For discussion
on 16 June 1999

PWSC(1999-2000)44

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 - DRAINAGE
Environmental Protection - Sewerage and sewage treatment
208DS - Outlying Islands sewerage, stage 1, phase 1

Members are invited to recommend to Finance Committee –

(a) the upgrading of part of **208DS,** entitled "Outlying Islands sewerage stage 1 phase 1B - outfall replacement and sewage sludge dewatering facilities upgrading at Cheung Chau sewage treatment plant", to Category A at an estimated cost of $106.7 million in money-of-the-day prices; and

(b) the retention of the remainder of **208DS** in Category B.

PROBLEM

The existing sewage sludge dewatering facilities at Cheung Chau sewage treatment plant cannot effectively dewater sewage sludge to the required standard for disposal at landfill sites. In addition, the existing submarine outfall at Cheung Chau cannot effectively disperse the treated effluent.

/PROPOSAL .....

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for Planning, Environment and Lands, proposes to upgrade part of **208DS** to Category A at an estimated cost of $106.7 million in money-of-the-day (MOD) prices for carrying out improvement works at Cheung Chau sewage treatment plant.

PROJECT SCOPE AND NATURE

3. The part of the project we now propose to upgrade to Category A comprises the following works at Cheung Chau sewage treatment plant -

(a) upgrading of existing sludge dewatering facilities;

(b) replacement of existing submarine outfall by a new outfall 750 metres long and 600 millimetres in diameter;

(c) construction of an outfall pumping station; and

(d) construction of ancillary civil and drainage works.

4. The remainder of **208DS** for retention in Category B comprises the following -

(a) construction of sewerage system and sewage treatment plant at Ngong Ping on Lantau Island;

(b) upgrading of the preliminary sewage treatment plant constructed under **429CL** "North Lantau development phase 1 remaining works" at Siu Ho Wan on Lantau Island to chemically enhanced primary level with disinfection; and

(c) construction of a sewage treatment plant and a submarine outfall at Yung Shue Wan on Lamma Island.

/JUSTIFICATIONS .....

JUSTIFICATIONS

5. In December 1994, we completed the Outlying Islands sewerage master plan (SMP) study under project item **146DS "**Outlying Islands sewerage master plan study - consultants' fees and investigations". The study identified the need to dewater the sludge to a dry solids content of 30% by weight before disposal at landfill sites. We consider it necessary to dewater sludge to this standard because wet sludge, which has a higher moisture content, would cause operational problems[1] at landfills as well as environmental problems arising from excessive leachate[2] generation.

6. Sewage sludge produced by the Cheung Chau sewage treatment plant is currently dewatered by means of drying beds. However, the drying bed method is not very effective in the wet season as it will take much more time to dewater sludge to the required standard, leading to accumulation of sludge on drying beds. Excessive accumulation of sludge causes storage and odour problems. To ensure that we would be able to meet the sludge dewatering standard at all times and overcome storage and odour problems, we need to replace the sludge drying beds at Cheung Chau sewage treatment plant with membrane filter presses which are capable of dewatering sludge to a dry solids content of not less than 30%.

7. In addition, we need to construct a reinforced concrete sludge dewatering house to accommodate the new presses and ancillary equipment and to store the dewatered sludge before disposal. At present, we pack the dewatered sludge in plastic bags and place the bags on open ground within the plant before collecting them for disposal. This arrangement creates odour nuisance and is unsatisfactory.

8. The SMP study also revealed that the dispersal of the treated effluent from the existing 300 m long submarine outfall at Cheung Chau sewage treatment plant is ineffective. As the existing outfall is close to the Tai Kwai

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[1] High moisture sludge is more difficult to compact and forms less stable slopes at landfills.

[2] Leachate is liquid draining from a landfill site. As leachate contains pollutants, exceeding the capacity of the existing leachate collection/treatment facilities would result in contamination of the groundwater in the vicinity of the landfill site.

/Wan .....

Wan beach, discharge has occasionally affected the water quality of the beach and the Adamasta Channel. To abate the water pollution problem, the SMP study recommended replacing the existing submarine outfall at Cheung Chau with a new and longer submarine outfall with improved dispersal capability. We will build a new outfall 750 metres in length and 600 millimetres in diameter to replace the existing outfall. In addition, we need to construct a pumping station to discharge the treated effluent through the longer submarine outfall.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be $106.7 million in MOD prices (see paragraph 10 below), made up as follows –

			$million	
(a)	Upgrading of existing sludge dewatering facilities		27.5	
	(i) civil works	15.0		
	(ii) electrical & mechanical works	12.5		
(b)	Replacement of existing submarine outfall		35.0	
(c)	Construction of an outfall pumping station		19.5	
	(i) civil works	16.0		
	(ii) electrical & mechanical works	3.5		
(d)	Construction of ancillary civil and drainage works		3.1	
(e)	Environmental mitigation measures		4.2	
(f)	Contingencies		7.7	
	Sub-total		97.0	(at December 1998 prices)

/(g) .....

		$million	
(g)	Provision for price adjustment	9.7	
	Total	106.7	(in MOD prices)

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

Year	**$ million (Dec 1998)**	**Price adjustment factor**	**$ million (MOD)**
1999 – 2000	2.0	1.02625	2.1
2000 – 2001	27.7	1.06217	29.4
2001 – 2002	45.0	1.09934	49.5
2002 – 2003	14.9	1.13782	17.0
2003 – 2004	7.4	1.17765	8.7
	97.0		106.7

11. We have derived the MOD estimates on the basis of the Government's latest forecasts of trend labour and construction prices for the period 1999 to 2004. We will tender the civil works of the project under a re-measurement contract because of the uncertain quantities of dredged and filled materials for the construction of the outfall and the depth of piling works for the sludge dewatering house. As the period for civil works will not exceed 21 months, we will not allow for price adjustments to the tender price. We will tender the electrical and mechanical works under a fixed price lump sum contract as the quantity of works is known.

12. We estimate the additional annual recurrent expenditure for maintenance works to be $2.1 million.

/13. .....

13. Based on the current level of expenditure on operation and maintenance of sewerage facilities, the proposed works by itself will lead to an increase in the recurrent cost of providing sewage services by about 0.4% in real terms which will need to be taken into account in determining sewage charges.

PUBLIC CONSULTATION

14. We presented the proposal on the sewerage extension and improvement works proposed under the SMP study to the Islands District Board on 24 April 1995. The Board supported the proposal. After completing the preliminary design for Outlying Islands sewerage stage 1 phase 1 works under **209DS** "Outlying Islands sewerage, stage 1, phase 1 - consultants' fees and investigations", we consulted the Provisional Islands District Board (PIDB) on 23 February 1998. The PIDB also supported the implementation of the works.

ENVIRONMENTAL IMPLICATIONS

15. The submarine outfall 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. We completed the EIA study for stage 1 phase 1 of the Outlying Islands sewerage in October 1997. The EIA concluded that the environmental impact of the submarine outfall and the odour from the pumping station can be controlled within the established standards and guidelines through the implementation of mitigation measures. The Advisory Council on the Environment endorsed the EIA in October 1997.

16. The pumping station and the sewage sludge dewatering facilities are not designated projects. The Director of Environmental Protection completed an Environmental Review on the dewatering facility in January 1997 which concluded that no EIA was required. To control the odour impact, both the pumping station and the sludge dewatering facilities will be enclosed and provided with deodorization installations.

17. We estimate the cost for implementing the mitigation measures to be $4.2 million. We have included this cost in the overall project estimate.

/LAND .....

LAND ACQUISITION

18. The project does not require any land acquisition.

BACKGROUND INFORMATION

19. We included **208DS** "Outlying Islands sewerage, stage 1, phase 1" in Category B in October 1995 for the provision of sewerage improvement works in Cheung Chau, Mui Wo, Siu Ho Wan, Yung Shue Wan and Ngong Ping.

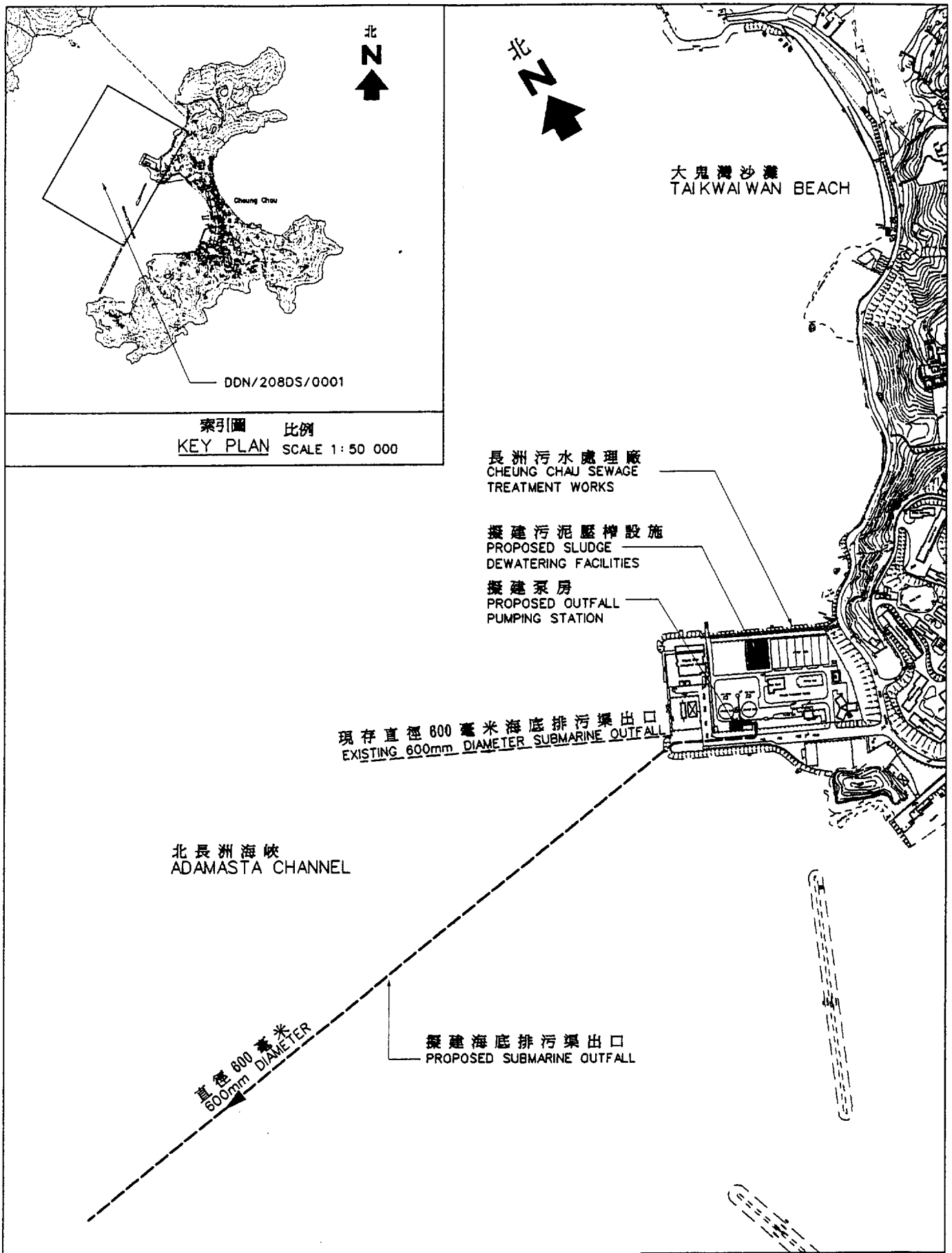
20. In April 1996, we upgraded part of **208DS** to Category A as **209DS "**Outlying Islands sewerage, stage 1, phase 1 - consultants' fees and investigations" for employing consultants to carry out site investigations, an environmental impact assessment and preliminary design of the Outlying Islands sewerage stage 1 phase 1 works (completed in January 1998) and detailed design of the proposed works at Ngong Ping and Siu Ho Wan. We undertook the detailed design and construction supervision for Cheung Chau, Mui Wo and Yung Shue Wan using in-house staff.

21. We have completed the detailed design for the sewerage improvement works in Cheung Chau using in-house staff. We plan to start the construction works in December 1999 for completion in March 2002.

22. We are carrying out the detailed design for the remaining sewerage improvement works under **208DS** and we plan to commence their construction in end 2000 for completion in mid 2005.

Planning, Environment and Lands Bureau
June 1999

(PWSC0166/WIN6)



工務計劃項目第 208DS 號
PWP ITEM No. 208DS

圖則名稱 drawing title 長洲污水處理廠的 海底排污渠出口更新及 污泥壓榨設施改善工程 OUTFALL REPLACEMENT & SEWAGE SLUDGE DEWATERING FACILITIES UPGRADING AT CHEUNG CHAU SEWAGE TREATMENT WORKS	繪圖 drawn by (SIGNED) K.W. FONG	日期 date 18.3.99	圖則編號 drawing no. DDN/208DS/0001	比例 scale 1:5 000
	批核 approved (SIGNED) P.W. CHAN	日期 date 18.3.99		
	部門 office 污水工程部 SEWERAGE PROJECTS DIVISION		香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	

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