For discussion **PWSC(2012-13)5**
on 18 April 2012

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Head 704 – DRAINAGE
Environmental Protection – Sewerage and sewage treatment
339DS – North District sewerage, stage 1 phase 2C and stage 2 phase 1

Members are invited to recommend to Finance Committee –

(a) the upgrading of part of **339DS**, entitled "Village sewerage in Kau Lung Hang San Wai, Kau Lung Hang Lo Wai and Tai Hang, and southern trunk sewer between Wai Tau Tsuen and Nam Wa Po", to Category A at an estimated cost of $316.8 million in money-of-the-day prices; and

(b) the retention of the remainder of **339DS** in Category B.

PROBLEM

Sewage from the unsewered areas in Kau Lung Hang San Wai, Kau Lung Hang Lo Wai and Tai Hang is a source of water pollution to the nearby Ng Tung River and the receiving waters of Deep Bay.

/**PROPOSAL** …..

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to upgrade part of 339DS to Category A at an estimated cost of $316.8 million in money-of-the-day (MOD) prices for implementing sewerage works in the three unsewered areas in Tai Po.

PROJECT SCOPE AND NATURE

3. The part of **339DS** that we propose to upgrade to Category A comprises the construction of –

(a) about 11 kilometres (km) of sewers ranging from 150 millimetres (mm) to 350 mm in diameter for three unsewered areas in Tai Po, namely Kau Lung Hang San Wai, Kau Lung Hang Lo Wai and Tai Hang;

(b) about 1.5 km of gravity trunk sewers ranging from 250 mm to 450 mm in diameter along Tai Wo Services Road West between Wai Tau Tsuen and Nam Wa Po;

(c) one sewage pumping station (SPS) at Tai Hang in Tai Po;

(d) about 125 metres (m) of twin rising mains of 200 mm in diameter in association with construction of the SPS in (c) above; and

(e) ancillary works.

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

4. Subject to the funding approval of the Finance Committee (FC), we plan to commence the proposed works in June 2012 for completion in December 2016.

5. We will retain the remainder of **339DS** in Category B, which involves laying of about 28.9 km sewers in 16 other unsewered areas in the North District and Tai Po. Planning and design of the relevant works are in progress. Funding for the remainder of **339DS** will be sought at a later stage after completion of the design and preparatory works.

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JUSTIFICATION

6. At present, sewage from village areas in Kau Lung Hang is often treated and disposed of by means of private on-site treatment facilities (such as septic tanks and soakaway (STS) systems). These facilities are however often ineffective in removing pollutants due to their proximity to watercourse[1] and inadequate maintenance[2]. Sewage from these unsewered areas has therefore been identified as a source of water pollution to the nearby Ng Tung River as well as the receiving waters of Deep Bay.

7. The aforesaid situation will persist unless sewerage infrastructure is made available to collect and treat sewage from these areas properly. As a long-term measure, we have formulated a programme under the North District Sewerage Master Plan to provide public sewerage in Kau Lung Hang in phases. The proposed works aim to collect sewage generated from the three unsewered areas in Kau Lung Hang, namely Kau Lung Hang San Wai, Kau Lung Hang Lo Wai and Tai Hang, and convey it to the Shek Wu Hui sewage treatment works for proper treatment and disposal. This will minimise the release of pollutants into the environment and bring about sustainable improvement to the water quality of Ng Tung River and Deep Bay.

8. Based on the village properties survey results and the potential village house development information within the three unsewered areas obtained in October 2010 and November 2011 respectively, the proposed sewerage facilities for Kau Lung Hang San Wai, Kau Lung Hang Lo Wai and Tai Hang mentioned in paragraph 7 above will be able to serve some 1 349 village houses comprising about 735 existing houses, 138 planned houses and 476 potential houses[3].

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1 STS systems operate by allowing the effluent to percolate through gravels whereby pollutants are removed in a natural manner. However, if the STS system is located in an area where the ground water table is high, such as an area in proximity to watercourses, it will not function properly due to ineffective percolation.

2 Inadequate maintenance of STS systems would affect their pollutant removal efficiency and might even lead to overflow of effluent.

3 The 476 potential village houses are houses that may be developed on vacant lands which are adjacent to the proposed sewer alignment. There is currently no development programme for these houses, which is subject to landowners' will and Lands Department's approval. In the event that some of these potential houses are not built, the abortive cost is not expected to be significant because, according to the designed sewer alignment, the proposed sewers will in any case need to pass through the vacant lands to serve the existing and planned houses.

9. The proposed works along Tai Wo Service Road West described in paragraph 3(b) above fall within the project boundaries of **720TH** "Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling" and **13GB** "Liantang/Heung Yuen Wai Boundary Control Point and associated works" managed by the Highways Department (HyD) and the Civil Engineering and Development Department (CEDD) respectively. HyD and CEDD intend to seek funding support from the FC to implement **720TH** and **13GB** at a later stage[4]. In order to avoid repeated road openings and any interface problems that may arise from multiple contractors working on the same site, we will entrust the construction of the corresponding gravity trunk sewer segments to HyD and CEDD for implementation in conjunction with the roadworks under the two aforesaid works projects. Details are shown at Enclosure 1.

FINANCIAL IMPLICATIONS

10. We estimate the cost of the proposed works to be $316.8 million in MOD prices (please see paragraph 11 below), broken down as follows –

			$ million
(a)	Construction of sewers		129.2
(b)	Construction of gravity trunk sewers[5]		35.6
(c)	Construction of SPS		33.9
	(i) civil engineering works	24.1	
	(ii) electrical and mechanical works	9.8	
(d)	Construction of rising mains		2.5
(e)	Ancillary works		1.0

/(f) …..

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[4] HyD will seek FC's approval for **720TH** after completion of detailed design, while CEDD has planned to put **13GB** to FC in June 2012.

[5] As described in paragraph 9 above, the construction of the gravity trunk sewers ($35.6 million in September 2011 prices) will be implemented in conjunction with the roadworks under **720TH** and **13GB**.

			$ million		
(f)	Environmental mitigation measures			3.6	
(g)	Consultants' fees for			1.9	
	(i)	contract administration	0.6		
	(ii)	management of resident site staff	1.3		
(h)	Remuneration of resident site staff			28.0	
(i)	Contingencies			19.7	
		Sub-total		255.4	(in September 2011 prices)
(j)	Provision for price adjustment			61.4	
		Total		316.8	(in MOD prices)

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

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

Year	**$ million (Sept 2011)**	**Price adjustment factor**	**$ million (MOD)**
2012 – 2013	12.3	1.05325	13.0
2013 – 2014	25.3	1.11118	28.1
2014 – 2015	60.3	1.17229	70.7
2015 – 2016	63.9	1.23677	79.0

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Year	$ million (Sept 2011)	Price adjustment factor	$ million (MOD)
2016 – 2017	50.3	1.30479	65.6
2017 – 2018	33.4	1.37656	46.0
2018 – 2019	9.9	1.45227	14.4
	255.4		316.8

12. We have derived the MOD estimate 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 2012 to 2019. While we will construct the gravity trunk sewers through two contracts to be managed by HyD and CEDD as explained in paragraph 9 above, we will deliver the remaining works 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 of the uncertain underground conditions that may affect the alignments of the sewers. The contract will provide for price adjustments. We will deliver the electrical and mechanical works under a lump-sum contract as the scope of works can be well defined.

13. We estimate the additional annual recurrent expenditure arising from the proposed works to be $2.4 million. The recurrent expenditure attributable to sewage charges 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) and the recurrent expenditure attributable to trade effluent surcharges will be taken into account in reviewing the trade effluent surcharge rates in future.

PUBLIC CONSULTATION

14. We consulted the Tai Po Rural Committee on 11 May 2007 and the Environment, Housing and Works Committee under the Tai Po District Council on 14 September 2007. Both Committees supported the proposed works.

15. We gazetted the proposed works in accordance with the Water Pollution Control (Sewerage) Regulation under three schemes between June 2009 and October 2011. No objection was received on the proposed gravity trunk sewer along Tai Wo Services Road West and the scheme was subsequently authorised in November 2011. For the other two schemes that cover the proposed sewerage works in (a) Kau Lung Hang San Wai and Kau Lung Hang Lo Wai and (b) Tai Hang, 27 and 11 objections to the original gazetted schemes were received respectively on land resumption and sewer alignment issues. Regarding (a), we met with the objectors and prepared a total of three amendment schemes between February 2010 and August 2011 in response to their concerns. After gazettal of the third amendment scheme, all the objectors have withdrawn their objections (including eight and five further objections to the first and second amendment schemes respectively) unconditionally. As regards (b), the objectors have subsequently withdrawn their objections unconditionally after several meetings with them and gazettal of an amendment scheme. One objection to the amendment scheme was also received but it was subsequently withdrawn unconditionally. As all the objections have been resolved, the Director of Environmental Protection authorised the proposed works in Kau Lung Hang San Wai and Kau Lung Hang Lo Wai in October 2011 and those in Tai Hang in December 2011.

16. We consulted the Legislative Council Panel on Environmental Affairs on 27 February 2012 on the proposed works. Members raised no objection to the proposed works.

ENVIRONMENTAL IMPLICATIONS

17. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have completed the Preliminary Environmental Review in September 2008 for the proposed works, which set out the mitigation measures necessary for the proposed works. With such mitigation measures in place, the proposed works would not have long-term environmental impacts.

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18. For short-term environmental impacts during construction, we will control noise, dust and site run-off to levels within the established standards and guidelines through implementation of environmental mitigation measures, such as 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 also 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 10(f) above a sum of $3.6 million (in September 2011 prices) in the project estimates for implementing the environmental mitigation measures.

19. At the planning and design stages, we have considered ways to reduce the generation of construction waste where possible. For example, in addition to the need for meeting hydraulic and traffic requirements, we have designed the alignment of the proposed sewerage works in such a manner that excavation and demolition of existing structures will be minimised. In addition, we will require the contractor 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[6]. We will encourage the contractor to maximise the use of recycled / recyclable inert construction waste, as well as the use of non-timber formwork to further reduce the generation of construction waste.

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 contractors 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 at public fill reception facilities and landfills respectively through a trip-ticket system.

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[6] Public fill reception facilities are specified in Schedule 4 of 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.

21. We estimate that the proposed works will generate in total about 110 650 tonnes of construction waste. Of these, we will reuse about 59 220 tonnes (54%) of inert construction waste on site and deliver 46 425 tonnes (42%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 5 005 tonnes (about 4%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be about $1.9 million for the proposed works (based on a unit cost of $27 per tonne for disposal at public fill reception facilities and $125 per tonne[7] at landfills).

HERITAGE IMPLICATION

22. 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

23. We have reviewed the design of the proposed works to minimise the extent of land acquisition. We will resume 168 private agricultural lots and 50 mixed lots (with a total area of about 9 511 square metres (m^2)) for carrying out the proposed works. The land resumption and clearance will not affect any households or domestic structures. The cost of land resumption and clearance is about $39.07 million which will be charged to **Head 701 – Land Acquisition**. A breakdown of the land resumption and clearance costs is at Enclosure 3.

BACKGROUND INFORMATION

24. In October 1994, we upgraded **203DS** "North District sewerage" to Category B to implement sewerage works recommended under the comprehensive study of the sewerage systems in the North District in two stages.

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[7] This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at $90 per m^3), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

25. We deployed in-house resources to conduct detailed design for the stage 1 phase 1 works. In December 1998, we engaged consultants to carry out detailed design for the stage 1 phase 2 works and necessary investigations at an estimated cost of $13.1 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". The consultancy works are being carried out in phases.

26. In December 1998 and February 2002, we upgraded part of **203DS** to Category A as **219DS** "North District sewerage, stage 1 phase 1A" at an approved project estimate (APE) of $124.7 million and **330DS** "North District sewerage, stage 1 phases 1B and 2A" at an APE of $125.1 million in MOD prices respectively. The construction works of **219DS** and **330DS** were completed in December 2002 and January 2006 respectively.

27. Between 2004 and 2006, we re-packaged the remaining works under **203DS** with due regard to the priority of the works and availability of resources. In October 2004 and October 2005, we split **203DS** into **203DS** " North District sewerage, stage 2 part 2B", **339DS** "North District sewerage, stage 1 phases 2B and 2C and stage 2 phase 1" and **345DS** "North District sewerage, stage 2 part 2A".

28. In January 2006, we engaged consultants to carry out detailed design and necessary investigations for the stage 2 phase 1 works at an estimated cost of $9.84 million in MOD prices. We have charged this amount to block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme". The consultancy works are being carried out in phases.

29. In January 2007, we upgraded part of **339DS** to Category A as **359DS** "North District sewerage, stage 1 phase 2B" at an APE of $130.0 million in MOD prices. The construction works were completed in January 2011. The remainder of **339DS** is retitled as "North District sewerage, stage 1 phase 2C and stage 2 phase 1".

30. In January 2009, we upgraded part of **339DS** to Category A as **366DS** "Kau Lung Hang sewerage – trunk sewers, pumping station and rising main" at an APE of $103.2 million in MOD prices. The construction works commenced in February 2009 for completion in September 2012.

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31. In June 2011, we upgraded part of **339DS** to Category A as **375DS** "Sewerage in Ping Kong, Fu Tei Pai and Tai Wo" at an APE of $226.8 million in MOD prices. The construction works commenced in November 2011 for completion in November 2015.

32. We have substantially completed the detailed design of the proposed works mentioned in paragraph 3 above.

33. The proposed works will not involve any tree removal or planting proposal.

34. We estimate that the proposed works will create about 83 jobs (67 for labourers and another 16 for professional/technical staff), providing a total employment of 3 900 man-months.

Environment Bureau
April 2012

圖例
LEGEND:

擬建的鄉村污水收集系統範圍
PROPOSED AREA FOR IMPLEMENTATION OF VILLAGE SEWERAGE WORKS

擬建的泰亨污水泵房
PROPOSED TAI HANG SEWAGE PUMPING STATION

擬建的加壓污水管
PROPOSED RISING MAINS

擬委託土木工程拓展署13GB項目下敷設的無壓污水幹渠
PROPOSED GRAVITY TRUNK SEWERS TO BE ENTRUSTED TO CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT UNDER 13GB

擬委託路政署720TH項目下敷設的無壓污水幹渠
PROPOSED GRAVITY TRUNK SEWERS TO BE ENTRUSTED TO HIGHWAYS DEPARTMENT UNDER 720TH

現有的無壓污水幹渠
EXISTING GRAVITY TRUNK SEWERS

建造中相關工程 (項目375DS)
RELATED WORKS UNDER CONSTRUCTION (ITEM 375DS)

大窩鄉村污水收集系統範圍
TAI WO VILLAGE SEWERAGE AREA

大窩污水泵房
TAI WO SEWAGE PUMPING STATION

無壓污水幹渠
GRAVITY TRUNK SEWERS

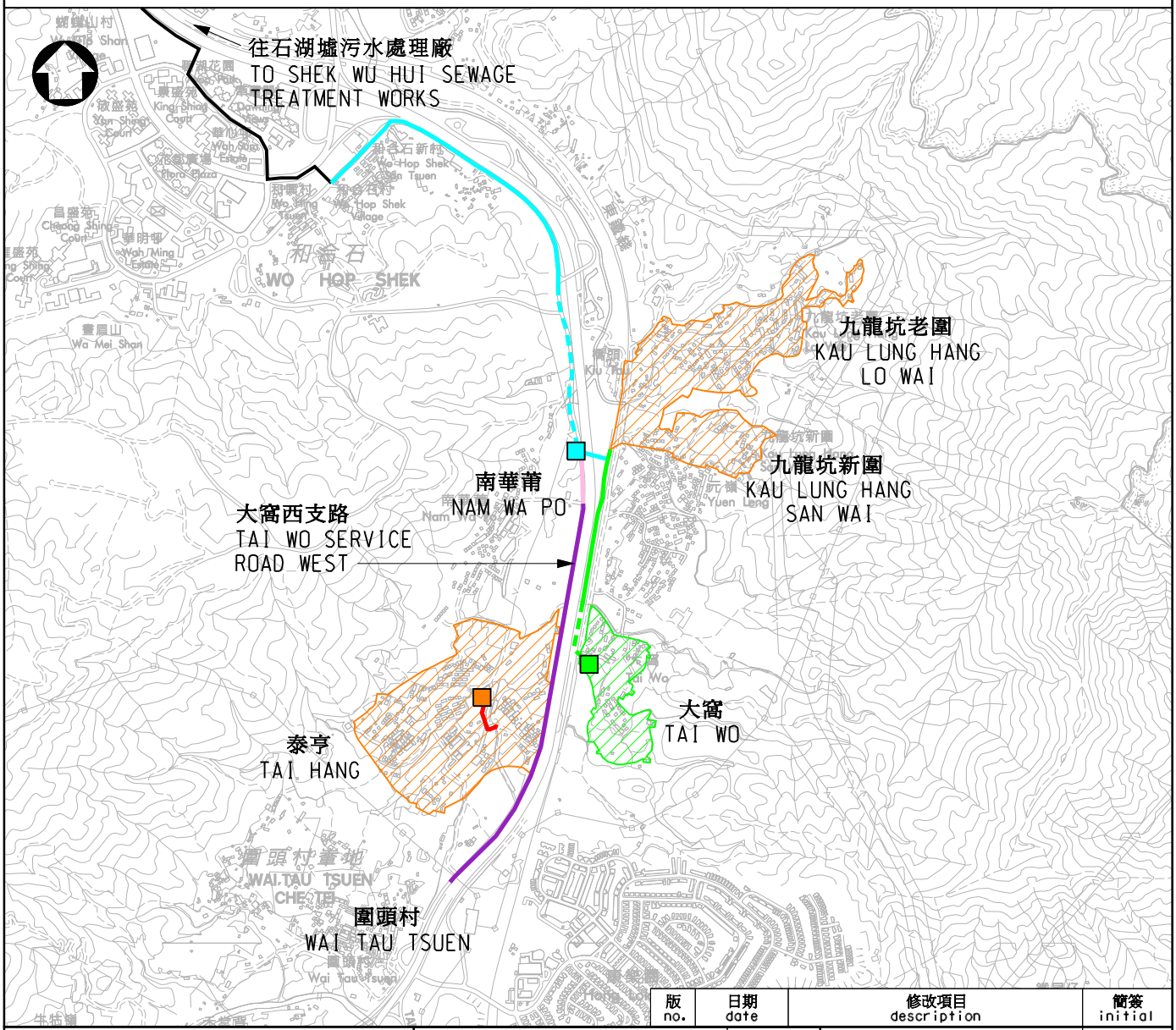
加壓污水管
RISING MAINS

建造中相關工程 (項目366DS)
RELATED WORKS UNDER CONSTRUCTION (ITEM 366DS)

南華莆污水泵房
NAM WA PO SEWAGE PUMPING STATION

無壓污水幹渠
GRAVITY TRUNK SEWERS

加壓污水管
RISING MAINS



版 no.	日期 date	修改項目 description	簡簽 initial

圖則名稱 drawing title

工務計劃項目第339DS號
- 北區污水收集系統第1階段第2C期及第2階段第1期
PWP ITEM No. 339DS
- NORTH DISTRICT SEWERAGE, STAGE 1 PHASE 2C AND STAGE 2 PHASE 1

繪畫 drawn	W. Y. HUI	日期 date 28 DEC 2011
核對 checked	S. C. WONG	日期 date 28 DEC 2011
批核 approved	H. L. WONG	日期 date 28 DEC 2011
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION	

圖則編號 drawing no. DCM/2011/166

比例 scale N.T.S.

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

Enclosure 2 to PWSC(2012-13)5

339DS – North District sewerage, stage 1 phase 2C and stage 2 phase 1

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2011 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	0.5
		Technical	-	-	-	0.1
					Sub-total	0.6
(b)	Resident site staff costs (Note 3)	Professional	82	38	1.6	8.2
		Technical	623	14	1.6	21.1
					Sub-total	29.3
	Comprising –					
	(i) Consultants' fees for management of resident site staff					1.3
	(ii) Remuneration of resident site staff					28.0
					Total	29.9

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants. (As at now, MPS salary point 38 = $62,410 per month and MPS salary point 14 = $21,175 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 part of **339DS** to Category A.

3. The actual man-months and actual costs will only be known after completion of the construction works.

339DS – North District sewerage, stage 1 phase 2C and stage 2 phase 1

Breakdown of the land resumption and clearance costs

		$ million	$ million
(I) Estimated resumption cost			**33.52**
(a)	Agricultural land ex-gratia compensation in Kau Lung Hang San Wai and Kau Lung Hang Lo Wai 138 lots (with a total area of 6 909 m^2) will be resumed, including 106 agricultural lots (5 837 m^2) and 32 mixed lots (1 072 m^2) 6 909 m^2 x $3,525 per m^2 (Zone C) (see Notes 1 to 3)	24.35	
(b)	Agricultural land ex-gratia compensation in Tai Hang 80 lots (with a total area of 2 602 m^2) will be resumed, including 62 agricultural lots (2 457 m^2) and 18 mixed lots (145 m^2) 2 602 m^2 x $3,525 per m^2 (Zone C) (see Notes 1 to 3)	9.17	
(II) Estimated clearance cost			**1.09**
(a)	Ex-gratia allowance of crop compensation	0.74	
(b)	Ex-gratia allowance for farm structures and miscellaneous permanent improvements to farms	0.25	
(c)	Ex-gratia allowance for "Tun Fu"	0.10	
(III) Interest and contingency payment			**3.46**
(a)	Interest payment on various ex-gratia compensations for private land	0.0002	
(b)	Contingency on the above costs	3.46	
(IV) Compensation for temporary occupation area (by valuation)			**1.00**
	Total costs		**39.07**

Notes

1. Mixed lots refer to lots containing both agricultural land and building land. Under **339DS,** only agricultural land in these mixed lots would be resumed.

2. There are four ex-gratia compensation zones, namely Zones A, B, C and D, for land resumption in the New Territories as approved by the Executive Council in 1985 and 1996. The boundaries of these zones are shown on the Zonal Plan for Calculation of Compensation Rates. The land to be resumed in the project **339DS** is agricultural land currently within Zone C.

3. In accordance with G.N. 2128 dated 16 March 2012 on the revised ex-gratia compensation rates for resumed land, the ex-gratia compensation rate of agricultural land for Zone C is 50% of the Basic Rate at $655 per square foot (or $7,050 per m^2). Hence the ex-gratia compensation rate used for estimating the resumption cost of the 138 lots in Kau Lung Hang San Wai and Kau Lung Hang Lo Wai as well as the 80 lots in Tai Hang affected by **339DS** is $3,525 per m^2.