

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

### **HEAD 709 – WATERWORKS**

#### **Water Supplies – Fresh water supplies**

#### **237WF – Mainlaying along Fanling Highway and near She Shan Tsuen – stage 2**

Members are invited to recommend to Finance Committee the upgrading of **237WF** to Category A at an estimated cost of \$225.5 million in money-of-the-day prices for the laying of additional water mains to improve integration between the Sheung Shui water treatment works and the Tai Po water treatment works.

### **PROBLEM**

Fanling, Sheung Shui and Tai Po East areas receive fresh water supply from the Sheung Shui water treatment works (WTW). In the event of breakdown in the Sheung Shui WTW, there may be widespread suspension of fresh water supply.

### **PROPOSAL**

2. The Director of Water Supplies (DWS), with the support of the Secretary for Development, proposes to upgrade the remaining part of **237WF** to Category A at an estimated cost of \$225.5 million in money-of-the-day (MOD) prices to upgrade the integration between the Sheung Shui WTW and the Tai Po WTW by laying additional water mains.

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## PROJECT SCOPE AND NATURE

3. The remaining part of **237WF** (i.e. stage 2 works) comprises –
  - (a) laying of about 2.3 kilometres (km) of fresh water mains of 1 200 millimetres (mm) in diameter along Fanling Highway; and
  - (b) laying of about 1.4 km of fresh water mains ranging from 900 mm to 1 400 mm in diameter along Tai Po Road – Tai Wo and near She Shan Tsuen.

Site plans showing the proposed works are at Enclosure 1.

4. Subject to the funding approval of the Finance Committee (FC), we plan to commence the construction of the proposed works in April 2012 for completion in phases by December 2017.

## JUSTIFICATION

5. Currently, the Fanling, Sheung Shui and Tai Po East areas with a population of about 330 000 receive fresh water supply from the Sheung Shui WTW. In the event of a breakdown in the Sheung Shui WTW, only around 127 000 people in Fanling town centre, Sheung Shui town centre and Tai Po East areas will be able to receive back-up water supply from the Tai Po WTW. Full back-up supply is not available due to the constraint of the capacity of the existing water mains linking the two WTWs. There is a risk of widespread suspension of fresh water supply affecting a population of about 203 000 if the Sheung Shui WTW breaks down.

6. To improve the reliability of the fresh water supply in the Fanling, Sheung Shui and Tai Po areas, we propose to lay additional water mains to enable the transfer of fresh water from the Tai Po WTW to the supply zones of the Sheung Shui WTW. We have already commenced construction of the stage 1 works (comprising the laying of about 1 km of fresh water mains of 1 200 mm in diameter along Fanling Highway and Tai Wo Service Road West) by incorporating the works into **843TH** – “Widening of Tolo Highway between Island House Interchange and Tai Hang” (which is part-upgraded from **720TH** “Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling”) implemented by the Highways Department (HyD). The stage 1 works are scheduled for completion by 2013. We need to take forward the remaining works (i.e. stage 2 works) to fully upgrade the integration between Sheung Shui and Tai Po WTWs and achieve full back-up supply when needed.

7. The proposed mainlaying works along Fanling Highway described in paragraph 3(a) above fall within the project boundary of **720TH**. HyD intends to seek funding support from the FC in mid 2012 to implement the remaining part of **720TH**. In order to avoid repeated road openings and interface problems arising from two contractors working on the same site, we will entrust the proposed mainlaying works to the HyD for implementation in conjunction with the road works under **720TH**. As regard the proposed works described in paragraph 3(b) above, we will arrange separate mainlaying contracts.

## FINANCIAL IMPLICATIONS

8. We estimate the cost of the proposed works to be \$225.5 million in MOD prices (please see paragraph 10 below), broken down as follows –

	<b>\$ million</b>
(a) Mainlaying by	149.3
(i) conventional method <sup>1</sup>	141.5
(ii) trenchless methods <sup>2</sup>	7.8
(b) Environmental mitigation measures	2.2
(c) Consultants' fee for	1.1
(i) contract administration	0.8
(ii) management of resident site staff	0.3
(d) Remuneration of resident site staff	7.1
	/(e) .....

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<sup>1</sup> Mainlaying by conventional method refers to laying of new water mains in trench. It involves opening up the road surface for the whole lengths of the pipelines. We have assumed that around 98% of water mains will be laid by conventional method. The actual percentage will depend on site conditions.

<sup>2</sup> Mainlaying by trenchless methods (sometimes referred to as 'minimum dig' or 'reduced dig' methods) refers to the use of pipe jacking, micro-tunnelling or boring techniques to construct underground pipelines without opening up the road surface for the whole lengths of the pipelines. We have assumed that around 2% of water mains will be laid by trenchless methods. The actual percentage will depend on site conditions.

		<b>\$ million</b>
(e) Contingencies		15.9
	Sub-total	175.6 (in September 2011 prices)
(f) Provision for price adjustment		49.9
	Total	<u>225.5<sup>3</sup></u> (in MOD prices)

9. We propose to engage consultants to undertake contract administration and site supervision of the proposed mainlaying works as described in paragraph 3(a), which will be entrusted to HyD for implementation under **720TH**. A breakdown of the estimates for consultants' fees by man-months is at Enclosure 2. The proposed works to be carried out by the Water Supplies Department as described in paragraph 3(b) will be supervised by in-house resources.

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

Year	\$ million (Sept 2011)	Price adjustment factor	\$ million (MOD)
2012 – 2013	14.0	1.05375	14.8
2013 – 2014	15.0	1.11171	16.7
2014 – 2015	20.0	1.17285	23.5
2015 – 2016	33.0	1.23736	40.8
2016 – 2017	34.0	1.30541	44.4

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<sup>3</sup> The total project cost has included the estimated cost for mainlaying works as described in paragraph 3(a) (\$135 million in MOD prices) for construction in conjunction with the road works to be implemented under **720TH**.

Year	\$ million (Sept 2011)	Price adjustment factor	\$ million (MOD)
2017 – 2018	29.0	1.37721	39.9
2018 – 2019	19.0	1.45296	27.6
2019 – 2020	11.6	1.53287	17.8
	175.6		225.5

11. 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 2012 to 2020. We will deliver the works under re-measurement contracts because the quantities of works are subject to variation during construction to suit the actual site conditions. The contract will provide for price adjustments.

12. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$230,000.

13. The project by itself will lead to an increase in production cost of water by 0.05% in real terms by 2020<sup>4</sup>.

## **PUBLIC CONSULTATION**

14. We have separately consulted the village representatives of Tai Po Tau Shui Wai, Mui Shue Hang, She Shan, Tai Hang, Tai Wo, Yuen Leng Lei Uk, Yuen Leng Yip Uk, Nam Wa Po, Kau Lung Hang, as well as the concerned District Council members on the proposed works through Home Affairs Department during the period from June 2008 to May 2009. They had no objection to the proposed works.

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<sup>4</sup> The increase in production cost of water is calculated at the present price level and on the assumption that the water demand remains static during the period from 2012 to 2020.

15. We also consulted the Traffic and Transport Committee of the North District Council by circulating an information paper in April 2009. No objection to the proposed works had been received.

16. We circulated an information paper to the Legislative Council Panel on Development on the proposed works on 5 January 2012. Members raised no objection to the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

17. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have completed the Preliminary Environmental Review for the proposed works, which concludes that the works would not have any long-term environmental impact. We have included a sum of \$2.2 million (in September 2011 prices) in the project estimates for the implementation of standard pollution control measures to mitigate short-term environmental impacts during construction stage. These measures include the use of movable noise barriers and silenced construction plant for noisy construction activities, frequent cleaning and watering of the site and the provision of wheel-washing facilities to prevent dust nuisance.

18. At the planning and design stages, we have considered the alignment of the water mains to reduce the generation of construction waste where possible. In addition, we will require 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 at public fill reception facilities<sup>5</sup>. We will encourage the contractors to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimise the generation of construction waste.

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<sup>5</sup> Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities 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 the 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 and non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

20. We estimate that the proposed works will generate in total about 41 000 tonnes of construction waste. Of these, we will reuse about 31 100 tonnes (76%) of inert construction waste on site and deliver 8 900 tonnes (22%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 1 000 tonnes (2%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be \$365,300 for this project (based on a unit cost of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne<sup>6</sup> at landfills).

## **TRAFFIC IMPLICATIONS**

21. To avoid repeated road openings and interface problems arising from two contractors working on the same site, we will entrust the proposed mainlaying works along Fanling Highway as described in paragraph 3(a) to HyD under **720TH** so that they would be carried out in conjunction with the roadworks contracts. Trenchless methods will be used for laying of watermains across busy road junctions. The remaining proposed works will have minimal traffic impact to the surrounding road network.

22. During construction, we will maintain smooth traffic flow through implementing temporary traffic management measures and will display notice boards on site to explain the reasons of temporary traffic arrangements and indicate the expected completion dates of the concerned sections of works. In addition, we will set up telephone hotlines for public enquiries or complaints. In busy road sections, construction works will only be carried out during non-peak hours; these road sections will remain open during peak hours.

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<sup>6</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 per m<sup>3</sup>), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

## HERITAGE IMPLICATIONS

23. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

## LAND ACQUISITION

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

## BACKGROUND INFORMATION

25. We included **237WF** in Category B in October 1999. The full scope comprises laying of about 4.7 km long fresh water mains ranging from 900 mm to 1 400 mm in diameter.

26. We engaged a consultant in 2001 to undertake the site investigation and design for the part of mainlaying works along Fanling Highway entrusted to **720TH** at a total cost of about \$2.3 million. We charged this amount to block allocation under Subhead **9100WX** – “Waterworks, studies and investigations for items in Category D of the Public Works Programme”. The consultant has substantially completed the design. For other proposed works, we have substantially completed the design by in-house resources.

27. In February 2009, Finance Committee approved the upgrading of part of **237WF** to Category A as **338WF** – “Mainlaying along Fanling Highway and near She Shan Tsuen – stage 1” at an approved project estimate of \$52.6 million in MOD prices for the laying of about 1 km long fresh water mains of 1 200 mm in diameter along Fanling Highway and Tai Wo Service Road West. The construction works have been entrusted to Highways Department under **843TH**, which was part-upgraded from **720TH** to Category A in February 2009. The stage 1 works are anticipated to complete in 2013.

28. Of the 491 trees within the project boundary, it is expected that 432 trees will be preserved. The proposed works will involve the felling of 59 trees,

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none of which are important trees<sup>7</sup>. The majority of the trees to be felled are either invasive weedy species or in poor health or form. We will incorporate planting proposals as part of the project, including planting of about 59 trees.

29. We estimate that the proposed works will create about 58 jobs (49 for labourers and another nine for professional/technical staff) providing a total employment of 2 400 man-months.

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Development Bureau  
January 2012

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<sup>7</sup> “Important trees” refers 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/canopy spread equal or exceeding 25 m.

**237WF – Mainlaying along Fanling Highway and  
near She Shan Tsuen – stage 2**

**Breakdown of estimates for consultants' fees and resident site staff costs  
(in September 2011 prices)**

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$million)
(a) Consultants' fees for contract administration (Note 2)	Professional	-	-	-	0.5
	Technical	-	-	-	0.3
				Sub-total	<hr/> 0.8
(b) Resident site staff costs (Note 3)	Professional	26	38	1.6	2.6
	Technical	142	14	1.6	4.8
				Sub-total	<hr/> 7.4
Comprising –					
(i) Consultants' fees for management of resident site staff					0.3
(ii) Remuneration of resident site staff					7.1
				<b>Total</b>	<hr/> <b>8.2</b>

\* MPS = Master Pay Scale

**Notes**

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants. (As at now, MPS salary point 38 = \$62,410 per month and MPS salary point 14 = \$21,175 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 **720TH**. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade the proposed works to Category A.
3. The actual man-months and actual cost will only be known after completion of the construction works.