

For discussion
on 22 October 2014

PWSC(2014-15)43

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE

Environmental Protection – Sewerage and sewage treatment

388DS – Shek Wu Hui sewage treatment works – further expansion phase 1A

Members are invited to recommend to the Finance Committee –

- (a) the upgrading of part of **388DS**, entitled “Shek Wu Hui sewage treatment works – further expansion phase 1A – advance works, consultants’ fees and investigation”, to Category A at an estimated cost of \$502.7 million in money-of-the-day prices; and
- (b) the retention of the remainder of **388DS** in Category B.

PROBLEM

It is necessary to upgrade the existing Shek Wu Hui sewage treatment works (SWHSTW) to cope with the forecast sewage flow demand and to enhance its environmental performance.

/PROPOSAL

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to upgrade part of **388DS** to Category A at an estimated cost of \$502.7 million in money-of-the-day (MOD) prices for the construction of the advance works of the phase 1A of the further expansion of the SWHSTW and for carrying out the detailed design and associated site investigation works for the main works of the phase 1A of the further expansion of the SWHSTW.

PROJECT SCOPE AND NATURE

3. The part of **388DS** that we propose to upgrade to Category A comprises –

- (a) the construction of the advance works of the phase 1A of the further expansion of the SWHSTW including –
 - (i) the conversion of one existing bioreactor and two existing final sedimentation tanks into one membrane bioreactor; and
 - (ii) the ancillary works.
- (b) the engagement of consultants for the main works of the phase 1A of the further expansion of the SWHSTW including –
 - (i) detailed design of sewage and sludge treatment facilities;
 - (ii) impact assessments on environmental, drainage, geotechnical, waterworks, traffic and other aspects necessary for detailed design;
 - (iii) preparation of tender documents and assessment of tenders;
 - (iv) the supervision of site investigation, surveys and laboratory testing in (c) below; and
- (c) the site investigation, surveys and laboratory testing in support of the detailed design work and impact assessments.

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

4. Subject to funding approval of the Finance Committee, we plan to commence the proposed advance works detailed in paragraph 3(a) above in March 2015 for completion by March 2018. The detailed design and the associated site investigation works for the main works as detailed in paragraphs 3(b) and 3(c) above will start in March 2015 and will be completed in stages between 2017 and 2019.

5. We will retain the remainder of **388DS** in Category B for the main works of the phase 1A of the further expansion of the SWHSTW to upgrade the treatment capacity from 105 000 cubic metres (m³) to 133 000 m³ per day and further environmental enhancement of the SWHSTW. Funding for the remainder of **388DS** will be sought at a later stage after completion of the design and preparatory works.

JUSTIFICATION

6. The existing sewage treatment design capacity of the SWHSTW is 93 000 m³ per day. It provides secondary treatment to sewage collected from Sheung Shui, Fanling and adjacent areas. The SWHSTW is already operating at about 90% of its design capacity, which is expected to be fully utilised by 2018 based on the flow projection derived from the latest planning data and village sewerage programme.

7. In view of the expected population growth and the acceleration of the village sewerage programme in the North District as recommended in the Audit Commission Report No.55 published in 2010 within the catchment, there is a need to upgrade the SWHSTW progressively. We now propose to upgrade part of **388DS** to Category A for the construction of the advance works of the phase 1A of the further expansion of the SWHSTW to increase the treatment capacity of the SWHSTW (from the current 93 000 m³ to 105 000 m³ per day by 2018)¹ to cater for the sewage treatment demand by then. Besides, in view of the lead time required, we further propose to engage consultants to carry out the detailed design and associated site investigation works for the main works of the phase 1A of the further expansion of the SWHSTW.

/8.

¹ Through the conversion mentioned in paragraph 3(a), a more efficient set of treatment unit will be engaged which can upgrade the sewage treatment standard of the treatment unit concerned from secondary to tertiary level and increase the sewage treatment capacity by 12 000 m³ per day.

8. Upon completion of the detailed design and the associated site investigation works in paragraphs 3(b) and 3(c), we plan to further increase the treatment capacity of the SWHSTW by 28 000 m³ per day to 133 000 m³ per day by 2022 (viz. main works of the phase 1A of the further expansion)². To keep pace with the latest standards, we also plan to further enhance the environmental performance of the SWHSTW by upgrading the sewage treatment standard from secondary to tertiary level to reduce the residual pollution loading of the treated effluent, the implementation of comprehensive odour control/mitigation measures and extensive landscaping works. In the longer run, the volume of sewage the SWHSTW needs to handle is expected to reach 190 000 m³ per day within 20 years as a result of the further housing developments and village sewerage programme in Fanling and Sheung Shui, and the North East New Territories New Development Areas (NENT NDA) project. Further upgrading in this regard will be carried out by phases and funding for such works will be sought in due course .

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be \$502.7 million in MOD prices (see paragraph 10 below), broken down as follows –

	\$ million
(a) Conversion of one existing bioreactor and two existing final sedimentation tanks into one membrane bioreactor	289.6
(i) civil engineering works	74.4
(ii) electrical and mechanical works	215.2
 (b) Ancillary works	 49.1
(i) civil engineering works	14.5
(ii) electrical and mechanical works	34.6
 (c) Environmental mitigation measures	 4.2
 (d) Consultants' fees for	 38.1
(i) detailed design	28.7
(ii) impact assessment	4.6
	(iii)

² Subject to funding approval of the Finance Committee for the PWP item 7747CL 'Advance site formation and engineering infrastructure works at Kwu Tung North new development area and Fanling North new development area', the Civil Engineering and Development Department will concurrently further upgrade the SWHSTW with an additional capacity of 20 000 m³ per day to tertiary treatment level to cater for anticipated increase of sewage from the NENT NDA project by 2023.

	\$ million	
(iii) tender documentation and assessment	3.2	
(iv) supervision of site investigations, surveys and testings	1.6	
(e) Site investigation works	3.5	
(f) Contingencies	38.3	
Sub-total	422.8	(in September 2014 prices)
(g) Provision for price adjustment	79.9	
Total	502.7	(in MOD prices)

Due to inadequate in-house resources, we propose to engage consultants to conduct the detailed design and site investigation for the main works of the phase 1A of the further expansion. A detailed breakdown of the estimates for the consultants' fees by man-months is at Enclosure 2.

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

Year	\$ million (Sept 2014)	Price adjustment factor	\$ million (MOD)
2015 – 2016	41.3	1.06000	43.8
2016 – 2017	133.8	1.12360	150.3
2017 – 2018	102.6	1.19102	122.2
2018 – 2019	106.2	1.26248	134.1
2019 – 2020	29.6	1.32876	39.3
2020 – 2021	9.3	1.39519	13.0
	422.8		502.7

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 2015 to 2021. We will deliver the advance works mentioned in paragraph 3(a) under two contracts, one for civil engineering works and the other for electrical and mechanical works. We will deliver the civil engineering works under a re-measurement contract because the quantity of works involved may vary depending on actual ground conditions. The contract will provide for price adjustment. We will deliver the electrical and mechanical works under a lump-sum contract as the scope of works can be well defined. We will tender the proposed consultancy mentioned in paragraph 3(b) under a lump-sum contract as the scope of the consultancy can be well defined. The consultancy contract will provide for price adjustment as its duration will exceed 12 months. We will deliver the site investigation, surveys and laboratory testing mentioned in paragraph 3(c) under a re-measurement contract because the quantities of works involved will vary depending on actual ground conditions. The contract will also provide for price adjustment.

12. We estimate the additional annual recurrent expenditure arising from the proposed advance works to be \$35.6 million. Based on the current level of expenditure on operation and day-to-day maintenance of sewerage facilities, the proposed works will lead to an increase in the recurrent cost of providing sewage services by about 2.32% which will be taken into consideration when determining the sewage charges in future.

PUBLIC CONSULTATION

13. Since September 2013, we have engaged the public on the expansion proposal by arranging site visits to the SWHSTW for members of the North District Council, the Sheung Shui District Rural Committee, village representatives and residents of the nearby Sheung Shui Heung and Fu Tei Au, so as to enable them to gain an in-depth understanding of the current mode of operation of the SWHSTW and the main aspects of the expansion proposal. We have also attended formal meetings with the above stakeholders to address their concerns.

14. The villagers from Sheung Shui Heung held strong reservations over the proposal to expand the SWHSTW. They expressed concerns about the odour and health impact of the operation of the SWHSTW on nearby residents, and requested that the SWHSTW be relocated to Sha Ling. Residents of Fu Tei Au were concerned about the quality of discharge from the SWHSTW to Ng Tung River. They further suggested that communication with the public on the operation of the SWHSTW be strengthened. Further meetings with village representatives were held on 27 February and 4 March 2014 respectively. We will also set up a community liaison group, at which we will keep local residents informed of the progress of the proposed works and follow up their concerns and suggestions.

15. We consulted the District Minor Works and Environmental Improvement Committee of the North District Council on the proposal on 17 March 2014. Members acknowledged the need to provide sufficient sewage treatment capacity to serve the development need of the community but expressed concerns about the odour and health impact of the operation of the current SWHSTW on nearby residents. Several members asked why the SWHSTW could not be relocated to a remote place such as Sha Ling and expressed objection to upgrading and increasing the treatment capacity of the SWHSTW at its present location. The Committee requested that the concerns of the nearby residents be properly addressed when the Administration proceeds further with the proposed works. We explained that the relocation of the SWHSTW to any other location would take a much longer lead time and could not cope with the forecast increase in sewage flow and hence the development needs in North District. We further outlined the measures to be adopted mentioned in paragraph 8 to enhance the environmental performance of the SWHSTW.

16. We consulted the Legislative Council Panel on Environmental Affairs on 28 April 2014 on the proposed works. Members raised no objection to the proposed works.

/ENVIRONMENTAL

ENVIRONMENTAL IMPLICATIONS

17. The SWHSTW further expansion is a designated project under Schedule 2 of the Environmental Impact Assessment Ordinance and an environmental permit (EP) is required for its construction and operation. The EIA report of NENT NDA (the NENT NDA EIA report), which covered the further expansion of the SWHSTW, was approved with conditions in October 2013 under the EIA Ordinance. The NENT NDA EIA report concluded that the environmental impact of the further expansion can be controlled to within the criteria under the EIA Ordinance and the Technical Memorandum on the EIA Process. We shall implement the measures recommended in the approved EIA report. The key measures include the upgrading of sewage treatment level, enhancement of the architectural and landscaping design of the facilities, proper design of odour mitigation measures including installation of appropriate deodorization facilities to fully address the concerns raised by the nearby residents outlined in paragraphs 14 and 15 above.

18. Regarding short-term environmental impacts arisen during the construction stage, we will implement environmental mitigation measures for the project to control the nuisance of noise, dust and site run-off to levels within established standards and guidelines. These measures include the use of silenced construction equipment and noise barriers to reduce noise generation, water-spraying to reduce emission of fugitive dust, and proper treatment of site run-off before discharge. We will carry out Environmental Monitoring and Audit to ensure that the construction works will comply with the relevant EP conditions. Furthermore, we will carry out regular site inspections to ensure that these recommended mitigation measures and good site practices will be properly implemented on site. We have included in paragraph 9(c) above a sum of \$4.2 million (in September 2014 price) in the project estimate of the proposed works for implementation of the necessary environmental mitigation measures.

19. We have considered at the planning and design stages ways to reduce generation of construction waste where possible, including optimization of the sewerage design to minimise the extent of excavation and to avoid as far as practicable demolition of existing structure. 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)³. We will encourage the contractors to maximise the use of recycled/recyclable inert construction waste and non-timber formwork to further reduce the generation of construction waste.

/20.

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

20. 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.

21. We estimate that the project will generate about 8 470 tonnes of construction waste. Of these, we will reuse about 710 tonnes (8%) of inert construction waste on site and deliver 7 430 tonnes (88%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, we will dispose of 330 tonnes (4%) of non-inert construction waste at landfills. The total cost of accommodating construction waste at PFRF and landfill sites is estimated to be about \$0.24 million for this project (based on a unit charge rate of \$27 per tonne for disposal at PFRF and \$125 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation).

HERITAGE IMPLICATIONS

22. 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

23. Land resumption is not required for the project.

BACKGROUND INFORMATION

24. In September 2012, we upgraded **388DS** “SWHSTW – further expansion phase 1A” to Category B.

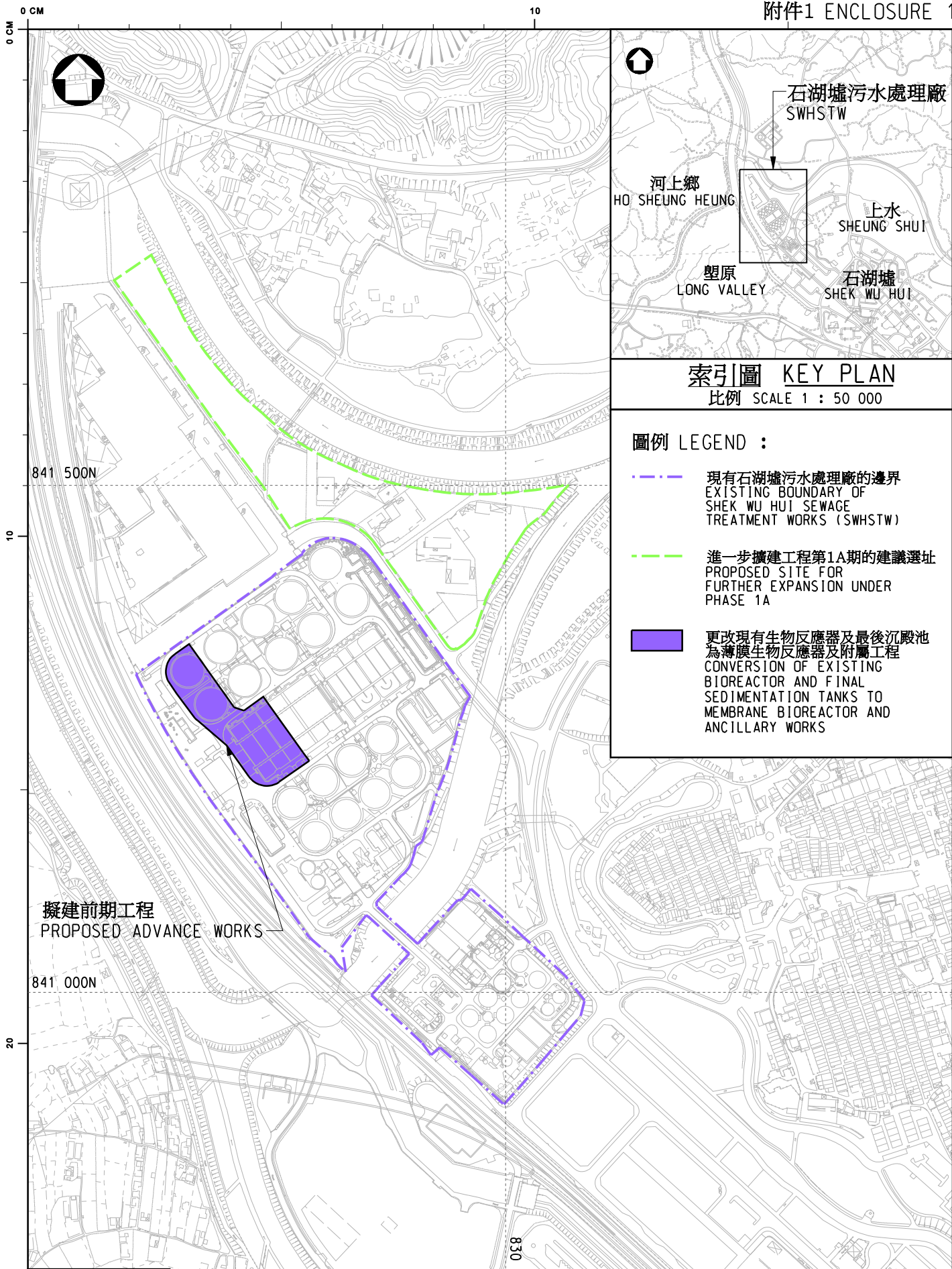
25. In December 2012, we commissioned a consultancy to carry out the investigation and preliminary design for **388DS**. The total estimated cost is \$12.4 million. We charged this amount to block allocation **Subhead 4100DX** “Drainage works, studies and investigations for items in Category D of the Public Works Programme”. We have substantially completed the detailed design of the advance works mentioned in paragraph 3(a) above by in-house resources in March 2014.

26. The proposed advance works will not involve any tree removal or planting proposals. The proposed detailed design and site investigation of the main works of the phase 1A of the further expansion will not directly 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 main works of the project. We will also incorporate tree planting proposals, where possible, in the construction phase of main works in the future.

27. We estimate that the proposed works will create about 120 jobs (76 for labourers and another 44 for professional/technical staff), providing a total employment of 2 730 man-months.

28. This paper supersedes PWSC(2014-15)21 which was not discussed by the Public Works Subcommittee during the 2013-14 legislative session. The programme, phasing of expenditure and estimated cost of the project have been updated due to the lapse of time.

Environment Bureau
October 2014



索引圖 KEY PLAN

比例 SCALE 1 : 50 000

圖例 LEGEND :

- - - 現有石湖墟污水處理廠的邊界
EXISTING BOUNDARY OF SHEK WU HUI SEWAGE TREATMENT WORKS (SWHSTW)
- - - 進一步擴建工程第1A期的建議選址
PROPOSED SITE FOR FURTHER EXPANSION UNDER PHASE 1A
- 更改現有生物反應器及最後沉澱池為薄膜生物反應器及附屬工程
CONVERSION OF EXISTING BIOREACTOR AND FINAL SEDIMENTATION TANKS TO MEMBRANE BIOREACTOR AND ANCILLARY WORKS

擬建前期工程
PROPOSED ADVANCE WORKS

PROVISIONAL
SUBJECT TO AMENDMENT

圖則名稱 drawing title

工務計劃項目第388DS號
石湖墟污水處理廠 -
進一步擴建工程第1A期
PWP ITEM NO. 388DS
SHEK WU HUI SEWAGE TREATMENT WORKS -
FURTHER EXPANSION PHASE 1A

繪畫 drawn
SIGNED K. S. LAM

日期 date
09 MAY 2014

核對 checked
SIGNED Y. M. TONG

日期 date
09 MAY 2014

批核 approved
SIGNED W. S. MAK

日期 date
09 MAY 2014

部門 office 污水工程部

SEWERAGE PROJECTS DIVISION

修改項目 description

圖則編號 drawing no.
DSP/388DS/21171

簡簽 initial

比例 scale
1 : 5000
OR
AS SHOWN

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香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
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SPECIAL ADMINISTRATIVE REGION

Enclosure 2 to PWSC(2014-15)43

388 DS – Shek Wu Hui sewage treatment works — further expansion phase 1A

Breakdown of estimate for consultants' fees (in September 2014 prices)

Consultants' staff costs (Note 2)			Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Detailed design	Professional	153	38	2.0	21.8
		Technical	141	14	2.0	6.9
(b)	Impact assessment	Professional	25	38	2.0	3.6
		Technical	20	14	2.0	1.0
(c)	Tender documentation and assessment	Professional	18	38	2.0	2.6
		Technical	12	14	2.0	0.6
(d)	Supervision of site investigations, surveys and testings	Professional	6	38	2.0	0.9
		Technical	15	14	2.0	0.7
Total						38.1

* 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' overhead and profit, for staff employed in the consultants' offices. (Subject to approval of the Finance Committee, MPS point 38 = \$71,385 per month and MPS point 14 = \$24,380 per month)
2. The actual man-months and fees will only be known when we have selected the consultants through the usual competitive lump sum fee bidding system.