

For information

**Legislative Council Panel on Planning, Lands and Works**

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

**111CD – Drainage improvement in Tsuen Wan, Kwai Chung and  
Tsing Yi – Tsuen Wan drainage tunnel**

**PURPOSE**

This paper briefs Members on the Administration's proposal to upgrade projects **103CD** and **111CD** to Category A at an estimated cost, in money-of-the-day (MOD) prices, of about \$3.0 billion and about \$1.3 billion respectively for the implementation of the above two drainage tunnel projects.

**PROJECT SCOPE AND NATURE**

2. The scope of the project **103CD** comprises the construction of -
  - (a) a drainage tunnel totalling about 11 kilometres (km) in length and of diameter varying from 6.25 to 7.25 metres (m) from Tai Hang to Pokfulam;
  - (b) eastern and western portals; and
  - (c) 34 nos. of intakes, about 8 km of associated connection adits and ancillary works.

A layout plan showing the location of the proposed drainage tunnel scheme under **103CD** is at **Enclosure 1**. We plan to start construction in late 2007 for completion in early 2012.

3. The scope of the project **111CD** comprises the construction of -
  - (a) a drainage tunnel totalling about 5 km in length and of diameter 6.5 m from Kwai Chung to Tsuen Wan;

- (b) an outfall portal; and
- (c) 3 nos. of intakes, about 80 m of associated connection adits and ancillary works.

— A layout plan showing the location of the proposed drainage tunnel scheme under **111CD** is at **Enclosure 2**. We plan to start construction in late 2007 for completion in end 2011.

## **JUSTIFICATION**

4. The drainage catchments of Hong Kong Island West and Tsuen Wan cover major residential, commercial and/or industrial districts, and their extensive upland catchment. The drainage systems in the urban areas of the above districts 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 runoff overloading the existing urban drainage systems. During heavy rainstorms, the fast and huge flows from the hills would run along paved areas and/or steep slopes down to the above-mentioned 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.

5. The traditional approach to increase the capacity of the existing drainage systems in these highly urbanized areas is to enlarge existing drains or box culverts or construct additional ones. It would 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 would 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 would also require extensive road opening in the busy roads causing serious disruption to 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 potential flooding in the built-up areas by constructing the proposed drainage tunnels to intercept the surface runoff in mid-hill, which is then conveyed for discharge into the sea without passing through the existing drainage network further downstream.

6. By diverting the upland flows to the proposed drainage tunnels, the commercial and financial centres in the Central, Admiralty and Wan Chai areas, the urban/residential areas in Western District, as well as Kwai Chung and Tsuen Wan, would be better protected from flooding. The extent of drainage upgrading works required in the congested lower catchment urban areas would also be drastically reduced. Traffic disruptions and disturbances to the public would be minimized, with the living environment of our society to be generally improved. Upon completion of the proposed schemes, the general standard of flood protection in these areas would be enhanced to withstand a rainstorm with a return period<sup>1</sup> of one in 50 years. The risk of rapid flow hazard can be vastly reduced, which would help build and maintain a positive image of Hong Kong as being a world class city.

## FINANCIAL IMPLICATIONS

7. We estimate that the costs of the two proposed drainage tunnel projects are as follows -

	<b>103CD</b>	<b>111CD</b>	
	(\$ million)	(\$ million)	
(a) Construction works	2 460	1 080	
(b) Consultants' fees for contract administration and site supervision	250	100	
(c) Environmental mitigation measures	20	10	
(d) Contingencies	270	110	
Total :	3 000	1 300	(in MOD prices)

8. We propose to invite tenders for the above drainage tunnel schemes separately. Design-and-build contracts will be adopted 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 tunneling. We will allow for price adjustments in the individual contract, as the construction period will exceed 21 months.

<sup>1</sup> "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.

## **PUBLIC CONSULTATION**

### ***103CD – Hong Kong West drainage tunnel***

9. 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 implementation of the project. We consulted the Works and Development Committee of the Eastern District Council by circulation of an information paper on 7 December 2006. No objection to the proposal was raised. We also consulted the Wah Fu and Pokfulam Area Committee on 21 September 2006, Wan Chai South Area Committee on 1 December 2006, Wan Chai West Area Committee on 4 December 2006, Wan Chai East Area Committee on 7 December 2006, Central and Mid Levels Area Committee on 8 December 2006, Shek Tong Tsui and Kennedy Town Area Committee on 15 December 2006, and Sheung Wan and Sai Ying Pun Area Committee on 20 December 2006. All these Area Committees did not have objection to the implementation of the project.

10. We gazetted the proposed works under the Foreshore and Sea-bed (Reclamations) Ordinance on 18 August 2006. Authorisation of the scheme under statutory procedures is in process.

### ***111CD – Tsuen Wan drainage tunnel***

11. We consulted the Environmental and Health Affairs Committee of the Tsuen Wan District Council on 2 November 2006, and the Planning and Environmental Hygiene Committee of the Kwai Tsing District Council on 19 December 2006. They all expressed support for the implementation of the project. We also consulted the Tsuen Wan West Area Committee, Tsuen Wan Rural Area Committee and Tsuen Wan East Area Committee on 11, 14 and 15 December 2006 respectively. There was no objection to the implementation of the project.

12. We gazetted the proposed works under the Foreshore and Sea-bed (Reclamations) Ordinance on 3 March 2006. The scheme was authorised on 9 June 2006.

### *Consultation with LegCo*

13. We attended the LegCo Panel on Planning, Lands and Works on 5 March 2001 and 4 January 2002 for discussing the drainage tunnel schemes. We also submitted information papers on 27 April 2004 and 13 July 2005 respectively updating Members on the progress of the schemes.

### **ENVIRONMENTAL IMPLICATIONS**

14. Environmental permits are required for the Hong Kong West drainage tunnel and the Tsuen Wan drainage tunnel schemes both of which are designated projects under the Environmental Impact Assessment (EIA) Ordinance. We completed the EIA Reports with the conclusion that upon implementation of the recommended mitigation measures, the proposed works would not give rise to long term adverse environmental impacts and any construction impact can be mitigated.

15. 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 would incorporate the EIA recommendations into the works contracts for implementation and will conduct environmental monitoring and auditing to ensure the effectiveness of the mitigation measures.

16. We have considered ways in the planning and design stages to reduce the generation of construction and demolition (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<sup>2</sup>. 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.

17. We will also require the contractors to submit waste management plans (WMP) for approval. The WMP will include appropriate mitigation measures to

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<sup>2</sup> 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.

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 contractors 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.

### ***103CD – Hong Kong West drainage tunnel***

18. We estimate that the project will generate about 1.85 million tonnes of C&D materials. Of these, we will reuse about 2 600 tonnes (0.2%) on site and deliver about 1.83 million tonnes (99.0%) to public fill reception facilities for subsequent reuse. In addition, we will dispose of about 15 000 tonnes (0.8%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be \$51.3 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne at landfills<sup>3</sup>).

### ***111CD – Tsuen Wan drainage tunnel***

19. We estimate that the project will generate about 673 600 tonnes of C&D materials. Of these, we will reuse about 9 400 tonnes (1.4%) on site and deliver about 635 900 tonnes (94.4%) to public fill reception facilities for subsequent reuse. In addition, we will dispose of about 28 300 tonnes (4.2%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be \$20.7 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne at landfills).

## **LAND ACQUISITION**

20. The alignments of the proposed drainage tunnels have been carefully designed to minimize encroachment upon private land as far as possible. The designed locations and depths of the tunnels are away from and well below existing and future developments and are mostly in the rock strata. Disturbance to built-up areas and impacts on future development will therefore be kept to a minimum. For the Tsuen Wan drainage tunnel, four private lots will be affected. We are discussing

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<sup>3</sup> 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<sup>3</sup>), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

with individual landowners with a view to obtaining rights or creating easements or utilizing existing rights under relevant land leases for the construction and maintenance of the proposed drainage tunnel.

## **TRAFFIC IMPLICATIONS**

21. The alignments of the proposed drainage tunnels have been selected to be located away from busy roads although some of the works are still required for connecting to the public road network. Traffic impacts due to the proposed works are assessed to be minimal. Preliminary temporary traffic management schemes for construction of the drainage tunnels have been drawn up and the relevant authorities including Transport Department (TD) and Hong Kong Police Force (HKPF) have been consulted. The schemes are considered acceptable.

22. We will establish respective Traffic Management Liaison Groups (TMLG) under the works contracts to discuss, scrutinise and agree on the proposed temporary traffic arrangements. Representatives from TD, HKPF, Highways Department, District Offices, various public transport operators and utility undertakings will be invited to attend the TMLG meetings. Every temporary traffic arrangement has to be agreed by the TMLG before implementation, which will be considered taking 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.

## **BACKGROUND**

23. In September 2000, we included **103CD** in Category B for alleviating the flooding problem in the Northern Hong Kong Island, and **111CD** in Category B for alleviating the flooding problem in Tsuen Wan and Kwai Chung.

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” and part of **111CD** to Category A as **121CD** “Drainage improvement in Tsuen Wan, Kwai Chung and Tsing Yi – preliminary design and investigations” for engaging consultants to carry out the preliminary design and investigations for the above tunnel projects.

25. In the first quarter of 2006, we engaged separate consultants to carry out reference design, prepare contract documentation and assist in the tendering process under the Design and Build procurement approach for **103CD** and **111CD**, at an estimated cost of \$12.9 million and \$11.0 million (in MOD prices) respectively. We have charged the amount to block allocation **Subhead 4100DX** “Drainage works, studies and investigations for items in Category D of the Public Works Programme”.

### ***103CD – Hong Kong West drainage tunnel***

26. Of the about 1 059 trees within the project boundary, about 966 trees will be preserved. The proposed works will involve the removal of 93 trees including about 43 trees to be felled and 50 trees to be transplanted within the project site. All trees to be removed are not important trees<sup>4</sup>. We will incorporate planting proposal as part of the project, including the planting of about 111 trees, 13 530 shrubs and 3 418 m<sup>2</sup> of grassed area.

27. We estimate that the proposed works will create about 425 jobs (300 for labourers and another 125 for professional/technical staff) providing a total employment of 16 000 man-months.

### ***111CD – Tsuen Wan drainage tunnel***

28. Of the about 1 033 trees within the project boundary, about 532 trees will be preserved. The proposed works will involve the removal of 501 trees including about 491 trees to be felled and ten trees to be transplanted within the project site. All trees to be removed are not important trees. We will incorporate planting proposal as part of the project, including the planting of about 1 700 trees, 9 000 shrubs and 35 000 m<sup>2</sup> of grassed area.

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<sup>4</sup> “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 –

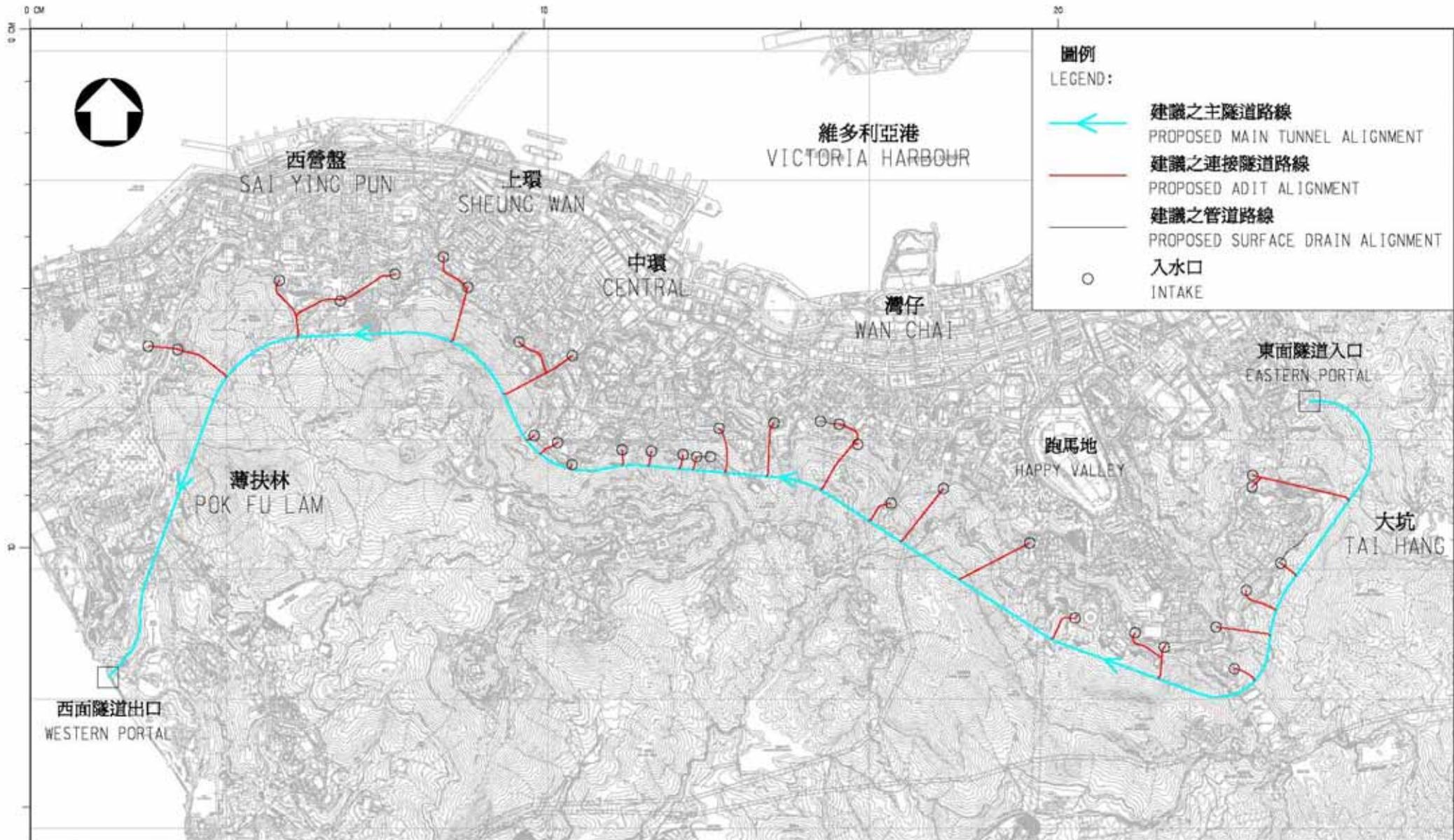
- (a) trees over 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or event;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (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 metre (measured at 1.3 metre above ground level), or with height/canopy spread equal or exceeding 25m.

29. We estimate that the proposed works will create about 230 jobs (140 for labourers and another 90 for professional/technical staff) providing a total employment of 7 600 man-months.

### **WAY FORWARD**

30. Members are invited to support our proposal of upgrading **103CD** and **111CD** to Category A for consideration by the Public Works Subcommittee with a view to seeking funding approval by the Finance Committee in mid 2007.

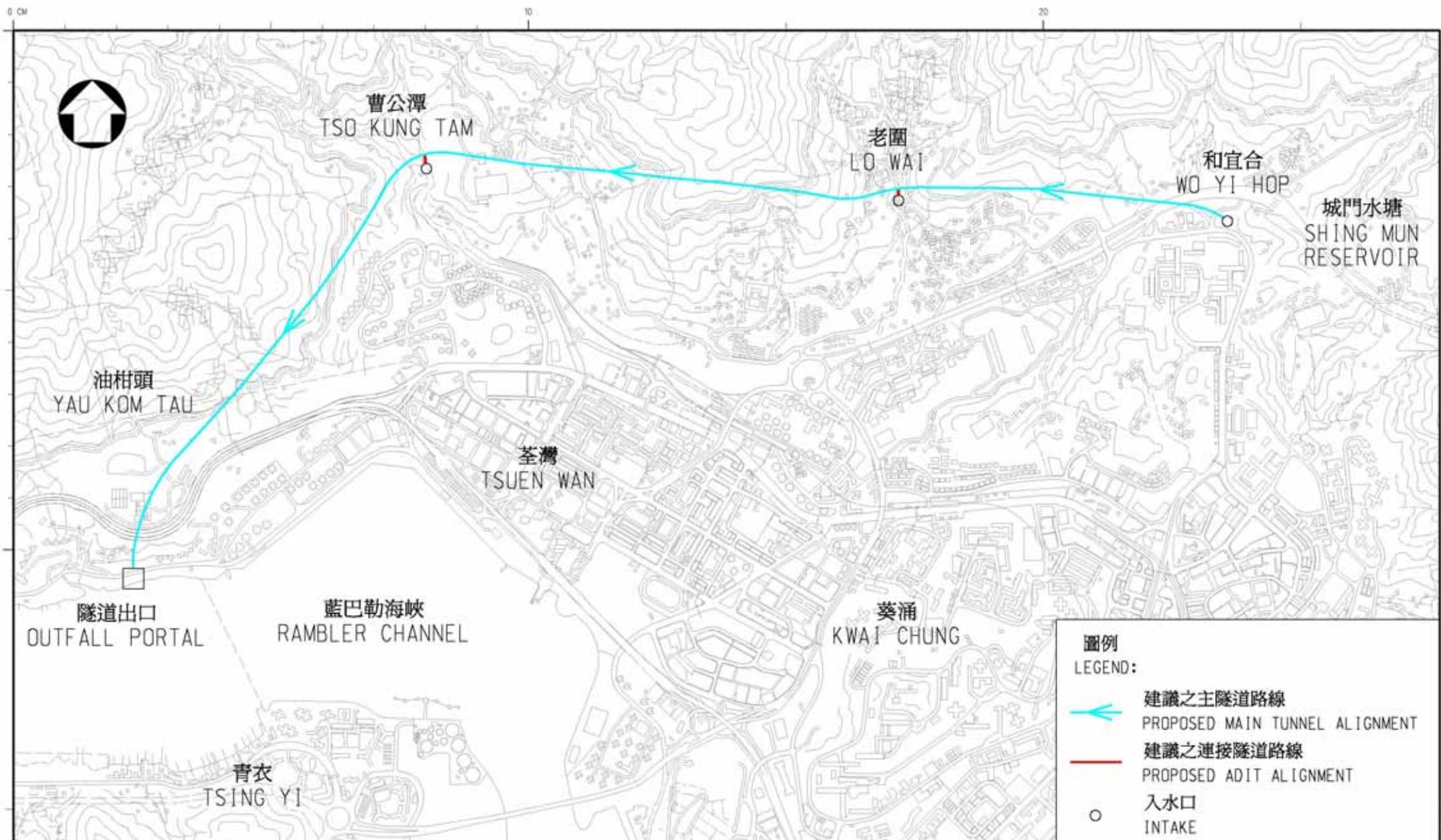
**Environment, Transport and Works Bureau**  
**March 2007**



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
覆核 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.	比例 scale
DPM/103CD0/0002	N.T.S.
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**圖例**  
LEGEND:

- 建議之主隧道路線  
PROPOSED MAIN TUNNEL ALIGNMENT
- 建議之連接隧道路線  
PROPOSED ADIT ALIGNMENT
- 入水口  
INTAKE

圖則名稱 drawing title  
**工務計劃項目第111CD號**  
**荃灣, 葵涌及青衣雨水排放系統改善工程-荃灣雨水排放隧道**  
 PWP ITEM NO. 111CD  
**DRAINAGE IMPROVEMENT IN TSUEN WAN, KWAI CHUNG AND TSING YI - TSUEN WAN DRAINAGE TUNNEL**

繪畫 drawn	SIGNED C.W. CHAN	日期 date	02FEB07
核對 checked	SIGNED K.K. UY	日期 date	02FEB07
批核 approved	SIGNED W.K. HO	日期 date	02FEB07
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

圖則編號 drawing no. **DCM/2007/007** 比例 scale N.T.S.

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ENCLOSURE 2 附件二