For discussion **PWSC(2007-08)17**
on 23 May 2007

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE
Civil Engineering – Drainage and erosion protection
103CD – Drainage improvement in Northern Hong Kong Island – Hong Kong West drainage tunnel

Members are invited to recommend to Finance Committee the upgrading of **103CD** to Category A at an estimated cost of $3,044.7 million in money-of-the-day prices for the implementation of a drainage tunnel project in Hong Kong Island West.

PROBLEM

Due to inadequate capacity of the existing drainage systems, Northern Hong Kong Island is susceptible to flooding during heavy rainstorms.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **103CD** to Category A at an estimated cost of $3,044.7 million in money-of-the-day (MOD) prices for the implementation of a drainage tunnel project in Hong Kong Island West.

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PROJECT SCOPE AND NATURE

3. The scope of **103CD** comprises the construction of -

(a) a drainage tunnel of about 11 kilometres (km) in length and of diameter varying from 6.25 metres (m) to 7.25 m from Tai Hang to Pokfulam;

(b) eastern and western portals; and

(c) 34 intakes, about 8 km of associated connection adits and ancillary works.

A layout plan showing the location of the proposed works is at Enclosure 1.

4. We plan to start construction in October 2007 for completion in March 2012.

JUSTIFICATION

5. The drainage catchment of Hong Kong Island West covers some major residential and commercial developments, and their extensive upland catchment. The existing drainage systems in these areas were built several decades ago to meet the flow requirements and standards at that time. Developments in these areas over the past decades have turned natural ground and slopes into paved areas, resulting in significant increase in surface run-off thus overloading the existing urban drainage systems. During heavy rainstorms, the fast and huge flows from the hills will run along paved areas and/or steep slopes down to these urban areas causing flooding hazards, leading to serious traffic congestion and disruption to business and tourism attractions at the downstream areas of the drainage catchments. As some of these areas are in the middle of major traffic routes, any traffic disruption due to flooding will impact on a much wider region.

6. The traditional approach to increase the capacity of the existing drainage systems in these highly urbanised areas is to enlarge existing drains or box culverts or construct additional ones. It will involve extensive pipelaying works in built-up areas. However, due to congestion of underground utilities in the built-up areas, it is often impracticable to find sufficient room in the ground to lay any new drains. It will therefore frequently necessitate the diversion of other existing utilities, if possible, to make room for the enlarged drains, thereby prolonging the construction periods substantially. The construction will also require extensive road opening in the busy roads causing serious disruption to

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traffic, disturbance to the public and business operations, and other nuisance like dust and noise for a prolonged period. To minimise the above potential problems and disturbance, we propose to reduce the risk of flooding in the built-up areas by constructing a drainage tunnel to intercept the surface run-off in mid-hill, which is then conveyed for discharge into the sea without passing through the existing drainage system further downstream.

7. By diverting the upland flows to the proposed drainage tunnel, the commercial and financial centres in the Central, Admiralty and Wan Chai areas, and the urban/residential areas in Western District will be better protected from flooding. The extent of drainage upgrading works required in the congested lower catchment urban areas will also be drastically reduced. Traffic disruptions and disturbances to the public would be minimised, with the living environment of our society to be generally improved. Upon completion of the drainage tunnel scheme, the general standard of flood protection in these areas will be enhanced to withstand a rainstorm with a return period[1] of one in 50 years.

FINANCIAL IMPLICATIONS

8. We estimate the cost of the proposed works to be about $3,044.7 million in MOD prices (see paragraph 9 below), made up as follows

			$ million	
(a)	Construction of			2,429.2
	(i)	drainage tunnel	1,769.2	
	(ii)	eastern and western portals	110.0	
	(iii)	intakes, adits and ancillary works	550.0	
(b)	Consultants' fees for			227.8
	(i)	contract administration	8.1	
	(ii)	site supervision	219.7	

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[1] "Return period" means the average number of years during which a certain severity of flooding will occur once, statistically. A longer return period means a rarer chance of occurrence of a more severe flooding.

(c)	Environmental mitigation measures	30.0	
(d)	Contingencies	263.0	
	Sub-total	2,950.0	(in September 2006 prices)
(e)	Provision for price adjustment	94.7	
	Total	3,044.7	(in MOD prices)

A breakdown of the estimates for the consultants' fees by man-months is at Enclosure 2.

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

Year	**$ million (Sept 2006)**	**Price adjustment factor**	**$ million (MOD)**
2007 – 2008	39.0	0.99900	39.0
2008 – 2009	280.0	1.00649	281.8
2009 – 2010	830.0	1.01656	843.7
2010 – 2011	820.0	1.02672	841.9
2011 – 2012	401.0	1.03699	415.8
2012 – 2013	240.0	1.05514	253.2
2013 – 2014	180.0	1.07624	193.7
2014 – 2015	160.0	1.09777	175.6
	2,950.0		3,044.7

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10. We have derived the MOD estimate on the basis of the Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period 2007 to 2015. We will adopt design-and-build contract in order to shorten the time required by allowing part of the detailed design and construction to be carried out in parallel and with a view to achieving a cost-effective design by utilising contractors' specialist knowledge in tunnelling. We will allow for price adjustments in the contract, as the contract period will exceed 21 months.

11. We estimate the annual recurrent expenditure arising from this project to be about $6.4 million.

PUBLIC CONSULTATION

12. We consulted the Planning, Works and Housing Committee of the Southern District Council on 23 October 2006, the Planning, Transport and Environmental Protection Committee of the Wan Chai District Council on 28 November 2006, and the Food, Environmental, Hygiene and Works Committee of the Central and Western District Council on 13 December 2006. All three Committees supported the proposed works. We consulted the Works and Development Committee of the Eastern District Council by circulation of an information paper on 7 December 2006. The Committee had no objection to the proposed works. We also consulted the Wah Fu and Pokfulam Area Committee on 21 September 2006. Between 1 December 2006 and 20 December 2006, we consulted Wan Chai South Area Committee, Wan Chai West Area Committee, Wan Chai East Area Committee, Central and Mid Levels Area Committee, Shek Tong Tsui and Kennedy Town Area Committee, and Sheung Wan and Sai Ying Pun Area Committee. The above Area Committees had no objection to the proposed works.

13. We gazetted the proposed works under the Foreshore and Sea-bed (Reclamations) Ordinance on 18 August 2006 and received one objection. The objector was concerned that the proposed works would generate unacceptable nuisances to the nearby occupants during construction. We explained to the objector and reassured that we will incorporate the Environmental Impact Assessment recommendations into the works contract to bring the potential nuisances within acceptable limits during the construction stage and conduct environmental monitoring and auditing to ascertain and ensure the effectiveness of the mitigation measures. The objector did not withdraw his objection. After considering the objection, the Chief Executive in Council authorised the proposed works without modification on 8 May 2007.

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14. We briefed the Legislative Council Panel on Planning, Lands and Works at its meetings on 5 March 2001 and 4 January 2002 on the drainage tunnel scheme. We circulated information papers to the Panel on 27 April 2004 and 13 July 2005 on the progress of the scheme. We consulted the Panel again on the proposed works by circulation of an information paper on 12 March 2007. Members had no objection to the proposed works.

ENVIRONMENTAL IMPLICATIONS

15. The drainage tunnel project is a designated project under Schedule 2 of the Environmental Impact Assessment Ordinance (Chapter 499) as part of the tunnel falls within the boundary of Tai Tam, Aberdeen, Pokfulam and Lung Fu Shan Country Parks. Environmental impacts in relation to the Country Parks are the focus of the EIA Ordinance control for the project. In April 2006, the EIA report for the project was approved under the EIA Ordinance and an environmental permit was obtained on 26 April 2007. Apart from the potential impacts related to the Country Parks, we have also assessed the environmental impacts of other parts of the project outside the country park boundary. The assessment concluded that the proposed works will not cause long-term adverse environmental impacts. We estimate the cost of implementing the environmental mitigation measures to be $30 million. We have included this cost in the overall project estimate.

16. For short-term impacts during construction, we will control noise, dust and site run-off within standards and guidelines through implementation of mitigation measures, such as the use of temporary noise barriers and silenced construction plants to reduce noise generation, water-spraying to reduce emission of fugitive dust, and strict control on diversion of stream flows in the works contracts. We will incorporate the EIA recommendations into the works contracts for implementation and conduct environmental monitoring and auditing to ensure the effectiveness of the mitigation measures.

17. We have considered optimising the tunnel diameter, tunnel alignment, the number and locations of intakes, as well as maximising the use of construction and demolition (C&D) materials by reusing the excavated soil material for landscaping and the excavated rock for architectural finishes in the planning and design stages to reduce the generation of C&D materials where possible. In addition, we will require the contractors to reuse inert C&D materials including excavated soil for backfilling on site or in other suitable construction sites as far as possible, in order to minimise the disposal of C&D materials to

public fill reception facilities[2]. We will encourage the contractor to maximise the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimise the generation of construction waste.

18. We will also require the contractor to submit waste management plans (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of public fill and C&D waste to public fill reception facilities and landfills respectively through a trip-ticket system. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

19. We estimate that the project will generate about 1.87 million tonnes of C&D materials. Of these, we will reuse about 2 600 tonnes (0.1%) on site and deliver about 1.86 million tonnes (99.5%) to public fill reception facilities for subsequent reuse. In addition, we will dispose of about 8 100 tonnes (0.4%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be $51.2 million for this project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonne at landfills[3]).

TRAFFIC IMPACTS

20. We have aligned the proposed drainage tunnel to be located away from busy roads although some of the works will still be required to be implemented in the vicinity of the public road network. Traffic impacts due to the proposed works are assessed to be minimal. We have drawn up preliminary temporary traffic management schemes for construction of the drainage tunnel and consulted the relevant authorities including Transport Department (TD) and Hong Kong Police Force (HKPF). The scheme is considered acceptable.

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[2] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of public fill in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

[3] The estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at $90/m^3$), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

21. We will establish a Traffic Management Liaison Group (TMLG) under the works contract to discuss, scrutinise and agree on the proposed temporary traffic arrangements. We will invite representatives from TD, HKPF, Highways Department, District Offices, various public transport operators and utility undertakings to attend the TMLG meetings and every temporary traffic arrangement has to be agreed by the TMLG before implementation. The TMLG will also take into account all relevant factors such as site restrictions, existing and future traffic conditions, pedestrian safety, access to building/shop fronts and provision of emergency vehicular access in considering the temporary traffic arrangements.

LAND ACQUISITION

22. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

23. In September 2000, we included **103CD** in Category B of the Public Works Programme.

24. In March 2002, we upgraded part of **103CD** to Category A as **122CD** "Drainage improvement in Northern Hong Kong Island – preliminary design and investigations" at an estimated cost of $64.6 million for engaging consultants to carry out the preliminary design and investigations for the proposed tunnel project.

25. In March 2006, we engaged consultants to carry out reference design, prepare contract documentation and assist in the tendering process under the design and build procurement approach for **103CD,** at an estimated cost of $12.9 million. We charged the amount to block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme".

26. Of the about 1 059 trees within the project boundary, about 970 trees will be preserved. The proposed works will involve the removal of 89 trees including about 34 trees to be felled and 55 trees to be transplanted within the

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project site. All trees to be removed are not important trees[4]. We will incorporate planting proposal as part of the project, including the planting of about 105 trees, 12 840 shrubs and 4 142 square metres of grassed area.

27. We estimate that the proposed works will create about 370 jobs (280 for labourers and another 90 for professional/technical staff) providing a total employment of 16 000 man-months.

Environment, Transport and Works Bureau
May 2007

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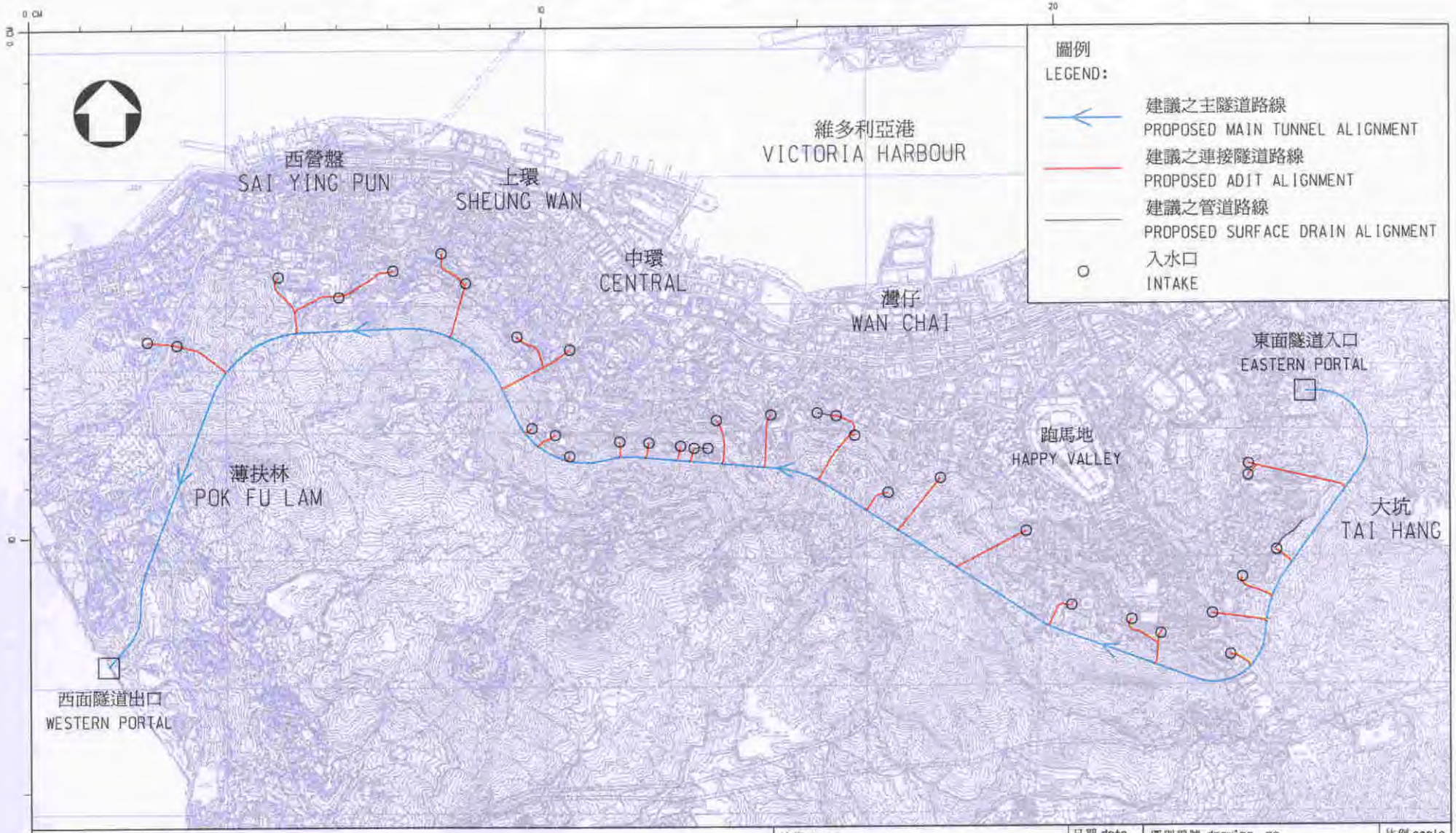
[4] "Important trees" refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –

(a) trees over 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 event;
(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 m (measured at 1.3 m above ground level), or with height/canopy spread equal or exceeding 25 m.



圖則名稱 drawing title

工務計劃項目第103CD號
港島北部雨水排放系統改善工程-港島西雨水排放隧道
PWP ITEM NO. 103CD
DRAINAGE IMPROVEMENT IN NORTHERN HONG KONG ISLAND
- HONG KONG WEST DRAINAGE TUNNEL

繪畫 drawn	SIGNED C.K.LAM	日期 date 01FEB07
核對 checked	SIGNED K.S.TONG	日期 date 01FEB07
批核 approved	SIGNED M.H.LEUNG	日期 date 01FEB07
部門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/103CD0/0002

比例 scale N.T.S.

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

ENCLOSURE 1 附件一

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Enclosure 2 to PWSC(2007-08)17

103CD – Drainage improvement in Northern Hong Kong Island – Hong Kong West drainage tunnel

Breakdown of the estimate for consultants' fees

	Consultants' staff costs		**Estimated man-months**	**Average MPS* salary point**	**Multiplier (Note 1)**	**Estimated fee ($million)**
(a)	Contract administration (Note 2)	Professional	-	-	-	5.0
		Technical	-	-	-	3.1
(b)	Site supervision by resident site staff of the consultants (Note 3)	Professional	1 371	38	1.6	119.0
		Technical	3 495	14	1.6	100.7
				Total consultants' staff costs		227.8

* MPS = Master Pay Scale

Notes :

1. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultants. (As at 1 January 2007, MPS Pt. 38 = $54,255 per month and MPS Pt.14 = $18,010 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 **103CD.** The construction phase of the assignment for the proposed works will only be executed subject to Finance Committee's approval to upgrade the proposed works to Category A.
3. We will only know the actual man-months and actual costs for site supervision after completion of the works

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