

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE

Environmental Protection – Sewerage and sewage treatment 329DS – Upgrading of Pillar Point sewage treatment works

Members are invited to recommend to Finance Committee the upgrading of **329DS** to Category A at an estimated cost of \$1,360.9 million in money-of-the-day prices.

PROBLEM

Pillar Point sewage treatment works (STW) is unable to cope with the forecast sewage flow from Tuen Mun area and the treatment level requires upgrading to comply with the Water Quality Objectives of the north-western waters.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to upgrade **329DS** to Category A at an estimated cost of \$1,360.9 million in money-of-the-day (MOD) prices for the upgrading of Pillar Point STW.

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of **329DS** comprises –
- (a) upgrading of the sewage treatment level from preliminary treatment to chemically enhanced primary treatment¹ (CEPT) with ultraviolet disinfection;
 - (b) expansion of the treatment capacity from 215 000 cubic metres (m³) per day to 241 000 m³ per day;
 - (c) provision of new septic waste reception and treatment facilities to cater for septic waste of 1 200 m³ per day; and
 - (d) ancillary works.

—————
A conceptual layout plan² showing the existing and the proposed new facilities in Pillar Point STW is at Enclosure 1.

4. We plan to commence design and construction of the proposed works in October 2009 for commissioning of the upgraded Pillar Point STW in February 2013.

JUSTIFICATION

5. Pillar Point STW serving the Tuen Mun district is a preliminary treatment works with a design capacity of 215 000 m³ per day. It only removes solids and grit from the sewage inflow prior to discharging the treated effluent into the north-western waters via a twin submarine outfall. Pillar Point STW also provides septic waste reception and treatment facilities to handle septic waste delivered to the treatment works by septic waste collection contractors.

/6.

¹ Preliminary treatment includes screening and removal of grits. Solids larger than 6mm in diameter as well as grit which consists of sands, bone pieces, etc. are removed from the sewage. Primary treatment includes screening, removal of grit and a primary sedimentation process for removal of settleable suspended solids from the sewage. For chemically enhanced primary treatment, chemicals are added during the primary sedimentation process to enhance the removal of suspended solids.

² As the project will be implemented under a design-build-operate contract, the conceptual layout of the proposed works is for illustrative purpose only and subject to the contractor's design.

6. Currently, the quantity of sewage flow and septic waste to Pillar Point STW are about 170 000 m³ per day and 600 m³ per day respectively. We need to upgrade Pillar Point STW to cater for the forecast sewage flow of 241 000 m³ per day and septic waste of 1 200 m³ per day due to population growth in the Tuen Mun district. To comply with the respective Water Quality Objectives, we also need to upgrade the treatment level of the plant to CEPT with disinfection to reduce pollution loads to the north-western waters.

7. If we do not implement the proposed works, the existing Pillar Point STW will not be able to handle the forecast sewage flow and pollution loads. This will hinder future development of Tuen Mun district and will not bring about water quality improvement to the north-western waters.

FINANCIAL IMPLICATIONS

8. We estimate the capital cost of the proposed works to be \$1,360.9 million in MOD prices (see paragraph 9 below), made up as follows –

		\$ million
(a)	Design and Construction of sewage treatment facilities, ultraviolet disinfection facilities and septic waste reception facilities	1,052.6
	(i) civil engineering works	399.1
	(ii) electrical and mechanical works	653.5
(b)	Consultants' fees	8.5
	(i) contract administration	4.6
	(ii) management of resident site staff	3.9
(c)	Remuneration of resident site staff	58.5

/(d)

		\$ million	
(d)	Environmental mitigation measures	10.3	
(e)	Contingencies	119.0	
	Sub-total	1,248.9	(in Sept 2008 prices)
(f)	Provision for price adjustment	112.0	
	Total	1,360.9	(in MOD prices)

— A detailed breakdown of the estimates for the consultants' fees and resident site staff costs by man-months is at Enclosure 2.

9. Subject to approval, we will phase the expenditure as follows—

Year	\$ million (Sept 2008)	Price adjustment factor	\$ million (MOD)
2009 – 2010	50.3	1.03500	52.1
2010 – 2011	222.7	1.05570	235.1
2011 – 2012	328.3	1.07681	353.5
2012 – 2013	368.1	1.09835	404.3
2013 – 2014	187.9	1.12032	210.5
2014 – 2015	91.6	1.15113	105.4
	1,248.9		1,360.9

/10.

10. We have derived the MOD estimate on the basis of Government's latest forecast of the trend rate of change in the prices of the public sector building and construction output for the period from 2009 to 2015. We will procure by adopting design-build-operate arrangement to allow flexibility for the contractor to optimise the work schedule in the design and construction stages, and to achieve reasonable construction and operation costs of the sewage treatment facilities. The contract will provide for price adjustment.

11. We estimate the annual recurrent expenditure arising from the proposed works to be \$90.0 million. This has been taken into account in determining the sewage charges for the years 2008-09 to 2017-18 stipulated in the Sewage Services (Sewage Charge) Regulation (Cap. 463A).

PUBLIC CONSULTATION

12. On 16 September 2005, we consulted the Environment, Hygiene and District Development Committee (EHDDC) of the Tuen Mun District Council on the proposed works and obtained its support for the implementation of the proposed works. On 28 March 2008, we reported the latest development of the project in the EHDDC meeting. Members welcomed the project and supported the implementation of the proposed works.

13. We consulted the Legislative Council Panel on Environmental Affairs on 27 October 2008 on the proposed works. Members raised no objection to our plan to submit the funding proposal to the Public Works Subcommittee.

ENVIRONMENTAL IMPLICATIONS

14. **329DS** is a designated project under the Environmental Impact Assessment (EIA) Ordinance. The EIA report for the project was approved under the EIA Ordinance in June 2008. The EIA study concluded that the project would reduce pollution loadings and thus help improve the quality of the receiving waters. The water quality modelling results showed that the level and type of treatment adopted is effective in minimising the water quality impacts. Besides, with the implementation of the mitigation measures, the proposed works would not give rise to unacceptable environmental impacts during construction and operation. The Environmental Permit for the project was issued in November 2008. We shall implement the mitigation measures set out in the Environmental Permit.

15. For short term impacts during construction, we will control noise, dust and site run-off within the established standards and guidelines through implementation of mitigation measures in the works contract, such as the use of silenced construction plants to reduce noise generation, water-spraying to reduce emission of fugitive dust, and proper treatment of site run-off before discharge. We will also carry out close site inspection to ensure that these recommended mitigation measures and good site practice are properly implemented on site. We have included in paragraph 8(d) above a sum of \$10.3 million (in September 2008 prices) in the project estimate for implementation of the environmental mitigation measures.

16. We have considered ways, such as minimising the excavation for structures, in the planning and design stage to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil and demolished concrete) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimise the generation of construction waste.

17. We will also 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 approval 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 construction waste and non-inert construction waste to public fill reception facilities³ and landfills respectively through a trip-ticket system.

18. We estimate that the project will generate in total about 126 900 tonnes of construction waste. Of these, we will reuse about 29 800 tonnes (23%) of inert construction waste on site and deliver 97 100 tonnes (77%) of inert construction waste to public fill reception facilities for subsequent reuse. The total cost for accommodating construction waste at public fill reception facilities is estimated to be about \$2.6 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities).

/HERITAGE

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

HERITAGE IMPLICATIONS

19. 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

20. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

21. The Review of the Tuen Mun and Tsing Yi Sewerage Master Plan, commissioned in February 1999 and completed in 2001, was to review and update the existing and future developments, population figures, and sewage flows and loads arising from the study area. The Study recommended upgrading of the existing Pillar Point STW to CEPT with disinfection to improve the effluent quality and to meet projected demands.

22. Based on the recommendations of the study, we upgraded **329DS** to Category B in October 2004.

23. In July 2005, we commissioned a consultancy to carry out the reference design, prepare the contract documentation and assist in the tendering process for **329DS**, at an estimated cost of \$13.2 million in MOD prices. We charged this amount to block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme".

24. Of the 343 trees within the project boundary, 253 trees will be preserved. The proposed works will involve the removal of 90 trees including 18 trees to be felled and 72 trees to be replanted within the project site. All trees to

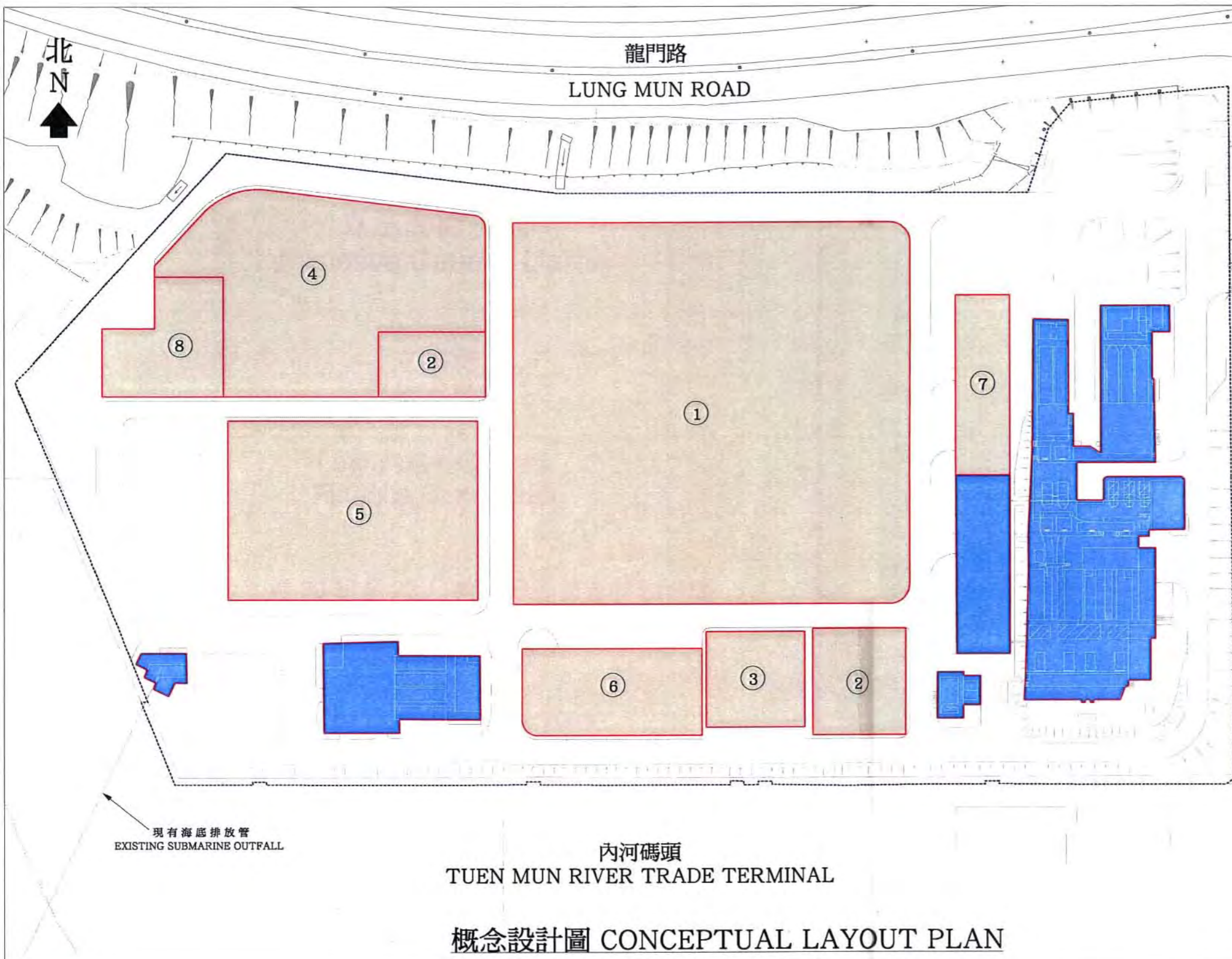
be removed are not important trees⁴. We will include proposals of planting and green roofscape as part of the project, including estimated quantities of about 81 trees and 2 230 square metres of turf.

25. We estimate that the proposed works will create about 478 jobs (390 for labourers and another 88 for professional/technical staff) providing a total employment of about 13 500 man-months.

Environment Bureau
June 2009

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 more;
- (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 event;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- (e) trees with trunk diameter equal or exceeding 1.0 m (measured at 1.3 m above ground level), or with height/canopy spread equal or exceeding 25 m.



KEY PLAN 示意圖

- 圖例**
LEGEND :
- 工地範圍
BOUNDARY OF THE SITE
 - 需改善的現有設施
EXISTING FACILITIES TO BE UPGRADED
 - 擬建的新設施
PROPOSED NEW FACILITIES
 - ① 絮凝池及沉澱池
FLOCCULATION & SEDIMENTATION TANKS
 - ② 氣味控制設施
ODOUR CONTROL PLANTS
 - ③ 泵房
PUMPING STATION
 - ④ 污泥貯存設施
SLUDGE HANDLING FACILITIES
 - ⑤ 紫外光消毒設施
UV DISINFECTION FACILITIES
 - ⑥ 化學品儲存室及工場
CHEMICAL STORAGE BUILDING & WORKSHOP
 - ⑦ 實驗室及行政樓
LABORATORY & ADMINISTRATIVE BUILDING
 - ⑧ 糞便廢物收集及處理設施
SEPTIC WASTE RECEPTION AND TREATMENT FACILITIES

內河碼頭
TUEN MUN RIVER TRADE TERMINAL

概念設計圖 CONCEPTUAL LAYOUT PLAN

圖則名稱 drawing title
工務工程計劃第329DS號
望后石污水處理廠改善工程
PWP ITEM NO. 329DS
UPGRADING OF PILLAR POINT SEWAGE TREATMENT WORKS

繪畫 drawn	ORIGINAL SIGNED	C.W. CHAN	日期 date	05-09-2008
核對 checked	ORIGINAL SIGNED	S.K. LEUNG	日期 date	05-09-2008
批核 approved	ORIGINAL SIGNED	T.Y. YUEN	日期 date	05-09-2008
部門 office	淨化海港計劃部 HARBOUR AREA TREATMENT SCHEME DIVISION			

圖則編號 drawing no.	比例 scale
DSS/2008/002	N.T.S.
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Enclosure 2 to PWSC(2009-10)59

329DS – Upgrading of Pillar Point sewage treatment works

Breakdown of estimates for consultants' fees and resident site staff costs (in September 2008 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fees (\$ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	3.8
		Technical	-	-	-	0.8
Sub-total						4.6
(b)	Resident site staff costs (Note 3)	Professional	351	38	1.6	34.0
		Technical	895	14	1.6	28.4
Sub-total						62.4
Comprising –						
(i)	Consultants' fees for management of resident site staff				3.9	
(ii)	Remuneration of resident site staff				58.5	
Total						67.0

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultants. (As at 1 April 2008, MPS point 38 = \$60,535 per month and MPS point 14 = \$19,835 per month)
2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the design and construction of the project. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **329DS** to Category A.
3. We will only know the actual man-months and actual costs for site supervision after the completion of the construction works.