

## **ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE**

### **HEAD 704 – DRAINAGE**

#### **Environmental Protection – Sewerage and sewage treatment 211DS – Outlying Islands sewerage, stage 1 phase 2 – upgrading of Peng Chau sewage treatment works**

Members are invited to recommend to Finance Committee the upgrading of **211DS** to Category A at an estimated cost of \$93.0 million in money-of-the-day prices for carrying out upgrading works for Peng Chau sewage treatment works.

### **PROBLEM**

Peng Chau sewage treatment works (PCSTW) has reached its design capacity and will not be able to cope with the forecast sewage flow.

### **PROPOSAL**

2. The Director of Drainage Services, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **211DS** to Category A at an estimated cost of \$93.0 million in money-of-the-day (MOD) prices for the construction of the proposed upgrading works for PCSTW.

### **PROJECT SCOPE AND NATURE**

3. The scope of the proposed upgrading works for PCSTW comprises –

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- (a) reconstruction of the sewage treatment works to increase the capacity from 450 cubic metres (m<sup>3</sup>) per day to 1 580 m<sup>3</sup> per day and to provide nitrogen removal and dechlorination;
- (b) construction of a submarine effluent outfall and an emergency overflow submarine outfall with an approximate length of 100 metres (m) and 40 m, respectively;
- (c) laying of about 350 m of twin inlet pumping mains (i.e. total length of mains about 700 m) to the treatment works;
- (d) provision of deodorisation facilities;
- (e) provision of sludge dewatering and handling facilities; and
- (f) provision of ancillary works including building services, architectural and landscape works.

4. We plan to start construction of the proposed works in March 2005 for completion in March 2008. A site plan showing the scope of the proposed work is at Enclosure 1.

## JUSTIFICATION

5. The existing PCSTW is located at Tai Lei Island connected to Peng Chau. It is a secondary sewage treatment plant with disinfection facilities. It has a design capacity of 450 m<sup>3</sup> per day. PCSTW mainly serves two public housing estates, namely Kam Peng Estate and Peng Lai Court. The other areas in Peng Chau are served by on-site sewage treatment facilities which are mainly septic tanks and soakaway systems. We are now implementing a comprehensive village sewerage programme to improve the sewerage infrastructure of Peng Chau. In this regard, we started the construction of the sewerage works in the central parts of Peng Chau under project **228DS** "Outlying Islands sewerage, stage 1 phase 2 – Peng Chau and Cheung Chau sewerage" in 2002 for completion in 2005. At the moment, the sewage flow received by PCSTW has already reached its design capacity. With the extension of the sewerage system, the sewage flows to PCSTW will increase substantially to 1 260 m<sup>3</sup> per day in the coming years. To cope with the increase in sewage flow, we need to increase the capacity of the

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existing PCSTW and the associated inlet pumping mains. We also propose to enhance the treatment level by including nitrogen removal and providing dechlorination, and to expand the treatment capacity from 450 m<sup>3</sup> per day to 1 580 m<sup>3</sup> per day. We will also construct a submarine outfall to enhance the initial dilution of the effluent in the receiving waters.

6. If we do not proceed with the proposed upgrading works, the flows to be collected by the newly constructed sewerage systems will not receive proper treatment before being discharged. This will result in the deterioration of water quality in the Southern Waters.

### FINANCIAL IMPLICATIONS

7. We estimate the capital cost of the proposed works to be \$93.0 million in MOD prices (see paragraph 8 below), made up as follows –

|   | <b>\$ million</b> |
|---|-------------------|
| (a) Construction of                       | 70.5              |
| (i) sewage treatment works                | 42.7              |
| (ii) submarine outfalls                   | 3.5               |
| (iii) inlet pumping mains                 | 2.0               |
| (iv) deodorisation facilities             | 5.5               |
| (v) sludge dewatering/handling facilities | 11.0              |
| (vi) ancillary works                      | 5.8               |
| (b) Consultants' fees for                 | 11.9              |
| (i) contract administration               | 2.0               |
| (ii) site supervision                     | 9.9               |

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|     |                                   | <b>\$ million</b>               |
|-----|-----------------------------------|---------------------------------|
| (c) | Environmental mitigation measures | 2.9                             |
| (d) | Contingencies                     | 8.5                             |
|     | Sub-total:                        | 93.8 (in September 2004 prices) |
| (e) | Provision for price adjustment    | (0.8)                           |
|     | Total:                            | 93.0 (in MOD prices)            |

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

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

| <b>Year</b> | <b>\$ million<br/>(Sept 2004)</b> | <b>Price adjustment<br/>factor</b> | <b>\$ million<br/>(MOD)</b> |
|-------------|-----------------------------------|------------------------------------|-----------------------------|
| 2005 – 2006 | 15.8                              | 0.99000                            | 15.6                        |
| 2006 – 2007 | 22.7                              | 0.98753                            | 22.4                        |
| 2007 – 2008 | 31.8                              | 0.99123                            | 31.5                        |
| 2008 – 2009 | 23.5                              | 0.99990                            | 23.5                        |
|             | 93.8                              |                                    | 93.0                        |

9. We have derived the MOD estimate on the basis of Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period 2005 to 2009. We will tender the proposed works on a re-measurement basis because of uncertainties of the rock head level, and the location of underground utilities such as electricity cables and water pipes. The contract will provide for price adjustments because the contract period will exceed 21 months. The electrical and mechanical works portion will be on a lump sum basis without any price adjustment.

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10. We estimate the annual recurrent expenditure arising from the proposed works to be about \$2.5 million.

11. Based on the current level of expenditure on operation and maintenance of sewerage facilities, the proposed works by themselves will lead to an increase in the recurrent cost of providing sewage services by about 0.15%, which will need to be taken into account in determining future sewage charges.

## **PUBLIC CONSULTATION**

12. We consulted the Peng Chau/Discovery Bay Area Committee and the Island District Council on the proposed works in December 2003 and February 2004 respectively. They supported implementation of the proposed works. We also consulted the residents of Sea Crest Villa, the Green Peng Chau Association and the Peng Chau Fishermen Association in January 2004 and obtained their support for the project.

13. We gazetted the proposed works under the Foreshore and Sea-bed (Reclamations) Ordinance on 18 June 2004. We did not receive any objections to the proposed works during the gazetting period and the scheme was authorised under the Foreshore and Sea-bed (Reclamations) Ordinance on 12 November 2004.

14. We consulted the Legislative Council Panel on Environmental Affairs on the proposed works on 22 November 2004. Members supported the implementation of the proposed project.

## **ENVIRONMENTAL IMPLICATIONS**

15. The project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for the construction and operation (or decommissioning) of the project. In October 2004, the EIA report for the project was approved under EIA Ordinance. The EIA report has concluded that the environmental impact of the project can be controlled to within the criteria under EIA Ordinance and the Technical Memorandum on EIA Process. We shall implement the measures recommended in the approved EIA report. The key measures include good site practices and proper phasing of the works. We estimate the cost of implementing the environmental mitigation measures to be \$2.9 million. We have included this cost in the overall project estimate.

16. At the planning and design stages, we have given due consideration to the need to minimise the generation of construction and demolition (C&D) materials when designing the level and layout of the proposed works. We will 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 in designated public filling 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. We estimate that the project will generate about 7 000 m<sup>3</sup> of C&D materials. Of these, we will reuse about 500 m<sup>3</sup> (7%) on site, 6 450 m<sup>3</sup> (92%) as fill in public filling areas<sup>1</sup>, and dispose of 50 m<sup>3</sup> (less than 1%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$6,250 for this project (based on a notional unit cost<sup>2</sup> of \$125/m<sup>3</sup>).

## LAND ACQUISITION

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

## BACKGROUND INFORMATION

18. In 1994, we completed the Sewerage Master Plan (SMP) Study under **146DS** “Outlying Islands Sewerage Master Plan Study – consultants’ fees and investigations” and recommended a series of sewerage improvement works at Lantau Island, Peng Chau, Cheung Chau, Lamma Island, and other small islands to the west and south of Hong Kong Island.

19. In August 1996, we included **211DS** “Outlying Islands sewerage stage 1 phase 2” into Category B for the provision of sewerage systems to the central parts of Peng Chau and Cheung Chau, amongst others, as recommended under the Study.

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<sup>1</sup> A public filling area is a designated part of a development project that accepts public fill for reclamation purposes. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering and Development.

<sup>2</sup> This 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 are likely to be more expensive) when existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

20. In October 1998, we included an item under block allocation **Subhead 4100DX** for the minor sewerage works in Peng Chau under stage 1 phase 2 of **211DS**. The works commenced in March 1999 and completed in 2002.

21. In January and February 2002, we completed a preliminary project feasibility study for the upgrading works in PCSTW and the “Outlying Islands SMP Stage 2 Review” respectively. Both studies recommended the upgrading works for the existing PCSTW, including the provision of secondary treatment facilities, submarine outfalls, and the associated supporting facilities. In the same year, we included the PCSTW upgrading works into the scope of **211DS**.

22. In May 2002, we upgraded part of **211DS** to Category A as **228DS** “Outlying Islands sewerage, stage 1 phase 2 – Peng Chau and Cheung Chau sewerage”. The works mainly involve construction of sewers and a sewage pumping station in the village areas of Peng Chau and Cheung Chau. The works commenced in September 2002 and will be completed in mid-2007. Following completion of the proposed works, we will serve notice to request villagers to carry out the final house connection works under the Water Pollution Control Ordinance.

23. We have substantially completed the design and planned to start the construction of the proposed upgrading works for PCSTW in March 2005 for completion in March 2008.

24. The proposed upgrading works will affect 111 common trees, of which 103 will need to be felled and eight will be transplanted within the project site. All trees to be removed are not important trees<sup>3</sup>. We have incorporated planting proposals as part of the project, including estimated quantities of 157 trees, 445 shrubs and 860 m<sup>2</sup> of grassed area.

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<sup>3</sup> Important trees include trees on the Register of Old and Valuable Trees, and any other trees which meet one or more of the following criteria –

- (a) trees over 100 years old;
- (b) trees of cultural, historical or memorable significance;
- (c) trees of precious or rare species;
- (d) trees of outstanding form; or
- (e) trees with trunk diameter exceeding one metre (measured at one metre above ground level).

25. We estimate that the proposed works will create about 47 jobs (35 for labourers and another 12 for professional/technical staff) providing a total employment of 1 250 man-months.

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Environment, Transport and Works Bureau  
December 2004



附件 1 Enclosure 1

**211DS – Outlying Islands sewerage, stage 1 phase 2 –  
upgrading of Peng Chau sewage treatment works**

**Breakdown of estimate for the consultants’ fees**

| Consultants’ staff cost |  |              | Estimated<br>man-<br>months | Average<br>MPS*<br>salary<br>point | Multiplier<br>(Note 1) | Estimated<br>fee<br>(\$ million) |
|-------------------------|--|--------------|-----------------------------|------------------------------------|------------------------|----------------------------------|
| (a)                     | Contract   | Professional | -                           | -                                  | -                      | 1.8                              |
|                         | administration   | Technical    | -                           | -                                  | -                      | 0.2                              |
| (Note 2)                |  |              |                             |                                    |                        |                                  |
| (b)                     | Site supervision<br>by resident site<br>staff employed by<br>the consultants | Professional | 44                          | 38                                 | 1.6                    | 3.8                              |
|                         |  | Technical    | 210                         | 14                                 | 1.6                    | 6.1                              |
| (Note 3)                |  |              |                             |                                    |                        |                                  |
| Total                   |  |              |                             |                                    |                        | 11.9                             |

\* MPS = Master Pay Scale

**Notes**

1. A multiplier of 1.6 is applied to the average MPS point to estimate the resident site staff cost supplied by the consultants. (As at 1.1.2005, 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 investigation, design and construction of **211DS**.
3. We will only know the actual man-months and actual costs for site supervision after the completion of the works.