ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Fresh water supplies

- 355WF Water supply to new housing developments in Sheung Shui and Fanling
- 365WF Siu Ho Wan water treatment works extension

Water Supplies – Combined fresh/salt water supplies

196WC – Implementation of Water Intelligent Network

201WC – Relocation of Diamond Hill fresh water and salt water service reservoirs to caverns

Members are invited to recommend to the Finance Committee –

- (a) the upgrading of 355WF to Category A at an estimated cost of \$1,699.7 million in money-of-the-day (MOD) prices;
- (b) the upgrading of part of 365WF, entitled "Siu Ho
 Wan water treatment works extension detailed
 study, design and site investigation", to Category A
 at an estimated cost of \$111.5 million in MOD
 prices;
- (c) the upgrading of part of 196WC, entitled
 "Implementation of Water Intelligent Network, stage
 2", to Category A at an estimated cost of
 \$655.4 million in MOD prices;

- (d) the upgrading of part of 201WC, entitled "Relocation of Diamond Hill fresh water and salt water service reservoirs to caverns investigation study, design and site investigation", to Category A at an estimated cost of \$127.5 million in MOD prices; and
- (e) the retention of the remainders of **365WF**, **196WC** and **201WC** in Category B.

PROBLEM

We need to carry out the following waterworks projects related to water supplies –

- (a) **355WF** to cope with the anticipated increase in water demand arising from planned new housing developments in Sheung Shui and Fanling areas;
- (b) part of **365WF** to cope with the anticipated increase in water demand arising from planned new developments in North Lantau Island;
- (c) part of **196WC** to continuously monitor the performance of the existing water distribution network and determine the most cost-effective means to maintain the healthiness of the network; and
- (d) part of **201WC** to relocate the Diamond Hill fresh water and salt water service reservoirs (DHSRs) to caverns, and hence releasing the existing DHSRs site for housing or other uses.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to upgrade the following projects to Category A –

- (a) **355WF** at an estimated cost of \$1,699.7 million in MOD prices to improve the fresh water supply to Sheung Shui and Fanling areas for the planned new housing developments;
- (b) part of **365WF** at an estimated cost of \$111.5 million in MOD prices to carry out detailed study, design and the associated site investigation works for the Siu Ho Wan water treatment works extension;
- (c) part of **196WC** at an estimated cost of \$655.4 million in MOD prices to implement the second stage of Water Intelligent Network; and
- (d) part of **201WC** at an estimated cost of \$127.5 million in MOD prices to carry out investigation study, design and the associated site investigation works on relocation of DHSRs to caverns.

PROJECT SCOPE AND NATURE

3. Details of the above four projects are provided at Enclosures 1 to 4 respectively.

Development Bureau April 2018

355WF – Water supply to new housing developments in Sheung Shui and Fanling

PROJECT SCOPE AND NATURE

The scope of the proposed works comprises -

- (a) construction of a fresh water service reservoir at Tong Hang with a capacity of 55 000 cubic metres (m^3) ;
- (b) laying of about 2 kilometres (km) trunk mains with 900 millimetres (mm) diameter connecting to the new service reservoir to existing water supply system;
- (c) laying of about 12 km distribution mains with diameters ranging from 150 mm and 700 mm in the south-western part of Sheung Shui and Fanling (SSF) areas and associated service connections;
- (d) upgrading of the existing Tai Po fresh water pumping station and laying of associated water mains; and
- (e) associated works including environmental mitigation works, landscaping works and other engineering works.

2. Layout plans showing the proposed works are at Annex 1 to Enclosure 1.

3. Subject to the funding approval of the Finance Committee (FC), we plan to commence the proposed works in the third quarter of 2018 for completion in stages from the first quarter of 2021 to the first quarter of 2024. In order to meet the tight schedule, we have invited tenders in April 2018 to enable early commencement of the proposed works. The tender will only be awarded after obtaining FC's funding approval.

JUSTIFICATION

4. The existing fresh water service reservoirs supplying to SSF areas have a total storage capacity of 139 500 m^3 . In order to cope with the anticipated increase in water demand arising from planned new housing developments in SSF

areas from 2021, we need to construct a new service reservoir with a storage capacity of 55 000 m³ so that the total service reservoir storage capacity in SSF areas will be increased to 194 500 m³. Upon completion of the proposed works, the total storage capacity of the fresh water service reservoirs within SSF areas can meet the daily demand of 203 000 m³ per day.

5. We also need to upgrade the existing Tai Po fresh water pumping station and lay associated water mains for transferring fresh water from Tai Po water treatment works to SSF areas and to construct additional distribution mains in the south-western part of SSF areas with sizes ranging from 150 mm diameter to 700 mm diameter to increase the water carrying capacity of the distribution network in order to cope with the increasing water demand.

FINANCIAL IMPLICATIONS

6. We estimate the cost of the proposed works to be \$1,699.7 million in money-of-the-day (MOD) prices (please see paragraph 8 below), broken down as follows –

			\$ million (in MOD prices)
(a)	Construction of service reservoir		301.8
(b)	Laying of water mains		983.4
(c)	Upgrading of the existing Tai Po fresh water pumping station	h	80.5
(d)	Environmental mitigation measures		23.7
(e)	 Consultants' fees for (i) contract administration (ii) management of resident site staff (RSS) 	6.6 4.3	10.9
(f)	Remuneration of RSS		145.0
(g)	Contingencies		154.4
		Total	1,699.7

/7.

7. We propose to engage consultants to undertake contract administration and site supervision of the proposed works. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Annex 2 to Enclosure 1.

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

Year	\$ million (MOD)
2018 - 2019	176.0
2019 - 2020	258.7
2020 - 2021	258.2
2021 - 2022	264.7
2022 - 2023	264.1
2023 - 2024	274.3
2024 - 2025	141.9
2025 - 2026	61.8
	1,699.7

9. 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 2018 to 2026. We will deliver the proposed works under New Engineering Contract $(NEC)^1$ form of contracts with provision for price adjustment.

10. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$2.8 million.

/11.

¹ NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

11. The project will lead to an increase in the production cost of water by 0.33% in real terms by 2026^2 .

PUBLIC CONSULTATION

12. We consulted the Environment, Housing and Works Committee of the Tai Po District Council and the District Minor Works and Environmental Improvement Committee of the North District Council on 13 and 18 July 2016 respectively. Members generally supported the proposed works.

13. On 22 December 2017, the Town Planning Board approved the application for permission under section 16 of the Town Planning Ordinance (Cap. 131) for the proposed fresh water service reservoir site.

14. We consulted the Legislative Council Panel on Development on 23 January 2018 and Members generally supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

15. The proposed works is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We carried out the Preliminary Environmental Review (PER) for the project in September 2016. The PER concluded and the Director of Environmental Protection agreed in July 2017 that the project would not have any long-term environmental impacts. We will incorporate the mitigation measures recommended in the PER into the works contract to control the environmental impacts arising from the construction works to within established standards and guidelines. These measures include frequent watering of the site, provision of wheel-washing facilities, covering of materials on trucks and use of silenced construction plant. We have included in paragraph 6(d) above a sum of \$23.7 million (in MOD prices) in the project estimate for the implementation of these environmental mitigation measures.

16. At the planning and design stages, we have considered design and layouts optimisation to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or in other suitable

/construction

² The increase in production cost of water is calculated at the 2017-18 price level and on the assumption that the water demand remains static and all other factors remain constant during the period from 2018 to 2026.

construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities $(PFRF)^3$. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

17. 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 portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

18. We estimate that the proposed works will generate 729 577 tonnes of construction waste. Of these, we will reuse 50 218 tonnes (7%) of inert construction waste on site and deliver 662 180 tonnes (91%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 17 179 tonnes (2%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfills is estimated to be \$50.5 million for this project (based on a unit charge rate of \$71 per tonne for disposal at PFRF and \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

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

/LAND

³ PFRF are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in PFRF requires a licence issued by the Director of Civil Engineering and Development.

LAND ACQUISITION

20. The proposed works do not involve resumption of private land, but clearance of about 53 100 square metres of government land and 9 temporary structures are required. The cost of clearance estimated at \$3.1 million will be charged to **Head 701 – Land Acquisition**. A breakdown of the land clearance cost is at Annex 3 to Enclosure 1.

TRAFFIC IMPLICATIONS

21. We have carried out Traffic Impact Assessments (TIAs) for the proposed works. The TIAs concluded that the proposed works would not cause any significant impact on the traffic through implementation of appropriate traffic management schemes but a traffic review at the construction stage is needed to further ascertain the feasibility of the temporary traffic arrangements to meet the latest traffic situation before implementation.

BACKGROUND

22. We upgraded **355WF** to Category B in September 2014.

23. In February 2016, we engaged a consultant to undertake the investigation and detailed design and engaged contractors to carry out site investigation works for the proposed works at an estimated cost of \$17.1 million in MOD prices. We have charged this amount to block allocation **Subhead 9100WX** "Waterworks, studies and investigations for items in Category D of the Public Works Programme". The investigation and detailed design of the proposed works have been completed.

24. Of the 206 trees within the project boundary, 132 trees will be preserved and 74 trees will be felled. All trees to be removed are not important trees⁴. We will incorporate planting proposals as part of the project, including estimated quantities of 74 trees and 9 200 square metres of grassed area.

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[&]quot;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 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 to or exceeding 1.0 metre (m) (measured at 1.3 m above ground level), or with height or canopy spread equal to or exceeding 25 m.

25. We estimate that the proposed works will create about 310 jobs (250 for labourers and 60 for professional or technical staff) providing a total employment of 14 000 man-months.



REF_62017-112-001_R1.DWG



355WF – Water supply to new housing developments in Sheung Shui and Fanling

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2017 prices)

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Consultants' fee for contract administration (Note 2)	Professional Technical			_	3.8 1.6
				Sub-total	5.4#
(b) Resident site staff	Professional	435	38	1.6	54.8
(RSS) costs ^(Note 3)	Technical	1 520	14	1.6	66.8
				Sub-total	121.6
Comprising – (i) Consultants' fees for management of RSS				3.6#	
(ii) Remuneration of RSS				118.0#	
				Total	127.0

*MPS = Master Pay Scale

Notes

- 1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS point 38 = \$78,775 per month and MPS point 14 = \$27,485 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 phase of the project. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **355WF** to Category A.
- 3. The actual man-months and actual costs will only be known after completion of the construction works.

Remarks

The figures in this Annex are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 6 of Enclosure 1.

Annex 3 to Enclosure 1 to PWSC(2018-19)10

355WF – Water Supply to new housing developments in Sheung Shui and Fanling

Breakdown of land clearance cost

				\$ million
(I)	Estimated cost for land clearance			2.75
	(a) Ex-gratia allowances for agricultural undertakings		0.15	
	(b) Ex-gratia allowances for domestic occupiers		2.60	
(II)	Contingency Payment			0.28
		Total		3.03 say (3.1)

Note

The above estimated land acquisition cost is based on the prevailing rates as at January 2018.

365WF – Siu Ho Wan water treatment works extension

PROJECT SCOPE AND NATURE

The part of 365WF which we propose to upgrade to Category A comprises –

- (a) detailed study on the water treatment process and operation of the Siu Ho Wan water treatment works (SHWWTW) and its proposed extension, and on the raw water transfer systems to cater for the proposed increase in the output of the SHWWTW;
- (b) environmental review ¹ and assessments on traffic impact, geotechnical, drainage, hydraulic, as well as other relevant aspects²;
- (c) detailed design for the proposed extension of the SHWWTW and the Siu Ho Wan raw water booster pumping station; improvement and uprating of the existing raw water supply systems; and other associated works including environmental mitigation works, landscaping works and other engineering works;
- (d) associated site investigation works³ and supervision; and
- (e) preparation of tender documents and assessment of tenders for the associated site investigation works and the future construction works.

2. A location plan of the SHWWTW extension is at Annex 1 to Enclosure 2.

/3.

¹ Environmental review includes a thorough review on the approved Environmental Impact Assessment report for extension of the SHWWTW (see paragraph 15).

² Other relevant aspects include assessments of the condition of existing waterworks facilities associated with the operation of the SHWWTW, such as the condition of the existing raw water mains along South Lantau Road.

³ In addition to ground condition investigation, this item includes setting up of a pilot plant to investigate and assess the performance of the various proposed water treatment processes.

3. Subject to funding approval of the Finance Committee (FC), we plan to engage consultants to carry out the detailed study, design and associated site investigation works in the third quarter of 2018 for completion in the third quarter of 2021. In order to meet the tight schedule, we have invited tenders in February 2018 to enable early commencement of the detailed study, design and associated site investigation works for the SHWWTW extension. The tender will only be awarded after obtaining FC's funding approval.

4. We will retain the remainder of **365WF** in Category B, which mainly comprises the construction of the proposed works described in paragraph 1(c) above. We will seek funding for the remainder of **365WF** at a later stage.

JUSTIFICATION

5. The SHWWTW was commissioned in 1996 with a design water treatment capacity of 150 000 cubic metres (m^3) per day to provide reliable fresh water supply to developments in North Lantau including the Hong Kong International Airport and the Tung Chung New Town.

6. Subsequent to the launching of development proposals in North Lantau, including the Hong Kong International Airport Three-Runway System, the increase in water demand will render the existing water treatment capacity of the SHWWTW be exceeded by 2025. In view of this, the Water Supplies Department proposes to implement the SHWWTW extension to expand the water treatment capacity of the SHWWTW to 300 000 m³ per day, which could meet the ultimate water demand of North Lantau, and increase correspondingly the transfer capacity of the associated raw water supply systems. An expansion strategy to tie in with the future water demand buildup will be formulated in the detailed design.

FINANCIAL IMPLICATIONS

7. We estimate the cost of the proposed detailed study, design and associated site investigation works to be \$111.5 million in money-of-the-day (MOD) prices (please see paragraph 9 below), broken down as follows –

/(a)

		\$ million (in MOD prices)
(a)	Consultants' fee for	67.6
	 (i) detailed study on the water treatment process and operation of the SHWWTW and its proposed extension, and on the raw water transfer systems to cater for the proposed increase in the output of the SHWWTW 	10.2
	 (ii) environmental review and assessments on traffic impact, geotechnical, drainage, hydraulic, as well as other relevant aspects 	5.0
	(iii) detailed design	46.1
	(iv) preparation of tender documents and tender assessment	5.7
	(v) management of resident site staff(RSS) for site investigation works	0.6
(b)	Remuneration of RSS for site investigation works	2.9
(c)	Site investigation works	30.9
(d)	Contingencies	10.1
	Total	111.5

8. We propose to engage consultants to conduct the proposed detailed study, design and supervision of the associated site investigation works. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Annex 2 to Enclosure 2.

Year	\$ million (MOD)
2018 - 2019	10.0
2019 - 2020	31.1
2020 - 2021	39.8
2021 - 2022	20.9
2022 - 2023	9.7
	111.5

9. Subject to funding approval, we plan to phase the expenditure as follows –

10. 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 2018 to 2023. We will deliver the proposed consultancy under New Engineering Contract (NEC⁴) form of contract with provision for price adjustment. We will deliver the site investigation works under re-measurement contract because the quantities of works involved may vary depending on the actual ground condition. The contract will provide for price adjustment.

11. The proposed detailed study, design and associated site investigation works will not give rise to any recurrent expenditure.

12. The proposed detailed study, design and associated site investigation works will lead to an increase in the production cost of water by 0.03% in real terms by 2023^5 .

/**PUBLIC**

⁴ NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

⁵ The increase in production cost of water is calculated at the 2017-18 price level and on the assumption that the water demand remains static and all other factors remain constant during the period from 2018 to 2023.

PUBLIC CONSULTATION

13. We consulted the Tourism, Agriculture, Fisheries and Environmental Hygiene Committee of the Islands District Council on 27 November 2017 on the proposed detailed study, design and associated site investigation works. Members generally supported the proposal.

14. We consulted the Legislative Council Panel on Development on 23 January 2018 and Members generally supported the proposal.

ENVIRONMENTAL IMPLICATIONS

15. The proposed detailed study, design and associated site investigation works are not designated projects under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499), but form part of the SHWWTW extension project which is a designated project under Schedule 2 of the EIA Ordinance. We carried out an EIA study⁶ for uprating the SHWWTW from a capacity of 150 000 m³ per day to 300 000 m³ per day and the EIA report was approved by the Director of Environmental Protection in December 2004 with an Environmental Permit issued in January 2005. With the implementation of the recommended pollution control measures, the approved EIA report concluded that the proposed site investigation and construction activities will not cause any adverse environmental impacts. We have included in the project estimate the cost of implementing suitable mitigation measures to control short-term environmental impacts arising from the site investigation works.

16. The proposed site investigation works will only generate very little construction waste. We will require the consultants to fully consider measures to minimise the generation of construction waste and to reuse or recycle construction waste as much as possible in the future implementation of the SHWWTW extension.

HERITAGE IMPLICATIONS

17. The proposed detailed study, design and associated site investigation works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

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We carried out an investigation study, which included an EIA study, in 2004 for uprating the SHWWTW (see paragraph 20).

LAND ACQUISITION

18. The proposed detailed study, design and associated site investigation works do not require any land acquisition.

TRAFFIC IMPLICATIONS

19. The proposed detailed study, design and associated site investigation works will not have significant impact on traffic.

BACKGROUND

20. In view of the potential development and thus anticipated water demand increase in the North Lantau based on forecast made in 2001, we carried out an investigation study in 2004 for uprating the SHWWTW from a water treatment capacity of 150 000 m³ to 300 000 m³ per day. The investigation study was funded by block allocation **Subhead 9100WX** "Waterworks, studies and investigations for items in Category D of the Public Works Programme" at an amount of \$9.8 million in MOD prices. The investigation study was completed in 2005.

21. We upgraded **365WF** to Category B in October 2017.

22. The proposed detailed study, design and associated site investigation works will not involve any tree removal or planting proposals. We will require the consultant to take into consideration the need for tree preservation during the planning and design stages of the SHWWTW extension. We will also incorporate tree planting proposals, where possible, in the construction phase in the future.

23. We estimate that the proposed detailed study, design and associated site investigation works will create about 40 jobs (15 for labourers and 25 for professional or technical staff) providing a total employment of 900 man-months.





365WF – Siu Ho Wan water treatment works extension

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2017 prices)

(a) C	onsultants' staff costs	(Note 2)	Estimated man- months	Average MPS* salary point	Multiplier (note 1)	Estimated fee (\$ million)
(i)	detailed study on the water treatment process and operation of the SHWWTW and its proposed extension, and on the raw water transfer systems to cater for the proposed increase in the output of the SHWWTW	Professional Technical	36 56	38 14	2.0 2.0	5.7 3.1 } 8.8#
(ii)	environmental review and assessments on traffic impact, geotechnical, drainage, hydraulic, as well as other relevant aspects	Professional Technical	18 28	38 14	2.0 2.0	2.8 1.5 } 4.3#
(iii)	detailed design	Professional Technical	176 218	38 14	2.0 2.0	$27.7 \\ 12.0 $ 39.7#
(iv)	preparation of tender documents and tender assessment	Professional Technical	26 15	38 14	2.0 2.0	$\begin{array}{c} 4.1\\ 0.8 \end{array} \right\} 4.9 \#$
					Sub-total	57.7

Annex 2 to Enclosur	e 2 to	PWSC(2018	8-19)10
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			Estimated man- months	Average MPS* salary point	Multiplier (note 1)	Estimated fee (\$ million)
(b)	Resident site staff	Professional	10	38	1.6	1.3
	(RSS) costs (Note 3)	Technical	39	14	1.6	1.7
					Sub-total	3.0
	Comprising –					
	(i) Consultants' fees for management of RSS for site investigation works				0.5#	
	(ii) Remuneration of RSS for site investigation				2.5#	
	works				Total	60.7

*MPS = Master Pay Scale

Notes

- 1. A multiplier of 2.0 is applied to the average MPS point to estimate the full staff costs, including the consultants' overheads and profit, as the staff will be employed in the consultants' office. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS point 38 = \$78,775 per month and MPS point 14 = \$27,485 per month.).
- 2. The actual man-months and fees will only be known when we have selected the consultants through the usual competitive bidding system.
- 3. The actual man-months and costs will only be known after completion of the site investigation works.

Remarks

The figures in this Annex are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 7 of Enclosure 2.

196WC – Implementation of Water Intelligent Network

PROJECT SCOPE AND NATURE

The part of **196WC** which we propose to upgrade to Category A comprises the construction of chambers, pipeworks and other associated works for the establishment of about 275 District Metering Areas (DMAs) and Pressure Management Areas (PMAs)¹ in Islands, Tsuen Wan, Wong Tai Sin, Kwun Tong, Sai Kung, Sha Tin and Tai Po districts² with the installation of monitoring and sensing equipment in the respective part of the water distribution network.

2. Plans showing the locations of the major water supply zones (MSZs) covering the proposed DMAs and PMAs mentioned in paragraph 1 above are at Annex 1 to Enclosure 3.

3. Subject to funding approval of the FC, we plan to commence the proposed works in the third quarter of 2018 for completion in the third quarter of 2022. In order to meet the tight schedule, we will invite tenders in parallel to enable early commencement of the proposed works. The tender will only be awarded after obtaining FC's funding approval.

4. We will retain the remainder of **196WC** in Category B, which mainly comprises the establishment of the remaining about 240 DMAs and PMAs and the reprovisioning of water mains which will become aged and susceptible to bursting or leakage. We will seek funding for the remainder of **196WC** at a later stage.

/JUSTIFICATION

¹ A DMA is defined as a discrete area of a water distribution network established by the closure of district boundary valve(s) or complete disconnection of water mains, with the quantity of water supplied to the area metered. DMAs will also serve as PMAs where there is room for pressure management without affecting the minimum supply pressure to sustain normal supply. The monitoring and sensing equipment includes among others flowmeters and pressure loggers to collect water flow and pressure data.

² The DMAs and PMAs in Islands and Tsuen Wan districts are under the coverage of the Islands major water supply zone (MSZ); those in Wong Tai Sin, Kwun Tong, and Sai Kung districts are under the coverage of Kowloon East MSZ; and those in Sha Tin and Tai Po districts are under the coverage of Sha Tin MSZ.

JUSTIFICATION

5. In the 1990s, maintenance of a considerable length of water mains approaching the end of their service life became increasingly difficult and costly. Given the poor condition of the water distribution network, replacement and rehabilitation (R&R) of the aged water mains was the most effective solution to rejuvenate the water distribution network to arrest the rapid rising trend of main bursting and leakage. A programme of R&R of water mains (R&R Programme) was launched in 2000 to replace and rehabilitate around 3 000 kilometres (km) of the aged water mains in Hong Kong. The R&R Programme was substantially completed in 2015. At present, the total length of water mains in Hong Kong is about 8 000 km.

6. Following the substantial completion of the R&R Programme, the condition of the water distribution network has been largely improved. The annual number of water main bursts has been reduced from the peak of about 2 500 in 2000 to 88 in 2017. The leakage rate has also been reduced from exceeding 25% in 2000 to about 15.2% in 2017.

7. Notwithstanding the completion of the R&R Programme, the water mains previously not covered in the R&R Programme will continue to age and deteriorate. Riding on the technological advancement of sensors, telemetry, network management software and data analysis in recent years, we consider it an opportune time to implement the Water Intelligent Network (WIN) to maintain the healthiness of the water distribution network. With WIN, we would be able to analyse the condition of the water distribution network and determine the most cost-effective means to maintain the healthiness of the network.

8. The essence of WIN is continuous monitoring of network performance in a holistic manner by utilising advanced technologies. Under WIN, the water distribution network will be divided into discrete DMAs and PMAs of manageable size with high-technology monitoring and sensing equipment installed in each DMA and PMA network. Implementation of WIN enables the effective execution of measures under the four pillars of network management in an integrated and coordinated manner. These four pillars include (a) active leakage detection and control through the usage of the monitoring and sensing equipment installed in the network; (b) pressure management to reduce the pressure in the network of the PMAs; (c) quality and speedy repairs to water main leaks and bursts; and (d) asset management by reprovisioning of aged water mains which are beyond economic repair. WIN also enables detection of probable unauthorised consumption from the network.

9. Tremendous amount of flow and pressure data as well as other associated network data will be collected from the monitoring and sensing equipment of the DMAs and PMAs. An intelligent network management system (INMS) is being established for analysing the data collected for continuous monitoring of the condition of the network so as to assess the level of leakage and unauthorised consumption, and to enable timely determination of the priorities and the most effective network management measures for the DMAs and PMAs. For full implementation of WIN to cover the entire water distribution network in the territory, we will link up all DMAs and PMAs, which are either established or to be established to the INMS. By incorporating all the DMAs and PMAs into the INMS, WIN will eventually be established and will enable efficient network management to cover the water distribution network in

FINANCIAL IMPLICATIONS

the whole territory.

10. We estimate the cost of the proposed works to be \$655.4 million in money-of-the-day (MOD) prices (please see paragraph 12 below), broken down as follows –

		\$ 1 (in M	§ million AOD prices)	
(a)	Construction works with installation of monitoring and sensing equipment in the network for the 275 DMAs and PMAs		525.6	
(b)	Environmental mitigation measures		5.4	
(c)	 Consultants' fees for (i) contract administration (ii) management of resident site staff (RSS) 	5.0 3.4	8.4	
(d)	Remuneration of RSS		56.5	
(e)	Contingencies		59.5	
	Total		655.4	

/11.

Page 4

11. We propose to engage consultants to undertake contract administration and site supervision of the proposed works. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Annex 2 to Enclosure 3.

12. Subject to funding approval, we plan to phase the expenditure as follows-

Year	\$ million (MOD)
2018 - 2019	50.0
2019 - 2020	61.4
2020 - 2021	83.0
2021 - 2022	96.9
2022 - 2023	175.5
2023 - 2024	121.1
2024 - 2025	67.5
	655.4

13. We have derived the MOD estimate 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 2018 to 2025. We will deliver the proposed works under New Engineering Contract (NEC³) form of contract with provision for price adjustment.

14. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$26.1 million.

/15.

³ NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

15. The project will lead to an increase in the production cost of water by 0.39% in real terms by 2025^4 .

PUBLIC CONSULTATION

16. We consulted the relevant committees of seven District Councils concerned as listed in Annex 3 to Enclosure 3 between September and November 2017. Members generally supported the proposed works.

17. We consulted the Legislative Council Panel on Development on 23 January 2018 and Members generally supported the proposed works. Supplementary information related to the estimated benefits of the implementation of WIN and the plans showing the distribution of about 2 000 DMAs and PMAs throughout the territory was provided to the Panel on 14 March 2018.

ENVIRONMENTAL IMPLICATIONS

18. The proposed works are not designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The proposed works will not cause any long-term environmental impact. We have included in paragraph 10(b) above a sum of \$5.4 million (in MOD prices) in the project estimate the cost to implement suitable mitigation measures to control short-term environmental impacts.

19. We will control noise, dust and site run-off nuisances to meet established standards and guidelines through the implementation of mitigation measures in the relevant works contracts. These include the use of silencers, mufflers, acoustics lining or shields for noisy construction activities, frequent cleaning and watering of the site, and provision of wheel-washing facilities.

/20.

⁴ The increase in production cost of water is calculated at the 2017-18 price level and on the assumption that the water demand remains static and all other factors remain constant during the period from 2018 to 2025.

20. At planning and design stages, we have considered locations of chambers for accommodation of the proposed network monitoring and sensing equipment to reduce the generation of construction waste where possible. In addition, we will require the contractors 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 (PFRF)⁵. We will encourage the contractors to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

21. At construction stage, we will require the contractors to submit for approval a plan setting out waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that day-to-day operations on site comply with the approved plan. We will require the contractors to separate inert portion from 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 PFRF and landfills respectively through a trip-ticket system.

22. We estimate that the proposed works will generate 5 700 tonnes of construction waste. Of these, we will reuse 850 tonnes (15%) of inert construction waste on site and deliver 4 550 tonnes (80%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 300 tonnes (5%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfill sites is estimated to be \$0.4 million for this project (based on a unit charge rate of \$71 per tonne for disposal at PFRF and \$200 per tonne for disposal at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

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

/LAND

⁵ PFRF are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

LAND ACQUISITION

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

TRAFFIC IMPLICATIONS

25. We have carried out a Traffic Impact Assessment (TIA) for the proposed works. The TIA has concluded that the proposed works would not cause any significant impact on the traffic through implementation of appropriate temporary traffic management schemes.

BACKGROUND

26. We upgraded **196WC** to Category B in September 2014.

27. In August 2015, we engaged a consultant to undertake the investigation and detailed design for the 85 DMAs and PMAs in Kwun Tong, Sha Tin and Tai Po districts, and reprovisioning of water mains at an estimated cost of \$4.5 million in MOD prices. We charged this amount under block allocation **Subhead 9100WX** "Waterworks, studies and investigation for items in Category D of the Public Works Programme". The investigation and detailed design for the DMAs and PMAs was completed in June 2016.

28. On 28 June 2016, we upgraded part of **196WC** to Category A as **198WC** entitled "Implementation of WIN, stage 1" at an estimated cost of \$239.7 million in MOD prices for the construction of the 85 DMAs and PMAs in Kwun Tong, Sha Tin and Tai Po districts, procurement and establishment of the INMS; and investigation and detailed design for the remaining 515 DMAs and PMAs in the territory. In December 2016, we commenced the works for the 85 DMAs and PMAs for completion by end 2019, and commenced the consultancy on the investigation and detailed design for the 275 DMAs and PMAs. We have completed the detailed design for the 275 DMAs and PMAs mentioned in paragraph 1 above, and are working on the detailed design of the remaining 240 DMAs and PMAs. The procurement and establishment of the INMS is being arranged for completion by end 2019 tentatively.

29. The proposed works will not involve any tree removal or planting proposals.

30. We estimate that the proposed works will create about 125 jobs (100 for labourer and 25 for professional or technical staff) providing a total employment of 5 300 man-months.



REF. 62017-130_1_REV1.DWG





196WC – Implementation of Water Intelligent Network

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2017 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fee for	Professional	_	_	_	2.8
	contract administration (Note 2)	Technical	_	_	_	1.2
					Sub-total	4.0#
(b)	Resident site staff	Professional	155	38	1.6	19.5
	(RSS) costs ^(Note 3)	Technical	648	14	1.6	28.5
					Sub-total	48.0
	Comprising –					
	(i) Consultants' fees for management of RSS				2.7#	
	(ii) Remuneration of RSS				45.3#	
					Total	52.0

*MPS = Master Pay Scale

Notes

- 1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS point 38 = \$78,775 per month and MPS point 14 = \$27,485 per month).
- 2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the construction phase of the project. The construction phase of the 275 DMAs and PMAs will only be executed subject to Finance Committee's approval to upgrade part of **196WC** to Category A.
- 3. The actual man-months and actual costs will only be known after completion of the construction works.

Remarks

The figures in this Annex are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in the money-of-the-day prices in paragraph 10 of Enclosure 3.

196WC – Implementation of Water Intelligent Network

Date of	District	Committee		
Consultation	Council			
28 September 2017	Kwun Tong	Traffic and Transport Committee		
2 November 2017	Sha Tin	Development and Housing		
		Committee		
2 November 2017	Tsuen Wan	Environmental and Health Affairs		
		Committee		
8 November 2017	Tai Po	Environment, Housing and Works		
		Committee		
23 November 2017	Sai Kung	Traffic and Transport Committee		
27 November 2017	Islands	Tourism, Agriculture, Fisheries and		
		Environmental Hygiene Committee		
28 November 2017	Wong Tai Sin	Traffic and Transport Committee		

Consultation with District Councils

201WC – Relocation of Diamond Hill fresh water and salt water service reservoirs to caverns

PROJECT SCOPE AND NATURE

The part of 201WC which we propose to upgrade to Category A comprises –

- (a) an investigation study on the relocation of Diamond Hill fresh water and salt water service reservoirs (DHSRs) to caverns, detailed assessments on related environment, traffic, geotechnical, blasting vibration, slope, drainage, waterworks, utilities and other relevant aspects (please see paragraph 2 below);
- (b) preliminary and detailed design of the proposed works on:
 - construction of the relocated DHSRs (i) and associated pumping stations, water main laying works, access road improvement works, tunnels, adits. ventilation shaft(s) and caverns for accommodating the relocated DHSRs and associated facilities:
 - (ii) decommissioning of the existing DHSRs and associated facilities; and
 - (iii) associated works¹;
- (c) public engagement (PE) and consultation exercises² with relevant stakeholders;
- (d) associated site investigation works and supervision; and
- (e) preparation of tender documents and assessment of tenders for the associated site investigation works and the future construction works.

/2.

¹ Including environmental mitigation works, landscaping works, utilities diversion, etc. that are incidental to the Project.

² The PE and consultation activities will include roving exhibitions, community liaison group meetings and public forum.

2. In regard to paragraph 1(a) above, the investigation study will include –

- (a) a review/further exploration on the options of vehicular access tunnel portal location (i.e. Vehicular Access Option 1 Portal of access tunnel located near the entrance of the Lion Rock Park; and Vehicular Access Option 2 Portal of access tunnel located next to the Ma Chai Hang fresh water service reservoir); and
- (b) a study on the technical feasibility of extending the salt water network of the relocated Diamond Hill salt water service reservoir to reach Tsui Chuk Garden, while the detailed impact assessment on slope will include private slopes in the vicinity of the proposed caverns and tunnels (e.g. Chuk Yuen North Estate's).

3. A plan showing the preliminary layout³ of the relocated DHSRs is shown at Annex 1 to Enclosure 4.

4. Subject to funding approval of the Finance Committee (FC), we plan to engage consultants to carry out the proposed investigation study, design and associated site investigation works in the third quarter of 2018 for completion in the second quarter of 2021. In order to meet the tight schedule, we will invite tenders in parallel to enable early commencement of the proposed investigation study, design and associated site investigation works. The tender will only be awarded after obtaining FC's funding approval.

5. We will retain the remainder of **201WC** in Category B, which mainly comprises the proposed works described in paragraph 1(b) above. We will seek funding for the remainder of **201WC** at a later stage.

JUSTIFICATION

3

6. There is a pressing need to optimise the supply of land for various uses by sustainable and innovative approaches to support social and economic development. It is the established policy of the Government to adopt a multi-pronged approach to expand land resources. One practicable approach is rock cavern development, which is a viable source of long-term land supply.

/7.

Page 2

The location and sizes of the relocated DHSRs and associated pumping stations and facilities are subject to review under the proposed investigation study and design.

7.

Kong is suitable for cavern development from topographical and geological The other study on "Enhancing Land Supply Strategy: perspectives. Reclamation outside Victoria Harbour and Rock Cavern Development" completed by CEDD in 2014 further proposed relocating DHSRs to caverns as one of the proposed pilot schemes for rock cavern development.

8. The Water Supplies Department (WSD) in December 2014 commenced a feasibility study on the relocation of DHSRs to caverns (FSR). The main tasks of the FSR were substantially completed in December 2016. The results confirmed that relocating DHSRs to caverns in the hillside to the north of Chuk Yuen North Estate is technically feasible.

9. The FSR also identified that the relocation of DHSRs to caverns (the Project) would generate social benefits from the releasing of about 4 hectares of land to address the territorial housing needs and the local community needs. We therefore propose to carry out the proposed investigation study, design and associated site investigation works for the relocation of the existing DHSRs to caverns as soon as possible.

10. The future land uses of the existing DHSRs site to be released are subject to a separate planning and engineering (P&E) study, in which public views received during the previous PE exercises under the FSR will be taken into consideration and reviewed to formulate appropriate development and land uses schemes for further consultation with the public and stakeholders.

FINANCIAL IMPLICATIONS

11. We estimate the cost of the proposed investigation study, design and associated site investigation works to be \$127.5 million in MOD prices (please see paragraph 13 below), broken down as follows -

/(a)

(a)

(b)

(c)

		<pre>\$ million (in MOD prices)</pre>	
Cons	sultants' fee for		31.4
(i)	investigation study on the relocation of DHSRs to caverns and related detailed assessments	8.3	
(ii)	preliminary and detailed design	18.8	
(iii)	PE and consultation exercises with relevant stakeholders	1.5	
(iv)	preparation of tender documents and tender assessment	2.4	
(v)	management of resident site staff (RSS) for site investigation works	0.4	
Rem inve	nuneration of RSS for site stigation works		7.5
Site	investigation works		77.1

(d) Contingencies 11.5

Total	127.5
Total	127.5

12. We propose to engage consultants to conduct the proposed investigation study, design and supervision of the associated site investigation works. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Annex 2 to Enclosure 4.

/13.

13. Subject to funding approval, we plan to phase the expenditure as follows –

Year	\$ million (MOD)
2018 - 2019	10.0
2019 - 2020	83.2
2020 - 2021	31.8
2021 - 2022	2.5
	127.5

14. 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 2018 to 2022. We will deliver the proposed consultancy for the investigation study and design under a lump sum contract. The proposed consultancy will provide for price adjustment. We will deliver the site investigation works under a re-measurement contract because the quantities of works involved may vary depending on the actual ground condition. The contract will provide for price adjustment.

15. The proposed investigation study, design and associated site investigation works will not give rise to any recurrent expenditure.

PUBLIC CONSULTATION

16. We have conducted a two-stage PE exercise under the FSR to seek the views of the public and stakeholders with a view to building consensus on the Project. The Stage 1 PE was conducted from October 2015 to January 2016 to establish the need for the relocation and to solicit views on future use of the existing DHSRs site to be released, while the Stage 2 PE was conducted from November to December 2016 to solicit views on the preliminary relocation proposal and land use option for the existing DHSRs site to be released. We also met with the relevant Wong Tai Sin District Council (WTSDC) Members in April to July 2015. During the PE exercise, we carried out a wide range of activities, including distribution of PE digests, roving exhibitions, community group meetings, and public forum.

17. During the PE exercise, the major concerns/views raised by the stakeholders were on the type of residential development in the existing DHSRs site to be released, the traffic impact during construction and from the proposed development in the existing DHSRs site to be released, as well as the effect of blasting vibration on buildings and slopes and the environmental nuisances such as noise and dust emission arising from the construction works of the Project. These aspects will respectively be reviewed under a separate P&E study for the future land use of the existing DHSRs site to be released mentioned in paragraph 10 above and the proposed investigation study of the Project.

18. We consulted the WTSDC on the findings and recommendations of the FSR, as well as the proposal to proceed with the proposed investigation study, design and associated site investigation works, on 9 January 2018 and 6 March 2018. The WTSDC generally supported the proposal⁴.

19. We consulted the Legislative Council Panel on Development on 27 March 2018 and Members generally supported the proposed investigation study, design and associated site investigation works.

ENVIRONMENTAL IMPLICATIONS

4

20. The proposed investigation study, design and associated site investigation works are not designated projects under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499), and will not cause any long-term environmental impacts. We have included in the project estimate the cost of implementing suitable mitigation measures to control short-term environmental impacts arising from the site investigation works.

21. The proposed site investigation works will only generate very little construction waste. We will require the consultants to fully consider measures to minimise the generation of construction waste and to reuse or recycle construction waste as much as possible for implementation in the construction stage of the Project in future.

/22.

In view of some WTSDC Members' concern with the portal location of the vehicular access tunnel, WSD will review the options of portal location under the proposed investigation study (vide paragraph 2 above), and consult the WTSDC on the outcome of the review before proceeding with the detailed design of the Project.

22. The proposed relocation of DHSRs to caverns constitutes a designated project under Schedule 2 of the EIA Ordinance, and an environmental permit is required for its construction and operation. We will conduct an EIA study to address the environmental impacts and prepare an EIA report to meet the requirements under the EIA Ordinance.

HERITAGE IMPLICATIONS

23. The proposed investigation study, design and associated site investigation works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

24. The proposed investigation study, design and associated site investigation works will not require any land acquisition.

TRAFFIC IMPLICATIONS

25. The proposed investigation study, design and associated site investigation works will not have significant impact on traffic.

BACKGROUND

26. On 11 July 2014, FC approved upgrading **195WC** "Feasibility study on relocation of Diamond Hill fresh water and salt water service reservoirs to caverns" to Category A with an approved project estimate of \$46 million in MOD prices for carrying out the FSR. The FSR commenced in December 2014. The main tasks under the FSR were substantially completed in December 2016.

27. We upgraded **201WC** to Category B in October 2017.

28. The proposed investigation study, design and associated site investigation works will not involve any tree removal or planting proposals. We will require the consultants to take into consideration the need for tree preservation during the planning and design stages of the project. We will also incorporate tree planting proposals, where possible, in the construction phase in future.

29. We estimate that the proposed investigation study, design and associated site investigation works will create about 95 jobs (62 for labourers and 33 for professional or technical staff) providing a total employment of 1 720 man-months.



Reservoirs to Caverns

現有鑽石山食水配水庫(將被重置) EXISTING DIAMOND HILL FW SR

:配水庫	圖 例 LE	EGEND :
MOND		擬敷設的食水水管接駁至現有系統 PROPOSED FRESH WATER MAINS CONNECTED TO EXISTING NETWORK
CATED)	•	擬敷設的海水水管接駁至現有系統 PROPOSED SALT WATER MAINS CONNECTED TO EXISTING NETWORK
Works in progress		擬敷設的食水水管 PROPOSED FRESH WATER MAINS
		擬敷設的海水水管 PROPOSED SALT WATER MAINS
DIAM	450	食水管道直徑(毫米) DIAMETER OF FRESH WATER MAINS (MILLIMETRES)
	800	海水管道直徑(毫米) DIAMETER OF SALT WATER MAINS (MILLIMETRES)
	+ 87.2	水平基準高度 SPOT LEVEL
	FW	食水 FRESH WATER
	SW	海水 SALT WATER
	PS	抽水站 PUMPING STATION
	SR	配水庫 SERVICE RESERVOIR
	I.L.	內底水平 INVERT LEVEL
		腾出土地 SITE TO BE RELEASED
		沙田至中環綫(施工中) SHATIN TO CENTRAL LINK (UNDER CONSTRUCTION)
	WATER	水務署 SUPPLIES DEPARTMENT
草 圖 SKETC	編號 S	SK 62017 / 135

REF. 62017-135.DWG

201WC – Relocation of Diamond Hill fresh water and salt water service reservoirs to caverns (DHSRs)

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2017 prices)

			Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) C	onsultants' staff costs (*	Note 2)		•		
(i)	Investigation study on the relocation of DHSRs to caverns and related detailed assessments	Professional Technical	33 40	38 14	2.0 2.0	5.2 2.2 - 7.4#
(ii)	Preliminary and detailed design	Professional Technical	75 91	38 14	2.0 2.0	$\begin{array}{c}11.8\\5.0\end{array}\right] 16.8\#$
(iii)	Public engagement and consultation exercises with relevant stakeholders	Professional Technical	5 9	38 14	2.0 2.0	$\begin{array}{c} 0.8\\ 0.5 \end{array} \right] 1.3\#$
(iv)	Preparation of tender documents and tender assessment	Professional Technical	10 10	38 14	2.0 2.0	$\begin{array}{c} 1.6\\ 0.5 \end{array} \right] 2.1 \#$
					Sub-total	27.6
(b) R	esident site staff	Professional	33	38	1.6	4.2
(RSS) costs (Note 3)		Technical	67	14	1.6	2.9
					Sub-total	7.1
Comp	rising					
(i)	Consultants' fees for management of RSS for site investigation works				0.4#	
(ii)	Remuneration of RSS for site investigation works				6.7#	
					Total	34.7

Notes

- 1. A multiplier of 2.0 is applied to the average MPS point to estimate the full staff costs, including the consultants' overheads and profit, as the staff will be employed in the consultants' office. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS point 38 = \$78,775 per month and MPS point 14 = \$27,485 per month.).
- 2. The actual man-months and fees will only be known when we have selected the consultants through the usual competitive bidding system.
- 3. The actual man-months and costs will only be known after completion of the site investigation works.

Remarks

The figures in this Annex are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 11 of Enclosure 4.