

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Head 704 – DRAINAGE

Civil Engineering – Drainage and erosion protection

128CD – Drainage improvement in Southern Lantau

Members are invited to recommend to Finance Committee the upgrading of **128CD** to Category A at an estimated cost of \$86.7 million in money-of-the-day prices for drainage improvement works in Southern Lantau.

PROBLEM

Due to the low-lying nature and inadequate capacity of the existing drainage systems, some areas in Southern Lantau are 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 **128CD** to Category A at an estimated cost of \$86.7 million in money-of-the-day (MOD) prices for drainage improvement works covering Pak Ngan Heung, Luk Tei Tong, Tai Tei Tong, Ling Tsui Tau in Mui Wo, and Cheung Sha Sheung Tsuen, Lo Uk Tsuen and Pui O Ham Tin San Tsuen in Southern Lantau.

PROJECT SCOPE AND NATURE

3. The scope of **128CD** comprises –

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- (a) construction of about 800 metres (m) of drainage channels with width ranging from 8 m to 18 m, and 200 m of box culverts with width of 11 m in Pak Ngan Heung and Luk Tei Tong areas;
- (b) construction of about 800 m of drains with diameter ranging from 750 millimetres (mm) to 1500 mm in Ling Tsui Tau, Cheung Sha Sheung Tsuen and Lo Uk Tsuen areas;
- (c) widening of three river bottlenecks in Tai Tei Tong and construction of about 100 m of flood protection walls in Pui O Ham Tin San Tsuen; and
- (d) ancillary works including reprovisioning of footpath and emergency vehicular access and landscaping work.

———— A site plan and typical sections showing the proposed works are at Enclosure 1.

4. We plan to commence construction in July 2007 for completion in July 2010.

JUSTIFICATION

5. Owing to the low-lying nature and inadequate capacity of the existing streamcourses, Pak Ngan Heung, Luk Tei Tong, Tai Tei Tong and Ling Tsui Tau in Mui Wo, and some local areas in Cheung Sha Sheung Tsuen, Lo Uk Tsuen and Pui O Ham Tin San Tsuen in Southern Lantau are susceptible to flooding during heavy rainstorms.

6. To alleviate the flooding risks and to meet the community's increasing expectation for better flood protection, we propose to construct drainage channels and box culverts in Pak Ngan Heung and Luk Tei Tong and drains in Ling Tsui Tau, Cheung Sha Sheung Tsuen and Lo Uk Tsuen. Upon completion of the proposed works, the standard of flood protection in the areas concerned would be improved to withstand rainstorms with a return period¹ of one in 50 years.

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¹ "Return period" is 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.

7. We originally planned to carry out a full-scale training of Tai Tei Tong River. Following receipt of strong objections from villagers and green groups, we have modified the plan to widen three river bottlenecks only, thereby minimising land resumption and disruption to the existing natural streamcourses. This modification, however, would mean only offering protection for the Tai Tei Tong area from rainstorms with a return period of one in five years. This flood protection level was discussed at the meeting of the Mui Wo Rural Committee on 26 November 2004, and Members of the Mui Wo Rural Committee had no objection (see paragraph 13 below).

8. To abate the flooding problem in Pui O Ham Tin San Tsuen, we propose to construct 1.0 m high flood protection walls along Pui O River. Upon requests of the villagers, we have reduced the height of the flood protection walls to 0.6 m to minimise visual impacts. At a meeting with the Chairman of the South Lantao Rural Committee on 30 March 2006, we explained that the flood protection walls with reduced height would only provide a flood protection level with a return period of one in ten years. The Chairman considered the modified height of the flood protection walls and the reduced flood protection level acceptable.

FINANCIAL IMPLICATIONS

9. We estimate the cost of the proposed works to be \$86.7 million in MOD prices (see paragraph 10 below), made up as follows –

	\$ million
(a) Drainage improvement works and ancillary works in –	72.7
(i) Pak Ngan Heung and Luk Tei Tong	60.3
(ii) Ling Tsui Tau, Cheung Sha Sheung Tsuen and Lo Uk Tsuen	5.7
(iii) Tai Tei Tong and Pui O Ham Tin San Tsuen	6.7
(b) Environmental mitigation measures	4.8

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		\$ million	
	(c) Contingencies	7.7	
	Sub-total	85.2	(in September 2006 prices)
	(d) Provision for price adjustment	1.5	
	Total	86.7	(in MOD prices)

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

Year	\$ million (Sept 2006)	Price adjustment factor	\$ million (MOD)
2007 – 2008	8.3	0.99900	8.3
2008 – 2009	23.8	1.00649	24.0
2009 – 2010	23.9	1.01656	24.3
2010 – 2011	18.4	1.02672	18.9
2011 – 2012	10.8	1.03699	11.2
	85.2		86.7

11. We have derived the MOD estimates 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 2012. We will tender the proposed works under a standard re-measurement contract because of uncertainties of the existence and alignment of the underground utilities and the ground condition. The contract will provide for price adjustments because the contract period will exceed 21 months.

12. We estimate the annual recurrent expenditure arising from this proposed works to be \$0.3 million.

PUBLIC CONSULTATION

13. We consulted the South Lantao Rural Committee on 11 September 2004, and received no objection to the proposal. We consulted the Chairman of the South Lantao Rural Committee on 30 March 2006 on the proposed construction of flood protection walls at Pui O Ham Tin San Tsuen. He accepted the proposal to reduce the height of the flood protection walls to 0.6m to minimise the visual impact and the revised flood protection level. We consulted the Islands District Council and Mui Wo Rural Committee on 18 October and 25 August 2004 respectively. We provided further details on the proposed improvement works in Tai Tei Tong including the flood protection level to the Mui Wo Rural Committee at its meeting on 26 November 2004. The District Council and Mui Wo Rural Committee supported implementation of the proposed works.

14. We gazetted the proposed works under the Roads (Works, Use and Compensation) Ordinance and the Foreshore and Sea-bed (Reclamations) Ordinance on 9 and 30 September 2005 respectively. We did not receive any objection to the proposed works under the Foreshore and Sea-bed (Reclamations) Ordinance. We received three objections to the road scheme. One objector expressed concerns about the potential visual impact and effectiveness of the proposed works. The other two objectors were concerned about the clearance of the Government land granted to them under Government Lands Licences. After our explanations, all objectors withdrew their objections unconditionally by February 2006.

15. We consulted the Legislative Council Panel on Planning, Lands and Works on the proposed works by circulation of an information paper on 16 January 2007. Members had no objection to the proposed works.

ENVIRONMENTAL IMPLICATIONS

16. The proposed drainage improvement works in Pak Ngan Heung, Luk Tei Tong and Tai Tei Tong are designated projects under the Environmental Impact Assessment (EIA) Ordinance (Cap 499), and an environmental permit is required for the construction and operation of the works. In December 2005, the EIA report for the proposed works was approved under the EIA Ordinance, which concluded that the environmental impact of the works could be controlled to comply with the criteria under the EIA Ordinance and the Technical Memorandum on EIA Process through implementation of controlling measures including proper programming of the works. For example, no works within Luk Tei Tong Marsh and the confluence of Pak Ngan Heung River, Tai Tei Tong River and Luk Tei Tong River shall be carried out in the wet season between April to October so as

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to avoid impacts on breeding of wildlife. We subsequently obtained the environmental permit for construction of the works under the EIA Ordinance in January 2006. We shall implement the measures recommended in the approved EIA report and the requirements imposed in the environmental permit.

17. For short term impacts caused by excavation works during construction, we will control noise, dust, and site run-off within the standards and guidelines through implementation of mitigation measures, such as the use of temporary noise barriers and silenced construction plant to reduce noise generation, water-spraying to reduce emission of fugitive dust and strict control on diversion of stream flows in the works contract. We will also adopt environment friendly designs such as gabion walls, natural substrates on river-bed, fish ladder and ecological planting. We have included \$4.8 million (in September 2006 prices) in the project estimate for implementing the environmental mitigation measures.

18. We have considered ways in the planning and design stages to reduce the generation of construction and demolition (C&D) materials where possible. For example, we have reviewed the horizontal and vertical alignment of the proposed drainage by-pass channel and box culverts in order to minimise the volume of excavated material. The volume of excavation for the construction of retaining walls is also kept to a minimum. In addition, we will require the contractor 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 facilities². We will encourage the contractors 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.

19. We will also require the contractor to submit a waste management plan (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.

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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.

20. We estimate that the project will generate about 121 900 tonnes of C&D materials. Of these, we will reuse about 11 200 tonnes (9%) on site, deliver 83 000 tonnes (68%) to public fill reception facilities for subsequent reuse. In addition, we will dispose of 27 700 tonnes (23%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be \$5.7 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne at landfills³).

21. We have carried out traffic impact assessment for the proposed works which concluded that the proposed works would not cause unacceptable traffic impact.

LAND ACQUISITION

22. We will resume about 24 517 square metres (m²) of private agricultural land and clear about 29 583 m² of government land for the proposed works. The land resumption will only affect non-domestic structure and re-housing will not be required. We will charge the land resumption and clearance costs, estimated to be about \$62.0 million, comprising \$56.7 million for land resumption and \$5.3 million for clearance, to **Head 701 - Land Acquisition**.

BACKGROUND INFORMATION

23. In April 2002, we included **128CD** "Drainage improvement in Southern Lantau" in Category B for alleviating the flooding problems in Southern Lantau.

24. In July 2002, we engaged consultants to undertake environmental impact assessment, traffic impact assessment, site investigations, surveys and preliminary design for the drainage improvement works under the project at a cost of \$4.9 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". The consultancy commenced in May 2003 and was substantially completed in October 2004.

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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/m³), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

25. Of the 379 trees within the project boundary, 226 trees will be preserved. The proposed works will involve the removal of 153 common trees including 124 trees to be felled and 29 trees to be transplanted elsewhere. All trees to be removed are not important trees⁴. We will incorporate planting proposal as part of the project, including estimated quantities of 407 trees, 13 200 shrubs and 20 000 m² of grassed area.

26. We estimate that the proposed works will create about 52 jobs (45 for labourers and another seven for professional/technical staff) providing a total employment of 1 600 man-months.

Environment, Transport and Works Bureau
April 2007

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.

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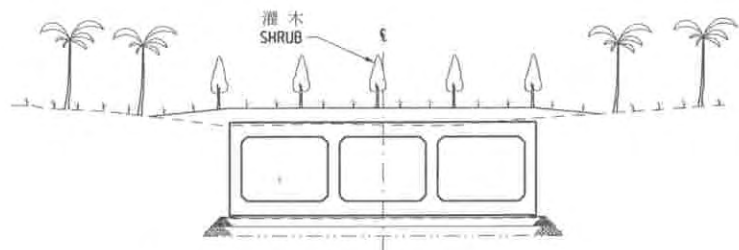
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排水道典型橫切面
TYPICAL SECTION OF GABION WALL CHANNEL

不依比例 NOT TO SCALE



箱型暗渠典型橫切面
TYPICAL SECTION OF BOX CULVERT

不依比例 NOT TO SCALE

圖則名稱 drawing title

工程編號第 4128CD - 南大嶼山雨水排放系統改善工程
 橫切面圖
 PROJECT No. 4128CD - DRAINAGE IMPROVEMENT IN SOUTHERN LANTAU
 SECTIONAL PLAN

繪畫 drawn

W. H. KO

日期 date
27 JUL 06

圖則編號 drawing no.

DDN/128CD/01015

比例 scale

無比例 AS SHOWN

核對 checked

W. L. CHUI

日期 date
XX JUL 06

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批核 approved

Y. Y. CHAN

日期 date
XX JUL 06

部門 office

排水工程處
 DRAINAGE PROJECTS DIVISION

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