

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Fresh water supplies

353WF – Upgrading of Sheung Wong Yi Au fresh water supply system

371WF – Ngau Tam Mei Water Treatment Works extension

Members are invited to recommend to the Finance Committee –

- (a) the upgrading of **353WF** to Category A at an estimated cost of \$136.5 million in money-of-the-day (MOD) prices;
- (b) the upgrading of part of **371WF** as **372WF**, entitled “Ngau Tam Mei Water Treatment Works extension – investigation study, design and site investigation”, to Category A at an estimated cost of \$136.6 million in MOD prices; and
- (c) the retention of the remainder of **371WF** in Category B.

PROBLEM

We need to commence the following projects related to water supplies –

/(a)

- (a) remaining part of **353WF** to cope with the increase in water demand in Tai Po South area; and
- (b) part of **371WF** to cope with the increase in water demand in Yuen Long.

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) remaining part of **353WF** at an estimated cost of \$136.5 million in MOD prices to carry out the remaining upgrading works for the Sheung Wong Yi Au fresh water supply system; and
- (b) part of **371WF** at an estimated cost of \$136.6 million in MOD prices for the engagement of consultants to carry out the investigation study, design and the associated site investigation works for Ngau Tam Mei Water Treatment Works extension.

PROJECT SCOPE AND NATURE

3. Details of the above two projects are provided at Enclosures 1 and 2 respectively.

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353WF – Upgrading of Sheung Wong Yi Au fresh water supply system

PROJECT SCOPE AND NATURE

The remaining part of **353WF** which we propose to upgrade to Category A comprises –

- (a) the construction of Sheung Wong Yi Au (SWYA) No. 3 fresh water service reservoir; and
- (b) the laying of the associated fresh water mains with diameters ranging from 300 millimetres (mm) to 600 mm with an approximate total length of 450 metres.

2. The location of the proposed works is shown on the plan at Annex 1 to Enclosure 1.

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

JUSTIFICATION

4. At present, the SWYA fresh water supply system includes the Ha Wong Yi Au (HWYA) fresh water pumping station and the SWYA fresh water service reservoirs, namely SWYA No. 1 and 2 fresh water service reservoirs, which can cater for a mean daily water demand of about 10 500 cubic metres (m³) per day.

5. The part of **353WF**, comprising the upgrading of the existing HWYA fresh water pumping station and laying of the associated pumping mains, was upgraded to Category A in July 2020, in order to meet the projected daily demand of 12 900 m³ in 2022. As the projected daily demand will further increase to 15 600 m³ in 2030 due to the new housing development within the supply zone, we propose to upgrade the remaining part of **353WF** for the construction of SWYA No. 3 fresh water service reservoir and laying of the associated fresh water mains. Moreover, the proposed upgrade could also enhance the reliability of water supply to the areas apart from meeting the increasing water demand.

FINANCIAL IMPLICATIONS

6. We estimate the cost of the proposed works to be \$136.5 million in money-of-the-day (MOD) prices, broken down as follows -

	\$ million (in MOD prices)
(a) Construction of SWYA No. 3 FWSR	82.7
(b) Geotechnical works	17.6
(c) Laying of the associated fresh water mains	18.7
(d) Environmental mitigation measures	1.3
(e) Consultants' fees for advisory service for administration of contract adopting New Engineering Contract (NEC) ¹ form of contract	3.8
(f) Contingencies	12.4
Total	<u>136.5</u>

7. 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 1.

/8.

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

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

Year	\$ million (MOD)
2021 – 2022	10.0
2022 – 2023	54.3
2023 – 2024	45.0
2024 – 2025	19.4
2025 – 2026	4.1
2026 – 2027	2.0
2027 – 2028	1.7
	<hr/> 136.5 <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 2028. We will deliver the proposed works under NEC form of contract with provision for price adjustment.

10. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$0.17 million.

11. The project will lead to an increase in the total annual expenditure on waterworks operation by 0.02% in real terms by 2028².

/PUBLIC

² 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 from 2021 to 2028.

PUBLIC CONSULTATION

12. We consulted the Tai Po Rural Committee as well as the Environment, Housing and Works Committee of the Tai Po District Council on 7 November 2018. Members supported the proposed works.

13. We consulted the Legislative Council Panel on Development on 27 October 2020. Members supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

14. 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 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 \$1.3 million (in MOD prices) in the project estimate for implementing these environmental mitigation measures.

15. At the planning and design stages, we have considered design and layouts optimisation to reduce 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 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 generation of construction waste where possible.

/16.

³ Public fill reception facilities 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.

16. 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 also control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

17. We estimate that the proposed works will generate in total about 23 320 tonnes of construction waste. Of these, we will reuse about 3 540 tonnes (15%) of inert construction waste on site and deliver 17 440 tonnes (75%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 2 340 tonnes (10%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfills is estimated to be \$1.7 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

18. 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

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

TRAFFIC IMPLICATIONS

20. Traffic review has been carried out for the proposed works in the design stage and it concluded that the proposed works would not cause any significant impact on the traffic during the construction and operation stages. Temporary traffic arrangement schemes will be submitted to the Transport Department, the Hong Kong Police Force and relevant departments for approval in case any road closure or diversion of the traffic on public roads are required.

BACKGROUND

21. We upgraded **353WF** to Category B in September 2014.

22. In September 2015, we engaged contractors to carry out site investigations and consultants to undertake the landscape design for the proposed works at a total cost of \$1.8 million in MOD prices. We charged the 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 were completed in 2020.

23. On 10 July 2020, we upgraded part of **353WF** to Category A as **369WF** “Uprating of Sheung Wong Yi Au fresh water supply system - stage 1” at an approved project estimate of \$207.0 million in MOD prices to implement the uprating of existing HWYA fresh water pumping station and laying of the associated pumping mains. The stage 1 works commenced in September 2020 for completion in the second half of 2023.

24. Of the 320 trees within the project boundary of the proposed works, 51 trees will be preserved and 269 trees will be felled. All trees to be removed are not important trees⁴. We will incorporate planting proposals as part of the proposed works, including planting of 128 trees and formation of 2 520 square metres of grassed area.

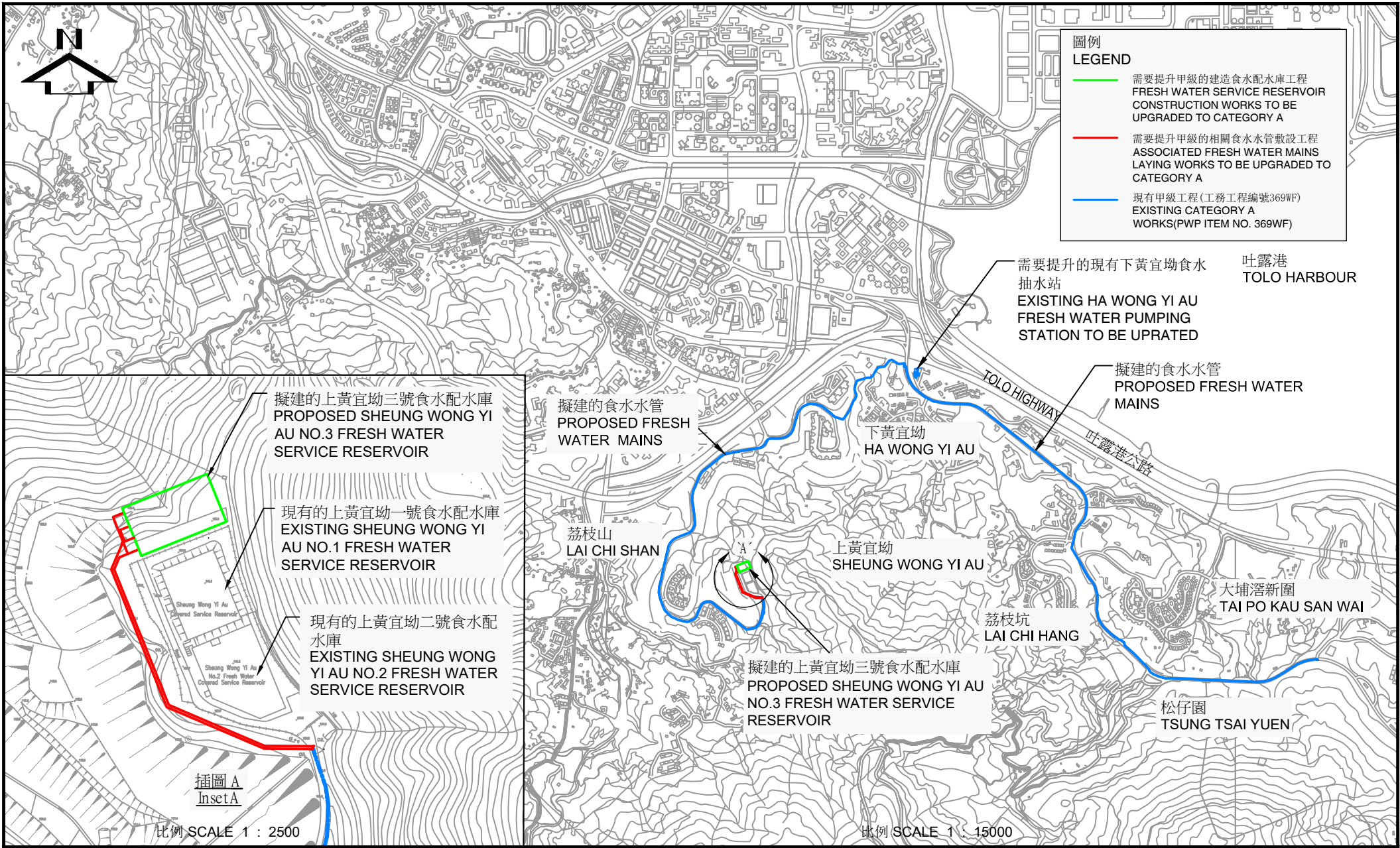
/25.

⁴ “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, shapes 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 40 jobs (32 for labourers and 8 for professional or technical staff) providing a total employment of 1 350 man-months.

Development Bureau
November 2020



圖例
LEGEND

- 需要提升甲級的建造食水配水庫工程
FRESH WATER SERVICE RESERVOIR CONSTRUCTION WORKS TO BE UPGRADED TO CATEGORY A
- 需要提升甲級的相關食水水管敷設工程
ASSOCIATED FRESH WATER MAINS LAYING WORKS TO BE UPGRADED TO CATEGORY A
- 現有甲級工程(工務工程編號369WF)
EXISTING CATEGORY A WORKS(PWP ITEM NO. 369WF)

需要提升的現有下黃宜坳食水抽水站
EXISTING HA WONG YI AU FRESH WATER PUMPING STATION TO BE UPRATED

吐露港
TOLO HARBOUR

擬建的食水水管
PROPOSED FRESH WATER MAINS

TOLO HIGHWAY
吐露港公路

下黃宜坳
HA WONG YI AU

上黃宜坳
SHEUNG WONG YI AU

擬建的食水水管
PROPOSED FRESH WATER MAINS

荔枝山
LAI CHI SHAN

荔枝坑
LAI CHI HANG

大埔滘新圍
TAI PO KAU SAN WAI

松仔園
TSUNG TSAI YUEN

擬建的上黃宜坳三號食水配水庫
PROPOSED SHEUNG WONG YI AU NO.3 FRESH WATER SERVICE RESERVOIR

現有的上黃宜坳一號食水配水庫
EXISTING SHEUNG WONG YI AU NO.1 FRESH WATER SERVICE RESERVOIR

現有的上黃宜坳二號食水配水庫
EXISTING SHEUNG WONG YI AU NO.2 FRESH WATER SERVICE RESERVOIR

擬建的上黃宜坳三號食水配水庫
PROPOSED SHEUNG WONG YI AU NO.3 FRESH WATER SERVICE RESERVOIR

插圖 A
Inset A

比例 SCALE 1 : 2500

比例 SCALE 1 : 15000

工務工程編號 353WF --- 上黃宜坳食水供應系統提升工程
P.W.P. Item No. 353WF --- Uprating of Sheung Wong Yi Au fresh water supply system

水務署
WATER SUPPLIES DEPARTMENT

草圖編號 SKETCH NO. SK 62019 / 172

附件一 附錄一 ANNEX 1 TO ENCLOSURE 1

Annex 2 to Enclosure 1 to PWSC(2020-21)17

353WF – Upgrading of Sheung Wong Yi Au fresh water supply system

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

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Consultants' fees for advisory service for administration of contract adopting New Engineering Contract (NEC) form of contract ^(Notes 2 & 3)	Professional	15	38	2.0	2.6
	Technical	15	14	2.0	0.9
Total					3.5#

*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 costs including the consultants' overheads 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 detailed arrangements for NEC administration.

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 6.

371WF – Ngau Tam Mei Water Treatment Works extension

PROJECT SCOPE AND NATURE

The scope of the proposed works comprises -

- (a) an investigation study on the water treatment process and operation of the Ngau Tam Mei Water Treatment Works (NTM WTW) and its raw water transfer and fresh water distribution facilities to cater for the proposed increase in the output of the NTM WTW;
- (b) impact assessments on environmental, traffic, geotechnical, drainage, hydraulic aspects and other relevant assessments;
- (c) the detailed design for the proposed extension of the NTM WTW, the extension of the Ngau Tam Mei fresh water primary service reservoir (NTMPSR), laying of fresh water trunk mains, modification of the existing raw water tunnel junction and other associated works including engineering, environmental mitigation and landscaping works;
- (d) the 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 for the NTM WTW extension.

_____ 2. The location plan of the NTM WTW extension is at Annex 1 to Enclosure 2.

/3.

3. We plan to commence the investigation study, design and associated site investigation works upon obtaining funding approval from the Finance Committee for completion of the works in around three and a half years.

4. We will retain the remainder of **371WF** 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 **371WF** at a later stage.

JUSTIFICATION

5. The NTM WTW was commissioned in 2000 with water treatment capacity at 230 000 cubic metres (m³) per day to provide reliable fresh water supply to areas including Yuen Long, Tin Shui Wai, Hung Shui Kiu, Ping Shan, Ngau Tam Mei, San Tin and Mai Po. We have reserved land for its future extension during the initial planning of the NTM WTW. Facilities built under the NTM WTW and reserved area for extension are shown in Annex 2 to Enclosure 2.

6. Subsequent to the launching of planned development in Yuen Long, including the development areas in Yuen Long South (Stages 1 & 2), Stages 1 & 2 of Hung Shui Kiu/Ha Tsuen, Wang Chau, Tan Kwai Tsuen and Long Bin, the NTM WTW would not be able to cope with the increase in water demand by 2028. In view of this, we propose to implement the NTM WTW extension to expand the water treatment capacity of the NTM WTW to 440 000 m³ per day, to modify the existing raw water tunnel junction and to increase the capacity of the associated fresh water supply system.

FINANCIAL IMPLICATIONS

7. We estimate the cost of the proposed investigation study, design and site investigation works to be \$136.6 million in money-of-the-day (MOD) prices, broken down as follows –

/(a)

		\$ million (in MOD prices)
(a)	Consultants' fee for	71.1
(i)	Investigation study on the water treatment process and operation of NTM WTW and its proposed extension, the proposed extension of NTMPSR, the proposed modification works at raw water tunnel junction, and the proposed trunk main connecting from NTM WTW to NTMPSR and existing fresh water distribution system near Tan Kwai Tsuen	14.3
(ii)	Detailed design of the proposed works set out in paragraph 7(a)(i) above	44.7
(iii)	Preparation of tender documents and tender assessment	12.1
(b)	Supervision and management for site investigation and survey works	4.6
(c)	Site investigation and survey works	47.9
(d)	Contingencies	<u>13.0</u>
Total		<u>136.6</u>

8. We propose to engage consultants to undertake the investigation study, design and supervision of the associated site investigation works. A detailed breakdown of the estimates for the consultants' fees by man-months is at Annex 3 to Enclosure 2.

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

/Year

Year	\$ million (MOD)
2021 – 2022	30.3
2022 – 2023	61.4
2023 – 2024	38.9
2024 – 2025	6.0
	<hr/>
	136.6
	<hr/>

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 2025. We will deliver the proposed works under New Engineering Contract (NEC)¹ form of contract with provision for price adjustment.

11. We estimate that there will not be any additional recurrent expenditure arising from the proposed works, as only investigation study, design and associated site investigation works are involved.

PUBLIC CONSULTATION

12. We consulted the Housing, Town Planning and Development Committee of the Yuen Long District Council on 29 April 2020 on the proposed investigation study, design and the associated site investigation works. Members in general supported the proposed works.

13. We consulted the Legislative Council Panel on Development on 27 October 2020. Members supported the proposed works.

/ENVIRONMENTAL

¹ 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.

ENVIRONMENTAL IMPLICATIONS

14. The proposed investigation study and design is not a designated project under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499). We will avoid environmentally sensitive area for the site investigation works. However, if it is found later that additional site investigation works fall within the environmentally sensitive area, such works may become a designated project and if affirmative, we shall follow the statutory procedure under the EIAO to obtain an environmental permit before commencement of the site investigation works. Suitable mitigation measures will be implemented to control short-term environmental impact arising from the site investigation works.

15. The NTM WTW extension is a designated project under Schedule 2 of the EIAO, which requires an environmental permit for its construction and operation. An Environmental Impact Assessment (EIA) Study Brief² for the NTM WTW extension project has been issued under the EIAO. We will carry out an EIA study as a part of the investigation study accordingly.

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

HERITAGE IMPLICATIONS

17. 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

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

/TRAFFIC

² Reference No. under the EIAO: ESB-333/2020

TRAFFIC IMPLICATIONS

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

BACKGROUND INFORMATION

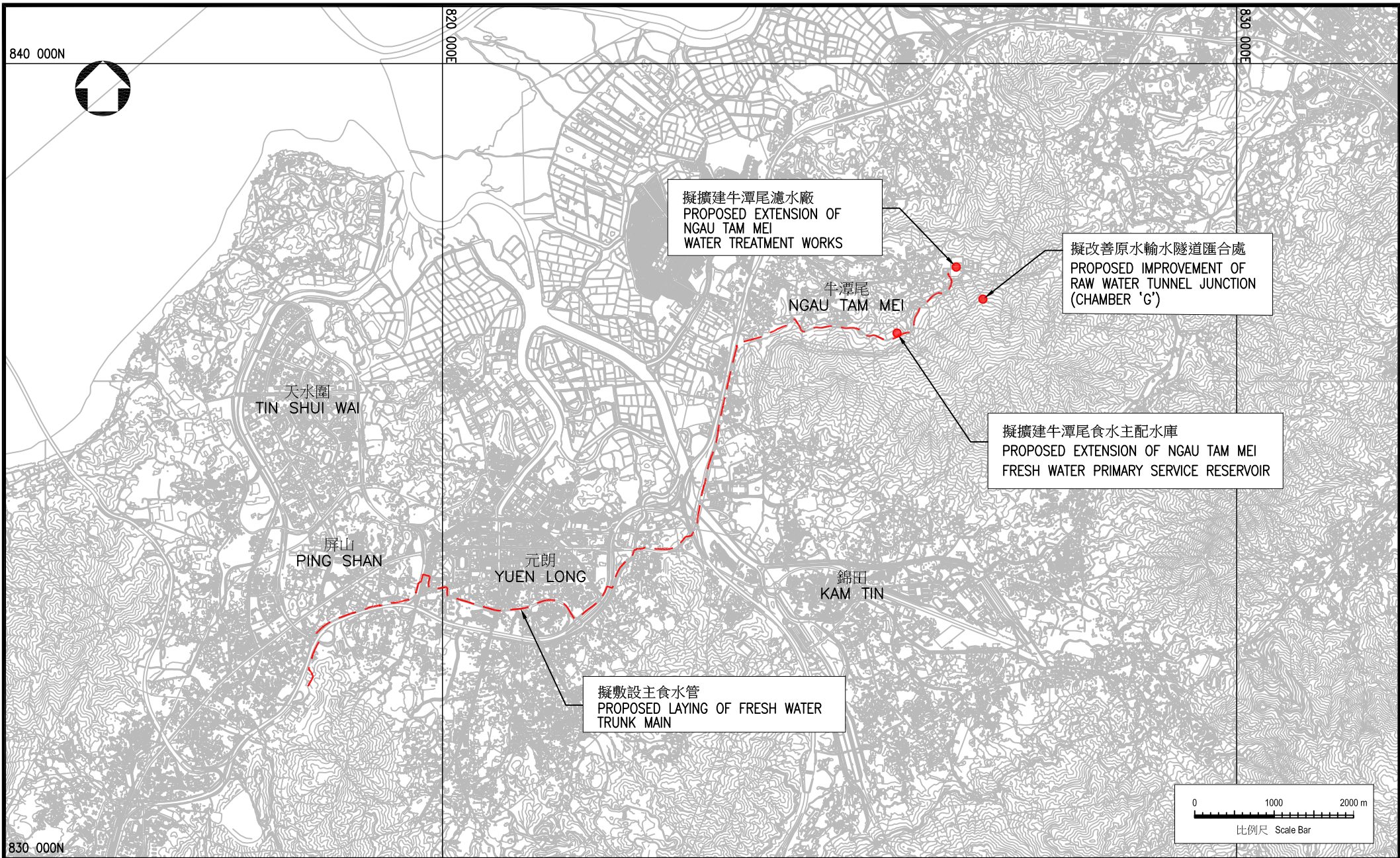
20. In view of the potential development and thus anticipated water demand increase in Yuen Long, we carried out a feasibility study in 2018 for upgrading the NTM WTW from a water treatment capacity of 230 000 m³ to 440 000 m³ per day. The feasibility study was funded by block allocation Subhead **9100WX** “Waterworks, studies and investigations for items in Category D of the Public Works Programme” at a total cost of \$6.0 million in MOD prices.

21. We upgraded **371WF** to Category B in October 2019.

22. 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 NTM WTW extension. We will also incorporate tree planting proposals, where possible, in the construction phase in the future.

23. We estimate that the proposed works will create about 50 jobs (25 for labourers and 25 for professional or technical staff) providing a total employment of 1 000 man-months.

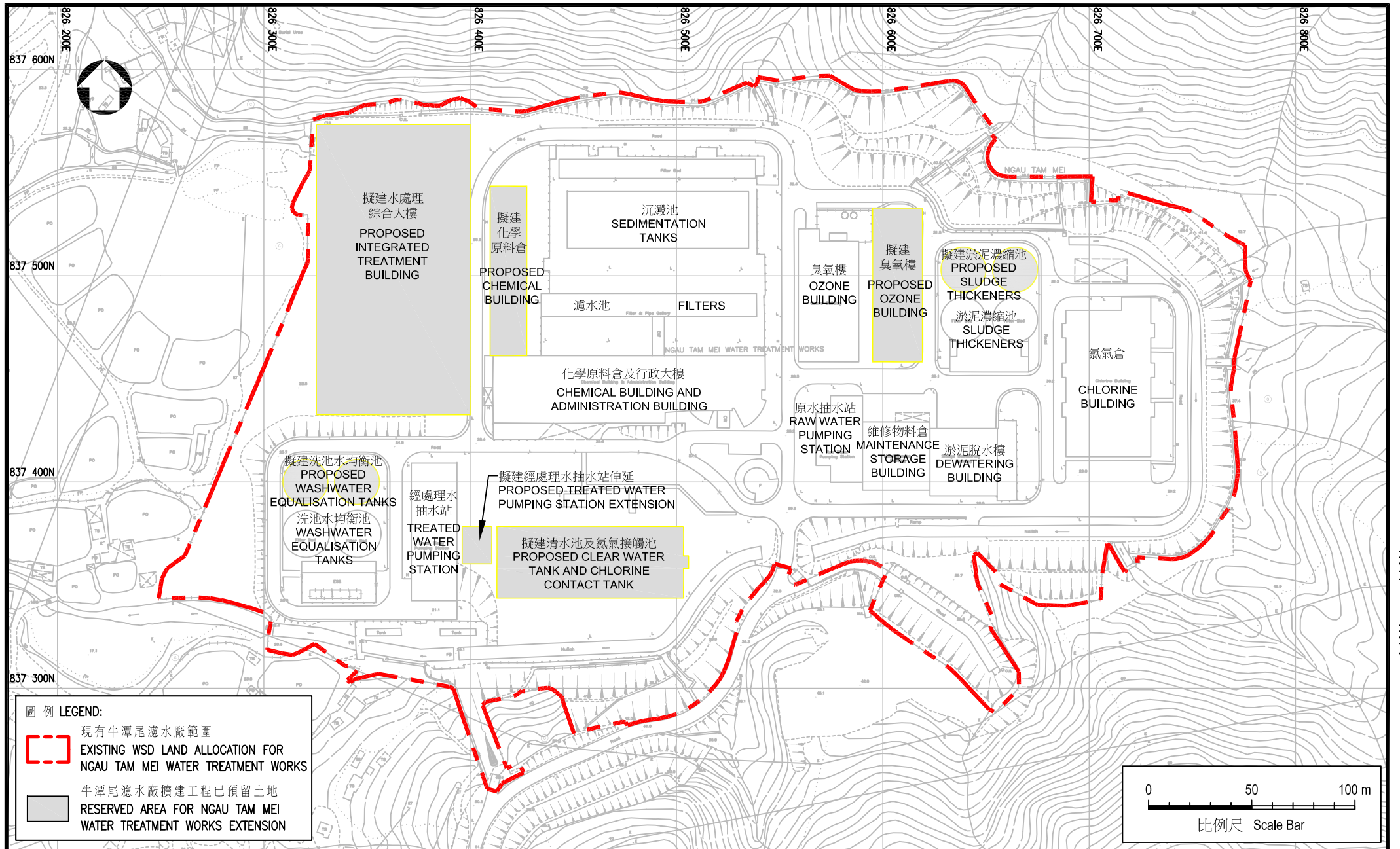
Development Bureau
November 2020



工務工程編號 371WF --- 牛潭尾濾水廠擴展工程
P.W.P. Item No. 371WF --- NGAU TAM MEI WATER TREATMENT WORKS EXTENSION
 建議擴展工程項目
PROPOSED WORKS ITEMS

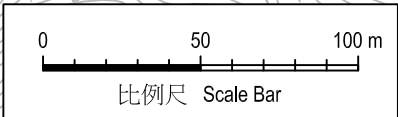
 **水務署**
Water Supplies Department

草圖編號
 SKETCH NO. **SK 52021 / 3**



圖例 LEGEND:

- 現有牛潭尾濾水廠範圍
EXISTING WSD LAND ALLOCATION FOR NGAU TAM MEI WATER TREATMENT WORKS
- 牛潭尾濾水廠擴建工程已預留土地
RESERVED AREA FOR NGAU TAM MEI WATER TREATMENT WORKS EXTENSION



工務工程編號 371WF --- 牛潭尾濾水廠擴展工程
 P.W.P. Item No. 371WF --- NGAU TAM MEI WATER TREATMENT WORKS EXTENSION
 現有牛潭尾濾水廠建築及已預留土地
 EXISTING NGAU TAM MEI WATER TREATMENT WORKS AND RESERVED AREA FOR EXTENSION

水務署
 Water Supplies Department

草圖編號 SK 52021 / 1
 SKETCH NO.

Annex 3 to Enclosure 2 to PWSC(2020-21)17

371WF – Ngau Tam Mei Water Treatment Works extension

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

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Consultants' fee for ^(Note 2)					
(i) Investigation study on the water treatment process and operation of NTM WTW and its proposed extension, the proposed extension of NTMPSR, the proposed modification works at raw water tunnel junction, and the proposed trunk main connecting from NTM WTW to NTMPSR and existing fresh water distribution system near Tan Kwai Tsuen	Professional	45	38	2.0	7.7
	Technical	90	14	2.0	5.4
(ii) Detailed design of the proposed works set out in paragraph (a)(i) above	Professional	156	38	2.0	26.8
	Technical	240	14	2.0	14.5
(iii) Preparation of tender documents and tender assessment	Professional	48	38	2.0	8.3
	Technical	48	14	2.0	2.9
				Sub-total	65.6#
(b) Supervision and management for site investigation and survey works ^(Note 3)	Professional	9	38	2.0	1.6
	Technical	45	14	2.0	2.7
				Sub-total	4.3#
				Total	69.9#

*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 costs including the consultants' overheads 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 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 MOD prices in paragraph 7.