For discussion **PWSC(1999-2000)103**
on 16 February 2000

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 - DRAINAGE
Environmental Protection - Sewerage and sewage treatment
52DS - Ting Kau development : sewerage and sewage treatment works including submarine outfall
126DS - Sham Tseng sewerage and sewage treatment and disposal facilities

Members are invited to recommend to Finance Committee -

(a) the upgrading of part of **52DS** and **126DS,** entitled "Ting Kau sewerage stage 1 and Sham Tseng sewerage stage 2 phase 2", to Category A at an estimated total cost of $438.3 million in money-of-the-day prices;

(b) the retention of the remainder of **52DS**, retitled "Ting Kau sewerage stage 2", in Category B; and

(c) the retention of the remainder of **126DS**, retitled "Sham Tseng sewerage stage 3", in Category B.

PROBLEM

There are no proper sewerage facilities in Ting Kau, Sham Tseng and Tsing Lung Tau. Sewage from these areas is discharged to the nearby coastal waters without proper treatment, causing serious water pollution.

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PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment and Food, proposes to upgrade part of **52DS** and **126DS** to Category A for the construction of Ting Kau sewerage stage 1 works and Sham Tseng sewerage stage 2 phase 2 works. The total estimated cost of the works involved is $438.3 million in money-of-the-day (MOD) prices ($40.6 million for item **52DS** and $397.7 million for item **126DS**).

PROJECT SCOPE AND NATURE

52DS

3. Item **52DS** aims to provide a sewerage system to collect sewage from Ting Kau and convey it to the proposed sewage treatment works at Sham Tseng for proper treatment and disposal. The part of the project we now propose to upgrade to Category A comprises the construction of about four kilometres of sewers and rising mains of diameters ranging from 150 to 400 millimetres along Castle Peak Road (Ting Kau Section) from Lido Beach to the proposed sewage treatment works at Sham Tseng.

4. The remainder of **52DS** for retention in Category B comprises pumping stations, rising mains and sewers in Ting Kau.

126DS

5. Item **126DS** aims to provide sewage treatment works and a submarine outfall at Sham Tseng to serve the Ting Kau, Sham Tseng and Tsing Lung Tau areas. It will also provide a sewerage system to collect sewage from Sham Tseng and Tsing Lung Tau and convey it to the proposed sewage treatment works. The part of the project we now propose to upgrade to Category A comprises the construction of -

(a) sewage treatment works with a 160-metre long submarine outfall on the reclaimed land west of Gemini Beach;

/(b) …..

(b) a sewage pumping station near Sham Tseng Kau Tsuen; and

(c) about 1.8 kilometres of sewers and rising mains of diameters ranging from 225 to 400 millimetres along Castle Peak Road (Tsing Lung Tau Section) from Tsing Lung Tau to the proposed Sham Tseng sewage treatment works.

6. The remainder of **126DS** for retention in Category B comprises pumping stations, rising mains and sewers in the Sham Tseng and Tsing Lung Tau areas.

JUSTIFICATIONS

7. Ting Kau, Sham Tseng and Tsing Lung Tau have a population of around 28 000 but the areas are at present unsewered.

8. In February 1989, the Director of Environmental Protection appointed consultants under **92DS** "Tsuen Wan, Kwai Chung, Tsing Yi sewerage masterplan study - consultants' fees and investigations" to review the sewerage requirement in Tsuen Wan, Kwai Chung and Tsing Yi including Sham Tseng and Ting Kau. The study recommended, inter alia, the provision of a centralised sewage treatment works and submarine outfall at Sham Tseng for Sham Tseng and Ting Kau areas and a comprehensive sewerage system stretching from Approach Beach in the east to Tsing Lung Tau in the west.

9. As a result of recent housing developments in the three areas above, we estimate that the population in the area will increase to 29 500 in 2003, to 37 000 in 2006, to 44 000 in 2008 and to around 55 000 in 2011. At present, about 8 000 cubic metres (m^3) of sewage is generated daily in the three areas. In the absence of public sewerage facilities, about 2 300 m^3 of this sewage is handled by private treatment facilities while the other 5 700 m^3 of sewage is discharged to the nearby coastal waters without adequate treatment, causing serious water pollution. We estimate that the daily sewage volume will increase to about 8 500 m^3 in 2003, to 11 000 m^3 in 2006, to 13 000 m^3 in 2008, and to 16 500 m^3 in 2011. To deal with the large volume of sewage generated, we propose to construct a sewage treatment works with the capacity to treat

/16 500 m^3 .....

16 500 m^3 of sewage per day, a submarine outfall at Sham Tseng, and a comprehensive sewerage network including sewers and pumping stations to collect and convey the sewage generated from the three areas, including sewage currently handled by private facilities, to the proposed sewage treatment works for proper treatment and disposal. The whole package of works will be covered under two project items, namely **52DS** and **126DS**. We have considered the suggestion of installing a higher level of treatment but concluded that it would not be cost-effective as it would significantly increase both the capital cost of constructing the plant and the operation and maintenance costs, without bringing about any material improvement in bacterial water quality conditions.

FINANCIAL IMPLICATIONS

10. We estimate the capital cost of the proposed works to be $438.3 million in MOD prices (see paragraph 11 below), made up as follows –

	$ million	
	52DS	**126DS**
(a) Sewers	26.9	8.4
(b) Sewage treatment plant	-	213.0
(i) civil works	-	126.0
(ii) electrical and mechanical works	-	87.0
(c) Submarine outfall	-	21.3
(d) Sewage pumping station	-	10.2
(i) civil works	-	6.0
(ii) electrical and mechanical works	-	4.2
(e) Environmental mitigation measures	0.9	8.4

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		$ million		
		52DS	**126DS**	
(f)	Consultants' fees	2.2	38.7	
	(i) construction stage	0.1	2.0	
	(ii) resident site staff	2.1	36.7	
(g)	Contingencies	3.0	30.0	
	Sub-total	33.0	330.0	(at December 1998 prices)
(h)	Provision for price adjustment	7.6	67.7	
	Total	40.6	397.7	(in MOD prices)

A breakdown by man months of the estimates for consultants' fees is at the Enclosure.

11. Subject to approval, we will phase the expenditure as follows -

Year	**$ million (Dec 1998)**		**Price adjustment factor**	**$ million (MOD)**	
	52DS	**126DS**		**52DS**	**126DS**
2000 – 2001	0.5	20.0	1.05814	0.5	21.2
2001 – 2002	2.3	56.0	1.11104	2.6	62.2
2002 – 2003	8.5	88.0	1.16660	9.9	102.7
2003 - 2004	9.5	68.0	1.22493	11.6	83.3

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Year	$ million (Dec 1998)		Price adjustment factor	$ million (MOD)	
	52DS	**126DS**		**52DS**	**126DS**
2004 – 2005	7.7	63.0	1.28617	9.9	81.0
2005 – 2006	4.5	35.0	1.35048	6.1	47.3
	33.0	330.0		40.6	397.7

12. We have derived the MOD estimates on the basis of the Government's latest forecast of trend labour and construction prices over the period 2000 to 2006.

13. We will tender the proposed sewage treatment works, submarine outfall and sewage pumping station at Sham Tseng under a lump sum design-and-build contract with clearly defined scope of works. We will allow for price adjustment to the tender price as the contract will exceed 21 months.

14. Director of Highways plans to start two proposed road works projects along Castle Peak Road, namely **365TH** "Castle Peak Road improvement between area 2 and Sham Tseng, Tsuen Wan" and **553TH** "Castle Peak Road improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan" shortly. To minimise the impact of the sewerage works on the users of Castle Peak Road, we will incorporate the construction of sewers along Castle Peak Road into the Highways Department's Castle Peak Road improvement projects. Such arrangement will also avoid conflicts between different contractors working at the same location.

15. We estimate the annual recurrent cost for operation and maintenance of the proposed project to be $12.0 million.

16. Based on the current level of expenditure on operation and maintenance of sewerage facilities, the proposed works by itself will lead to a 1.7% real increase in the recurrent expenditure of providing sewage services which will need to be taken into account in determining sewage charges.

PUBLIC CONSULTATION

17. We consulted the Tsuen Wan District Board on the proposed location of the sewage treatment works in May 1993. The District Board supported the construction of sewage treatment works on the reclamation in Sham Tseng. In September 1995, we briefed the Environmental Affairs Committee of the District Board on the environmental assessment of the project. The Committee supported the implementation of the project. We consulted the Environmental Affairs Committee of the Provisional Tsuen Wan District Board again in May 1998 specifically on the proposed location of the pumping station. The Committee supported the implementation of the project.

18. We consulted the LegCo Panel on Environmental Affairs (EA Panel) on the proposed project on 11 June 1999. Panel Members expressed concern about the adequacy of chemically enhanced primary treatment (CEPT) plus disinfection in ensuring that the treated sewage would meet the Water Quality Objectives of the adjacent water body. At Members' request, we provided the EA Panel with additional information on the environmental impact assessment of the Ting Kau and Sham Tseng sewerage scheme as well as the constraints associated with providing a secondary treatment plant at Sham Tseng on 14 June 1999. When this proposal was first submitted to this Subcommittee on 16 June 1999, Members of the EA Panel indicated that they wanted more time to consider the issues, and the proposal was withdrawn.

19. We consulted the EA Panel again on 5 November 1999. Panel Members raised a number of issues, relating to the adequacy of the level of treatment, the timeframe for the water body in the area to meet the Water Quality Objectives, the enforcement action taken, etc. Further to the discussion at the meeting, all outstanding queries were addressed in an information paper which was circulated to Panel Members on 30 November 1999. Members were invited to let us have their further comments or views on the proposed works before 11 January 2000. No further comments were received. We consulted the EA Panel on the proposed works again on 10 February 2000 and Members supported the early implementation of the project.

ENVIRONMENTAL .....

ENVIRONMENTAL IMPLICATIONS

20. Section 9(2)(c) of the Environmental Impact Assessment Ordinance (EIAO) stipulates that projects which were gazetted under the Foreshore and Sea-bed (Reclamations) Ordinance (FSRO) before the commencement of the EIAO in April 1998 are exempted from the provisions of EIAO. As the sewerage package for Ting Kau and Sham Tseng was gazetted under the FSRO before reclamation works at Sham Tseng took place from 1996 to 1997 for the proposed Sham Tseng sewage treatment works, it is therefore an exempted project under the EIAO. That said, we have assessed the environmental impacts of the sewerage works during the construction and operational stages under an Environmental Impact Assessment (EIA) study completed in August 1995. We have lodged the EIA report in the EIAO Register.

21. The EIA study concluded that the environmental impacts of the project, including the effects of effluent discharge, sludge handling and disposal, noise and odour can be mitigated to within the established standards and guidelines. We will implement the mitigation measures recommended in the EIA study. This includes provision of deodourisation facilities to mitigate odour impact, use of silenced equipment for noise control and introduction of height limit on buildings to reduce visual impact. We will also incorporate, in the contract, certain measures to control construction impacts to within the established standards and guidelines. These will include standard pollution control measures, such as water-spraying for haul roads, the provision of wheel-washing facilities to reduce emission of fugitive dust and the use of noise barriers and silenced construction plants to reduce noise generation. We estimate the cost of implementing the environmental mitigation measures to be about $9.3 million. We have included this cost in the overall project estimate. After completion of the project, pollution problems currently caused by the discharge of untreated sewage into the coastal waters of Ting Kau, Sham Tseng and Tsing Lung Tau will be reduced.

22. We have considered in the planning and design stages arrangements to minimize the generation of construction and demolition material (C&DM). We will reuse the public fill generated from the project either on site or in other construction sites as far as possible. We estimate that about 1 000 cubic metres of public fill will be delivered to public filling areas after allowing for reuse and about 5 000 cubic metres of construction and demolition (C&D) waste will be disposed of at landfills. We shall encourage the contractors to use steel instead of timber in formwork and temporary works to reduce the generation of waste. We will require the contractor(s) to implement necessary measures to minimize the

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generation of C&DM and to reuse and recycle C&DM. We will control the disposal of C&D waste to designated landfill through a trip-ticket system. The disposal, reuse and recycling of C&DM will be recorded for monitoring purposes.

LAND ACQUISITION

23. The proposed Ting Kau sewerage stage 1 works and Sham Tseng sewerage stage 2 phase 2 works do not require any land acquisition.

BACKGROUND INFORMATION

24. We included **52DS** "Ting Kau development: sewerage and sewage treatment works including submarine outfall" in Category AB[1] in July 1988. The original scope of the project was to provide permanent sewage collection and disposal facilities, including a submarine outfall, pumping station and sewage treatment works, for developments in the hinterland of Ting Kau Beach. In August 1990, we revised the scope of works of **52DS** for the provision of the sewage collection system to direct the sewage from Ting Kau to the proposed treatment facilities at Sham Tseng.

25. In November 1991, we upgraded **126DS** "Sham Tseng sewerage and sewage treatment and disposal facilities" to Category B for the provision of the proposed sewage treatment works and submarine outfall, and the sewage collection system for Sham Tseng and Tsing Lung Tau. Concurrently, we consulted the Town Planning Board (TPB) on reclaiming a piece of land to accommodate the proposed Sham Tseng sewage treatment works. Some members of the TPB suggested the idea of identifying a suitable cavern site to house the works rather than a reclamation. Accordingly, we conducted a geological assessment study and compared the options of reclamation vis-a-vis a cavern site. We completed the study in early 1993, confirming that the reclamation option was a better arrangement. This was subsequently endorsed by the TPB in mid 1993. We then proceeded with the EIA study for the whole sewerage scheme and commissioned consultants in May 1995 to undertake site investigations and design for the Ting Kau and Sham Tseng sewerage works under block allocation **Subhead 4006DX** "Consultants' design fees and charges and major in-house investigations for drainage projects".

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[1] In August 1990, the Administration introduced changes to the system of the Public Works Programme. Category AB projects under the previous system were classified as Category B projects under the new system.

26. On 2 February 1996, Finance Committee approved the upgrading of part of **126DS** to Category A as **279DS** entitled "Sham Tseng sewerage stage 1 – Sham Tseng reclamation" at an approved project estimate of $176 million in MOD prices. The reclamation works started in February 1996 and were completed in June 1997. The reclaimed land will accommodate the proposed sewage treatment works under **126DS** and will also provide for other land uses.

27. On 30 October 1998, Finance Committee approved the upgrading of another part of **126DS** to Category A as **218DS** entitled "Sham Tseng sewerage, stage 2 phase 1" at an approved project estimate of $158.2 million in MOD prices for the Sham Tseng sewerage advance works. We started the works in July 1999 for completion in August 2001.

28. On 16 June 1999, we submitted to the Public Works Subcommittee the proposal to upgrade Ting Kau sewerage stage 1 and Sham Tseng sewerage stage 2 phase 2 to Category A. For the reasons stated in paragraph 18 above, we withdrew the paper to allow for further discussion at the EA Panel. After further discussion with the EA Panel on 5 November 1999, we circulated an information paper on 30 November to address Members' concerns. We further consulted the EA Panel on 10 February 2000. We now resubmit the proposal for Members' consideration.

29. Under the present proposal, we plan to start a design-and-build contract for the proposed pumping station, sewage treatment works and submarine outfall in November 2000 for completion in November 2003. A commissioning period of twelve months will be required to conduct the required testing for the facilities and collect adequate data to ensure that the sewage treatment facility is performing in accordance with the design requirements.

30. We will implement the remaining sewerage works for Ting Kau, Sham Tseng and Tsing Lung Tau areas under the "Ting Kau sewerage stage 2" works and the "Sham Tseng sewerage stage 3" works. Upon completion of the whole sewerage scheme in early 2005, Ting Kau, Sham Tseng and Tsing Lung Tau will have a sewerage system with treatment capacity of 16 500 m^3 per day to meet the forecast sewage treatment demand up to the year 2011.

Environment and Food Bureau
February 2000

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52DS - Ting Kau development: sewerage and sewage treatment works including submarine outfall

Breakdown of estimates for consultants' fees

Consultants' staff costs			**Estimated man months**	**Average MPS salary point**	**Multiplier Factor**	**Estimated fee ($ million)**
(a)	Consultants' fees for construction stage	Professional	0.5	40	2.4	0.08
		Technical	1	16	2.4	0.05
(b)	Site supervision by resident site staff employed by the consultants	Professional	12	40	1.7	1.28
		Technical	23	16	1.7	0.82
				Total consultants' staff costs		2.23

126DS - Sham Tseng sewerage and sewage treatment and disposal facilities

Breakdown of estimates for consultants' fees

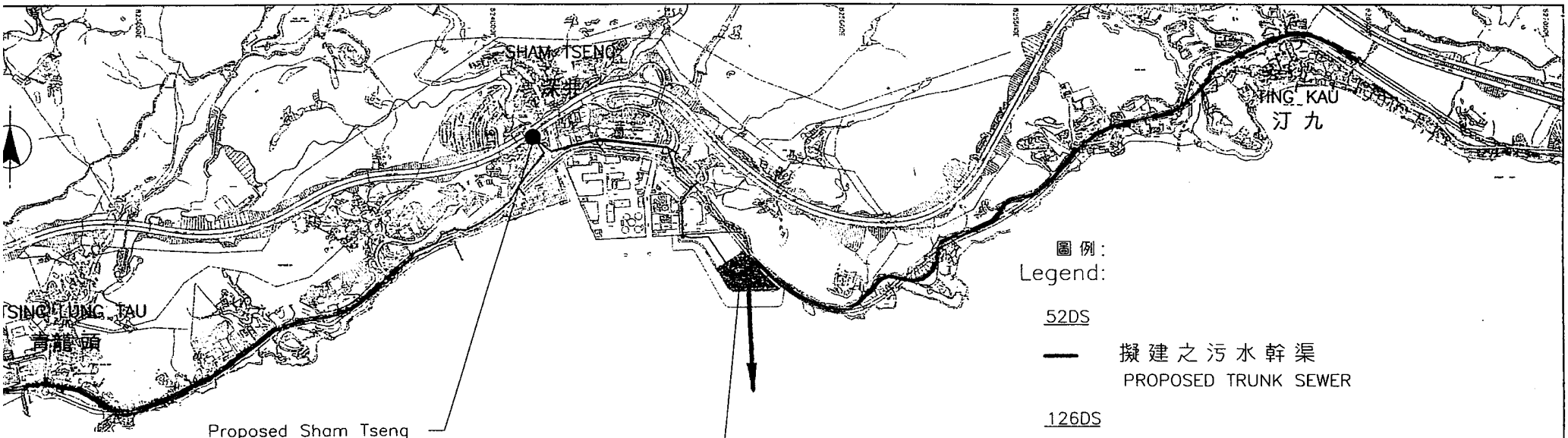
Consultants' staff costs			**Estimated man months**	**Average MPS salary point**	**Multiplier Factor**	**Estimated fee ($ million)**
(a)	Consultants' fees for construction stage	Professional	9	40	2.4	1.36
		Technical	12	16	2.4	0.61
(b)	Site supervision by resident site staff employed by the consultants	Professional	120	40	1.7	12.81
		Technical	670	16	1.7	23.93
				Total consultants' staff costs		38.71

* MPS = Master Pay Scale

Notes

1. A multiplier of 2.4 is applied to the average MPS point to arrive at the full staff cost including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. A multiplier factor of 1.7 is applied in the case of site staff supplied by the consultants. (At 1.4.1998, MPS pt. 40 = $62,780 p.m. and MPS pt. 16 = $21,010 p.m.).

2. The consultants' fees for construction stage are based on the lump sum fees calculated in accordance with an existing agreement with the consultants undertaking the design and construction of the project. The costs of resident site staff are based on estimates prepared by the Director of Drainage Services. We will only know the actual man months and actual costs when we have completed the construction works.



圖例：
Legend:

52DS

擬建之污水幹渠
PROPOSED TRUNK SEWER

126DS

擬建之海底排放管
PROPOSED SUBMARINE OUTFALL

擬建之污水泵房
PROPOSED SHAM TSENG SEWAGE PUMPING STATION

擬建之污水幹渠
PROPOSED TRUNK SEWER

擬建之深井污水處理廠
PROPOSED SHAM TSENG SEWAGE TREATMENT WORKS

218DS號工程計劃項下建造之污水渠
SEWERS TO BE CONSTRUCTED UNDER 218DS

52DS – TING KAU DEVELOPMENT: SEWERAGE AND SEWAGE TREATMENT WORKS INCLUDING SUBMARINE OUTFALL
汀九發展計劃：污水收集系統及污水處理廠(包括海底排放管)

126DS – SHAM TSENG SEWERAGE AND SEWAGE TREATMENT AND DISPOSAL FACILITIES
深井污水收集系統和污水處理及排放設施

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