# ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

# HEAD 705 – CIVIL ENGINEERING Environmental Protection – Refuse Disposal 167DR – Provision of grease trap waste treatment facility at a refuse transfer station

Members are invited to recommend to the Finance Committee the upgrading of **167DR** to Category A at an estimated cost of \$85.3 million in money-of-the-day prices for the design and construction of a grease trap waste treatment facility at the existing West Kowloon transfer station.

#### PROBLEM

The interim grease trap waste treatment facility (GTWTF) at Nim Wan, Tuen Mun is operating beyond its design capacity and the land it occupies will be required for landfilling of waste in the near future. It has to be replaced by a permanent GTWTF located in the urban area.

#### PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **167DR** to Category A at an estimated cost of \$85.3 million in money-of-the-day (MOD) prices for the design and construction of a GTWTF at the existing West Kowloon transfer station (WKTS) located in Sham Shui Po, Kowloon.

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#### PROJECT SCOPE AND NATURE

- 3. The scope of the project comprises
  - (a) design of the facilities for the reception, treatment, recovery and disposal of grease trap waste (GTW);
  - (b) civil engineering works including piling and foundation works;
  - (c) building works including construction of a control room, a store for chemical reagents and a new floor on top of the existing transformer rooms;
  - (d) modification of existing waste reception facilities at WKTS and provision of new facilities for reception, unloading, treatment, as well as recovery of oil and grease of GTW;
  - (e) modification of the existing wastewater treatment plant at WKTS and construction of a new wastewater treatment plant and ancillary facilities; and
  - (f) electrical and mechanical equipment comprising building services installations, fire services installations and utilities required.

The proposed GTWTF will be located completely within the boundary of the existing WKTS. Its location is shown in Enclosure 1. We plan to commence the proposed works in June 2006 for completion in May 2007.

#### JUSTIFICATION

4. At present, all GTW is delivered to the interim GTW treatment facility located in West New Territories landfill at Nim Wan, Tuen Mun for treatment before it is disposed of at the landfill.

5. The interim facility is operating in an overloaded condition as its design capacity is only 250 tonnes per day while the average intake of the interim facility was around 400 tonnes per day in 2005. This could lead to a deterioration of the environmental conditions under which the interim facility is expected to operate and eventually it would fail to meet the effluent discharge standards. It will no longer be able to provide any services when the site is required for

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landfilling of waste in the near future. Moreover, its location at Nim Wan is remote and inconvenient for GTW collectors. The GTW treated by the interim facility is also not ready for reuse and has to be disposed of at the landfill after mixing with pulverised fuel ash.

The design capacity of the proposed facility will be 450 tonnes per day 6. which, with further modification in future, could be increased to sustain GTW treatment of 500 tonnes per day. We propose to provide GTWTF in an operating refuse transfer station (RTS) because utilising the existing infrastructural support available at an operating RTS, including reception and loading areas, odour control units etc will reduce environmental impacts and achieve cost savings in the new facility. As most GTW is generated and collected in the urban area, locating the permanent GTWTF at an urban RTS would minimise the transportation distance of GTW. Amongst the five RTS in the urban area, two of them do not have sufficient space for the construction of GTWTF and the site of a RTS may be resumed for other uses. As a result, WKTS and Sha Tin transfer station were identified as the best available sites for the permanent GTWTF and their contractors were invited to submit proposals in November 2004. The proposals were evaluated using preapproved criteria by an assessment panel. The proposal submitted by the contractor of the WKTS achieved a higher score and was therefore selected.

7. The operating cost of the proposed facility at WKTS (around HK\$66.69/tonne) is much lower than the current operating cost of the interim facility (around HK\$150/tonne). Based on the current GTW intake of 400 tonnes per day, there will be a saving of around HK\$12 million per annum by operating the proposed GTWTF when compared to the interim facility.

8. The contractor of WKTS will make use of its existing waste reception and weighing facilities for reception of GTW collection road tankers. The whole GTW unloading operation will be carried out within the existing waste tipping hall which is fully enclosed and under negative air pressure. The air in the tipping hall will be cleaned by an efficient air scrubbing system prior to discharge to the atmosphere to minimise any odour impact to the environment. The wastewater in the GTW will be properly treated in a wastewater treatment system before discharge to foul sewer.

9. The proposed treatment facility will recover the oil and grease from GTW for reuse. The GTW unloaded from the collection tankers will be processed in a treatment system where the oil and grease in GTW will be concentrated into a semi-solid state which can then be recovered for reuse as an alternative industrial fuel, hence reducing reliance on fossil fuel.

10. An outline of the oil and grease recovery process is shown in Enclosure 2. The end product, i.e. recovered oil and grease, is essentially a purified animal and vegetable oil/fat concentrate containing mainly organic fatty acids. Because of its high calorific value, it can be used as an alternative biofuel in replacing fossil fuel. Due to its food origin, the sulphur content of the recovered oil and grease is much lower than that of industrial fuel used in Hong Kong and thus the use of it as a replacement fuel can reduce the emission of sulphur oxides. The recovered oil and grease has been successfully used as an alternative fuel replacing liquid fossil fuel in industrial furnances in France.

11. Based on the current GTW intake of 400 tonnes per day, we estimate that the proposed facility should be able to recover approximately 15 tonnes of recovered oil and grease for reuse on a daily basis (noting that the water content of GTW is over 90%). The recovered oil and grease will be sold to potential users by the contractor on a commercial basis. In the contract that we will enter with the contractor of WKTS, we will require the contractor to pay a royalty to the Government as a percentage of the net profit arising from the sale of the recovered oil and grease. We will negotiate the contract terms with the contractor of WKTS after funding approval. In addition, we are currently exploring the potential outlets (e.g. for installations at other waste facilities) for reusing the recovered oil and grease. We will ensure that the contractor can find suitable outlets to reuse the recovered oil and grease and we will maintain an appropriate record of this utilisation.

#### FINANCIAL IMPLICATIONS

12. We estimate the cost of the proposed works to be \$85.3 million in MOD prices (see paragraph 13 below), made up as follows –

		\$ million
(a)	Design	4.5
(b)	Civil engineering works	22.8
(c)	Building works	10.5
(d)	GTW reception, unloading, treatment, oil and grease recovery facilities	18.9
(e)	Wastewater treatment and ancillary facilities	19.7

		\$ million	
(f)	Electrical and mechanical equipment	7.7	
(g)	Independent assessor's fees	0.8	
(h)	Contingencies	0.3	
	Sub-total	85.2	(in September 2005 prices)
(i)	Provision for price adjustment	0.1	1 /
	Total	85.3	(in MOD prices)

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

Year	\$ million (Sept 2005)	Price adjustment factor	\$ million (MOD)
2007 - 2008	80.9	1.00125	81.0
2008 - 2009	4.3	1.00125	4.3
	85.2		85.3

14. We intend to implement the project under a design-build-and-operate contract arrangement. We have derived the MOD estimates on the basis of the Government's latest forecast of trend rate of change in prices of public sector building and construction output for the period 2007 to 2009.

15. Subject to approval of funding, we will enter into a Supplementary Agreement (SA) with the contractor of WKTS. We will pay the contractor the full capital costs for the design and construction work only when the contractor has satisfactorily commissioned the facility. The design and construction part of the SA would be on a fixed-price lump-sum basis. The Government will pay the contractor the operating charges of the facility by monthly instalments in arrears.

16. We estimate the annual recurrent expenditure arising from this project will be about \$9.7 million.

17. The contract management and supervision of the design, construction and operation of the GTWTF will be undertaken by the existing EPD staff currently overseeing the contract of WKTS. No additional staff and other recurrent costs will be required.

### PUBLIC CONSULTATION

18. On 3 November 2005, we consulted the Environment and Food Committee of the Sham Shui Po District Council on the project. Members had no objection to the proposed project.

19. We have also informed all the GTW collectors registered with the EPD of our plan to replace the interim facility in Tuen Mun by a permanent facility located in the WKTS at Sham Shui Po. They did not express objection to the proposal.

20. On 23 January 2006, we consulted the Legislative Council Panel on Environmental Affairs on the proposal. Members supported the proposal, and requested more information on the possible sale of the recovered oil and grease, the need to charge for the use of the GTWTF, the mandatory requirement for waste producers to deliver GTW to the GTWTF and the need for an additional facility. The supplementary information was circulated to the Panel on 7 February 2006.

### ENVIRONMENTAL IMPLICATIONS

21. The proposed GTWTF constitutes a material change to an exempted project (i.e. the WKTS). It requires an environmental permit under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) for the construction and operation of the GTWTF. Having regard to the project profile, the Director of Environmental Protection is satisfied that the impact of the project and the mitigation measures meet the requirements of the Technical Memorandum on EIA Process. The permission to apply directly for an environmental permit was granted on 9 January 2006 with conditions. We shall implement the environmental mitigation measures set out in the project profile and as required by the Director of Environmental Protection. We have included in the project estimate \$2.4 million in September 2005 prices for implementation of the environmental mitigation measures.

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22. During the design and construction stages, we will require the contractor to appoint an independent assessor, with Government's agreement, to ensure that the facility complies with the contract requirements. During the contract period, we will withhold payment to the contractor if there is any non-compliance with the required environmental standards. In addition, we will control dust, noise and site run-off nuisance during construction to within established standards and guidelines through the implementation of mitigation measures in the relevant works contract.

23. We will require the contractor to consider measures in the planning and design stages to reduce the generation of construction and demolition (C&D) materials where possible. In addition, we will require the contractor to reuse inert C&D materials in other suitable construction sites as far as possible, in order to minimise the disposal of inert C&D materials at public fill reception facilities. We will encourage the contractor to maximise the use of recycled or recyclable C&D materials, 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 a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of public fill, C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively through a trip-ticket system. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

25. We estimate that the project will generate about 570 tonnes of C&D materials. Of these, we will deliver 285 tonnes (50%) to public fill reception facilities<sup>1</sup> for subsequent reuse, and 57 tonnes (10%) to sorting facilities in order to retrieve the inert portion for reuse as public fill. In addition, we will dispose of 228 tonnes (40%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites, together with the cost for handling

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<sup>1</sup> Sorting facilities and public fill reception facilities are specified in Schedule 3 and Schedule 4 respectively of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of public fill in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

the materials at sorting facilities is estimated to be \$41,895 for this project (based on an unit cost of 27/tonne for disposal at public fill reception facilities, \$100/tonne at sorting facilities and \$125/tonne<sup>2</sup> at landfills).

26. This project will also bring about additional environmental benefits as the new facility is designed to recover oil and grease which has a high calorific value for beneficial reuse such as industrial fuel to replace fossil fuel. Moreover, since the new GTWTF is located in the urban area, it will not be necessary for GTW collectors to transport GTW all the way from the urban areas to Tuen Mun for disposal and thus the road traffic associated with the transportation of GTW will be reduced. We estimate that 90% of the collection journeys will be significantly shorter as a result of the relocation of the GTWTF. Air pollutants emitted by GTW collection vehicles will also be reduced because of the shorter haulage distance.

#### LAND ACQUISITION

27. The project does not require any land acquisition.

#### **BACKGROUND INFORMATION**

28. Grease traps are installed at restaurants and food processing establishments to separate cooking oils and animal fats from sewage flow because oil and grease will clog sewers and affect the treatment processes of government sewage treatment plants. The oil and grease intercepted has to be removed regularly to ensure the proper functioning of the grease traps. Currently, 71 collectors are registered with the EPD for the collection of GTW. The waste collected has a high water content (over 90%), as well as some oil and grease and other food debris.

29. We included **167DR** in Category B in January 2005.

30. The proposed works will not involve any tree removal and/or planting proposals.

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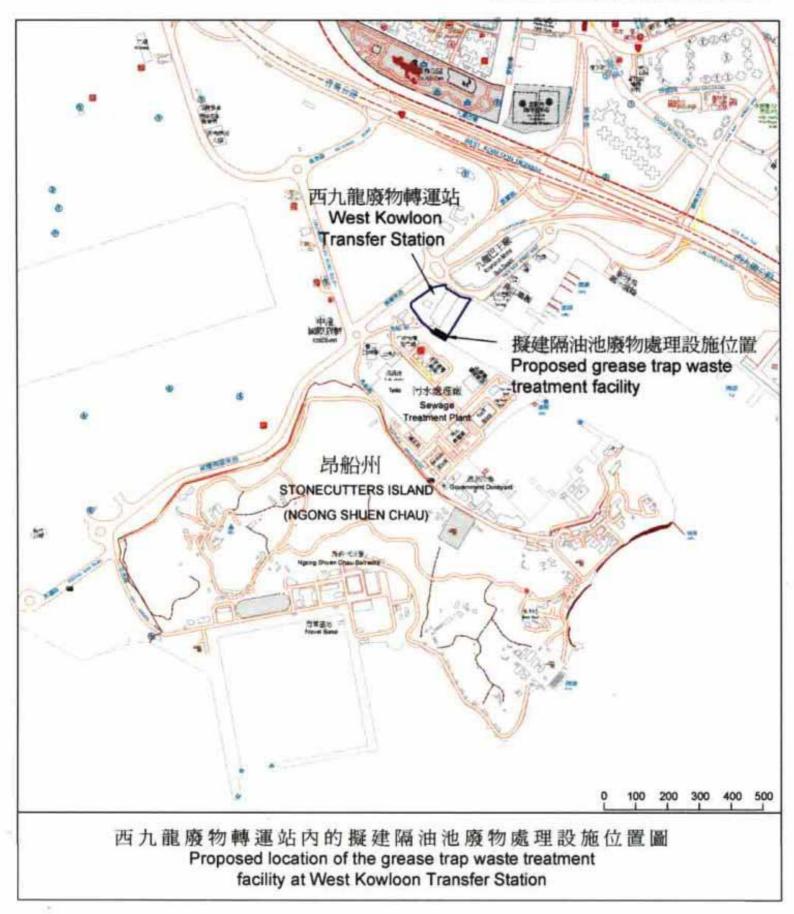
<sup>&</sup>lt;sup>2</sup> This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m<sup>3</sup>), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

31. We estimate that the proposed project will create 98 jobs (8 professional/technical staff and 90 labourers), totalling 980 man-months during the design and build stage, and will provide 7 jobs (7 labourers) during the operation stage.

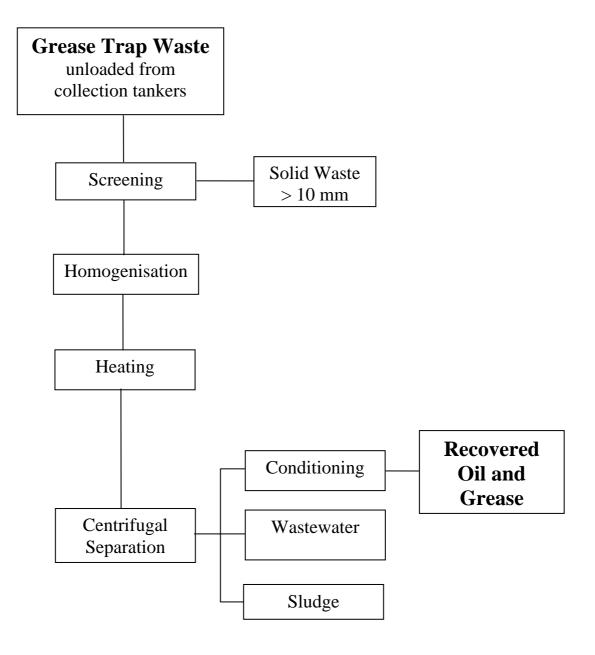
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Environment, Transport and Works Bureau February 2006

## Enclosure 1 to PWSC(2005-06)50



# RECOVERY OF OIL AND GREASE AT THE PROPOSED GREASE TRAP WASTE TREATMENT FACILITY



(Note : For the current intake of GTW of 400 tonnes per day, about 15 tonnes per day of concentrated oil and grease will be recovered. The balance is mostly water.)