ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE

Environmental Protection – Sewerage and sewage treatment

341DS – Harbour Area Treatment Scheme, stage 2A – construction of the sewage conveyance system and upgrading of Stonecutters Island sewage treatment works and preliminary treatment works

Members are invited to recommend to Finance Committee –

- (a) the upgrading of part of **341DS**, entitled "Harbour Area Treatment Scheme, stage 2A construction of the sewage conveyance system and advance works for upgrading of Stonecutters Island sewage treatment works", to Category A at an estimated cost of \$9,286.5 million in money-of-the-day prices; and
- (b) the retention of the remainder of **341DS** in Category B and retitled as "Harbour Area Treatment Scheme, stage 2A upgrading of Stonecutters Island sewage treatment works and preliminary treatment works".

PROBLEM

Sewage generated from the northern and south-western parts of Hong Kong Island (from North Point to Ap Lei Chau) that is currently not handled by stage 1 of the Harbour Area Treatment Scheme (HATS) is only receiving preliminary treatment at existing preliminary treatment works (PTWs) before being discharged into Victoria Harbour (the harbour). This is a major pollution source which has a significant impact on the water quality of the harbour.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to upgrade part of **341DS** to Category A at an estimated cost of \$9,286.5 million in money-of-the-day (MOD) prices for the construction of a sewage conveyance system (SCS) for conveying the sewage from the northern and south-western parts of Hong Kong Island to Stonecutters Island sewage treatment works (SCISTW) for treatment before discharge, the construction of advance preparation works for the expansion and upgrading of SCISTW, and the provision of covers and deodourization facilities to the existing sedimentation tanks at SCISTW under the HATS stage 2A.

PROJECT SCOPE AND NATURE

- 3. The full scope of 341DS comprises
 - (a) the construction of an SCS consisting of sewage tunnels of total length of about 21 kilometres (km) and associated ancillary works;
 - (b) the expansion and upgrading of SCISTW to increase its treatment capacity;
 - (c) the provision of disinfection at SCISTW;
 - (d) the provision of covers and deodourization facilities to the existing sedimentation tanks at SCISTW;
 - (e) the upgrading of eight associated preliminary treatment works on Hong Kong Island; and
 - (f) the monitoring of the harbour water quality for reviewing the performance of the HATS stage 2A.

- 4. The scope of the part of **341DS** which we propose to upgrade to Category A comprises
 - (a) the construction of an SCS consisting of sewage tunnels of total length of about 21 km and associated ancillary works;
 - (b) the construction of advance preparation works for the expansion and upgrading of SCISTW within the SCISTW site; and
 - (c) the provision of covers and deodourization facilities to the existing sedimentation tanks at SCISTW.

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

5. We plan to start construction of the proposed works in July 2009 for completion in September 2014. We will then commission the SCS under the HATS stage 2A in December 2014.

JUSTIFICATION

- 6. The HATS is one of the most important environmental protection programmes undertaken in Hong Kong to improve the water quality of the harbour. It involves the implementation of an integrated sewerage system that will collect and treat all sewage from both sides of the harbour in an efficient, effective and environmentally sustainable manner. Stage 1 of HATS was completed in 2001 and collects 75% of the sewage, or 1.4 million cubic metres a day (m³/day), generated around the harbour (i.e. from Kowloon and the north-eastern part of Hong Kong Island) via deep tunnels of about 24 km in length and transfers it to SCISTW for treatment before discharge. HATS stage 2A is the next phase in the programme to further improve the water quality of the harbour and also to cater for future growth in sewage flows. Stage 2A will collect the remaining 25% of harbour area sewage, or 450 000 m³/day, not handled by stage 1 and transfer it via deep tunnels for centralized treatment at the expanded SCISTW.
- 7. The Government is committed to proceeding with HATS stage 2A with a view to commissioning it in 2014. To meet the target commissioning date, we need to carry out construction of the critical elements of the project ahead of other works. The critical elements include the SCS, which involves about 21 km of sewage tunnels at depths of up to 160 metres (m) below sea level, advance preparation works for the expansion and upgrading of SCISTW including the deep

excavation for the foundation of a new main pumping station (MPS) at SCISTW and an inter-connection sewage tunnel between the new MPS and the existing MPS at SCISTW. In view of the scale, complexity and the inherent risks associated with underground conditions, we plan to start construction of these critical elements as early as possible.

- 8. In addition to the above time-critical works items mentioned in paragraph 7 above, we also plan to provide covers and deodourization facilities to the existing sedimentation tanks at SCISTW in accordance with the recommendations of the Environmental Impact Assessment (EIA) report, so as to mitigate odour nuisance generated from the SCISTW as soon as possible. To expedite the overall programme, we now propose to upgrade part of **341DS** to Category A for the construction of the above-mentioned time-critical works items and the odour mitigation measures at SCISTW. In parallel, we will continue with the design of the remaining components of HATS stage 2A, which consist of the expansion of SCISTW, installation of the permanent disinfection facilities and the upgrading of the eight associated PTWs on Hong Kong Island, with a view to inviting tenders in end 2009 for completion in 2014.
- 9. At present, the sludge from HATS stage 1 is being disposed of at the existing landfills. Following full commissioning of HATS stage 2A by 2014, it is estimated that the quantity of dewatered sludge generated by SCISTW would be increased from the present about 600 tonnes per day to more than 1 000 tonnes per day under ultimate development scenario. A Sludge Treatment Facility (STF) is being planned by the Environmental Protection Department (EPD) with a view to commissioning it in end 2012 to provide a sustainable sludge treatment and disposal solution for the dewatered sludge generated from HATS (i.e. SCISTW) as well as ten other regional sewage treatment works. The STF is an essential and integral part of the HATS programme. It would not be technically or environmentally acceptable for HATS stage 2A to proceed alone without a dedicated and sustainable outlet for the handling of the sludge arising from the HATS.

FINANCIAL IMPLICATIONS

10. We estimate the capital cost of the proposed works to be \$9,286.5 million in MOD prices (see paragraph 11 below), made up as follows –

(a)	Construction works		7,179.9	
	(i) SCS and ancillary works	6,358.8		
	(ii) advance preparation works	569.2		
	(iii) covers and deodourization facilities	251.9		
(b)	Consultants' fee		60.3	
	(i) contract administration	26.1		
	(ii) management of resident site staff	34.2		
(c)	Remuneration of resident site staff		403.3	
(d)	Environmental mitigation measures		77.3	
(e)	Contingencies		700.0	
	Sub-total		8,420.8	(in September
(f)	Provision for price adjustment		865.7	2008 prices)
	Total		9,286.5	(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.

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

Year	\$ million (Sept 2008)	Price adjustment factor	\$ million (MOD)
2009 – 2010	269.0	1.03500	278.4
2010 – 2011	1,344.9	1.05570	1,419.8
2011 – 2012	1,900.0	1.07681	2,045.9
2012 – 2013	2,017.4	1.09835	2,215.8
2013 – 2014	1,210.4	1.12032	1,356.0
2014 – 2015	867.7	1.15113	998.8
2015 – 2016	538.0	1.18566	637.9
2016 – 2017	273.4	1.22123	333.9
	8,420.8		9,286.5

- 12. We have derived the MOD estimate on the basis of the 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 2017. We will implement the works under five contracts: four civil engineering works contracts and one electrical and mechanical (E&M) works contract. We will adopt re-measurement construction contracts for the four civil engineering works contracts with provision for price adjustment. We will tender the E&M works contract under a lump sum contract.
- 13. We estimate the annual recurrent expenditure arising from the proposed works to be \$30.1 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

- 14. Between 2006 to 2008, we consulted the relevant committees of the Eastern District Council, Wan Chai District Council, Central and Western District Council, Southern District Council, Sham Shui Po District Council and Kwai Tsing District Council as well as Wah Fu and Pokfulam Area Committee regarding the HATS stage 2A SCS. In 2006 and 2008, we also consulted the Subcommittee on Harbour Plan Review of the Harbourfront Enhancement Committee regarding the proposed layout design of SCS facilities at Fung Mat Road, Sai Ying Pun. Members supported the proposed works in all of these meetings. In addition, the Sham Shui Po District Council and its relevant Committee were also consulted in September 2007 and July 2008 on the provision of covers to the existing sedimentation tanks at SCISTW. Members supported the early provision of these covers to mitigate the existing odour nuisances.
- 15. A list of the committee meetings of the District Councils, Wah Fu and Pokfulam Area Committee and the Harbourfront Enhancement Committee attended is at Enclosure 3.
- 16. We gazetted the HATS stage 2A SCS works under the Sewage Tunnels (Statutory Easements) Ordinance (Cap. 438) on 31 August 2007 and did not receive any objection. The HATS stage 2A SCS works were subsequently authorized on 7 November 2008.
- 17. We gazetted the reconstruction of a seawall at North Point under Foreshore and Sea-bed (Reclamations) Ordinance (Cap. 127) on 1 August 2008. One objection was received during the objection period. The objector requested enhancement of the footpath on top of the reconstructed seawall. After our agreement with the objector on the proposed enhancement works, the objector withdrew his objection in November 2008. The scheme was then authorized on 18 February 2009.
- 18. We also gazetted the reconstruction of a seawall at Aberdeen under Foreshore and Sea-bed (Reclamations) Ordinance (Cap. 127) on 8 August 2008 and did not receive any objection. The scheme was authorised on 11 November 2008.
- 19. We consulted the EIA Subcommittee of the Advisory Council on the Environment (ACE) on 18 September 2008 and the ACE on 8 October 2008. No comment was received and the EIA report was endorsed.

20. We consulted the Legislative Council Panel on Environmental Affairs on 15 December 2008 on the proposed works under **341DS**. Members raised no objection to our plan to submit the funding proposal to the Public Works Subcommittee. Nevertheless, some Members requested the Administration to provide supplementary information on the measures to be taken to deal with the problem of polluted seabed near Tsuen Wan. We have submitted an information note to Panel Members on 23 March 2009.

ENVIRONMENTAL IMPLICATIONS

- 21. **341DS** is a designated project under the EIA Ordinance (Cap. 499). We have completed an EIA study in accordance with the EIA Ordinance for the project. The EIA report was endorsed by the Advisory Council on the Environment on 8 October 2008 and was approved under the EIA Ordinance on 30 October 2008. The Environmental Permit was issued on 19 November 2008 for the construction and operation of the project. The EIA report concluded that the project will significantly reduce the pollution loads being discharged into the harbour and improve the water quality of the harbour. The report further confirmed that with the implementation of the recommended mitigation measures, the environmental impacts of the proposed works can be controlled to within the standards and guidelines under the EIA Ordinance and the Technical Memorandum on the EIA Process. We shall implement the mitigation measures recommended in the approved EIA report.
- 22. For short term impacts during construction of the proposed works, 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 noise enclosure to reduce noise generation, water-spraying to reduce dust emission and proper pre-treatment of site run-off before discharge. We will carry out a comprehensive Environmental Monitoring and Audit (EM&A) programme to ensure compliance with the environmental permit requirements. We will also carry out site inspections to ensure that these recommended mitigation measures and good site practices are properly implemented on site. We have included in paragraph 10(d) above a sum of \$77.3 million (in September 2008 prices) in the project estimate for implementation of the environmental mitigation measures.
- 23. We have considered ways in the planning and design stages to reduce the generation of construction waste where possible. For example, we have optimized the size of tunnels and the size and depth of the new main pumping station, and explore the opportunity for processing excavated rock from the tunnel into aggregates for commercial use. In addition, we will require the

contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to the public fill reception facilities¹. We will encourage the contractor to maximize 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.

- 24. 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 approved 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 facilities and landfills respectively through a trip-ticket system.
- We estimate that the project will generate in total about 1 866 410 tonnes of construction waste. Of these, we will deliver 834 800 tonnes (45%) of inert construction waste which are granitic rocks to Lam Tei Quarry for processing into aggregates, 80 100 (4%) of completely decomposed granite to landfill operators as daily cover of landfills and 941 220 tonnes (50%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, we will dispose of 10 290 tonnes (1%) 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 \$26.7 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne² at landfills).

HERITAGE IMPLICATIONS

26. 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.

/27.

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.

This estimate has taken into account the cost for developing, operating and restoring the landfills after

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/m³), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

27. An EM&A programme will be implemented to ensure that vibration levels are kept within acceptable limits during blasting works in the vicinity of the historic buildings/structures near the project areas.

LAND ACQUISITION

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

BACKGROUND INFORMATION

- 29. In 1989, the Sewage Strategy Study recommended the Strategic Sewage Disposal Scheme (SSDS) (renamed as HATS) to collect and convey all sewage from the urban areas surrounding the harbour through deep tunnels, to one or two centralised sewage treatment plants for treatment, before final disposal to the waters south of Hong Kong. The SSDS was originally divided into four stages for implementation. To bring about early improvement in the water quality of the harbour, stage 1 focused on collecting and conveying the sewage from Kowloon and northeast Hong Kong Island to SCISTW for treatment, while stages 3 and 4 aimed to collect and convey the sewage from the north and southwest of Hong Kong Island. Stage 2 of the SSDS was planned to discharge the effluent away from the harbour in order to meet the environmental standards. HATS stage 1 commenced in early 1995 and was completed at the end of 2001.
- 30. In April 2000, an International Review Panel (IRP) was set up to consider the future development of the sewage treatment system for the main urban area in the light of experience with HATS stage 1 and developments in sewage treatment technology. In its report released on 30 November 2000, the IRP recommended that the Government adopt biological treatment and discharge the treated effluent into the harbour. The IRP also proposed options with different degrees of decentralisation for further assessment and consideration. Nevertheless, all these options involved the use of the Biological Aerated Filters (BAF) technology for treatment, deep tunnels for conveying the sewage and short outfalls for disposal of effluent.
- 31. On 25 May 2001, the Finance Committee approved \$73.6 million for upgrading **5227DS** "Trials and studies in relation to the way forward for the Harbour Area Treatment Scheme" to Category A to carry out a series of trials and studies to evaluate and select a final configuration for the remaining stages of HATS based on the options recommended by the IRP. The trials and studies were completed in June 2004. They confirmed that the recommended options were environmentally acceptable and technically feasible. Among the options, the centralised treatment at SCISTW was the preferred one in terms of cost, environmental and engineering aspects. It comprises –

- (a) Stage 2A the provision of additional facilities, including the upgrading of existing PTWs in the harbour area catchment on the northern and western sides of Hong Kong Island, the construction of about 20 km of deep tunnels to convey sewage from the above PTWs to Stonecutters Island, and the upgrading of the existing SCISTW to provide chemical treatment and disinfection; and
- (b) Stage 2B the provision of biological treatment facility at a site adjacent to the existing SCISTW.
- 32. In April 2005, we reported to the Legislative Council Panel on Environmental Affairs (the Panel) the results of an intensive 5-month public consultation exercise (from June to November 2004) on the way forward for HATS together with the proposed implementation programme. Subsequently, another two meetings of the Panel, with deputations invited, were held to discuss the findings of the studies relating to HATS stage 2 and the 2-phase approach for the second stage. We further consulted the Panel in July 2005 on the initial funding for the time-critical elements of stage 2A, including the design of the SCS and the EIA, and secured the Panel's support.
- 33. In April and July 2005, we included two items under block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme" at a total cost of \$14.0 million in MOD prices, for engaging consultants to undertake the site investigations, surveys and an EIA for the advance disinfection facilities at SCISTW, and carrying out advance site investigation works for collecting ground information, in particular under the sea, so as to facilitate early planning of the HATS stage 2A SCS study and the full scale ground investigation. The Category D items were completed in 2007.
- 34. In December 2005, we upgraded **238DS** "Harbour Area Treatment Scheme stage 2A environmental impact assessment, investigations, tunnel conveyance system design" to Category A at an estimated cost of \$166.5 million in MOD prices, for carrying out the EIA study, site investigations, and preliminary planning and design of the SCS for HATS stage 2A. The work under **238DS** commenced in January 2006 for completion in November 2009.

- In September 2006, we upgraded **341DS** to Category B for the construction works under the HATS stage 2A. In early 2007, Members of the Panel were also provided with progress updates on HATS stage 2 during the discussion on the proposal for applying the polluter-pays principle in the provision of sewage services. In July 2007, we upgraded **351DS** "Harbour Area Treatment Scheme, stage 2A planning and design of the upgrading works of Stonecutters Island sewage treatment works and the preliminary treatment works" to Category A at an estimated cost of \$105.6 million in MOD prices, for the planning and design of the upgrading works of SCISTW and the PTWs of HATS stage 2A. The work under **351DS** commenced in August 2007 for completion in August 2010.
- 36. In January 2008, we upgraded **352DS** "Harbour Area Treatment Scheme, stage 2A construction of advance disinfection facilities at Stonecutters Island sewage treatment works" to Category A at an estimated cost of \$109.9 million in MOD prices, for the construction of the advance disinfection facilities at SCISTW. In April 2008, an increase in the approved project estimate by \$9.8 million to \$119.7 million in MOD prices for **352DS** was approved for covering the increased cost for the construction of the advance disinfection facilities as a result of the high tender prices which were not foreseen at the time of preparing the estimate for the project. The works under **352DS** commenced in April 2008 for completion in October 2009.
- 37. In September 2008, we included an item under block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme" at an estimated cost of \$0.8 million in MOD prices, for engaging consultants to conduct the tendering exercise for the construction contracts under the project. The Category D item commenced in December 2008 for completion in September 2009.
- 38. Of the 308 trees within the project boundary, 142 trees will be preserved. The proposed works will involve the removal of 166 trees, including 31 trees to be felled and 135 trees to be replanted within the project site. All trees to be removed are not important trees³.

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[&]quot;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 above;

⁽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;

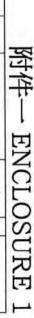
⁽c) trees of precious or rare species;

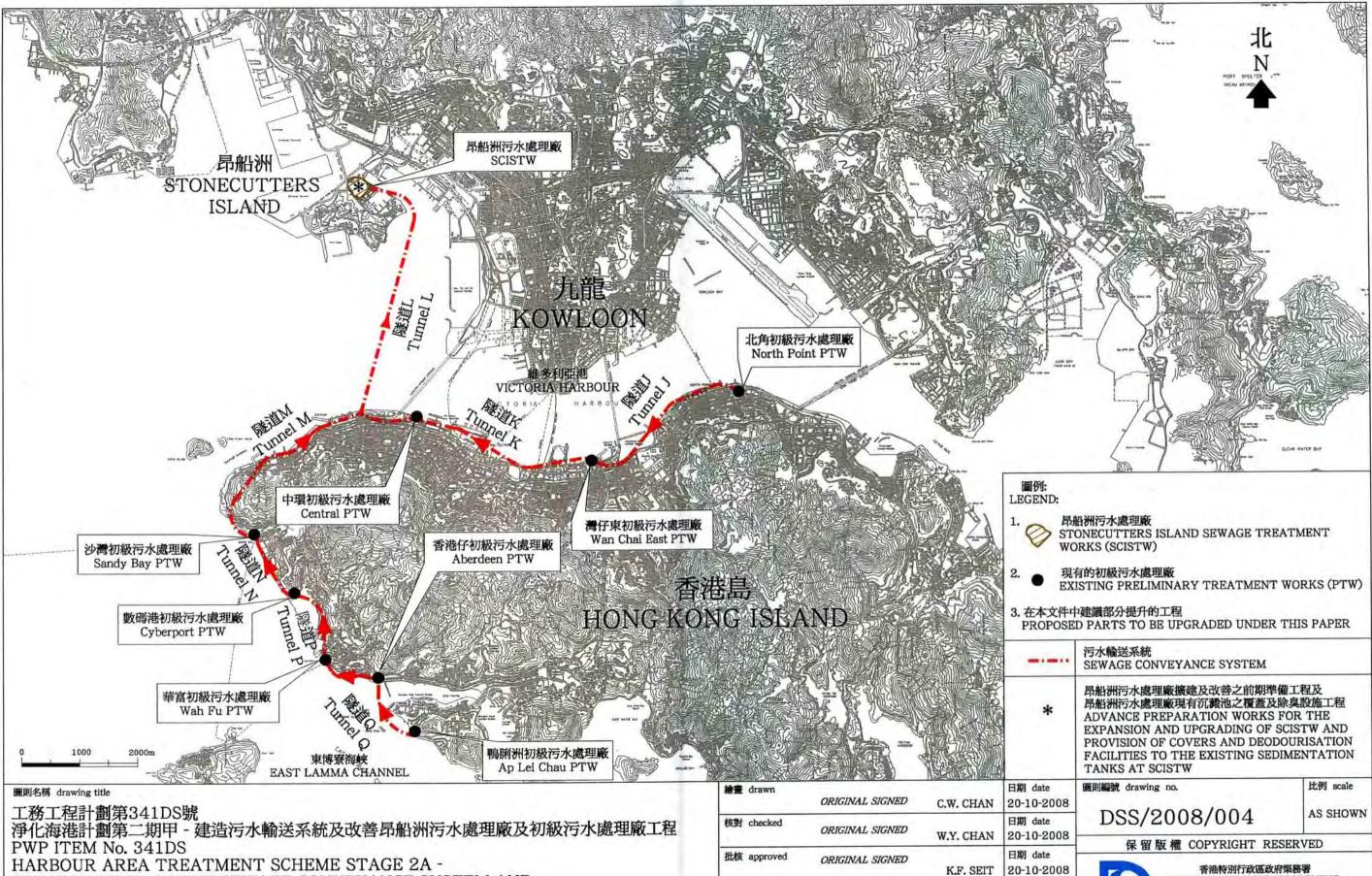
⁽d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or

⁽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.

39.	We estimate that the proposed works will create about 2 088 jobs
(1 695 for lal	bourers and another 393 for professional/technical staff) providing a
total employs	ment of about 83 000 man-months.

Environment Bureau May 2009





部門 office

淨化海港計劃部

HARBOUR AREA TREATMENT SCHEME DIVISION

CONSTRUCTION OF THE SEWAGE CONVEYANCE SYSTEM AND

AND PRELIMINARY TREATMENT WORKS

UPGRADING OF STONECUTTERS ISLAND SEWAGE TREATMENT WORKS

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

341DS – Harbour Area Treatment Scheme, stage 2A – construction of the sewage conveyance system and upgrading of Stonecutters Island sewage treatment works and preliminary 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 fee (\$million)
(a) Consultants' fees for contract administration (Note 2)	Professional Technical	-	-	-	22.7 3.4
				Sub-total	26.1
(b) Resident site staff costs (Note 3)	Professional Technical	2 468 6 254	38 14	1.6 1.6	239.0 198.5
Comprising –				Sub-total	437.5
(i) Consultants' fees for management of resident site staff				3	34.2
(ii) Remuneration of resident site staff					403.3
				Total	463.6

^{*} 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 agreements of **238DS** and **351DS** for the design and construction of the project. The construction phase will only be executed subject to Finance Committee's approval to part upgrade **341DS** to Category A.
- 3. We will only know the actual man-months and actual costs for site supervision after completion of the construction works.

341DS – Harbour Area Treatment Scheme, stage 2A – construction of the sewage conveyance system and upgrading of Stonecutters Island sewage treatment works and preliminary treatment works

List of Committee Meetings attended for the proposed works

District Council/others	Committee	Meeting Date
Central and Western District	Food, Environment, Hygiene	8 June 2006
Council	and Works Committee	
Harbourfront Enhancement	Subcommittee on Harbour Plan	12 July 2006
Committee	Review	
Southern District Council	Planning, Works and Housing	11 December
	Committee	2006
Eastern District Council	Works and Development	14 December
	Committee	2006
Kwai Tsing District Council	Planning and Environmental	19 December
	Hygiene Committee	2006
Sham Shui Po District	Environment and Food	11 January 2007
Council	Committee	
Central and Western District	Food, Environment, Hygiene	18 January 2007
Council	and Works Committee	
Wan Chai District Council	Planning, Transport and	23 January 2007
	Environmental Protection	
	Committee	
Wah Fu and Pokfulam Area		22 March 2007
Committee		
Southern District Council	Planning, Works and Housing	16 April 2007
	Committee	1.0
Sham Shui Po District	Environment and Food	6 September 2007
Council	Committee	
Sham Shui Po District		28 September
Council		2007
Sham Shui Po District	Environment and Hygiene	22 May 2008
Council	Committee	
Central and Western District	Food, Environment, Hygiene	22 May 2008
Council	and Works Committee	
Wan Chai District Council	Development, Planning and	27 May 2008
	Transport Committee	
Southern District Council	District Development and	2 June 2008
	Environment Committee	
Kwai Tsing District Council	Community Affairs Committee	10 June 2008
Eastern District Council	Planning, Works and Housing	3 July 2008
	Committee	
Sham Shui Po District	Environment and Hygiene	24 July 2008
Council	Committee	
Harbourfront Enhancement	Subcommittee on Harbour Plan	28 July 2008
Committee	Review	