For discussion **PWSC(2000-01)31**
on 24 May 2000

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 - DRAINAGE
Environment Protection - Sewerage and sewage treatment
4323DS - Improvement of sewage treatment facilities on Hei Ling Chau and at Sha Tsui Detention Centre on Lantau Island
4324DS - Improvement of sewage treatment facilities at O Pui Shan Boys' Home

Members are invited to recommend to Finance Committee the upgrading of **323DS** and **324DS** to Category A at an estimated total cost of $316.9 million in money-of-the-day prices for the improvement of sewage treatment facilities on Hei Ling Chau Island, at Sha Tsui Detention Centre and O Pui Shan Boys' Home.

PROBLEM

The effluent from three sewage treatment facilities on Hei Ling Chau Island, at the Sha Tsui Detention Centre on Lantau Island and the O Pui Shan Boys' Home in Kwai Chung cannot meet the standards prescribed in the discharge licences issued under the Water Pollution Control Ordinance (WPCO).

PROPOSAL

2. The Director of Drainage Services (DDS), with the support of the Secretary for Security and Secretary for Health and Welfare, proposes to upgrade **323DS** and **324DS** to Category A at an estimated cost of $291.8 million and $25.1 million respectively (total $316.9 million) in money-of-the-day (MOD) prices to improve the sewage treatment facilities at the sites of Correctional Services Department (CSD) and Social Welfare Department (SWD).

/PROJECT .....

PROJECT SCOPE AND NATURE

3. The scope of **323DS** comprises the following improvement items at CSD's sites-

(a) Hei Ling Chau Addiction Treatment Centre (Annex)

(i) construction of a sewage pumping system including two pumping stations; and

(ii) reconstruction of the internal sewerage system

(b) Hei Ling Chau Correctional Institution

(i) upgrading of the Oxidation Ditch Plant;

(ii) construction of a standby final clarifier unit;

(iii) construction of a wastewater cooling system; and

(iv) replacement of the chlorination disinfection system by an ultra-violet irradiation (UV) disinfection system.

(c) Lai Sun Correctional Institution and Hei Ling Chau Addiction Treatment Centre

(i) installation of a new sewage treatment plant (STP) with a UV disinfection system;

(ii) construction of a dry weather flow intercepting system; and

(iii) reconstruction of the internal sewerage system.

(d) Sha Tsui Detention Centre

(i) installation of a new STP with a UV disinfection system; and

(ii) construction of a sewage pumping system including four pumping stations.

4. The scope of **324DS** comprises the following improvement items at SWD's O Pui Shan Boys' Home-

(a) provision of a new sewage treatment plant

(i) replacement of the trickling filtration plant by a new STP with a UV disinfection system; and

(ii) reconstruction of the internal sewerage system.

A set of six drawings showing the locations of the proposed sewage treatment facilities is given at Enclosure 1.

JUSTIFICATION

Hei Ling Chau Addiction Treatment Centre (Annex) (HLTC(Annex))

5. At present, sewage from the HLTC(Annex) is treated by two septic tanks and discharged directly into the sea. With limited treatment capability, the septic tanks cannot provide effective treatment to the sewage to meet the standards prescribed in the discharge licences issued under the WPCO. Separately, wastewater generated from the laundry is discharged directly to the sea without treatment. The total substandard daily effluent from the HLTC(Annex) amounts to $100m^3$ and has become a major source of pollution to the coastal water.

6. Due to site constraints, it is not possible to build a STP at HLTC(Annex). We propose to construct a sewage pumping system to convey the sewage generated at HLTC(Annex) to Hei Ling Chau Correctional Institution for treatment by an upgraded Oxidation Ditch Plant there before final discharge to the sea. We will also need to reconstruct the internal sewerage system in HLTC(Annex) to connect all sewers to the new sewage pumping system.

Hei Ling Chau Correctional Institution (HLCI)

7. The sewage generated by HLCI is treated by an Oxidation Ditch Plant. The volume of the sewage treated has reached the plant's design capacity of 900 cubic metres (m^3) per day. There are also frequent process interruptions caused by the hot laundry wastewater. Excessive chlorine residue is found in the treated sewage due to the use of chlorination for disinfection.

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8. To cope with the additional sewage flow of 100m^3 from HLTC(Annex) as described in paragraph 5 above, we propose to increase the plant's treatment capacity to 1000m^3 per day. To solve the problems of process interruption and excessive chlorine residue, we propose to construct a wastewater cooling system to control the temperature of the sewage entering the treatment process and replace the current chlorination disinfection system with a UV disinfection system to ensure that the treated sewage complies with the required standards. To enhance the reliability of the treatment plant, we propose to install a standby clarifier unit.

Lai Sun Correctional Institution (LSCI) and Hei Ling Chau Addiction Treatment Centre (HLTC)

9. Sewage from LSCI and HLTC is discharged to a nearby stream after being treated by two septic tanks and a trickling filter. Similar to the situation at HLTC(Annex), the poorly treated sewage has become a major pollution source of the stream. We propose to construct a new STP with a UV disinfection system to ensure compliance with the licence standards.

10. We will reconstruct the internal sewerage system to connect all sewers to the new treatment plant for proper treatment.

11. In addition, there are other untreated discharges from the two institutions which seep into the stream and cause pollution. To rectify the situation, we will provide a dry weather flow intercepter to intercept and divert the polluted stream flow to the new STP for proper treatment prior to its releasing back to the stream.

Sha Tsui Detention Centre (STDC)

12. At present, the effluent from four septic tanks cannot meet the licence standards. We propose to install a central STP with a UV disinfection system to properly treat the sewage before discharge into sea. In addition, we need to construct a sewage pumping system to facilitate transportation of the sewage to the new STP.

O Pui Shan Boys' Home Sewage Treatment Plant

13. At present, the existing trickling filtration plant has served for about 30 years and is incapable of fully complying with the present discharge licence

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conditions. We propose to replace it by a new STP with a UV disinfection system to properly treat the sewage so as to ensure the effluent can consistently meet the required licence standards.

14. Owing to insufficient in-house resources, DDS proposes to engage consultants to carry out contract management, independent design check and site supervision.

15. If we do not implement the project, the effluent discharged from the sites concerned cannot meet the licence standards as required under the WPCO.

FINANCIAL IMPLICATION

16. We estimate the capital costs of **323DS** and **324DS** to be $291.8 million and $25.1 million in MOD prices (see paragraph 17 below), made up as follows -

		$ million	
		323DS	**324DS**
(a)	Hei Ling Chau Addiction Treatment Centre (Annex)		19.0
	(i) sewage pumping system	16.0	
	(ii) re-construction of internal sewerage system	3.0	
(b)	Hei Ling Chau Correctional Institution		55.6
	(i) upgrading of the Oxidation Ditch Plant	20.1	
	(ii) standby final clarifier units	15.0	

/(iii) .....

			$ million	
			323DS	**324DS**
	(iii)	a wastewater cooling system	12.0	
	(iv)	a UV disinfection system	8.5	
(c)	Lai Sun Correctional Institution and Hei Ling Chau Addiction Treatment Centre			86.7
	(i)	a sewage treatment plant	60.5	
	(ii)	a dry weather flow intercepting system	20.2	
	(iii)	re-construction of internal sewerage system	6.0	
(d)	Sha Tsui Detention Centre			47.5
	(i)	sewage pumping system	11.3	
	(ii)	a sewage treatment plant	36.2	
(e)	O Pui Shan Boys' Home Sewage Treatment Plant			17.0
	(i)	a sewage treatment plant	15.5	

/(ii) .....

			$ million 323DS	$ million 324DS	
	(ii)	re-construction of internal sewerage system		1.5	
(f)		Environmental mitigation measures	7.5	1.5	
(g)		Consultant's costs	37.9	3.3	
(h)		Contingencies	25.3	2.2	
		Sub-total	279.5	24.0	(in December 1999 prices)
(i)		Provision for price adjustment	12.3	1.1	
		Total	291.8	25.1	(in MOD prices)

A breakdown by man months of the consultant's costs is given at Enclosure 2.

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

Year	$ million (Dec 1999)		Price adjustment factor	$ million (MOD)	
	323DS	324DS		323DS	324DS
2000 – 2001	49.8	4.2	1.00000	49.8	4.2
2001 – 2002	204.3	17.7	1.04500	213.5	18.5
2002 – 2003	19.4	1.6	1.10770	21.5	1.8
2003 – 2004	6.0	0.5	1.17416	7.0	0.6
	279.5	24.0		291.8	25.1

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18. We have derived the MOD estimate on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2000 to 2004. We will tender the electrical and mechanical works under a lump sum contract because we can clearly define the scope of the works in advance, leaving little room for uncertainty. The works for the re-construction of internal sewerage systems will be carried out under existing term contracts being managed by the Director of Architectural Services.

19. We estimate the additional annually recurrent expenditure for **323DS** and **324DS** to be $4.1 million and $0.7 million respectively. As the recurrent cost is specifically for the operation and maintenance of institutional sewerage facilities, there will be no impact on the assessment of sewage charges paid by the public.

PUBLIC CONSULTATION

20. As the project only involves improvement works within the boundaries of the premises occupied by CSD and SWD, and the sites concerned are isolated and not readily accessible by the general public, we consider public consultation unnecessary.

ENVIRONMENTAL IMPLICATION

21. The project itself will not cause long term adverse environmental impact. We shall implement standard pollution control measures to minimise short-term environmental impacts during construction following established standards and guidelines. Measures such as water spraying to reduce emission of fugitive dust and the use of silenced construction plant to reduce noise generation will be implemented during construction.

22. We estimate the total cost of implementing the standard pollution control measures to be $9.0 million in December 1999 prices. We have included this cost in the overall project estimate.

23. We estimate that about 50m^3 of construction and demolition waste will be generated and disposed of at landfill and about 10m^3 of public fill will be delivered to public filling facilities. We have considered in the planning and design stages ways of reducing the generation of construction and demolition material (C&DM) as far as possible. We will require the contractor to implement necessary measures to minimise the generation of C&DM and to reuse and recycle C&DM.

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We will record the disposal, reuse and recycling of C&DM for monitoring purposes.

LAND ACQUISITION

24. This project does not require land acquisition.

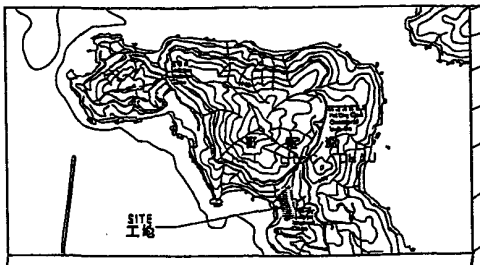
BACKGROUND INFORMATION

25. Pursuant to the declaration of Water Control Zones under the WPCO, CSD and SWD are required to obtain licences from the Director of Environmental Protection for sewage discharge to water receiving bodies and to ensure that the effluent complies with the standards prescribed in the licences. The effluent quality of the above sites cannot meet such discharge standards required under the WPCO. We upgraded **323DS** and **324DS** to Category B in May 2000. We plan to start the works in September 2000 for completion by December 2001.

26. We estimate that the proposed works will create some 80 new jobs during the construction stage. These will comprise 15 professional or technical staff and 65 labourers, totalling 1 280 man months.

Secretary for Security
Secretary for Health and Welfare
May 2000

(PWSC0274/WIN11)



位置圖
LOCATION PLAN

SEWAGE PUMPING STATION NO.2
污水泵房2號

現有之化糞池
EXISTING SEPTIC TANK

HWM

CONNECT TO HEI LING CHAU OXIDATION DITCH PLANT
連接喜靈洲氧化溝污水處理廠

污水泵房1號
SEWAGE PUMPING STATION NO.1

Rocky Area

現有之化糞池
EXISTING SEPTIC TANK

+11.8
+7.0
+4.6
+7.6
+6.0
+3.7
+3.7
+4.6
+3.0

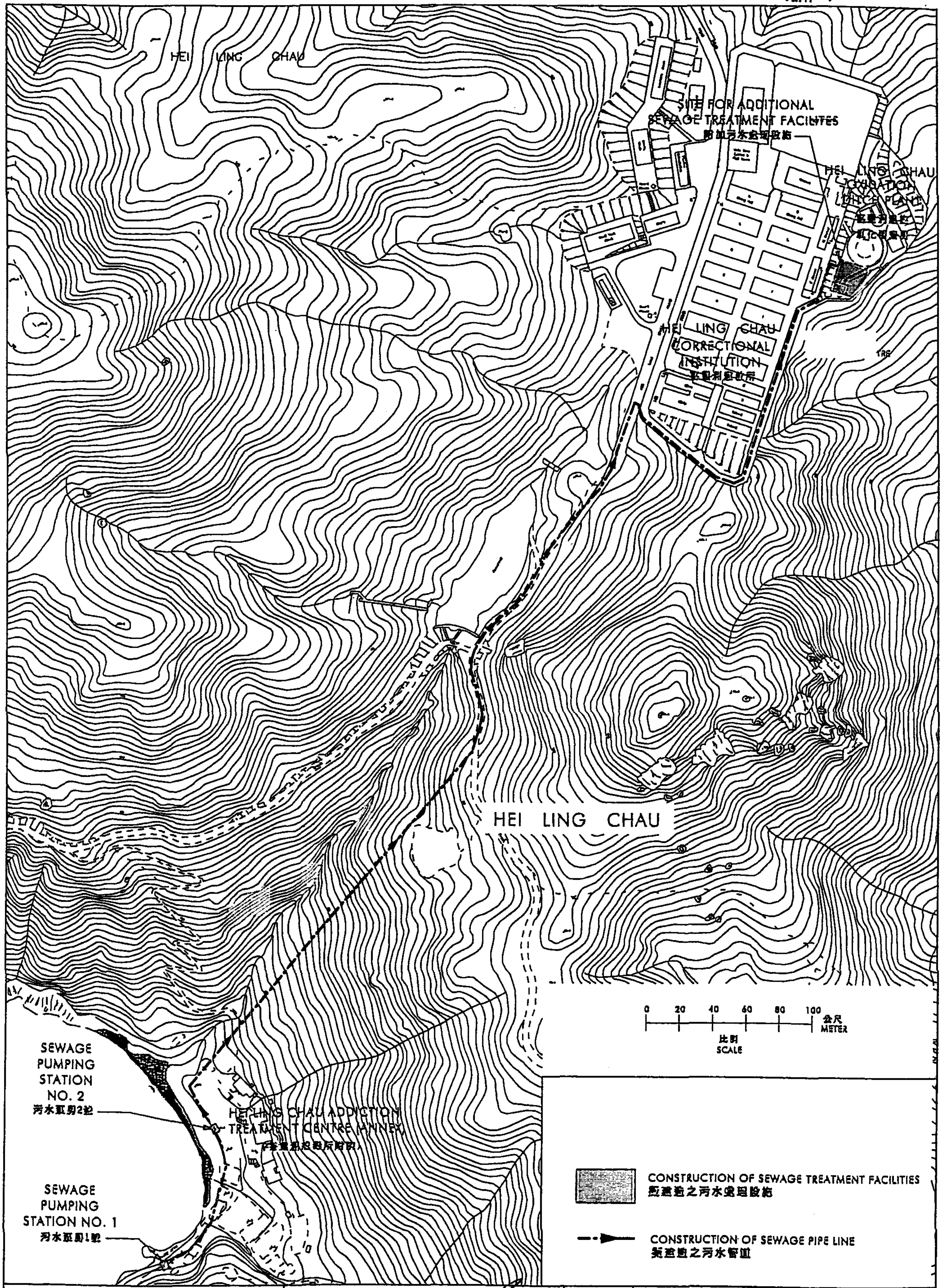
EXISTING SEWAGE TREATMENT FACILITIES
現有的污水處理設施

CONSTRUCTION OF SEWAGE TREATMENT FACILITIES
興建中之污水處理設施

CONSTRUCTION OF SEWAGE PIPE LINE
興建中之污水管道

0 5 10 15 20 公尺
METER
比例
SCALE

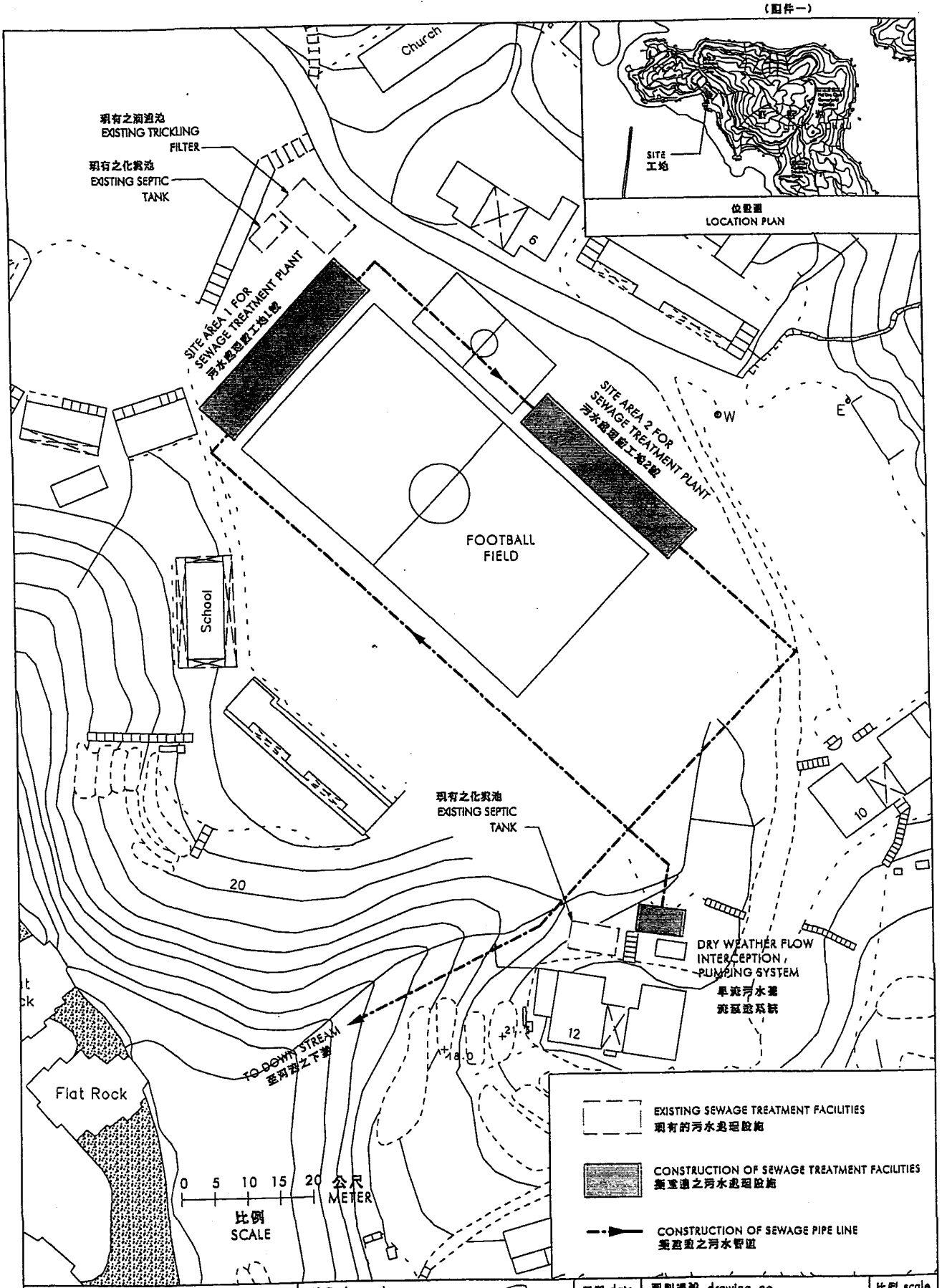
圖則名稱 drawing title: IMPROVEMENT OF SEWAGE TREATMENT FACILITIES AT HEI LING CHAU ADDICTION TREATMENT CENTRE (ANNEX) 污水處理設施改善工程 (喜靈洲戒毒所增設)	繪圖 drawn by: C.K.CHAU	日期 date: 17/5/2000	圖則編號 drawing no.: DEM-1225/PWSC/1	比例 scale: AS SHOWN
	批核 approved: S.M.YU	日期 date: 17/5/20		
	部門 office: 機電工程部 ELECTRICAL AND MECHANICAL 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	



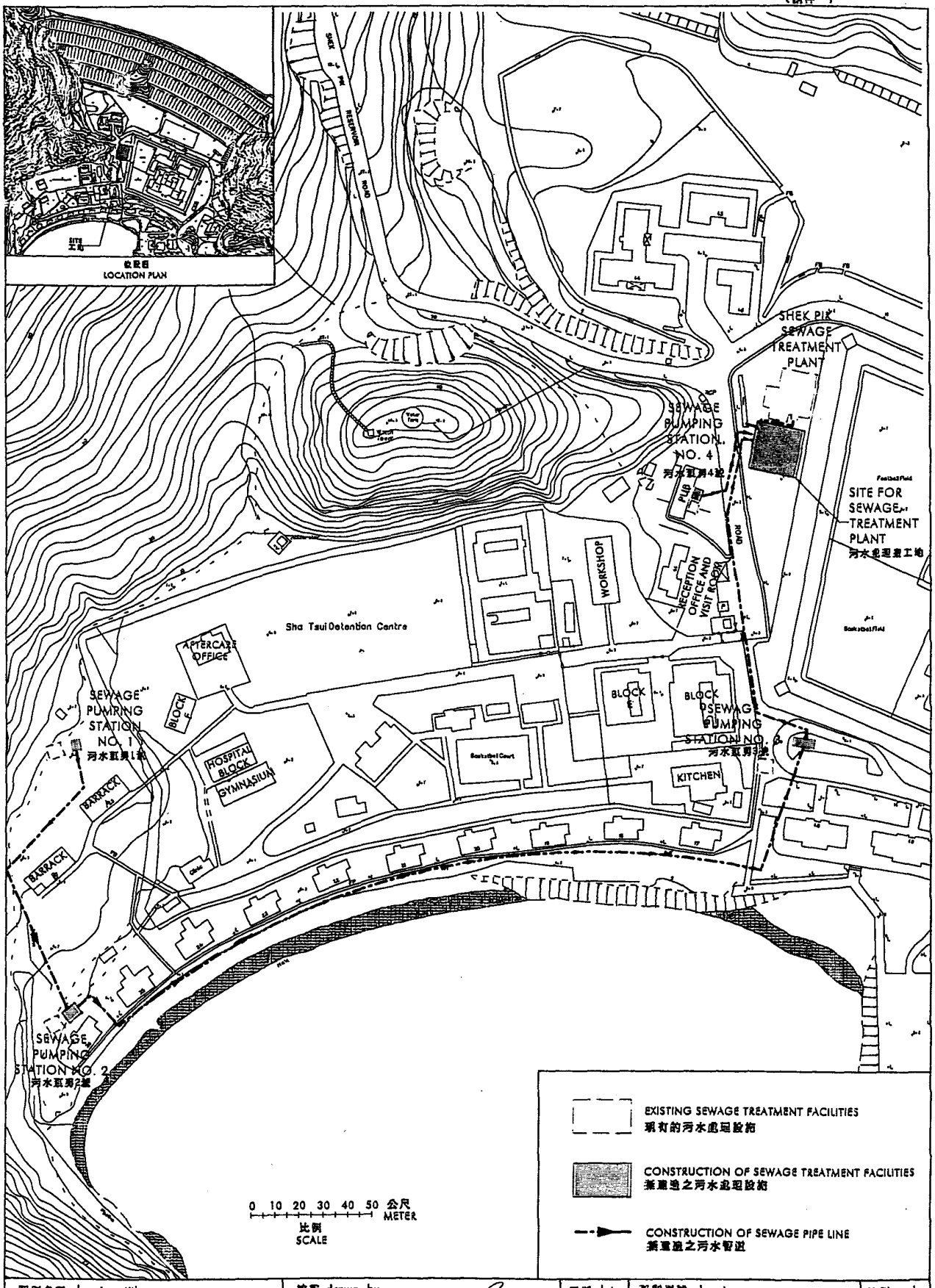
圖則名稱 drawing title	繪製 drawn by	日期 date	圖則編號 drawing no.	比例 scale
IMPROVEMENT OF SEWAGE TREATMENT FACILITIES - SEWAGE PIPING CONNECTION BETWEEN PUMPING STATION AT HEI LING CHAU ADDICTION TREATMENT CENTRE (ANNEX) AND HEI LING CHAU OXIDATION DITCH PLANT 污水處理設施改善工程 (污水管道連接喜靈洲戒毒所附屬抽水站及喜靈洲氧化溝廠房)	C.K.CHAU	16/1/2002	DEM-1225/PWSC/2	AS SHOWN
	批核 approved: S.M.YU	日期 date: 17/5/2002		
	部門 office: 機電工程部 ELECTRICAL AND MECHANICAL 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	

喜靈洲懲教所
HEI LING CHAU CORRECTIONAL INSTITUTION

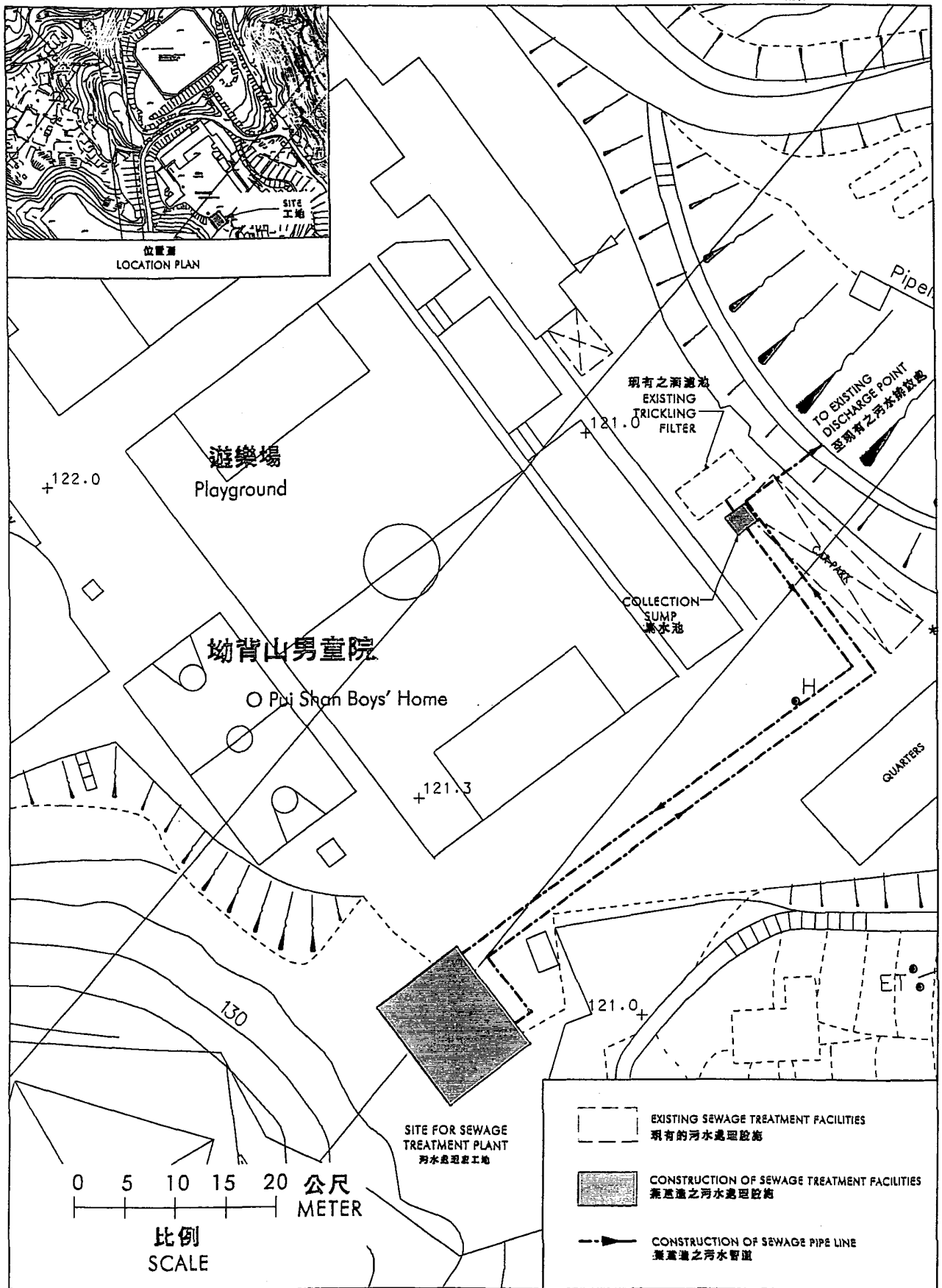
圖則名稱 drawing title IMPROVEMENT OF SEWAGE TREATMENT FACILITIES AT HEI LING CHAU OXIDATION DITCH PLANT 污水處理設施改善工程 喜靈洲迴旋渠廠房	繪圖 drawn by C.K.CHAU	日期 date 7/6/2000	圖則編號 drawing no. DEM-1225/PWSC/3	比例 scale AS SHOWN
	批核 approved S.M.YU	日期 date 11/5/2000		
	部門 office 機電工程部 ELECTRICAL AND MECHANICAL PROJECTS DIVISION		香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	



圖則名稱 drawing title IMPROVEMENT OF SEWAGE TREATMENT FACILITIES AT LAI SUN CORRECTIONAL INSTITUTION/ HEI LING CHAU ADDICTION TREATMENT CENTRE 污水處理設施改善工程 (勵新懲教所/喜靈洲戒毒所)	繪圖 drawn by C.K.CHAU	日期 date 7/5/2002	圖則編號 drawing no. DEM-1225/PWSC/4	比例 scale AS SHOWN
	批核 approved S.M.Y.U	日期 date 17/5/2002		
	部門 office 機電工程部 ELECTRICAL AND MECHANICAL 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	



圖則名稱 drawing title IMPROVEMENT OF SEWAGE TREATMENT FACILITIES AT SHA TSUI DETENTION CENTRE 沙咀羈留院設施改善工程 (沙咀羈教中心)	繪圖 drawn by C.K.CHAU	日期 date 17/5/2000	圖則編號 drawing no. DEM-1225/PWSC/S	比例 scale AS SHOWN
	批核 approved S.M.YU	日期 date 17/5/2000		
	部門 office 機電工程部 ELECTRICAL AND MECHANICAL 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	



圖則名稱 drawing title IMPROVEMENT OF SEWAGE TREATMENT FACILITIES AT O PUI SHAN BOY'S HOME 污水處理設施改善工程 (坳貝山男童院)	繪圖 drawn by C.K.CHAU	日期 date 7/5/2000	圖則編號 drawing no. DEM-1225/PWSC/6	比例 scale AS SHOWN
	批核 approved S.M.YU	日期 date 17/5/20		
	部門 office 機電工程部 ELECTRICAL AND MECHANICAL 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	

4323DS - Improvement of sewage treatment facilities on Hei Ling Chau and at Sha Tsui Detention Centre on Lantau Island
4324DS - Improvement of sewage treatment facilities at O Pui Shan Boys' Home

Breakdown of estimates for consultant's costs

Consultant's staff costs			Estimated man months	Average MPS salary point	Multiplier factor	Estimated fee ($ million)
(a)	Contract management	Professional	50	40	2.4	7.53
		Technical	40	16	2.4	2.02
(b)	Design Check	Professional	43	40	2.4	6.48
		Technical	40	16	2.4	2.02
(c)	Site supervision by resident site staff employed by the consultant	Professional	80	40	1.7	8.54
		Technical	400	16	1.7	14.28
					Total consultant's staff costs	40.87
Out-of-pocket expenses						
(a)	Oversea factory acceptance test					0.33
					Total out-of-pocket expenses	0.33

Notes

1. A mutilplier factor of 2.4 is applied to the average MPS point to arrive at the full staff costs including the consultant's overheads and profit, as the staff will be employed in the consultant's offices. (At 1.4.1999, MPS pt. 40 = $62,780 p.m. and MPS pt. 16 = $21,010 p.m.). A mutilplier factor of 1.7 is applied in the case of site staff supplied by the consultant.

2. Out-of-pocket expenses are the actual costs incurred. The consultant is not entitled to any additional payment for overheads or profit in respect of these items.

3. The figures given above are based on estimates prepared by the Director of Drainage Services. We will only know the actual man months and actual fees when we have selected the consultant through the usual competitive lump sum fee bid system.