

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

### **HEAD 709 – WATERWORKS**

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

##### **365WF – Siu Ho Wan water treatment works extension**

#### **Water Supplies – Salt water supplies**

##### **54WS – Salt water supply to Sha Tin Area 52, Shui Chuen O**

##### **55WS – Reclaimed water supply to Sheung Shui and Fanling**

Members are invited to recommend to the Finance Committee –

- (a) the upgrading of part of **365WF** as **373WF**, entitled “Siu Ho Wan water treatment works extension – main works”, to Category A at an estimated cost of \$3,694.9 million in money-of-the-day (MOD) prices;
- (b) the upgrading of **54WS**, to Category A at an estimated cost of \$136.0 million in MOD prices;
- (c) the upgrading of **55WS**, to Category A at an estimated cost of \$1,255.5 million in MOD prices; and
- (d) the retention of the remainder of **365WF** in Category B.

**/PROBLEM .....**

**PROBLEM**

We need to cope with the increase in water demand in North Lantau, to conserve fresh water resource and to relieve the burden of existing fresh water supply system in Sha Tin, Sheung Shui and Fanling.

**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) part of **365WF** at an estimated cost of \$3,694.9 million in MOD prices for the main works of Siu Ho Wan water treatment works extension;
- (b) **54WS** at an estimated cost of \$136.0 million in MOD prices for the construction of To Shek salt water pumping station and Shui Chuen O salt water service reservoir and laying of the associated water mains; and
- (c) **55WS** at an estimated cost of \$1,255.5 million in MOD prices for the construction of Shek Wu Hui water reclamation plant and laying of the associated water mains.

**/PROJECT .....**

**PROJECT SCOPE AND NATURE**

- 3. Details of the above three projects are provided at Enclosures 1 to 3 respectively.

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Development Bureau  
April 2021

**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) increasing the water treatment capacity of Siu Ho Wan water treatment works (SHW WTW) from 150 000 cubic metres (m<sup>3</sup>) per day to 300 000 m<sup>3</sup> per day within the existing WTW compound, by constructing new water treatment facilities and a new laboratory building and modifying the existing associated facilities;
- (b) constructing a new raw water booster pumping station in Siu Ho Wan to increase the raw water transfer capacity from Tai Lam Chung Reservoir to SHW WTW;
- (c) upgrading the existing Pui O raw water pumping station and Pui O No. 2 raw water pumping station to a combined raw water transfer capacity of 460 000 m<sup>3</sup> per day<sup>1</sup>; and
- (d) laying approximately 1.2 kilometres of water mains with diameter ranging from 1 200 millimetres (mm) to 1 400 mm along South Lantau Road (SLR) to increase the raw water transfer capacity from Shek Pik Reservoir to SHW WTW.

2. The location plan and the layout plan of the proposed works in the compound of SHW WTW are at Annexes 1 and 2 to Enclosure 1 respectively.

/3. ....

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<sup>1</sup> In addition to conveying 300 000 m<sup>3</sup> of raw water per day to the extended SHW WTW, Pui O raw water pumping station and Pui O No. 2 raw water pumping station also transfer 160 000 m<sup>3</sup> of raw water per day to the existing Silvermine Bay WTW.

3. We plan to commence the proposed works upon obtaining funding approval from the Finance Committee for completion in around six and a half years.

4. We will retain the remainder of **365WF** in Category B, which mainly comprises the upgrading of the pre-treatment, clarification and filtration processes and drinking water treatment technologies of the existing SHW WTW and laying of remaining water mains along SLR. We will seek funding for the remainder of **365WF** at a later stage.

### JUSTIFICATION

5. The SHW WTW was commissioned in 1996 with a design water treatment capacity of 150 000 m<sup>3</sup> 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. There are currently two sources of raw water supply to the SHW WTW, one from Tai Lam Chung Reservoir and the other from Shek Pik Reservoir. At present, raw water from Tai Lam Chung Reservoir is supplied to SHW WTW by gravity whereas raw water from Shek Pik Reservoir is transferred to SHW WTW via pumping at Pui O No. 2 raw water pumping station.

7. Subsequent to the launching of various development proposals in North Lantau including the Hong Kong International Airport Three-Runway System and the Tung Chung New Town Extension, the SHW WTW will not be able to cope with the increase in water demand by 2028. Therefore, we propose to expand the water treatment capacity of SHW WTW from 150 000 m<sup>3</sup> per day to 300 000 m<sup>3</sup> per day and increase correspondingly the transfer capacity of the two raw water supply systems.

/FINANCIAL .....

**FINANCIAL IMPLICATIONS**

8. We estimate the cost of the proposed works to be \$3,694.9 million in MOD prices, broken down as follows –

	<b>\$ million</b> <b>(in MOD prices)</b>
(a) Civil works	1,371.0
(i) water treatment facilities	801.9
(ii) Siu Ho Wan raw water booster pumping station	158.3
(iii) Pui O and Pui O No. 2 raw water pumping stations	163.3
(iv) water mains along SLR	247.5
(b) Electrical and mechanical works	1,405.2
(i) water treatment facilities	1,182.4
(ii) Siu Ho Wan raw water booster pumping station	67.8
(iii) Pui O and Pui O No. 2 raw water pumping stations	155.0
(c) Environmental mitigation measures and environmental monitoring and audit (EM&A) programme	76.0
(d) Consultants' fees for	23.2
(i) Contract administration	16.0
(ii) management of resident site staff (RSS)	7.2
(e) Remuneration of RSS	450.0
(f) Contingencies	369.5
Total	3,694.9

9. 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 3 to Enclosure 1.

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

Year	\$ million (in MOD prices)
2021 – 2022	240.5
2022 – 2023	746.5
2023 – 2024	988.6
2024 – 2025	798.7
2025 – 2026	374.1
2026 – 2027	267.1
2027 – 2028	149.3
2028 – 2029	65.5
2029 – 2030	48.7
2030 – 2031	15.9
	<hr style="width: 50%; margin: auto;"/> 3,694.9 <hr style="width: 50%; margin: auto;"/>

11. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2021 to 2031. We will deliver the proposed works under New Engineering Contract (NEC)<sup>2</sup> form of contract with provision for price adjustment.

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<sup>2</sup> NEC is a form of contract developed by the Institution of Civil Engineers, United Kingdom. It emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

12. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$66.0 million.

13. The proposed works will lead to an increase in total annual expenditure on waterworks operation by 1.43% in real terms upon the completion of the project<sup>3</sup>.

## **PUBLIC CONSULTATION**

14. We consulted the Tourism, Agriculture, Fisheries, Environmental Hygiene and Climate Change Committee of the Islands District Council on 23 November 2020 on the project. Members recognised the importance of the project to cope with the developments in North Lantau, and their main concern and suggestion was that the relevant part of SLR should be widened and improved in conjunction with the proposed mainlaying works. As it takes time to liaise with other departments on ways to address Members' suggestion, the water mains section in concern has been excluded from the main works and would be dealt with separately under the remainder of **365WF**.

15. We consulted the Legislative Council Panel on Development on 23 February 2021. Members in general supported the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

16. The proposed SHW WTW extension is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for the construction and operation of the project. In December 2004, the EIA report for the project was approved under EIA Ordinance (EIAO) with an Environmental Permit issued in January 2005. The EIA report concluded that the environmental impact of the project can be controlled to within the criteria under EIAO and the Technical Memorandum on EIA Process. We also conducted an Environmental Review in December 2020, which concluded that the evaluation and recommendations presented in the approved EIA report are still valid.

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<sup>3</sup> The increase in annual expenditure is calculated at the 2020-21 price level on the assumption that all other factors remain constant during the period until the completion of the project.



17. We shall implement the measures recommended in the approved EIA report. The key measures include the use of silencers, mufflers, acoustic lining or shields for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities to prevent noise, dust and site run off impacts during the construction stage. We have included a sum of \$76 million (in MOD prices) in the project estimate for the implementation of environmental mitigation measures.

18. At the planning and design stages, we have optimised the size of the process facilities and adopted advanced compact treatment system to minimise building footprint and excavation volume to reduce generation of construction waste wherever practicable. In addition, we will reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or at other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities (PFRF)<sup>4</sup>. We will maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce generation of construction waste.

19. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert 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.

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

20. We estimate that the proposed works will generate in total about 202 000 tonnes of construction waste. We will reuse about 15 660 tonnes (8%) of inert construction waste on site and deliver 180 790 tonnes (89%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 5 550 tonnes (3%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfill sites, is estimated to be about \$13.95 million for the proposed works (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**

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

### **LAND ACQUISITION**

22. Land acquisition is not required for implementing the proposed works.

### **TRAFFIC IMPLICATIONS**

23. To minimise possible disruption to traffic during construction, we have conducted a traffic impact assessment for the proposed works. During the construction stage, we will establish a traffic management liaison group and closely liaise with the Hong Kong Police Force, the Transport Department and other concerned government departments to discuss, scrutinise and review the proposed temporary traffic arrangement with a view to minimising the traffic impact arising from the construction works. In addition, we will set up a telephone hotline to respond to public enquiries or complaints.

### **BACKGROUND INFORMATION**

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

25. On 1 June 2018, we upgraded part of **365WF** to Category A as **366WF** “Siu Ho Wan water treatment works extension – detailed study, design and site investigation” at an approved project estimate of \$111.5 million in MOD price. We engaged a consultant in August 2018 to undertake the detailed design and site investigation works. We have substantially completed the detailed design of the proposed works.

26. Of the 657 trees within the proposed works boundary, 503 trees will be preserved. The proposed construction works will involve the removal of 154 trees, including 148 trees to be felled and 6 trees to be transplanted elsewhere. All trees to be removed are not important trees<sup>5</sup>. We will incorporate planting proposals as part of the proposed works, including estimated quantities of 212 trees and 35 170 square metres of grassed area.

27. We estimate that the proposed works will create about 710 jobs (about 570 for labourers and 140 for professional or technical staff) providing a total employment of 28 650 man-months.

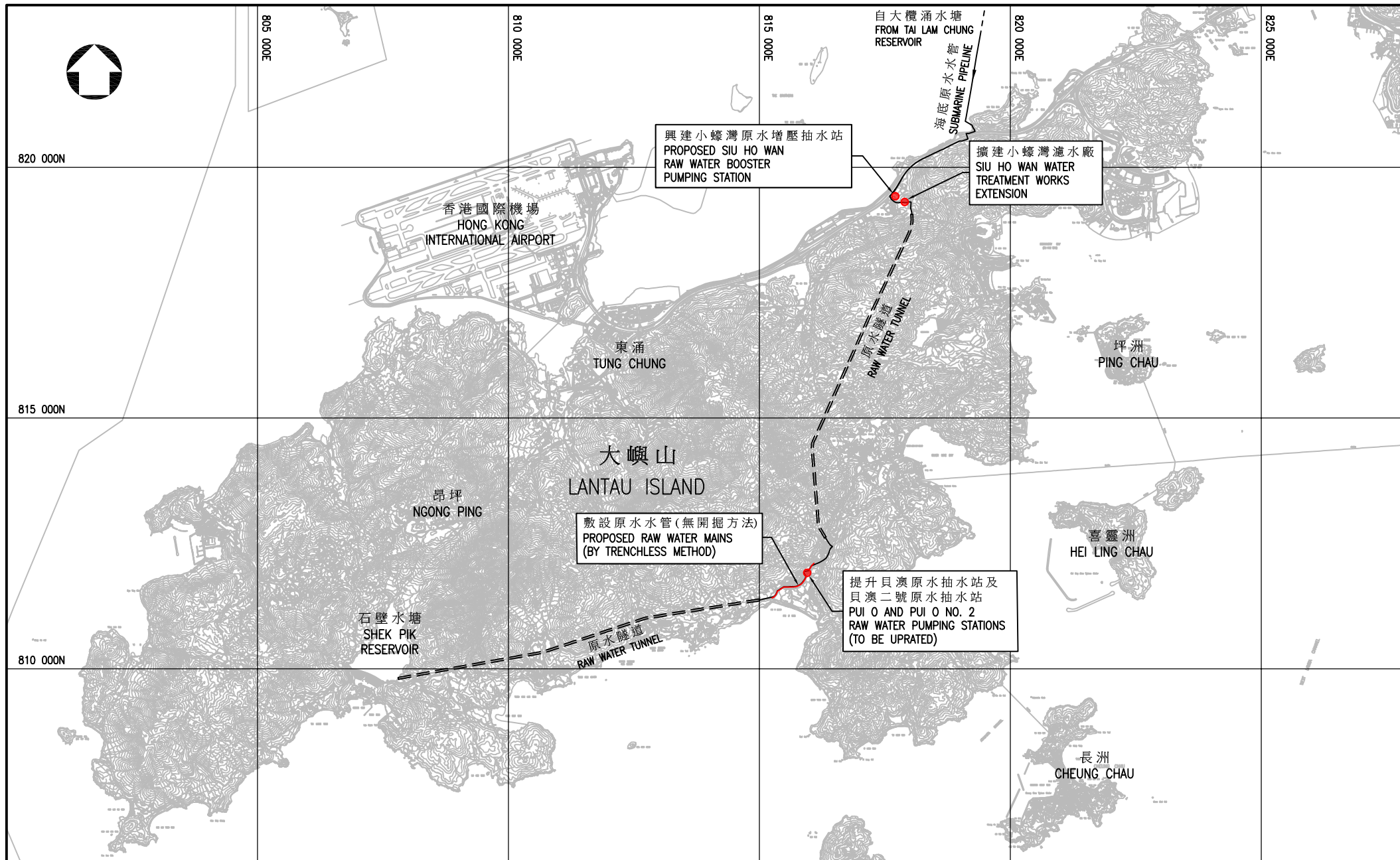
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Development Bureau  
April 2021

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<sup>5</sup> “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 m (measured at 1.3 m above ground level), or with height or canopy spread equal to or exceeding 25 m.

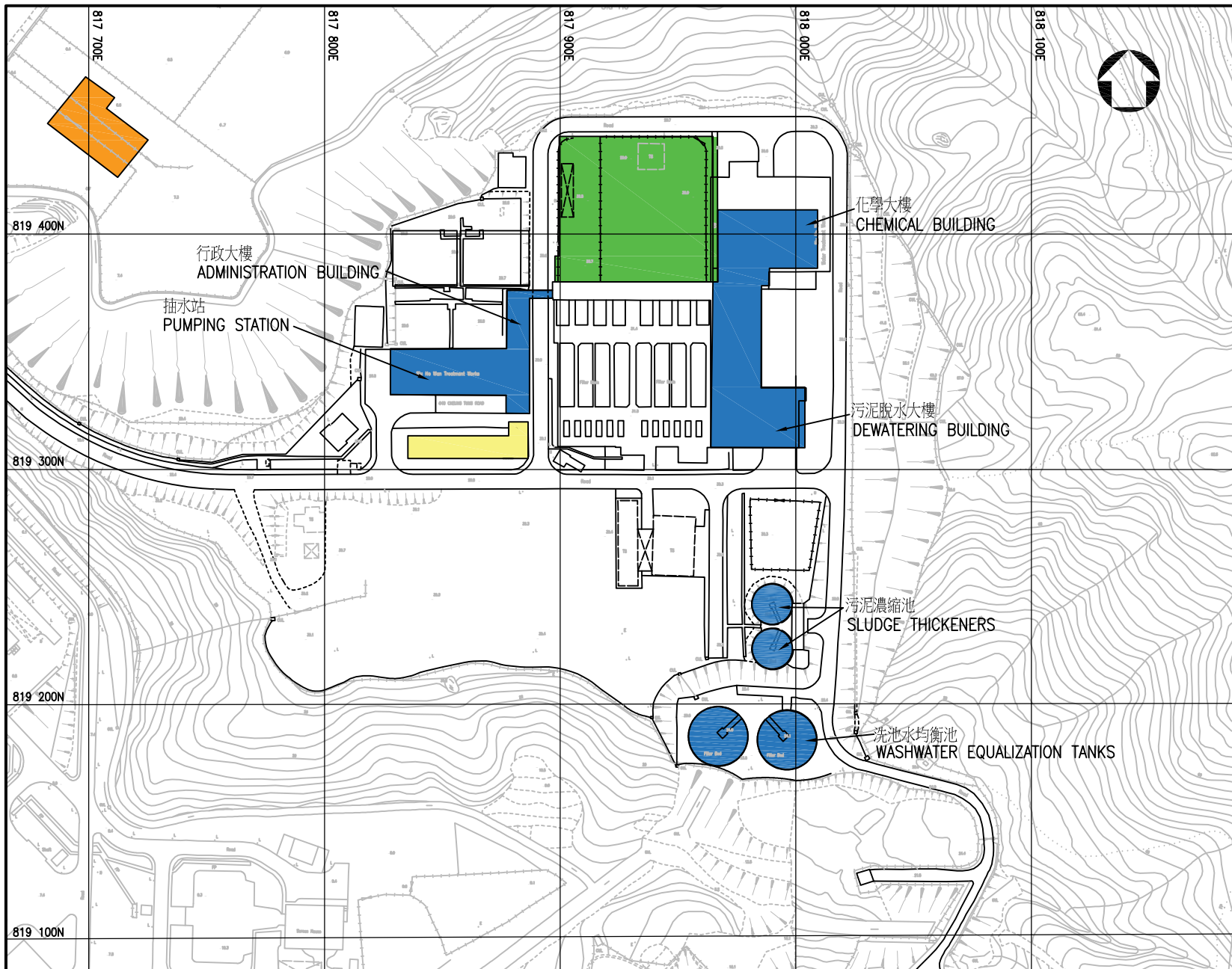


365WF-小蠔灣濾水廠擴展工程-主項工程  
**365WF - SIU HO WAN WATER TREATMENT WORKS EXTENSION - MAIN WORKS**  
 建議擴展工程項目  
**PROPOSED WORKS ITEMS**

 **水務署**  
 Water Supplies Department

草圖編號 SK 52016/3  
 SKETCH NO.

附件一 附錄一 ANNEX 1 TO ENCLOSURE 1



圖例 LEGEND: 主項工程 Main Works

- 擬建新濾水大樓  
PROPOSED NEW WATER TREATMENT BUILDING
- 擬議改動現有相關設施  
PROPOSED MODIFICATION TO EXISTING ASSOCIATED FACILITIES
- 擬建小蠔灣原水增壓抽水站  
PROPOSED SIU HO WAN RAW WATER BOOSTER PUMPING STATION
- 擬建實驗室大樓  
PROPOSED LABORATORY BUILDING

工務計劃項目第365WF號 - 小蠔灣濾水廠擴展工程 - 主項工程  
PWP ITEM NO. 365WF - Siu Ho Wan water treatment works extension - main works

**水務署**  
Water Supplies Department

草圖編號 SK 52016/9  
SKETCH NO.

## Annex 3 to Enclosure 1 to PWSC(2021-22)1

### 365WF – Siu Ho Wan water treatment works extension

#### Breakdown of the estimate for consultants' fees and resident site staff costs (in September 2020 prices)

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Consultants' fee for contract administration (Note 2)	Professional	–	–	–	6.0
	Technical	–	–	–	7.5
				Sub-total	13.5#
(b) Resident site staff (RSS) costs (Note 3)	Professional	1 569	38	1.6	215.6
	Technical	3 522	14	1.6	170.4
				Sub-total	386.0
Comprising –					
(i) Consultants' fees for management of RSS				6.1#	
(ii) Remuneration of RSS				379.9#	
				<b>Total</b>	<b>399.5</b>

\* MPS = Master Pay Scale

#### Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS point 38 = \$85,870 per month and MPS point 14 = \$30,235 per month).
2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the design and construction of the project. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade the part of 365WF to Category A.
3. The actual man-months and 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 MOD prices in paragraph 8 of Enclosure 1.

**54WS – Salt water supply to Sha Tin Area 52, Shui Chuen O**

**PROJECT SCOPE AND NATURE**

The **54WS** which we propose to upgrade to Category A comprises -

- (a) construction of To Shek salt water pumping station with a pumping capacity of approximately 4 000 cubic metres (m<sup>3</sup>) per day;
- (b) construction of Shui Chuen O salt water service reservoir with a capacity of around 820 m<sup>3</sup>; and
- (c) laying of associated water mains with diameter ranging from 100 millimetres (mm) to 300 mm with an approximate total length of 2.0 kilometres (km).

2. A location plan showing the proposed works is at Annex 1 to Enclosure 2.

3. We plan to commence the proposed works upon obtaining funding approval from the Finance Committee for target completion of the works within four years.

**JUSTIFICATION**

4. At present, temporary fresh water is provided to Shui Chuen O area for flushing. The mean daily demand of fresh water for flushing is about 3 300 m<sup>3</sup> per day.

5. Owing to increase in fresh water demand arising from new housing developments in Sha Tin area, we anticipate that the mean daily fresh water demand in the area will exceed the capacity of the related fresh water supply system by year 2025.

6. In order to conserve precious fresh water resources and to relieve the burden of the fresh water supply system in meeting the future demand, we propose to provide salt water supply to the Shui Chuen O area, including constructing a new salt water pumping station of a pumping capacity of 4 000 m<sup>3</sup> per day (namely To Shek salt water pumping station), constructing a new salt water service reservoir of a storage capacity of 820 m<sup>3</sup> (namely Shui Chuen O salt water service reservoir), and laying about 2.0 km of the associated water mains.

## FINANCIAL IMPLICATIONS

7. We estimate the cost of the proposed works to be \$136.0 million in money-of-the-day (MOD) prices, broken down as follows -

	<b>\$ million</b> (in MOD prices)
(a) Construction of To Shek salt water pumping station	52.8
(b) Construction of Shui Chuen O salt water service reservoir	26.3
(c) Laying of the associated water mains	37.6
(d) Environmental mitigation measures	3.2
(e) Consultants' fees for advisory service for administration of contract adopting New Engineering Contract (NEC) <sup>1</sup> form of contract	3.7
(f) Contingencies	12.4
<b>Total</b>	<b>136.0</b>

8. While the construction of the proposed works will be supervised by in-house staff, we propose to engage consultants to provide advisory service for administration of the contract for the proposed works which will adopt NEC form of contract. A detailed breakdown of the estimate for the consultants' fees by man-months is at Annex 2 to Enclosure 2.

/9. ....

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<sup>1</sup> NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It emphasises cooperation, mutual thrust and collaborative risk management between contracting parties.



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

Year	\$ million (in MOD prices)
2021 – 2022	19.7
2022 – 2023	41.4
2023 – 2024	43.1
2024 – 2025	24.7
2025 – 2026	5.7
2026 – 2027	1.4
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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 2021 to 2027. We will deliver the proposed works under NEC form of contracts with provision for price adjustment.

11. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$1.31 million.

12. The project will lead to an increase in the total annual expenditure on waterworks operation by 0.05% in real terms upon the completion of the project<sup>2</sup>.

## **PUBLIC CONSULTATION**

13. We consulted the Development and Housing Committee of the Sha Tin District Council on 27 October 2020. Members of the committee noted that the initiative would help save fresh water and we agreed to adjust the proposed water main alignment to minimise its traffic impact.

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<sup>2</sup> The increase in annual expenditure is calculated at the 2020-21 price level on the assumption that all other factors remain constant during the period until the completion of the project.

14. We consulted the Legislative Council Panel on Development on 23 February 2021. Members supported the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

15. The proposed works are not regarded as a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have completed the Preliminary Environmental Review (PER) for the project. The PER concluded and the Director of Environmental Protection agreed that the project would not have any long-term environmental impacts. We will incorporate the mitigation measures recommended in the PER into the works contracts 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 7(d) above a sum of \$3.2 million (in MOD prices) in the project estimate for implementing 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. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or at other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities (PFRF)<sup>3</sup>. 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 where possible.

17. At the construction stage, we will require the contractor 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 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. ....

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

18. We estimate that the proposed works will generate 24 500 tonnes of construction waste. Of these, we will reuse about 4 750 tonnes (19%) of inert construction waste on site and deliver 18 250 tonnes (75%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 1 500 tonnes (6%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfills is estimated to be \$1.6 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 ACQUISITION**

20. The proposed works do not involve resumption of private land.

### **TRAFFIC IMPLICATIONS**

21. We have carried out a traffic impact assessment (TIA) for the proposed works. According to the findings of the assessment, with the implementation of appropriate temporary traffic arrangement (TTA), the construction works will not cause significant impact on the traffic in the areas concerned.

22. At the construction stage, we will establish a traffic management liaison group and closely liaise with the Hong Kong Police Force, the Transport Department and other relevant departments to discuss, scrutinise and review the proposed TTA with a view to minimising the traffic impact arising from the construction works.

### **BACKGROUND**

23. We upgraded **54WS** to Category B in August 2014.

24. Between 2018 and 2019, we engaged contractors to carry out site investigations and consultants to undertake the TIA, tree survey and landscape design for the proposed works at a total cost of \$4.75 million in MOD prices. We charged the amount to block allocation **Subhead 9100WX** “Waterworks, studies and investigations for item in Category D of the Public Works Programme”. We have substantially completed the detailed design of the proposed works using in-house resources.

25. Of the 250 trees within the project boundary, 172 trees will be preserved. The proposed construction works will involve the removal of 78 trees, all of which will be felled. All trees to be removed are not important trees<sup>4</sup>. We will incorporate planting proposals as part of the project, including 78 trees.

26. We estimate that the proposed works will create about 40 jobs (34 for labourers and 6 for professional or technical staff) providing a total employment of 1 340 man-months.

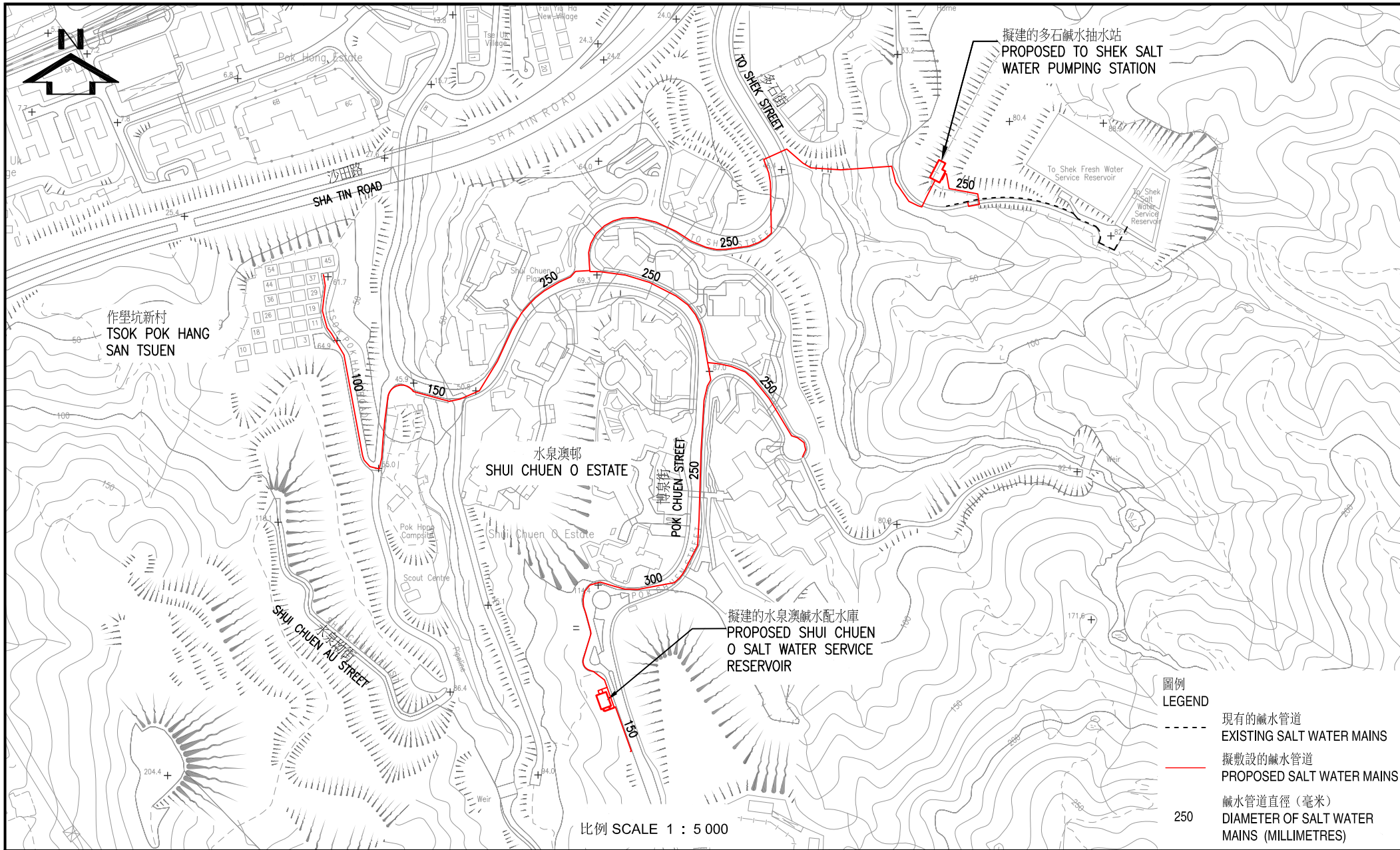
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Development Bureau  
April 2021

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<sup>4</sup> “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.



工務工程編號54WS號 --- 沙田第52區水泉澳鹹水供應系統  
P.W.P. Item No. 54WS --- Salt water supply to Sha Tin Area 52, Shui Chuen O

水務署  
WATER SUPPLIES DEPARTMENT

草圖編號  
SKETCH NO. SK 62020 / 107

## Annex 2 to Enclosure 2 to PWSC(2021-22)1

### 54WS – Salt water supply to Sha Tin Area 52, Shui Chuen O

#### Breakdown of the estimates for consultants' fees (in September 2020 prices)

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fee for Professional	12	38	2.0	2.1
	advisory service for Technical	20	14	2.0	1.2
administration of contract adopting New Engineering Contract (NEC) form of contract <sup>(Note 2 &amp; 3)</sup>					
				<b>Total</b>	<b>3.3#</b>

\* MPS = Master Pay Scale

#### Notes

1. A multiplier of 2.0 is applied to the average MPS salary point to arrive at the full staff cost including the consultants' overhead and profit, as the staff were employed in the consultants' offices (as at now, MPS point 38 = \$85,870 per month and MPS point 14 = \$30,235 per month).
2. The actual man-months and fees will only be known after the consultants have been selected.
3. The Water Supplies Department (WSD) will deploy in-house staff to supervise the construction of the proposed works. The fees in (a) above will be used for engaging consultants to provide advisory service for WSD's contract administration and quantity surveying.

#### Remarks

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

**55WS – Reclaimed water supply to Sheung Shui and Fanling**

**PROJECT SCOPE AND NATURE**

The **55WS** which we propose to upgrade to Category A comprises -

- (a) construction of Shek Wu Hui water reclamation plant (SWHWRP) <sup>1</sup> with a production capacity of up to 73 000 cubic metres (m<sup>3</sup>) per day;
- (b) laying of about 1.2 kilometres (km) of pumping mains with a diameter of 600 millimetres (mm) connecting the proposed SWHWRP and the Table Hill reclaimed water service reservoir<sup>2</sup>;
- (c) laying of about 24.1 km of distribution mains with diameters ranging from 150 mm to 450 mm in the north-eastern part of Sheung Shui and Fanling (SSF) areas and associated water main connection works; and
- (d) associated works including environmental mitigation works, landscaping works and other engineering works.

— The location plan showing the proposed works and the layout plan of the proposed SWHWRP are at Annexes 1 and 2 to Enclosure 3 respectively.

2. We plan to commence the proposed works upon obtaining funding approval from the Finance Committee for completion in phases in around five and a half years, targeting to make reclaimed water supply first available in around two and a half years.

**/JUSTIFICATION .....**

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<sup>1</sup> The reclamation plant comprises mainly hypo-chlorination facilities and a pumping station.

<sup>2</sup> The existing Table Hill No. 2 fresh water service reservoir will be converted into the Table Hill reclaimed water service reservoir.

**JUSTIFICATION**

3. Expansion of the use of lower grade water (i.e. seawater and recycled water<sup>3</sup>) for non-potable purposes is one of the demand management measures in the updated Total Water Management Strategy, promulgated in 2019, which aims at sustainable use of fresh water to ensure water security and support the development of Hong Kong.

4. SSF areas are located inland and are currently supplied with fresh water temporarily for flushing. Taking the opportunity arising from the Drainage Services Department's upgrading of Shek Wu Hui sewage treatment works to tertiary treatment, we will further process the treated sewage effluent therefrom to produce reclaimed water for supply to the Northeast New Territories areas for non-potable uses. We will implement reclaimed water supply in phases and start the supply with SSF areas in 2024 subject to the funding approval being sought. The supply will be extended to Kwu Tung North and Fanling North New Development Areas (NDAs) in pace with their development programmes. It is estimated that about 22 million m<sup>3</sup> of fresh water can be saved each year ultimately.

5. For providing reclaimed water supply to SSF areas with allowance to cater for the NDAs' demand, the facilities mentioned in paragraph 1 above are required to be put in place.

**/FINANCIAL .....**

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<sup>3</sup> Recycled water includes reclaimed water (from the processing of treated effluent from sewage treatment works), treated grey water (from the treatment of used water collected from baths, wash basins, kitchen sinks or similar fittings) and harvested rainwater.



**FINANCIAL IMPLICATIONS**

6. We estimate the cost of the proposed works to be \$1,255.5 million in MOD prices, broken down as follows –

	<b>\$ million</b> (in MOD prices)
(a) Civil works	877.6
(i) SWHWRP	226.1
(ii) Pumping and distribution mains	651.5
(b) Electrical and mechanical works for SWHWRP	104.7
(c) Environmental mitigation measures	9.5
(d) Consultants' fees for	10.0
(i) contract administration	7.2
(ii) management of resident site staff (RSS)	2.8
(e) Remuneration of RSS	139.6
(f) Contingencies	<u>114.1</u>
Total	<u>1,255.5</u>

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 3 to Enclosure 3.

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

/Year .....

Year	\$ million (in MOD prices)
2021 – 2022	103.8
2022 – 2023	357.0
2023 – 2024	361.0
2024 – 2025	129.0
2025 – 2026	116.0
2026 – 2027	91.8
2027 – 2028	81.1
2028 – 2029	15.8
	<hr/> 1,255.5 <hr/>

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 2021 to 2029. We will deliver the proposed works under New Engineering Contract (NEC)<sup>4</sup> form of contract with provision for price adjustment.

10. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$35.4 million.

11. The proposed works will lead to an increase in the total annual expenditure on waterworks operation by 0.72% in real terms upon the completion of the project<sup>5</sup>.

/PUBLIC .....

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

<sup>5</sup> The increase in annual expenditure is calculated at the 2020-21 price level on the assumption that all other factors remain constant during the period until the completion of the project.

## **PUBLIC CONSULTATION**

12. We consulted the Committee on Land Development, Housing and Works of North District Council on 16 March 2020 and 18 May 2020 respectively. Members supported the proposed works.

13. We consulted the Legislative Council Panel on Development on 23 February 2021. Members supported the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

14. The proposed SWHWRP will reuse treated sewage effluent to produce reclaimed water. The reuse of treated sewage effluent is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for its construction and operation. It formed part of the “North East New Territories New Development Areas” project of which the EIA report was approved in October 2013. The EIA report concluded that the environmental impact of the designated project can be controlled to within the criteria under the EIA Ordinance (EIAO) and the Technical Memorandum on EIA Process. An Environmental Permit was issued in November 2013. We shall implement mitigation measures recommended in the approved EIA report and the Environmental Monitoring and Audit Manual, such as pollution control measures including frequent watering of site, provision of wheel washing facilities, covering of materials on trucks, use of silenced construction plant, temporary noise barriers and acoustic enclosures for noisy construction activities.

15. While the mitigation measures are applicable to the construction of SWHWRP, the laying of pumping mains and distribution mains is not a designated project under the EIAO. We have carried out a Preliminary Environmental Review (PER) for the mainlaying works. The PER concluded and the Director of Environmental Protection agreed in November 2020 that the works would not have any long-term environmental impacts. We will incorporate the mitigation measures recommended in the PER, similar to those described in paragraph 14 above, into the works contract to control the environmental impacts arising from the construction works to within established standards and guidelines. We have included in the project estimate the cost of \$9.5 million (in MOD prices) mentioned in paragraph 6 above for implementing the environmental mitigation measures referred to in paragraphs 14 and 15.

16. At the planning and design stages, we have considered optimising the design and layouts of the proposed works to reduce 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 at other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities (PFRF)<sup>6</sup>. 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 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 in total about 37 520 tonnes of construction waste. Of these, we will reuse about 21 730 tonnes (58%) of inert construction waste on site and deliver 14 930 tonnes (40%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 860 tonnes (2%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfills is estimated to be about \$1.23 million for the 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 .....**

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<sup>6</sup> PFRF are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste at PFRF requires a licence issued by the Director of Civil Engineering and Development.

## HERITAGE IMPLICATIONS

19. The project 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

20. The proposed works will only involve government land. No land resumption is required. We will charge the cost of land clearance for government land, estimated at \$120,000, to **Head 701 – Land Acquisition**. A breakdown of the land clearance cost is at Annex 4 to Enclosure 3.

## TRAFFIC IMPLICATIONS

21. We have carried out a traffic impact assessment (TIA) for the proposed works. The TIA concluded that with the implementation of appropriate traffic management measures, the proposed works would not cause significant impact on the traffic. Prior to commencement of works on site, we will carry out a traffic review at the construction stage to revisit the temporary traffic management measures with reference to the latest traffic condition.

## BACKGROUND

22. We upgraded **55WS** to Category B in August 2016.

23. In February 2019, we engaged consultants to undertake the investigation and detailed design and engaged contractors to carry out site investigation works for the proposed works at a cost of about \$23.48 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”. We have substantially completed the investigation and detailed design of the proposed works.

24. We have been implementing infrastructure works which allow for the supply of reclaimed water to SSF areas, including the construction of a service reservoir, laying of trunk water mains and the local distribution mains at south-western part of SSF areas. The Table Hill No. 2 fresh water service reservoir and trunk water mains (implemented under PWP Item No. **350WF**), as well as the distribution mains at south-western part of SSF areas (being implemented under PWP Item No. **355WF**) had been designed with flexibility for conversion in phases to a flushing water system using reclaimed water. These facilities will be progressively deployed to supply reclaimed water following the completion of the first phase of the proposed works, which includes the SWHWRP and associated reclaimed water mains.

25. Of the 49 trees within the project boundary of the proposed works, 1 tree will be transplanted and 48 trees will be felled. All trees to be removed are not important trees<sup>7</sup>. We will incorporate planting proposals as part of the project, including planting of 49 trees and formation of around 1 800 square metres of grassed area.

26. We estimate that the proposed works will create about 240 jobs (190 for labourers and 50 for professional/technical staff) providing a total employment of 8 780 man-months.

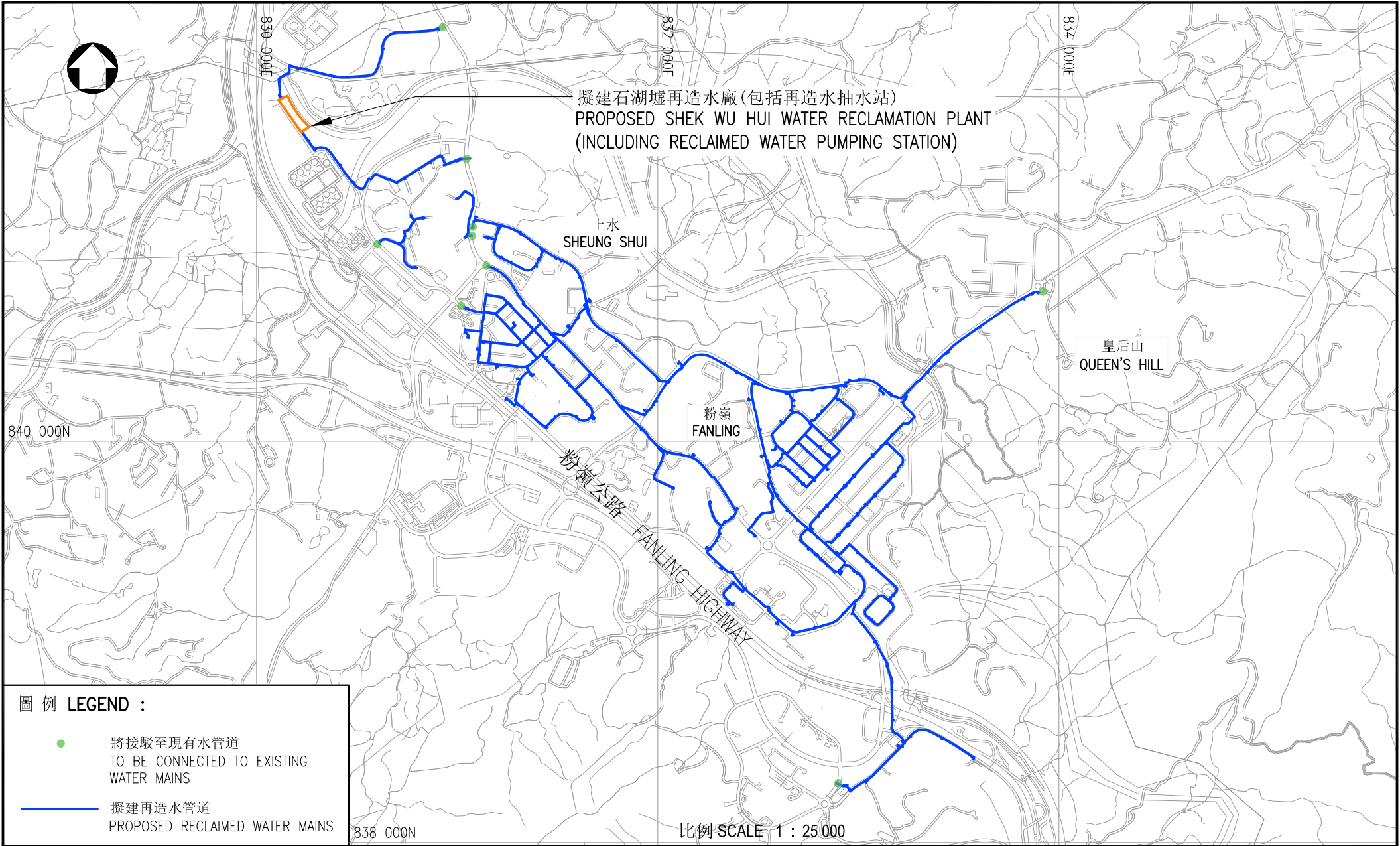
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Development Bureau  
April 2021

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<sup>7</sup> “Important trees” refers to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria-

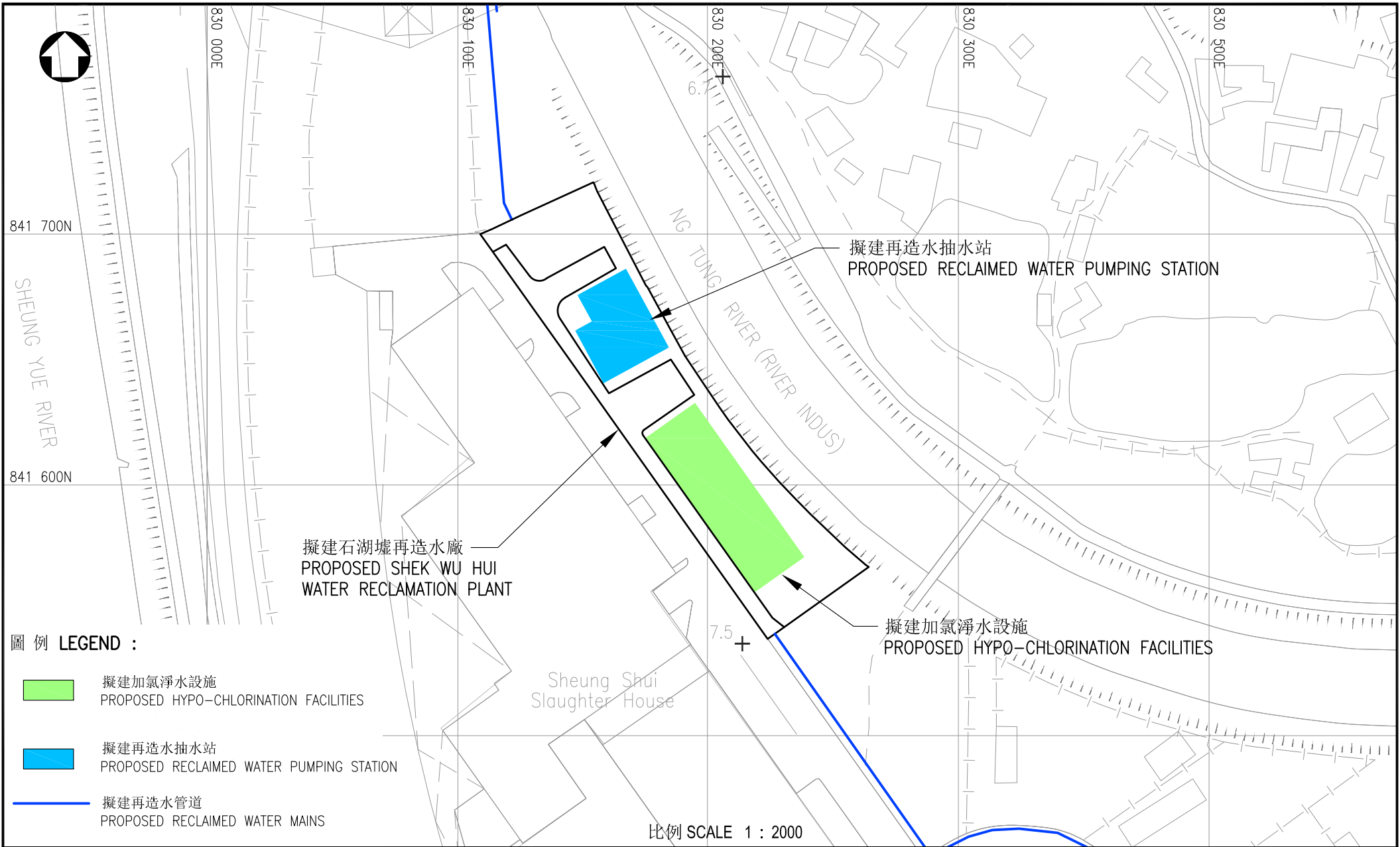
- (a) trees of 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or events;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- (e) trees with trunk diameter equal 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.



工程計劃編號第55WS號 --- 上水及粉嶺再造水供應工程  
P.W.P. Item No. 55WS --- Reclaimed water supply to Sheung Shui and Fanling

水務署  
WATER SUPPLIES DEPARTMENT

草圖編號  
SKETCH NO. SK 62020 / 019



圖例 LEGEND :

- 擬建加氯淨水設施  
PROPOSED HYPO-CHLORINATION FACILITIES
- 擬建再造水抽水站  
PROPOSED RECLAIMED WATER PUMPING STATION
- 擬建再造水管道  
PROPOSED RECLAIMED WATER MAINS

比例 SCALE 1 : 2000

工程計劃編號第55WS號 --- 上水及粉嶺再造水供應工程  
P.W.P. Item No. 55WS --- Reclaimed water supply to Sheung Shui and Fanling

水務署  
WATER SUPPLIES DEPARTMENT

草圖編號 SKETCH NO. SK 62021 / 034

附件三 附錄二 ANNEX 2 to ENCLOSURE 3



## Annex 3 to Enclosure 3 to PWSC(2021-22)1

### 55WS – Reclaimed water supply to Sheung Shui and Fanling

#### Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2020 prices)

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Consultants' fees for contract administration (Note 2)	Professional	–	–	–	4.3
	Technical	–	–	–	1.7
	Sub-total				6.0#
(b) Resident site staff (RSS) costs (Note 3)	Professional	309	38	1.6	42.5
	Technical	1 608	14	1.6	77.8
	Sub-total				120.3
Comprising –					
(i) Consultants' fees for management of RSS				2.4#	
(ii) Remuneration of RSS				117.9#	
	<b>Total</b>				<b>126.3</b>

\* MPS = Master Pay Scale

#### Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS point 38 = \$85,870 per month and MPS point 14 = \$30,235 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 will only be executed subject to Finance Committee's approval to upgrade 55WS 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 6 of Enclosure 3.

**Annex 4 to Enclosure 3 to PWSC(2021-22)1**

**55WS – Reclaimed water supply to Sheung Shui and Fanling**

**Breakdown of estimated cost for land clearance**

	<b>\$ million</b>
<b>(I) Ex-gratia allowances for crops compensation</b>	<b>0.1</b>
<b>(II) Contingency</b>	<b>0.02</b>
<b>Estimated cost for land clearance</b>	<b><u>0.12</u></b>