

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 to increase the approved project estimate of **76WC** by \$100.5 million from \$229.3 million to \$329.8 million in money-of-the-day prices.

PROBLEM

The approved project estimate (APE) of **76WC** is not sufficient to cover the costs of the works under the project.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to increase the APE of **76WC** by \$100.5 million from \$229.3 million to \$329.8 million in money-of-the-day (MOD) prices.

PROJECT SCOPE AND NATURE

3. In May 2007, the Finance Committee (FC) approved the upgrading of the final phase of **76WC** to Category A at an estimated cost of \$229.3 million in MOD prices. The approved scope of works under **76WC** comprises –

/Mid-level

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 (m³) and 4 500 m³ 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 m³ per day (m³/day) to 7 300 m³/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 m³;
- (e) construction of the Kotewall Road fresh water pumping station with an output of 3 300 m³/day;
- (f) relocation of the existing Peak fresh water pumping station with an output of 345 m³/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 m³/day to 17 300 m³/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. We started the construction works in October 2007 and originally planned to complete the works in June 2011. By March 2010, about 58% of the works have been completed. Subject to funding approval of FC in April 2010, we anticipate that the project will be completed in September 2012 in view of the potential extension of time to be granted for inclement weather and the unforeseen circumstances as detailed in paragraphs 6 to 8 below.

JUSTIFICATION

5. Following a review of the financial position of the project, it is considered necessary to increase the APE of **76WC** by \$100.5 million in MOD prices to cover additional costs arising from the following –

- (a) unforeseen working hour restriction;
- (b) unforeseen ground conditions;
- (c) increase in site supervision costs; and
- (d) increase in provision for price adjustment.

Additional costs due to unforeseen working hour restriction

6. In carrying out the mainlaying works in the mid-level area, we encountered unforeseen restriction on working hours which necessitated additional costs. A traffic impact assessment (TIA) was carried out during the design stage of the project for the mainlaying works. The finalised TIA report was completed in October 2006 and circulated to the authorities concerned. No adverse comment was received at that time. The report recommended that mainlaying works at critical road locations should be carried out only during non-peak hours, i.e. during the six hours between 10 a.m. and 4 p.m. of the days which are not public holidays or Sunday. When the mainlaying works in the mid-level area began in April 2008, it then came to light that there were significant problems and difficulties in applying the daily working period of six hours in many of the locations concerned. This was primarily attributed to the increase in other construction activities, the prevailing traffic conditions as well as the heightened public concerns about traffic and road safety in the areas. On further consultation with the authorities concerned, it was found that the daily working period for a significant portion of the mainlaying works, particularly at Conduit Road and Lyttelton Road, would need to be further restricted to five hours a day between 10 a.m. and 3 p.m., thus requiring additional cost and longer construction period. The total additional payment due to unforeseen working hour restriction is estimated to be \$29.1 million.

/Additional

Additional costs due to unforeseen ground conditions

7. When works commenced in early 2008, the existing ground condition of the roads in mid-level area was found to be much more congested with utilities than expected which necessitated changes of the water main alignment in many locations. As a result, we need to introduce many more bends and fittings to lay the water mains amid the clutters of closely packed pipes and cables and other underground obstructions. Such process inevitably involved the laying of longer pipes length and required additional road opening, excavation, pipe fittings and anchor blocks, thus requiring additional cost and longer construction period. The total additional mainlaying cost resulting from such unexpected difficult ground condition is estimated to be \$27.8 million.

8. Unforeseen geological conditions were also encountered during the construction of the Hatton Road No. 1 fresh water service reservoir. A larger amount of boulders than that anticipated in the design stage was found in the course of site formation. Therefore, additional excavation works and slope stabilization works were carried out to cater for the actual site conditions. The total additional payment due to unforeseen geological conditions is estimated to be \$6.0 million.

Increase in site supervision costs

9. The original APE of 76WC covers consultants' staff cost of \$18.2 million for 478 man-months of resident site staff (RSS) to be deployed by consultants for site supervision. Following a review, we anticipate that extra RSS resources are required to cater for the unforeseen difficulties encountered during construction as well as the extended construction period due to inclement weather and circumstances as explained in paragraphs 6 to 8 above. We estimate that the required RSS man-months will increase from 478 to 890 man-months. As a result, there will be a total increase of \$17.3 million in the cost of site supervision by the consultants.

Increase in provision for price adjustment

10. According to existing Government practice, monthly payments to contractors for construction contracts are adjusted to cover market fluctuation in labour and material costs on the basis of "Index Numbers of the Costs of Labour and Materials used in Public Sector Construction Projects", which are known as Contract Price Fluctuation (CPF) payment. A provision of \$5 million was allowed in the original APE for the price adjustment based on the prevailing price

/adjustment

adjustment factors and the project cash flow projected in 2007. However, in the light of the upsurge of the actual and projected CPF payment during the construction period, we anticipate the provision for price adjustment will have to be increased by \$36.7 million from \$5 million to \$41.7 million. Details are at Enclosure 2.

Offset by lower-than-expected tender prices and project contingencies

11. The increase in cost due to reasons explained in paragraphs 6 to 10 above is partly offset by a sum of \$7.5 million and \$8.9 million to be released from lower-than-expected tender prices and project contingencies respectively. Compared with the total value of \$184.3 million allowed in the APE, the corresponding total value based on the tender prices for the works was calculated to be \$176.8 million, representing a decrease in the overall cost of the works by \$7.5 million.

12. The original APE covers a provision of \$20.4 million for contingencies, which is 10% of the estimated works value plus the consultants' fees. As the corresponding remaining expenditure is about \$115.3 million, we propose to revise the provision to \$11.5 million, representing a decrease in the contingencies provision by \$8.9 million.

Summary of Review Results

13. A summary of the proposed increase of \$100.5 million for 76WC is as follows –

Factors	Proposed increased amount/savings in MOD prices (\$ million)	% of the total increased amount/savings
Increase due to –		
(a) Unforeseen working hour restriction	29.1	24.9
(b) Unforeseen ground conditions	33.8	28.9
(i) Mainlaying works	27.8	
(ii) Site formation	6.0	
		/(c)

Factors		Proposed increased amount/savings in MOD prices (\$ million)	% of the total increased amount/savings
(c)	Site supervision	17.3	14.8
(d)	Increase in provision for price adjustment	36.7	31.4
(e)	Total increase (e = a + b + c + d)	116.9	100.0
Partly offset by –			
(f)	Lower-than-expected tender prices	7.5	45.7
(g)	Contingencies	8.9	54.3
(h)	Total savings (h = f + g)	16.4	100.0
(i)	Proposed increase (i = e – h)	100.5 ¹	

_____ A comparison of the cost breakdown of the APE and the revised project estimates is at Enclosure 3.

FINANCIAL IMPLICATIONS

14. Subject to approval, we will revise the phasing of the expenditure as follows –

/Year

¹ In the information paper circulated to the Panel on Development, the proposed increase in the APE was \$99.7 million, which was worked out based on the actual project expenditure up to November 2009 and the prevailing price adjustment factors in October 2009. In the current submission, the actual project expenditure is now updated to reflect position up to February 2010, and the required project contingencies are also reduced as a result of the reduced amount of remaining works. Moreover, the price adjustment factors were updated in March 2010 vide PWSCI(2009-10)16. After taking into account these changes, the proposed increase in the APE is slightly raised by \$0.8 million from \$99.7 million mentioned in the information paper to \$100.5 million mentioned in this PWSC paper.

Year	\$ million (MOD)
Up to 31 March 2010	188.3
2010 – 2011	56.4
2011 – 2012	41.4
2012 – 2013	27.8
2013 – 2014	15.9
	<hr/>
	329.8
	<hr/>

15. The proposed increase in the APE will not give rise to any additional recurrent expenditure.

16. Compared with the increase in production cost of water of 0.14% in real terms by 2013 as a result of upgrading the remaining works under **76WC** to Category A which was discussed by the PWSC on 18 April 2007, with an increased APE, the project will now lead to an increase in production cost of water of 0.20% in real terms by 2014².

PUBLIC CONSULTATION

17. The proposed increase in the APE does not involve any change in the scope of the project. We consider that further public consultation is not necessary.

18. We circulated to the Legislative Council Panel on Development (the Panel) an information paper on the proposed increase in APE on 17 February 2010. Members raised no objection to the proposal.

/ENVIRONMENTAL

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 2010 to 2014.

ENVIRONMENTAL IMPLICATIONS

19. The proposed increase in the APE will not have any environmental implication.

HERITAGE IMPLICATIONS

20. The proposed increase in the APE 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

21. The proposed increase in the APE will not require any land acquisition.

BACKGROUND INFORMATION

22. 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.

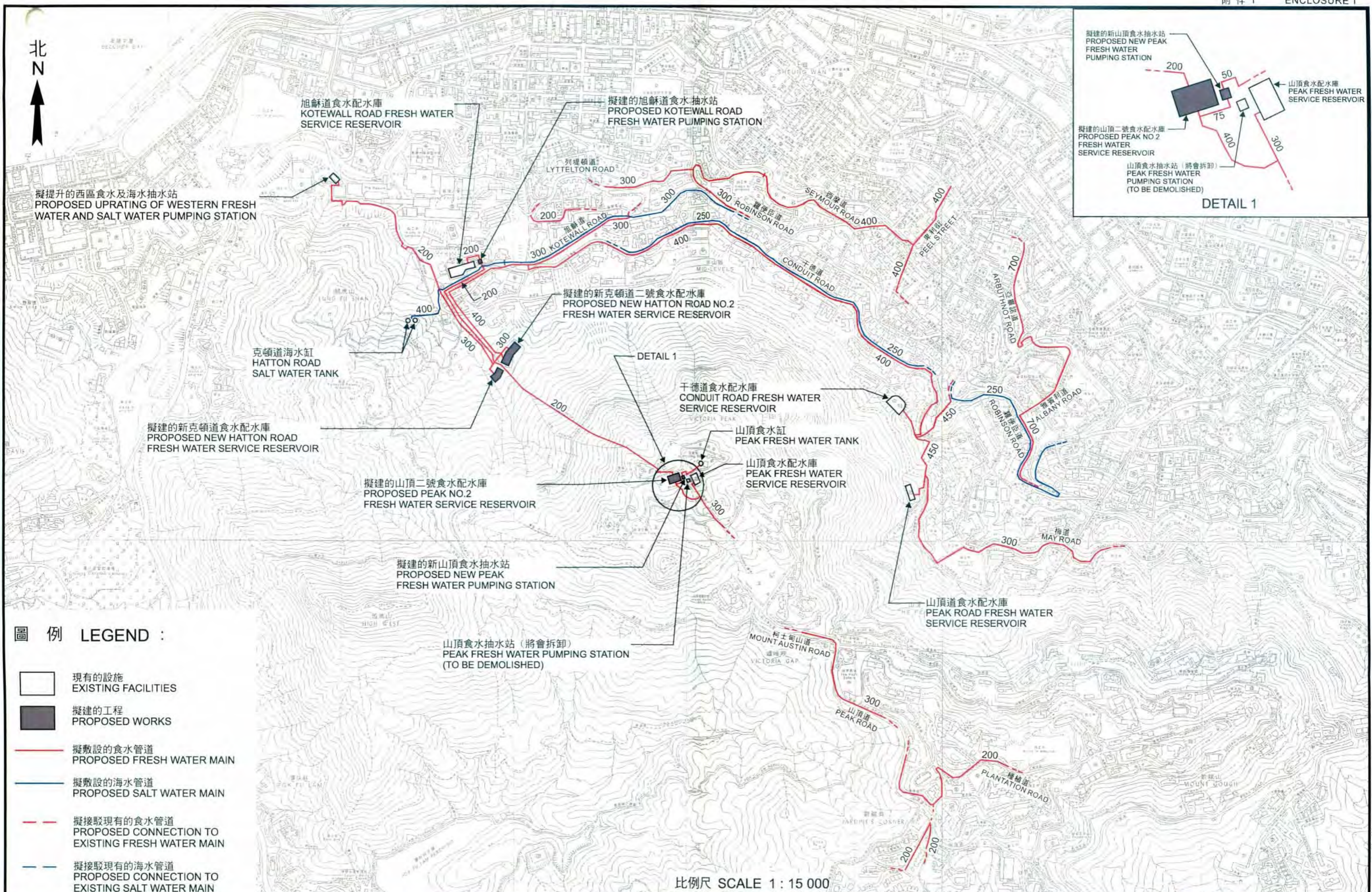
23. In May 2003, we upgraded another part of **76WC** to Category A as **183WC** “Improvement to Hong Kong Central mid-level and high level areas water supply – Stage 2” at an estimated cost of \$70.6 million in MOD prices for the construction of Magazine Gap Road No. 3 fresh water service reservoir, 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.

24. In May 2007 the final phase of **76WC** was upgraded to Category A at an estimated cost of \$229.3 million in MOD prices.

25. The proposed increase in the APE will not involve any additional tree removal or planting proposal.

26. The proposed increase in the APE will not create any new jobs.

Development Bureau
April 2010



圖例 LEGEND :

- 現有的設施
EXISTING FACILITIES
- 擬建的工程
PROPOSED WORKS
- 擬敷設的食水管道
PROPOSED FRESH WATER MAIN
- 擬敷設的海水管道
PROPOSED SALT WATER MAIN
- 擬接駁現有的食水管道
PROPOSED CONNECTION TO EXISTING FRESH WATER MAIN
- 擬接駁現有的海水管道
PROPOSED CONNECTION TO EXISTING SALT WATER MAIN

比例尺 SCALE 1 : 15 000

核准 APPROVED

 總工程師/顧問工程管理 CE/CM
 30 / 3 / 2010

工務計劃項目第 76WC 號 — 港島中區半山及以上地區供水系統改善計劃 — 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

 水務署
 WATER SUPPLIES DEPARTMENT
 草圖編號 SK 62009 / 507A
 SKETCH NO.

附件 1 ENCLOSURE 1

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

Table 1 – Cash flow and provisions for price adjustment in PWSC(2007-08)5

Year	Original project estimate (\$ million in September 2006 prices) X	Original price adjustment factors (March 2007)# Y	Approved project estimate (\$ million, in MOD prices) Z	Provision for price adjustment (\$ million) A = Z - X
2007 – 2008	15.0	0.99900	15.0	0.0
2008 – 2009	43.1	1.00649	43.4	0.3
2009 – 2010	50.0	1.01656	50.8	0.8
2010 – 2011	64.2	1.02672	65.9	1.7
2011 – 2012	36.3	1.03699	37.6	1.3
2012 – 2013	15.7	1.05514	16.6	0.9
Total	224.3		229.3	5.0

Table 2 – Latest cash flow and provision for price adjustment due to latest project estimate (PE) and latest adjustment factors

Year	Latest PE (\$ million in September 2006 prices) a	Latest PE (\$ million in September 2009 prices)* b	Latest price adjustment factors (March 2010)** c	Latest PE (\$ million, in MOD prices) d	Latest provision for price adjustment (\$ million) e	Net increase in provision for price adjustment (\$ million) f
2007 – 2008	12.2	12.6 ^	1.00000	12.6	e = d - a	f = e - A
2008 – 2009	77.9	89.1 ^	1.00000	89.1		
2009 – 2010	81.0	86.6 ^^	1.00000	86.6		
2010 – 2011	48.4	54.9	1.02700	56.4		
2011 – 2012	34.3	38.9	1.06551	41.4		
2012 – 2013	22.1	25.1	1.10813	27.8		
2013 – 2014	12.2	13.8	1.15246	15.9		
Total	288.1###	321.0		329.8	41.7	36.7

Notes:

Price adjustment factors adopted in March 2007 are based on the projected movement of prices for public sector building and construction output at that time, which are assumed to decrease by 0.4% per annum in 2006, no adjustment in 2007, to increase by 1.0% per annum over the period from 2008 to 2011 and by 2.0% per annum over the period from 2012 to 2013.

The latest PE of \$289.4 million (in September 2006 prices) mentioned in the information paper of February 2010 issued to the Panel on Development was based on actual project expenditure up to November 2009 and the project contingencies required for remaining works at that point of time. The latest PE is now revised to \$288.1 million (in September 2006 prices) taking into account the actual expenditure up to February 2010, and the decrease in project contingencies required due to the reduced amount of remaining works.

* The latest PE (in September 2006 prices) is multiplied by 1.13501 for conversion to September 2009 prices. The figure of 1.13501 represents the changes in price movement for public sector building and construction output between September 2006 and September 2009.

** Price adjustment factors adopted in March 2010 are based on the latest movement of prices for public sector building and construction output which are assumed to increase by 3.0% per annum in 2010 and by 4.0% per annum over the period from 2011 to 2014.

^ \$12.6 million and \$89.1 million for 2007-08 and 2008-09 respectively are actual expenditures in MOD prices.

^^ Latest PE of \$86.6 million in 2009-10 comprises actual expenditure of \$75.5 million for the period from April 2009 to February 2010, and latest PE (in September 2009 prices) of \$11.1 million for March 2010, which is derived by multiplying the latest PE of \$9.8 million in September 2006 prices by 1.13501 for conversion to September 2009 prices.

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

Comparison between original APE and the Revised Project Estimate

A comparison of the APE and the latest project estimate is as follows –

	(A) Approved Project Estimate (\$ million)	(B) Revised Project Estimate ¹ (\$ million)	(C) Latest Project Estimate (\$ million)	(C) – (A) Difference (\$ million)
<u>Mid-level Area</u>				
(a) Demolition of existing service reservoirs	1.0	6.8	6.8	5.8
(b) Construction of fresh water service reservoirs	62.9	29.1	35.1	(27.8)
(c) Upgrading of Western fresh water and salt water pumping station	3.9	10.6	10.6	6.7
(d) Mainlaying	65.7	64.2	121.1	55.4
<u>High Level Area</u>				
(e) Construction of fresh water service reservoir	12.0	12.9	12.7	0.7
(f) Construction of fresh water pumping station	16.5	29.6	29.2	12.7
(g) Upgrading of Western fresh water and salt water pumping station	6.1	8.0	8.0	1.9
(h) Mainlaying	14.0	13.4	14.0	0
<u>General</u>				
(i) Environmental mitigation measures	2.2	2.2	2.2	0
Total value of contract works (sum of items (a) to (i))	184.3	176.8	239.7	

¹ Revised project estimate after the award of the contract.

	(A) Approved Project Estimate	(B) Revised Project Estimate¹	(C) Latest Project Estimate	(C) – (A) Difference
	(\$ million)	(\$ million)	(\$ million)	(\$ million)
(j) Consultants' fees	19.6	19.6	36.9	17.3
(i) for contract administration	1.4	1.4	1.4	0
(ii) for site supervision	18.2	18.2	35.5	17.3
(k) Contingencies	20.4	20.4	11.5	(8.9)
Sub-total (sum of items (a) to (k))	224.3	216.8	288.1	63.8
(l) Provision for price adjustment	5.0	5.0	41.7	36.7
Total	229.3	221.8	329.8	100.5

2. As regards **1(a) (Mid-level area – Demolition of existing service reservoirs)**, the increase of \$5.8 million is due to higher-than-expected tender prices.

3. As regards **1(b) (Mid-level area – Construction of fresh water service reservoirs)**, the decrease of \$27.8 million is due to –

- (i) a decrease of \$33.8 million due to lower-than-expected tender prices; and
- (ii) an increase of \$6.0 million due to unforeseen ground condition encountered during the construction of the New Hatton Road No. 1 fresh water service reservoir.

4. As regards **1(c) (Mid-level area – Uprating of Western fresh water and salt water pumping station)**, the increase of \$6.7 million is due to higher-than-expected tender prices.

5. As regards **1(d) (Mid-level area – Mainlaying)**, the increase of \$55.4 million is due to –

- (i) a decrease of \$1.5 million due to lower-than-expected tender prices;
- (ii) an increase of \$29.1 million in construction costs due to unforeseen working hours restriction; and

¹ Revised project estimate after the award of the contract.

(iii) an increase of \$27.8 million in construction costs due to unforeseen difficult ground conditions.

6. As regards **1(e) (High-level area – Construction of fresh water service reservoir)**, the increase of \$0.7 million is due to –

- (i) an increase of \$0.9 million due to higher-than-expected tender prices; and
- (ii) a decrease of \$0.2 million due to reduced works quantities on pipe works at Peak No. 2 fresh water service reservoir to suit site conditions.

7. As regards **1(f) (High-level area – Construction of fresh water pumping station)**, the increase of \$12.7 million is due to –

- (i) an increase of \$13.1 million due to higher-than-expected tender prices; and
- (ii) a decrease of \$0.4 million due to the use of a smaller surge vessel for the Kotewall Road fresh water pumping station.

8. As regards **1(g) (High-level area – Uprating of Western fresh water and salt water pumping station)**, the increase of \$1.9 million is due to higher-than-expected tender prices.

9. As regards **1(h) (High-level area – Mainlaying)**, there has been no change in the estimate as there was –

- (i) a decrease of \$0.6 million due to lower-than-expected tender prices; and
- (ii) an increase of \$0.6 million due to increased works quantities on pipe fittings and road re-instatement for mainlaying works in the high-level area to suit site conditions.

10. As regards **1(j) (Consultants' fees)**, the increase of \$17.3 million is due to an increase in site supervision costs.

11. As regards **1(k) (Contingencies)**, the decrease of \$8.9 million is due to the drawing down of contingencies.

12. As regards **1(l) (Provision for price adjustment)**, the increase of \$36.7 million is due to an increase in payment for actual/projected contract price fluctuation.
