For discussion **PWSC(2007-08)5**
on 18 April 2007

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS
Water Supplies – Combined fresh/salt water supply
76WC – Improvement to Hong Kong Central mid-level and high level areas water supply – remaining works

Members are invited to recommend to Finance Committee the upgrading of the remaining works under **76WC** to Category A at an estimated cost of $229.3 million in money-of-the-day (MOD) prices for improving the water supply to Hong Kong Central mid-level and high level areas.

PROBLEM

The existing fresh water and salt water supply systems in the Hong Kong Central mid-level and high level areas[1] are not adequate to provide a reliable water supply with operational safety to the areas.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade the remaining works under **76WC** to Category A at an estimated cost of $229.3 million in MOD prices to further improve the water supply to Hong Kong Central mid-level and high level areas.

/**PROJECT** .....

---

[1] Hong Kong Central mid-level covers the area from south of Queen's Road Central to north of Conduit Road between Cotton Tree Drive and Pok Fu Lam Road. Hong Kong Central high level covers the area at Victoria Peak, Mount Gough and Mount Kellett.

PROJECT SCOPE AND NATURE

3. The scope of the proposed works comprises -

Mid-level Area

(a) construction of the New Hatton Road No. 1 and No. 2 fresh water service reservoirs with storage capacities of 2 500 cubic metres (m^3) and 4 500 m^3 respectively to replace the existing Hatton Road fresh water service reservoirs;

(b) uprating of the Hatton Road fresh water service reservoir pump group in the existing Western fresh water and salt water pumping station from 5 530 m^3 per day (m^3/day) to 7 300 m^3/day;

(c) laying of about 5 400 metres (m) fresh water trunk mains of diameters ranging from 300 millimetres (mm) to 700 mm and about 4 100 m salt water distribution mains of diameters ranging from 200 mm to 450 mm;

High Level Area

(d) construction of the Peak No. 2 fresh water service reservoir with a storage capacity of 1 750 m^3;

(e) construction of the Kotewall Road fresh water pumping station with an output of 3 300 m^3/day;

(f) relocation of the existing Peak fresh water pumping station with an output of 345 m^3/day;

(g) uprating of the Kotewall Road fresh water service reservoir pump group in the existing Western fresh water and salt water pumping station from 14 500 m^3/day to 17 300 m^3/day; and

(h) laying of about 1 600 m fresh water trunk mains of diameters ranging from 200 mm to 700 mm and about 300 m fresh water distribution mains of diameter 200 mm.

A site plan showing the proposed works is at Enclosure 1.

/4. .....

4. We plan to start construction in October 2007 for completion in June 2011.

JUSTIFICATION

Mid-level Area

5. Currently, the existing Hatton Road fresh water service reservoirs, Conduit Road fresh water service reservoir and Peak Road fresh water service reservoir each serves its own supply zone in the mid-level area without any interconnection. In case any of these service reservoirs is in need of maintenance, water supply to some of the zones will be affected. Moreover, the two existing Hatton Road fresh water service reservoirs have been in service for more than 50 and 80 years respectively. Their condition is unsatisfactory due to aging and maintenance is becoming difficult and costly. The service reservoirs may have water leakage problems causing hazards to the stability of the slopes in the vicinity.

6. To safeguard the reliability of fresh water supply to the mid-level area with adequate operational safety, we propose to reconstruct these two existing service reservoirs and link up the supply zones of these fresh water service reservoirs and increase the total storage capacity from the existing quantity of 13 258 m^3 to the required quantity of 16 905 m^3.

7. To dovetail with the above improvement works, we need to uprate the existing pumping system within the district with increased capacity to provide adequate reserve for supply reliability and cater for the interconnection of the foregoing service reservoirs with increased capacity. We also need to lay additional fresh water and salt water distribution mains in the mid-level area to improve the hydraulics of the systems, as the area may suffer weak water pressure or interruption of water supply even when a small scale repair or planned maintenance is carried out.

High Level Area

8. Currently, only the Peak fresh water service reservoir with a storage capacity of 1 796 m^3 serves the high level area, which is fed by only one water main from the Western fresh and salt water pumping station with no alternative supply source. To safeguard the reliability of fresh water supply to the high level area with adequate operational safety, we propose to construct an additional fresh water service reservoir with a capacity of 1 750 m^3 to integrate with the existing Peak fresh water service reservoir to enable possible shut down of the existing service reservoir for maintenance when required.

/9. .....

9. In conjunction with such improvement works, we need to construct a new pumping station at Kotewall Road and uprate the associated pumping system, for providing a second and adequate supply source such that fresh water supply would be maintained even if there is interruption in one of the fresh water supply routes to the high level area. We also plan to relocate the existing Peak fresh water pumping station to coordinate the operation of the proposed additional fresh water service reservoir. In addition, we will lay additional trunk mains and distribution water mains in the high level area so as to connect the new pumping station and the service reservoirs as well as to improve the hydraulics of the system to avoid the problem of weak water pressure.

FINANCIAL IMPLICATIONS

10. We estimate the cost of the proposed works to be $229.3 million in MOD prices (see paragraph 11 below), made up as follows –

		$ million
	<u>Mid-level Area</u>	
(a)	Demolition of existing service reservoirs	1.0
(b)	Fresh water service reservoirs	62.9
(c)	Uprating of Western fresh water and salt water pumping station	3.9
(d)	Mainlaying	65.7
	<u>High Level Area</u>	
(e)	Fresh water service reservoir	12.0
(f)	Fresh water pumping stations	16.5
(g)	Uprating of Western fresh water and salt water pumping station	6.1
(h)	Mainlaying	14.0
	<u>General</u>	
(i)	Environmental mitigation measures	2.2

/(j) .....

			$ million	
(j)	Consultants' fees		19.6	
	(i) for contract administration	1.4		
	(ii) for site supervision	18.2		
(k)	Contingencies		20.4	
	Sub-total		224.3	(in September 2006 prices)
(l)	Provision for price adjustment		5.0	
	Total		229.3	(in MOD prices)

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

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

Year	**$ million (Sept 2006)**	**Price Adjustment Factor**	**$ million (MOD)**
2007 – 2008	15.0	0.99900	15.0
2008 – 2009	43.1	1.00649	43.4
2009 – 2010	50.0	1.01656	50.8
2010 – 2011	64.2	1.02672	65.9
2011 – 2012	36.3	1.03699	37.6
2012 – 2013	15.7	1.05514	16.6
	224.3		229.3

12. 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 from 2007 to 2013. We will tender the works on a re-measurement basis because the quantities of works are subject to variation during construction to suit the actual site conditions. The contract will provide for price adjustment as the contract period will exceed 21 months.

/13. .....

13. We estimate the annual recurrent expenditure arising from the project to be $3.1 million.

14. The project by itself would lead to an increase in the production cost of water by 0.14% in real terms by 2013[2].

PUBLIC CONSULTATION

15. We consulted the Food, Environment, Hygiene and Works Committee of the Central and Western District Council on 12 October 2006. The Committee supported the proposed works.

16. We consulted the Legislative Council Panel on Planning, Lands and Works on the proposed works by circulation of an information paper on 20 March 2007. Members raised no objection to the proposal.

ENVIRONMENTAL IMPLICATIONS

17. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap 499). We completed a Preliminary Environmental Review (PER) for the project in March 2007. The PER concluded, and the Director of Environmental Protection agreed that, with the recommended mitigation measures in place, the project would not cause any adverse environmental impact.

18. We have included about $2.2 million (in September 2006 prices) in the project estimates for the implementation of mitigation measures, including the use of temporary noise barriers, silenced construction plant, water-spraying during construction, suitably designed enclosures for pumping stations etc. to control impacts during construction and operation stages to within established standards and guidelines.

19. We have considered the layout and foundation level of the proposed service reservoirs and pumping stations in the planning and design stage to reduce the generation of construction and demolition (C&D) materials where possible.

/In .....

---

[2] The increase in the 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 2007 to 2013.

In addition, we will require the contractor to reuse inert C&D materials (e.g. excavated soil) 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[3]. 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.

20. 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 and will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

21. We estimate that the project will generate about 52 000 tonnes of C&D materials. Of these, we will reuse about 30 000 tonnes (about 58%) on site, deliver 15 200 tonnes (29%) to public fill reception facilities for subsequent reuse and dispose of 6 800 tonnes (13%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be about $1.3 million for this project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonnes at landfills[4]).

TRAFFIC IMPACTS

22. To minimise possible disruption to traffic during construction, we have completed the traffic impact assessment which concluded that the proposed works would not cause unacceptable traffic impact. During construction, we will maintain smooth traffic flow through implementing temporary traffic management measures as far as possible and displaying notice boards on site to explain the reason of temporary traffic arrangements and the expected completion

/date .....

---

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

[4] 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^3), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

date of the concerned section of works. We will set up telephone hotlines for public enquiries or complaints. We will arrange to carry out construction works in busy road sections in non-peak hours. We will employ trenchless method as far as practicable at road junctions where traffic impacts may be significant, including the junctions of Magazine Gap Road and Garden Road, Robinson Road and Old Peak Road, Caine Road and Castle Road, and Wyndam Street and Arbuthnot Road.

23. We will establish a Traffic Management Liaison Group (TMLG) under the works contract to discuss, scrutinise and agree on the proposed temporary traffic management measures. Representatives from Transport Department, Hong Kong Police Force, Highways Department, the relevant District Offices and public transport operators will be invited to attend the TMLG before implementation. The TMLG will take into account all the relevant factors, such as site restrictions, existing and future traffic conditions, pedestrian safety, access to buildings/shop fronts and provision of emergency vehicle access, while considering the temporary traffic arrangements.

LAND ACQUISITION

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

BACKGROUND INFORMATION

25. We included **76WC** "Improvement to Hong Kong Central mid-level and high level areas water supply" to Category B in July 1994.

26. In January 1995, we upgraded part of **76WC** to Category A as **77WC** "Improvement to Hong Kong Central mid-level and high level areas water supply – Stage 1" at an estimated cost of $20.5 million (in MOD prices) for the construction of the extension of new Albany fresh water pumping station (FWPS) and the laying of salt water mains along Robinson Road. We started the works in November 1995 and completed them in September 1999.

27. In May 2003, we upgraded another part of **76WC** to Category A as **183WC** "Improvement to Hong Kong Central mid-level and high level areas water supply – Stage 2" at an estimated cost of $70.6 million (in MOD prices) for the construction of Magazine Gap Road No.3 fresh water service reservoir, uprating of Magazine Gap Road FWPS, Bowen Road FWPS, Severn Road FWPS and the laying of fresh water mains in the Bowen Road group high level supply system. We started the works in August 2003 and completed them in November 2006.

/28. .....

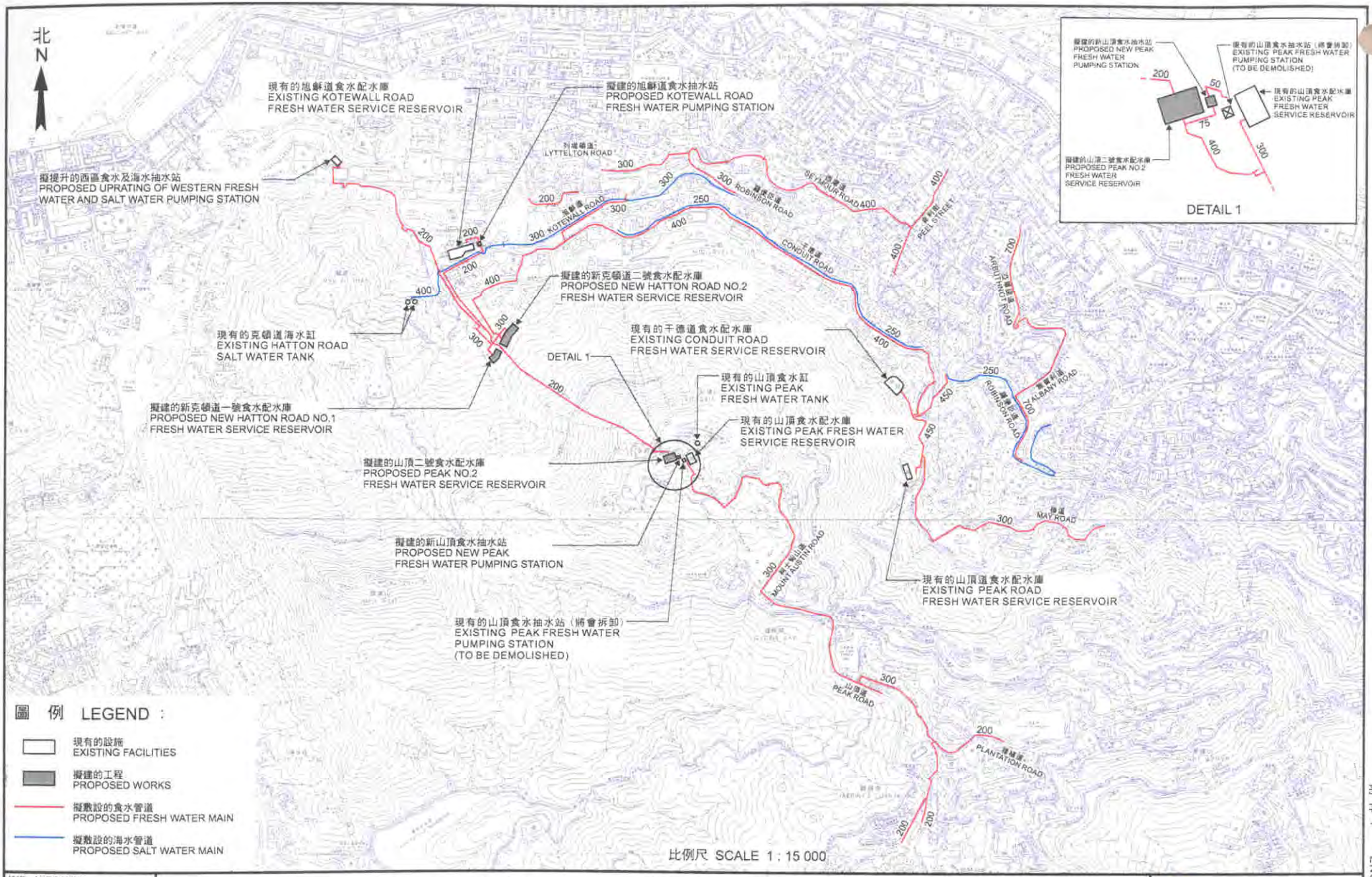
28. Of the 1 037 trees within the project boundary, we shall be able to preserve 895 trees. The proposed works will involve felling of about 142 common trees. All trees to be felled are not important trees[5]. We will incorporate planting proposal as part of the project, including estimated quantities of 145 trees and 900 square metres of grassed area.

29. We estimate that the proposed works will create about 100 jobs (80 for labourers and another 20 for professional/technical staff) providing a total employment of 4 000 man-months.

Environment, Transport and Works Bureau
April 2007

---

[5] "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 events;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall trees 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.



核准 APPROVED 總工程師/顧問工程管理 CE/CM 15 / 3 / 2007	工務計劃項目第 76WC 號 — 港島中區半山及以上地區供水改善計劃 — 餘下工程 P.W.P. Item no. 76WC — Improvement to Hong Kong Central mid-level and high level areas water supply — remaining works （甲 級 工 程） (CAT 'A' Submission)	水務署 WATER SUPPLIES DEPT. 圖則編號 DRAWING NO. SK 62006 / 094 / 001

附件 1 ENCLOSURE 1

Enclosure 2 to PWSC(2007-08)5

76WC – Improvement to Hong Kong Central mid-level and high level areas water supply – remaining works

Breakdown of estimate for consultants' fees –

Consultants' staff costs		**Estimated man-months**	**Average MPS* salary point**	**Multiplier** (Note 1)	**Estimated fee ($million)**
(a) consultants' fees for works in the construction stage (Note 2)					1.4
(b) site supervision by resident site staff employed by the consultants (Note 3)	Professional	76	38	1.6	6.6
	Technical	402	14	1.6	11.6
		Total consultants' staff cost			**19.6**

*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. (With effect from 1.1.2007, MPS Pt. 38 = $54,255 per month and MPS Pt. 14 = $18,010 per month).

2. The consultants' fees for works in the construction stage are the actual tendered prices provisionally included in the consultancy agreement for the design and construction of the project. 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. We will only know the actual man-months and actual cost after completion of the construction works.