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY

擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖四之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS - STAGE 1 (DRAWING 4 OF 7)

版 no.	日期 date	修改項目 description	簡簽 initial

繪畫 drawn	SIGNED K.S. LEUNG	日期 date 12 MAR 2018	圖則編號 drawing no. DPM/4172CD/1007
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批核 approved	SIGNED K.W. FUNG	日期 date 12 MAR 2018	
部門 office	工程管理部 PROJECT MANAGEMENT DIVISION		

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

0 CM 10 20

0 CM 10 20

沙頭角
SHA TAU KOK

上水
SHEUNG SHUI

粉嶺
FANLING

大埔
TAI PO

圖 例 LEGEND :

擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY

擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖五之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS – STAGE 1 (DRAWING 5 OF 7)

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部門 office	工程管理部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4172CD/1008

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
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SPECIAL ADMINISTRATIVE REGION

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圖 例 LEGEND :

擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY

擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

馬鞍山
MA ON SHAN

沙田
SHA TIN

西貢
SAI KUNG

葵涌
KWAI CHUNG

荃灣
TSUEN WAN

青衣
TSING YI

長沙灣
CHEUNG SHA WAN

九龍塘
KOWLOON TONG

九龍灣
KOWLOON BAY

版 no.	日期 date	修改項目 description	簡簽 initial

圖則名稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖六之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS - STAGE 1 (DRAWING 6 OF 7)

繪畫 drawn	*SIGNED* K.S. LEUNG	日期 date 12 MAR 2018
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批核 approved	*SIGNED* K.W. FUNG	日期 date 12 MAR 2018
部門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4172CD/1009

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

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油麻地
YAU MA TEI

土瓜灣
TO KWA WAN

觀塘
KWUN TONG

將軍澳
TSEUNG KWAN O

尖沙咀
TSIM SHA TSUI

北角
NORTH POINT

西灣
SAI WAN

中灣
CENTRAL

灣仔
WAN CHAI

西灣河
SAI WAN HO

薄扶林
POK FU LAM

柴灣
CHAI WAN

香港島
HONG KONG ISLAND

香港仔
ABERDEEN

鴨脷洲
AP LEI CHAU

淺水灣
REPULSE BAY

赤柱
STANLEY

圖 例 LEGEND :

擬勘測之雨水渠 PROPOSED STORMWATER DRAINS FOR CONDITION SURVEY

擬修復之雨水渠 PROPOSED STORMWATER DRAINS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第172CD號 –
地下雨水渠修復工程 - 第1階段 (圖七之七)
PWP ITEM NO.172CD –
REHABILITATION OF UNDERGROUND STORMWATER DRAINS - STAGE 1 (DRAWING 7 OF 7)

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部門 office	工程管理部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4172CD/1010

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

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172CD – Rehabilitation of underground stormwater drains

Territory-wide Replacement and Rehabilitation (R&R) Programme for Stormwater Drains

Works Package	**Scope of Replacement and Rehabilitation Works**
Public Works Project Item No.: **172CD** (viz. Enclosure 1 to PWSC(2018-19)24)	● Condition surveys of 168 kilometres (km) of stormwater drains in different regions of the territory (out of which 133 km of stormwater drains will be carried out later after completion of design and preparatory work and after obtaining Finance Committee's approval.) ● Rehabilitation of 41 km of stormwater drains in different regions of the territory (out of which 30 km of stormwater drains will be rehabilitated later after completion of design and preparatory work and after obtaining Finance Committee's approval.)
R&R works to be carried out by the maintenance teams of Drainage Services Department	● Rehabilitation of 30 km of stormwater drains in different regions of the territory ● Condition surveys of 78 km of stormwater drains in different regions of the territory
Other R&R Works under planning	● Rehabilitation of stormwater drains subsequently confirmed by condition surveys to have high risk of structural failure in different regions of the territory

172CD – Rehabilitation of underground stormwater drains

Breakdown of estimates for consultants' fees and resident site staff costs (in September 2017 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	0.3
		Technical	-	-	-	0.1
					Sub-total	0.4#
(b)	Resident site staff (RSS) costs (Note 3)	Professional	36	38	1.6	4.5
		Technical	185	14	1.6	8.1
					Sub-total	12.6
	Comprising –					
	(i) Consultants' fees for management of RSS				0.2#	
	(ii) Remuneration of RSS				12.4#	
					Total	**13.0**

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS salary point 38 = $78,775 per month and MPS salary point 14 = $27,485 per month).

2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the design and construction of the project. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **172CD** to Category A.

3. The actual man-months and actual costs will only be known after the completion of the construction works.

Remarks

The figures in this Annex are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 9 of Enclosure 1.

172CD – Rehabilitation of underground stormwater drains

Consultation with District Councils

Date	District Council	Committee
27 November 2017	Southern	District Development and Housing Committee
30 November 2017	Sham Shui Po	Environment and Hygiene Committee
5 December 2017	Eastern	Planning, Works and Housing Committee
12 December 2017	Wan Chai	Development, Planning & Transport Committee
19 December 2017	Wong Tai Sin	Food and Environmental Hygiene Committee
4 January 2018	Tsuen Wan	Environmental and Health Affairs Committee
10 January 2018	Tai Po	Environment, Housing and Works Committee
11 January 2018	Sai Kung	Housing and Environmental Hygiene Committee
11 January 2018	Sha Tin	Health and Environment Committee
15 January 2018	North	District Minor Works and Environmental Improvement Committee
18 January 2018	Yau Tsim Mong	Food, Environmental Hygiene and Public Works Committee
18 January 2018	Kowloon City	Housing and Infrastructure Committee
19 January 2018	Tuen Mun	Environment, Hygiene and District Development Committee
22 January 2018	Yuen Long	Environmental Improvement Committee
29 January 2018	Islands	Tourism, Agriculture, Fisheries and Environmental Hygiene Committee
30 January 2018	Kwun Tong	Environment and Hygiene Committee
20 February 2018	Kwai Tsing	Planning and District Facilities Management Committee
15 March 2018	Central and Western	Food, Environment, Hygiene and Works Committee

108CD – West Kowloon drainage improvement – inter-reservoirs transfer scheme

PROJECT SCOPE AND NATURE

The proposed scope of works under **108CD** comprises the construction of –

(a) a water tunnel of about 2.8 kilometres with 3 metres diameter from the Kowloon Byewash Reservoir to the Lower Shing Mun Reservoir;

(b) an intake structure at the Kowloon Byewash Reservoir;

(c) an outfall structure at the Lower Shing Mun Reservoir; and

(d) ancillary works[1].

2. A plan showing the proposed works is at Annex 1 to Enclosure 2.

3. Subject to funding approval of the Finance Committee, we plan to commence the proposed works in the first quarter of 2019 for completion in the fourth quarter of 2022.

JUSTIFICATION

4. Most of the existing drainage systems in the developed districts of Sham Shui Po, Cheung Sha Wan and Lai Chi Kok were built more than 40 years ago. Owing to rapid developments and changes in land use over the years, the capacities of the existing drainage systems have not achieved the required flood protection standard.

/5. …..

[1] Ancillary works include slope upgrading works, landscaping works and associated roadworks etc.

5. In this regard, the latest scope of the Lai Chi Kok Transfer Scheme (LCKTS) were formulated in July 2005[2]. The LCKTS comprises the construction of the Lai Chi Kok drainage tunnel (LCKDT) and the proposed inter-reservoirs transfer scheme (IRTS). The LCKDT intercepts the surface runoff from the uphill catchment areas for direct discharge to the Victoria Harbour. The proposed IRTS will transfer collected surface runoff from the Kowloon group of reservoirs[3] to the Lower Shing Mun Reservoir, thereby creating a designated storage capacity in the Kowloon Byewash Reservoir to receive further surface runoff from the catchment. After completion of the LCKDT and the IRTS, the standard of flood protection in Sham Shui Po, Cheung Sha Wan and Lai Chi Kok will be improved to withstand rainstorms with return period of 1 in 50 years.

6. We implemented the LCKTS phase by phase, and the LCKDT was completed in 2012. The implementation of IRTS is essential, as an integrated part of the LCKTS, to improve flood protection for the areas of Sham Shui Po, Cheung Sha Wan and Lai Chi Kok up to the required standard. The proposed IRTS will also strengthen our resilience in flood mitigation for combating climate change. In addition, transferring of collected surface runoff from the Kowloon group of reservoirs to the Lower Shing Mun Reservoir through the proposed IRTS will generate an estimated average annual additional fresh water yield of about 3.4 million cubic metres[4].

FINANCIAL IMPLICATIONS

7. We estimate the capital cost of the proposed works to be $1,222 million in money-of-the-day (MOD) prices (please see paragraph 9 below), broken down as follows –

		$ million (in MOD prices)
(a)	Tunnelling works	752.6

/(b) …..

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[2] Please refer to paragraphs 24 and 25 below for relevant background information.

[3] The Kowloon group of reservoirs comprises the Kowloon Reservoir, the Shek Lei Pui Reservoir, the Kowloon Reception Reservoir and the Kowloon Byewash Reservoir, of which the Kowloon Byewash Reservoir is topographically the lowest.

[4] The estimated yield will vary subject to rainfall, which is unevenly distributed across the districts in the territory. The amount of rainfall in Hong Kong is also seasonal dependent, with rain mostly comes in heavy downpours within a short period of time during wet seasons. Coupled with its fluctuation between years, there would be a substantial difference in the quantities of collectible yield.

			$ million (in MOD prices)
(b)	Intake structure		80.4
(c)	Outfall structure		123.0
(d)	Ancillary works		24.6
(e)	Environmental mitigation measures		13.3
(f)	Consultant's fees for		10.4
	(i) contract administration	3.1	
	(ii) management of resident site staff (RSS)	7.3	
(g)	Remuneration of RSS		107.8
(h)	Contingencies		109.9
	Total		1,222.0

8. We propose to engage consultants to undertake contract administration and site supervision of the project. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Annex 2 to Enclosure 2.

9. Subject to funding approval, we plan to phase the expenditure as follows -

Year	**$ million (MOD)**
2018 – 2019	28.0
2019 – 2020	88.7
2020 – 2021	245.7
2021 – 2022	307.5
2022 – 2023	245.4
2023 – 2024	122.0

/**Year** …..

Year	$ million (MOD)
2024 – 2025	120.6
2025 – 2026	64.1
	1,222.0

10. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2018 to 2026. We will deliver the proposed works under a New Engineering Contract (NEC)[5] form of contract with provision for price adjustment.

11. We estimate the annual recurrent expenditure arising from the proposed project to be $500,000.

PUBLIC CONSULTATION

12. We consulted the Development and Housing Committee of the Sha Tin District Council on 4 January 2018. The Committee supported the proposed works.

13. We consulted the Legislative Council Panel on Development on 24 April 2018. Members generally supported the submission of this funding proposal to the Public Works Subcommittee for consideration.

ENVIRONMENTAL IMPLICATIONS

14. The proposed works are designated project under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and an environmental permit (EP) is required for the construction and operation of the proposed works. In April 2009, the Environmental Impact Assessment (EIA) report for the proposed works was approved under the EIAO and an EP for the project was issued in May 2009. The EIA report concluded that the environmental impact of the project can be controlled to within the criteria under the EIAO and the Technical Memorandum on EIA Process.

/15. …..

[5] NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

15. We will implement the measures recommended in the approved EIA report as well as the measures stipulated in the EP. We will carry out the environmental monitoring and audit programme to ascertain the effectiveness of the mitigation measures. We have included in paragraph 7(e) a sum of $13.3 million (in MOD prices) in the project estimate for implementation of the necessary environmental mitigation measures.

16. For short-term environmental impacts during construction, we will control noise, dust and site run-off nuisances to within the established standards and guidelines through the implementation of the recommended mitigation measures in the relevant contract. These include the use of silenced construction equipment and temporary noise barriers to reduce noise impact. We will implement appropriate measures to safeguard the water quality of the reservoirs and water gathering grounds. In addition, water-spraying to the construction site will be applied regularly to minimise emission of fugitive dust, and on-site treatment of site run-off will be carried out to minimise potential water quality impact. We will also carry out regular site inspections to ensure that these recommended mitigation measures and good practices will be properly implemented on site.

17. At the planning and design stages, we have considered ways to reduce the generation of construction waste where possible. In addition, we will request the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible in order to minimise the disposal of inert construction waste to the public fill reception facilities (PFRF)[6]. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formworks to further reduce the generation of construction waste.

18. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation measures to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will request the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

/19. …..

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[6] PFRF are specified in Schedule 4 of Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in PFRF requires a licence issued by the Director of Civil Engineering and Development.

19. We estimate that the proposed works will generate in total 111 500 tonnes of construction waste. Of these, we will reuse about 17 900 tonnes (16.1%) of inert construction waste on site and deliver 93 100 tonnes (83.5%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 500 tonnes (0.4%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfills is estimated to be $6.7 million for the proposed works (based on an unit charge rate of $71 per tonne for disposal at PFRF and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

20. We conducted a cultural heritage impact assessment for the project in accordance with the EIAO. It was identified that there are historical structures[7] in the vicinity of the proposed works, but no adverse impacts on the historical structures are anticipated. We will conduct condition survey for the historical structures prior to the construction works as a precautionary mitigation measure and submit the condition survey report to the Antiquities and Monuments Office of the Leisure and Cultural Services Department before the commencement of construction works in accordance with the conditions of the EP.

LAND ACQUISITION

21. The implementation of the proposed works will only involve government land. No land acquisition is required.

TRAFFIC IMPLICATIONS

22. We have carried out a traffic impact assessment (TIA) for the proposed works. The TIA indicated that the construction and operation of the proposed works would not cause any significant traffic impact to the surrounding road network.

BACKGROUND INFORMATION

23. In September 2000, we upgraded **108CD** in Category B.

/24. …..

[7] Including the Kowloon Byewash Reservoir Dam and Valve House, Shek Lei Pui Northeast Dam and Valve House, and Shek Lei Pui Southwest Dam, which are all Grade 2 historic structures.

24. In March 2002, we upgraded part of **108CD** to Category A as **123CD** "Lai Chi Kok Transfer Scheme – preliminary design and investigations" at an estimated cost of $33.3 million in MOD prices for engaging consultants to carry out the preliminary design and investigations for the LCKTS.

25. In July 2004, we commissioned an additional study under **123CD** to explore the feasibility of the proposed IRTS with a view to achieving both flood protection and collection of additional yield of local water. The study concluded that the proposed IRTS would serve dual objectives of substantially reducing the discharge into the existing drainage system in the Lai Chi Kok area and at the same time transforming the uncollectible rainwater into fresh water resources. The study also suggested that with the implementation of the proposed IRTS, the size of the main tunnel of the LCKDT could be reduced from 6.4 metres to 4.9 metres, while achieving the same general flood protection level. In July 2005, we issued an information paper CB(1)2006/04-05(01) to the Legislative Council Panel on Planning, Lands and Works to brief Members on the above revised scope of **108CD**.

26. In April 2007, we upgraded part of **108CD** to Category A as **150CD** "Inter-Reservoirs Transfer Scheme – environmental impact assessment, investigation and design" at an estimated cost of $26.0 million in MOD prices for engaging consultants to carry out the environmental impact assessment study, investigation and detailed design for the proposed IRTS. In February 2008, the Secretary for Financial Services and the Treasury approved under delegated authority an increase in the approved project estimate of **150CD** from $26 million by $5.5 million to $31.5 million to cover the additional cost of the site investigation works.

27. In April 2008, we upgraded part of **108CD** to Category A as **155CD** "West Kowloon drainage improvement – Lai Chi Kok drainage tunnel" at an estimated cost of $1,669.1 million in MOD prices for the construction of the LCKDT. The construction works of the LCKDT commenced in 2008 and were completed in 2012.

/28. …..

28. Of the 206 trees within the boundary of the proposed works, there is no registered Old and Valuable Tree. The proposed works will preserve 86 trees and involve the removal of 120 trees including 119 trees to be felled and one tree to be transplanted within the project site. Amongst these trees, two important trees[8] will be affected during the implementation of the project. A summary of important trees affected is provided at Annex 3 to Enclosure 2. We will incorporate planting proposals as part of the proposed works, including estimated quantities of 238 trees.

29. We estimate that the proposed works will create about 75 jobs (60 for labourers and 15 for professional or technical staff), providing a total employment of 3 100 man-months.

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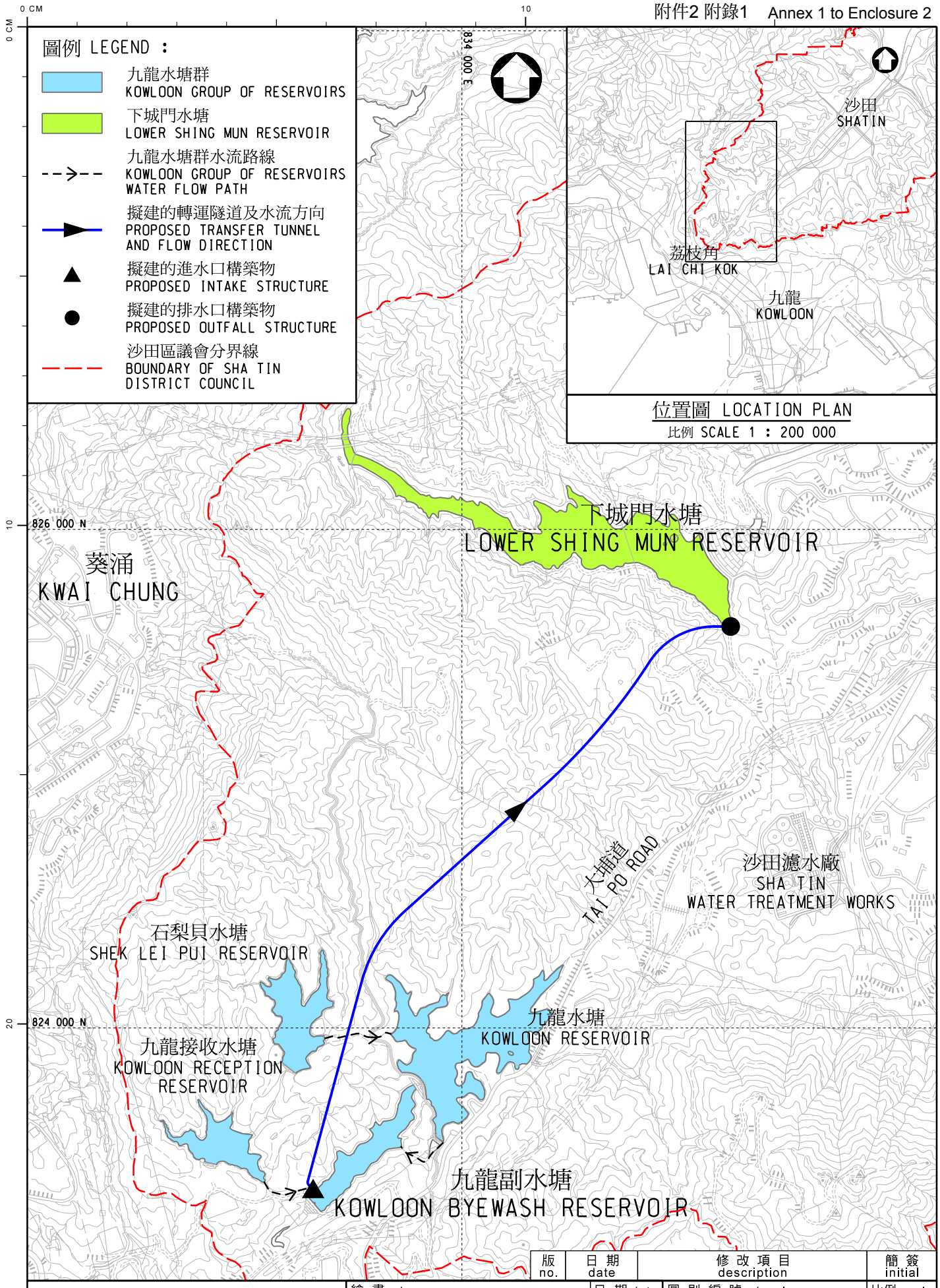
[8] "Important trees" refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria-

(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or events;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
(e) trees with trunk diameter equal or exceeding 1.0 metre (m) (measured at 1.3 m above ground level), or with height or canopy spread equal or exceeding 25 m.



版 no.	日 期 date	修 改 項 目 description	簡 簽 initial

圖 則 名 稱 drawing title

工務計劃項目108CD號
- 西九龍雨水排放系統改善計劃 -
水塘間轉運隧道計劃
PWP ITEM NO. 108CD
- WEST KOWLOON DRAINAGE IMPROVEMENT - INTER-RESERVOIRS TRANSFER SCHEME

繪 畫 drawn *SIGNED* W. H. CHAN	日 期 date 09 MAY 2018	
核 對 checked *SIGNED* Ir K. M. WONG	日 期 date 09 MAY 2018	
批 核 approved *SIGNED* Ir C. L. LO	日 期 date 09 MAY 2018	
部 門 office 顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

圖 則 編 號 drawing no. DCM/2018/018

比例 scale 1 : 20 000 OR AS SHOWN

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

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108CD – West Kowloon drainage improvement – inter-reservoirs transfer scheme

Breakdown of estimates for consultants' fees and resident site staff costs (in September 2017 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	1.8
		Technical	-	-	-	0.7
					Sub-total	2.5#
(b)	Resident site staff (RSS) costs (Note 3)	Professional	340	38	1.6	42.9
		Technical	1 113	14	1.6	48.9
					Sub-total	91.8
	Comprising –					
	(i) Consultants' fees for management of RSS				5.8#	
	(ii) Remuneration of RSS				86.0#	
					Total	**94.3**

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS salary point 38 = $78,775 per month and MPS salary point 14 = $27,485 per month).

2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the design and construction of **108CD**. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **108CD** to Category A.

3. The actual man-months and actual costs will only be known after the completion of the construction works.

Remarks

The figures in this Annex are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 7 of Enclosure 2.

108CD - West Kowloon drainage improvement – inter-reservoirs transfer scheme

Tree No.[1]	**Species**		**Measurements**			**Amenity value**[2]	**Form**	**Health condition**	**Structural condition**	**Suitability for transplanting**[3]		**Conservation status**[4]	**Recommendation**	**Department to provide expert advice to LandsD**	**Additional Remarks**
	Scientific name	Chinese name	Height (m)	DBH[5] (mm)	Crown spread (m)	(Good/Fair/Poor)				(High/ Medium/ Low)	Remarks		(Retain/ Transplant/ Fell)		
T426	*Artocarpus hypargyreus*	白桂木	12	137	7	Good	Poor	Poor	Poor	Low	• The tree is in poor form, poor health and poor structural condition, its transplant survival is low. • Heavy pruning is needed to facilitate transplant. It would lead to permanent deformation of natural shape.	RPPHK	Fell	Agriculture, Fisheries and Conservation Department	• It is not registered Old and Valuable Tree. • Status in China: Near Threatened (NT). Recorded in China Plant Red Data Book and Illustration of Rare & endangered plant in Guangdong Province. • In Hong Kong, this species is relatively common and many localities of wild occurrence are in Country Parks under protection. The species has also been artificially propagated. • The tree is in conflict with the construction works for the proposed tunnel and intake structure at the Kowloon Byewash Reservoir. • The tree is located on slope with bending trunk and unbalanced tree crown, and its root ball is not extractable for transplant. • The Kowloon Byewash Reservoir Dam is a Grade II historic structure with traffic load restriction imposed. Tree transplanting is considered infeasible. • Compensatory planting of 2 nos. of *Artocarpus hypargyreus* will be provided.

Tree No.[1]	Species		Measurements			Amenity value[2]	Form	Health condition	Structural condition	Suitability for transplanting[3]		Conservation status[4]	Recommendation	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	Height (m)	DBH[5] (mm)	Crown spread (m)	(Good/Fair/Poor)				(High/ Medium/ Low)	Remarks		(Retain/ Transplant/ Fell)		
T428	*Artocarpus hypargyreus*	白桂木	8	105	6	Good	Poor	Poor	Poor	Low	• The tree is in poor form, poor health and poor structural condition, its transplant survival is low. • Heavy pruning is needed to facilitate transplant. It would lead to permanent deformation of natural shape.	RPPHK	Fell	Agriculture, Fisheries and Conservation Department	• It is not registered Old and Valuable Tree. • Status in China: Near Threatened (NT). Recorded in China Plant Red Data Book and Illustration of Rare & endangered plant in Guangdong Province. • In Hong Kong, this species is relatively common and many localities of wild occurrence are in Country Parks under protection. The species has also been artificially propagated. • The tree is in conflict with the construction works for the proposed tunnel and intake structure at the Kowloon Byewash Reservoir. • The tree is located on slope with unbalanced tree crown, and its root ball is not extractable for transplant. • The Kowloon Byewash Reservoir Dam is a Grade II historic structure with traffic load restriction imposed. Tree transplanting is considered infeasible. • Compensatory planting of 2 nos. of *Artocarpus hypargyreus* will be provided.

1 Tree(s) in the Register of Old and Valuable Trees should be highlighted with OVT number.

2 Amenity value of a tree should be assessed by its functional values for shade, shelter, screening, reduction of pollution and noise and also its fung shui significance, and classified into the following categories.

Good: important trees which should be retained by adjusting the design layout accordingly.
Fair: trees that are desirable to be retained in order to create a pleasant environment, which includes healthy specimens of lesser importance than "Good" trees.
Poor: trees that are dead, dying or potentially hazardous and should be removed.

3 Assessment shall take into account conditions of an individual tree at the time of survey (including health, structure, age and root conditions), site conditions (including topography and accessibility), and intrinsic characters of tree species (survival rate after transplanting).

4 Conservation status is based on the rarity and protection status of the species under relevant ordinances in Hong Kong, such as Rare and Precious Plants of Hong Kong, the International Union for Conservation of Nature (IUCN) Red List of Threatened Species and the Forests and Countryside Ordinance.
IUCN:NT – "Near Threatened" under IUCN Red List of Threatened Species
IUCN:VU – "Vulnerable" under IUCN Red List of Threatened Species
RPPHK – Species included in AFCD publication "Rare and Precious Plants of Hong Kong (2003)"
Cap.586 – Native plants listed in Protection of Endangered Species of Animals and Plants Ordinance, Cap. 586.

5 Diameter at Breast Height (DBH) of a tree refers to its trunk diameter at breast height (i.e. measured at 1.3m above ground level)