

ITEM FOR FINANCE COMMITTEE

**CAPITAL WORKS RESERVE FUND
HEAD 705 – CIVIL ENGINEERING
Environmental Protection – Refuse Disposal
172DR – Organic waste treatment facilities phase 1**

Members are invited to approve the upgrading of **172DR** to Category A at an estimated cost of \$1,589.2 million in money-of-the-day prices for the design and construction of the organic waste treatment facilities phase 1.

PROBLEM

We need to re-submit the funding proposal of **172DR** (with necessary revisions after the last Finance Committee (FC) discussion on 11 July 2014) regarding the organic waste treatment facilities (OWTF) phase 1 project for consideration by FC.

PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, proposes to upgrade **172DR** to Category A at an estimated cost of \$1,589.2 million in money-of-the-day (MOD) prices (as detailed in the updated submission at Enclosure 1) for the design and construction of the OWTF phase 1 project.

Encl. 1

JUSTIFICATION

3. On 8 April 2014, the Public Works Subcommittee (PWSC) recommended that **172DR** be upgraded to Category A at an estimated cost

/of

Encl. 2

of \$1,532.8 million in MOD prices for the design and construction of the OWTF phase 1 vide PWSC(2014-15)1. At the FC meeting on 11 July 2014, when considering the PWSC recommendation, a motion to adjourn the discussion of the project was passed. Members' main concern was the cost comparison between the ballpark cost estimate of an initial idea from the private sector and the estimated cost of OWTF phase 1. Our response dated 26 September 2014 is at Enclosure 2.

4. The project scope of **172DR** to be upgraded as specified in PWSC(2014-15)1 remains unchanged. However, due to the lapse of time, we need to make the following necessary revisions –

- (a) adjusting the project cost estimate to \$1,589.2 million in MOD prices due to changes in price level (from September 2013 to September 2014) and cash flow requirements;
- (b) updating the deferred programme of the project; and
- (c) adjusting the estimates for consultants' fees and resident site staff costs based on latest estimations.

The paper at the Enclosure 1 has incorporated the above revisions. The revisions are shaded in grey for easy reference.

5. The tender validity period of OWTF phase 1, originally ended in July 2014, was extended to January 2015. If the project cannot be upgraded to Category A by end 2014, it may necessitate a re-tendering exercise, causing further cost increase and programme delay. Hence, we need to re-submit the funding proposal of **172DR** for FC's consideration as a matter of priority.

FINANCIAL IMPLICATIONS

6. We estimate the capital cost of the proposed works would be revised to \$1,589.2 million in MOD prices. The estimated annual recurrent expenditure arising from the proposed works remains to be about \$72.4 million.

Environment Bureau
October 2014

HEAD 705 – CIVIL ENGINEERING
Environmental Protection – Refuse Disposal
172DR – Organic waste treatment facilities phase 1

Members are invited to recommend to the Finance Committee the upgrading of **172DR** to Category A at an estimated cost of \$1,589.2 million in money-of-the-day prices for the design and construction of the organic waste treatment facilities phase 1.

PROBLEM

The current practice of disposing of food waste at landfills is neither sustainable nor environmentally desirable. We need to develop modern facilities to recycle source separated food waste.

PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, proposes to upgrade **172DR** to Category A at an estimated cost of \$1,589.2 million in money-of-the-day (MOD) prices for the design and construction of the organic waste treatment facilities (OWTF) phase 1.

PROJECT SCOPE AND NATURE

3. The project site is located at Siu Ho Wan in North Lantau and occupies an area of approximately 2.2 hectares. The proposed scope of works under **172DR** comprises –

- (a) design and construction of OWTF phase 1 with a capacity of 200 tonnes per day;
- (b) design and construction of associated architectural, building, civil and landscape works;
- (c) design and construction of heat recovery, power generation and surplus electricity export facilities; and

/(d)

- (d) provision of pollution control and environmental monitoring facilities.

— A plan showing the location of the OWTF phase 1 and a conceptual layout plan showing the proposed works are at Annex A and B respectively.

4. Subject to the funding approval of the Finance Committee (FC), we plan to commence the proposed works in January 2015 and commission the OWTF phase 1 in mid-2017.

JUSTIFICATION

5. Among the some 9 300 tonnes of municipal solid waste disposed of at landfills every day, about 3 337 tonnes (36%) are food waste, of which some 809 tonnes are generated from commercial and industrial (C&I) sources such as restaurants, hotels, wet markets, food production and processing industries. In recent years, the amount of food waste arising from the C&I sectors has increased steadily. The amount generated in 2012 was more than twice than that in 2002.

6. The current practice of disposing of biodegradable food waste at landfills is not sustainable and is environmentally undesirable as it depletes the limited landfill space, generates leachate and greenhouse gas that require further mitigation measures to deal with and squanders the useful organic contents.

7. The Government has adopted a multi-pronged approach to tackle Hong Kong's food waste problem, with main focus on avoidance of food waste generation and reduction at source. In "Hong Kong : Blueprint for Sustainable Use of Resources 2013-2022" (the Blueprint) unveiled by us in May 2013, the Administration maps out a comprehensive strategy, targets, policies and action plans for waste management for the coming 10 years with a view to tackling the waste crisis in Hong Kong. In February 2014, we unveiled "A Food Waste & Yard Waste Plan for Hong Kong 2014-2022" (the Plan), which is a companion document to the Blueprint that maps out a comprehensive strategy, targets, policies and action plans for the management of food waste and yard waste in the coming years. The Plan outlines the Administration's target of reducing food waste disposal to landfills by 40% in 2022 and maps out four strategies to tackle food waste, namely reduction at source, reuse and donation, recyclable collection, and turning food waste into energy. OWTF phase 1 is a key project under the Plan.

8. Over the past years, the Government has initiated and supported various programmes and educational campaigns to promote food waste reduction, source separation and recycling in different sectors and districts. Some of our recent actions include community food waste reduction and recycling projects supported by the Environment and Conservation Fund, the Food Waste Recycling Partnership Scheme, the Food Waste Recycling Projects in Housing Estates and the District Food Waste Reduction Programmes.

9. To further strengthen the promotion of food waste reduction, the Government has set up the Food Wise Hong Kong Steering Committee chaired by the Secretary for the Environment in December 2012 to implement the Food Wise Hong Kong Campaign. It is a territory-wide food waste reduction campaign that aims to galvanise the community, from individuals to households to C&I operators, to avoid and reduce food waste.

10. Notwithstanding the efforts for food waste avoidance and reduction, suitable and adequate food waste treatment and recycling facilities are necessary to treat and recycle food waste that cannot be avoided. In light of the fact that Hong Kong generates a very large amount of food waste each day, and that food waste in general decomposes quickly and is not suitable for compaction at refuse transfer stations for long-haul transport, the most suitable method to recycle food waste is to create a network of recycling plants. This approach enables food waste to be transported quickly from population centres to the facilities that are not too far away thereby reducing potential nuisance. We have set out in the Plan that Hong Kong, among other things, needs to build a network of around five to six OWTFs with a total recycling capacity of about 1 300 to 1 500 tonnes per day. This network is essential for achieving the target of reduction.

11. Given its substantial amount of food waste generation and better space provisions, food waste from the C&I establishments is the priority in our planning for promoting source separation, collection and treatment. Since 2010, we have launched a trial scheme with participation of over 120 restaurants and food producing enterprises to gain experience in food waste separation and collection for recycling in a pilot composting plant in Kowloon Bay. With the experience, guidelines on food waste avoidance, separation and collection for C&I establishments have been prepared and promulgated to the industries. The OWTF phase 1 with a design capacity of 200 tonnes per day is planned to receive and treat source separated food waste from the C&I sectors.

12. We have reviewed many types of technology for treating food waste to assess their suitability for Hong Kong. To meet Hong Kong's need for energy, our policy is to treat the city's collected food waste to produce energy using

/anaerobic

anaerobic digestion as the core technology. The OWTF phase 1 will adopt anaerobic digestion¹ and composting technologies to recycle food waste into biogas² and about 7 000 tonnes of compost³ each year.

13. The biogas will be used to generate electricity and apart from the internal use of OWTF phase 1, we estimate that about 14 million kWh of surplus electricity, which is equivalent to the power consumption by some 3 000 households, can be exported each year⁴. The decrease in use of fossil fuel for electricity generation together with the reduced amount of organic waste landfilled would prevent the emission of some 25 000 tonnes of greenhouse gas each year.

14. The diversion of some 73 000 tonnes of food waste from landfills per year could save up to \$13.9 million of landfill disposal cost⁵ each year.

FINANCIAL IMPLICATIONS

15. We estimate the capital cost of the proposed works to be \$1,589.2 million in MOD prices⁶ (please see paragraph 16 below), broken down as follows –

/\$ million

¹ Anaerobic digestion is a series of processes in which microorganisms break down biodegradable material in the absence of oxygen.

² Biogas is a renewable energy and can be used to generate electricity and heat energy, or as a natural gas substitute.

³ Compost is organic matter that has been decomposed and recycled as fertilizer or soil amendment.

⁴ We plan to export part of the surplus electricity to the nearby government facilities and part to the existing power grid. We have studied and confirmed the technical feasibility and cost-effectiveness of electricity export in the feasibility study. We have also explored with a power company the viability of connecting OWTF phase 1 to the existing grid and found it feasible for the Government to pursue this matter further.

⁵ This estimate is based on an estimated average unit cost of \$191 per tonne for disposal at landfills in 2013-14, which has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required, but does not include the land opportunity cost for existing landfill sites, nor the cost to provide new landfills when the existing ones are filled.

⁶ Compared to the initial project estimate shown in the paper for Panel on Environmental Affairs in 2010, the latest project estimate is based on the recent open and competitive tender initiated in 2013 and has reflected the latest market price for the construction of this facility under the current market conditions including price increase and the more exact requirements identified in the feasibility study completed in 2011 for reliable and effective operation of this new facility which is the first of its kind in Hong Kong. The initial estimate at \$489 million was an indicative figure based on an initial broad-brush scheme, comprising provision for basic plant and equipment for anaerobic digestion and composting (estimated at \$250 million) and basic civil engineering and building works (estimated at \$239 million).

	\$ million
(a) Site formation, geotechnical, drainage and civil works	138.6
(b) Architectural, building and landscape works	473.0
(c) Organic waste treatment facilities	348.9
(i) Waste receiving system ⁷	93.1
(ii) Pre-treatment system ⁸	56.2
(iii) Anaerobic digestion system ⁹	67.9
(iv) Composting system ¹⁰	24.3
(v) Biogas cleaning and storage system ¹¹	24.4
(vi) Associated electrical, control and instrument installations	83.0
(d) Ancillary works and facilities ¹²	66.1
(e) Waste water treatment system	50.7

/(f)

⁷ Item (c)(i) is for the design, construction and installation of the food waste receiving system. The works involve the provision of waste reception, monitoring, measurement, storage and feeding, and vehicle registration and washing facilities.

⁸ Item (c)(ii) is for the design, construction and installation of the food waste pre-treatment system. The works involve the provision of conveying, screening and grit removal, metal separation, shredding, crushing and mixing equipment.

⁹ Item (c)(iii) is for the design, construction and installation of the anaerobic digestion system. The works involve the provision of anaerobic digesters, dewatering system, pressure relief safety device, biogas sampling facilities, pumps and pipe-works.

¹⁰ Item (c)(iv) is for the design, construction and installation of the composting system. The works involve the provision of mixing drums, composting tunnels, maturation area, final screen, and storage and bagging facilities.

¹¹ Item (c)(v) is for the design, construction and installation of the biogas cleaning and storage system. The works involve the provision of biogas cleaning facilities, biogas storage tanks and standby flaring gas units.

¹² Item (d) is for the design and construction of ancillary works and facilities. The works involve the provision of temporary office and site accommodation, temporary roads, maintenance workshop and utility yard during construction.

		\$ million	
(f)	Heat recovery, power generation and surplus electricity export systems	105.3	
(g)	Pollution control and environmental monitoring facilities	43.9	
(h)	Mitigation measures and environmental monitoring and audit (EM&A) for construction works	12.8	
(i)	Consultants' fees for	25.5	
	(i) contract administration	20.6	
	(ii) management of resident site staff	2.4	
	(iii) operational performance reviews	2.5	
(j)	Remuneration of resident site staff	17.7	
(k)	Contingencies	128.0	
	Sub-total	1,410.5	(in September 2014 prices)
(l)	Provision for price adjustment	178.7	
	Total	1,589.2	(in MOD prices)

We propose to engage consultants to undertake contract administration for the proposed works, and carry out operational performance reviews for 12 months upon completion of the construction. A detailed breakdown of the estimates for consultants' fees and resident site staff costs by man-months is at [Annex C](#).

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

Year	\$ million (Sept 2014)	Price adjustment factor	\$ million (MOD)
2014 – 2015	15.0	1.00000	15.0
2015 – 2016	569.0	1.06000	603.1

/2016 – 2017

Year	\$ million (Sept 2014)	Price adjustment factor	\$ million (MOD)
2016 – 2017	412.0	1.12360	462.9
2017 – 2018	211.0	1.19102	251.3
2018 – 2019	203.5	1.26248	256.9
	1,410.5		1,589.2

17. We have derived the MOD estimates 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 2014 to 2019. We plan to implement the proposed works and the follow-on operation of the OWTF phase 1 under a Design-Build-and-Operate (DBO) contract arrangement. The capital cost of \$1,589.2 million will cover the design and build elements of the contract while the operation will be funded under the General Revenue Account. The contractual operation period will be 15 years. The DBO contract will provide for price adjustments for the entire contract period including the operation period.

18. We estimate that the annual recurrent expenditure arising from the proposed works to be about \$72.4 million. The fees and charges implication arising from the project will be considered in the context of waste charging discussion.

PUBLIC CONSULTATION

19. The OWTF phase 1 site straddles two District Councils, the Tsuen Wan District Council (TWDC) and the Islands District Council (IsDC). We consulted the TWDC on 26 January 2010 and the IsDC on 8 February 2010 on the findings of the Environmental Impact Assessment (EIA) study for OWTF phase 1. In response to the concern expressed by a few IsDC members on road safety issues, we explained that we had assessed the cumulative traffic impact on the local road network and concluded that the additional traffic caused by the proposed project would be insignificant. The two District Councils supported the proposal.

20. We consulted the Legislative Council Panel on Environmental Affairs (the Panel) on 22 November 2010 on the project. Members raised no objection to the proposed OWTF phase 1. We consulted the Panel on the project cost estimate on 13 March 2014. The Panel raised no objection to the submission of the funding proposal to the Public Works Subcommittee by the Administration. Supplementary information, including an indicative breakdown of the initial cost estimate presented to the Panel in 2010, power generation estimate, and the estimated recurrent expenditure, was provided to the Panel on 21 March 2014.

ENVIRONMENTAL IMPLICATIONS

21. **172DR** is a designated project under the EIA Ordinance and an environmental permit (EP) is required for its construction and operation. The EIA report was approved under the EIA Ordinance on 24 February 2010. The EIA report concluded that, with the implementation of the recommended mitigation measures, the project would comply with the established standards stipulated under the EIA Ordinance. The Director of Environmental Protection issued the EP for the project on 21 June 2010 and amended the EP on 18 March and 21 May 2013 to incorporate site boundary and layout changes. We estimate the cost of implementing the environmental mitigation measures including EM&A for construction works to be \$12.8 million. We have included this cost in the overall project estimate.

22. During construction, we will control noise, dust and site run-off to levels within established standards and guidelines through the implementation of mitigation measures such as the use of quiet construction plant to reduce noise generation, water-spraying to reduce dust emission and proper pre-treatment of site run-off. We will also carry out close site inspections to ensure that these recommended mitigation measures and good site practices are properly implemented.

23. At the design and construction stage, we will require the contractor to take measures such as adopting foundation design with minimum excavation to reduce the generation of construction waste where possible. 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 minimize the disposal of inert construction waste to public fill reception facilities¹³. In addition, we will encourage the contractor to maximize the use of

/recycled/recyclable

¹³ 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 license issued by the Director of Civil Engineering and Development.

recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce 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.

25. To minimize the risk to construction workers and operational staff of the OWTF phase 1 due to the transport, storage and use of chlorine associated with the operation of the Siu Ho Wan Water Treatment Works (SHWWTW) in the vicinity of the site, we will require the contractor to construct and maintain, during the construction and operation of the project, a solid fence of three metres high along the boundary facing the SHWWTW as shown in Annex B.

26. We estimate that the project will generate in total about 16 200 tonnes of construction waste. Of these, we will reuse about 2 600 tonnes (16%) of inert construction waste on site and deliver 12 000 tonnes (74%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 1 600 tonnes (10%) 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 \$524,000 for this project (based on a unit charge rate of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne at landfills as stipulated in the Waste Disposal (Charge for Disposal of Construction Waste) Regulation).

HERITAGE IMPLICATIONS

27. The proposed project 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

LAND ACQUISITION

28. The project does not require any land acquisition.

BACKGROUND

29. The “Policy Framework for the Management of Municipal Solid Waste (2005-2014)” published by the EPD in 2005 proposed that biodegradable materials such as food waste from C&I establishments could be separated at source for biological treatment to produce renewable energy and compost products.

30. In the 2009 Policy Address, the Government announced the intention to develop recycling facilities to process and recycle food waste generated by the C&I sectors. In the 2014 Policy Address, the Government reaffirmed the pledge to provide modern facilities in stages to convert organic waste into energy and other useful products.

31. To prepare for the development of large-scale modern OWTF, we engaged consultants in June 2006 to develop and operate a pilot composting plant in Kowloon Bay to assess the feasibility of and acquire local experience on biological treatment and recycling of source separated biodegradable waste collected from C&I establishments. The total cost of the pilot study is about \$13.61 million. We charged this amount to block allocation **Subhead 5101DX** “Environmental works, studies and investigations for items in Category D of the Public Works Programme”.

32. In August 2008, we engaged consultants to carry out the feasibility study, environmental impact assessment and tendering exercise for the project. The total estimated cost is about \$13.62 million. We charged this amount to block allocation **Subhead 5101DX** “Environmental works, studies and investigations for items in Category D of the Public Works Programme”.

33. We upgraded **172DR** to Category B in September 2007. We obtained the approval of the Secretary for the Environment in August 2010 to initiate parallel tendering before fund was secured for the project.

/34.

34. With the recommendation of the Public Works Subcommittee, we sought FC's funding approval for **172DR** at an estimated cost of \$1,532.8 million in MOD prices. On 11 July 2014, FC passed a motion to adjourn the discussion of **172DR**. The tender validity period of OWTF phase 1, originally ended in July 2014, was extended to January 2015. If the project cannot be upgraded to Category A by end 2014, it may necessitate a re-tendering exercise, causing further cost increase and programme delay. Hence, we need to re-submit the funding proposal of **172DR** for FC's consideration as a matter of priority.

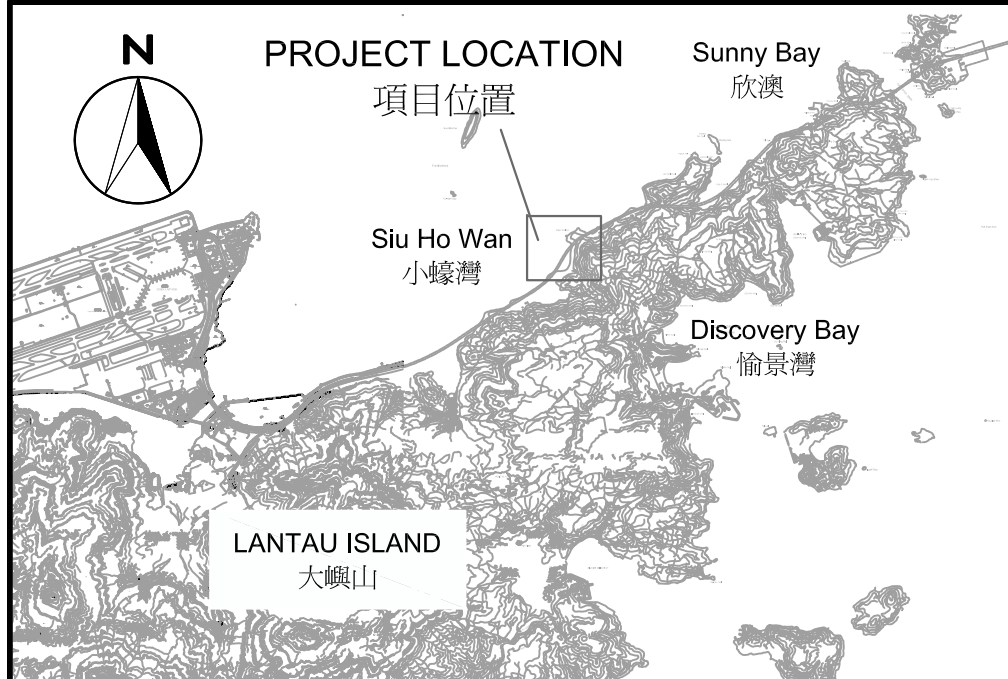
35. Of the 15 trees within the project boundary, three trees will be preserved. The proposed project will involve the removal of 12 trees, including 11 trees to be felled and one tree to be replanted within the project site (subject to finalization of design). All trees to be removed are not important trees¹⁴. We will require the contractor to incorporate planting proposals as part of the project.

36. We estimate that the design and construction of the proposed works will create about 595 jobs (514 for labourers and another 81 for professional/technical staff) providing a total employment of 10 830 man-months. In addition, we estimate that the operation of the OWTF phase 1 will create 62 permanent jobs (32 labourers and another 30 professional/ technical staff).

Environment Bureau
October 2014

¹⁴ An "important tree" refers 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 over 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or even;
- (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 metre (m) (measured at 1.3 m above ground level), or with height/ canopy spread equal or exceeding 25 m.



KEY PLAN
1:1000000

北大嶼山廢物轉運站
NORTH LANTAU
REFUSE TRANSFER
STATION

巴士車廠
BUS DEPOTS

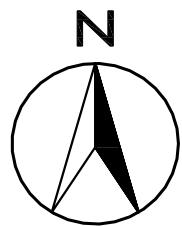
擬建的有機資源回收中心第1期
PROPOSED ORGANIC
WASTE TREATMENT
FACILITIES PHASE 1

小蠔灣濾水廠
SIU HO WAN WATER
TREATMENT WORKS

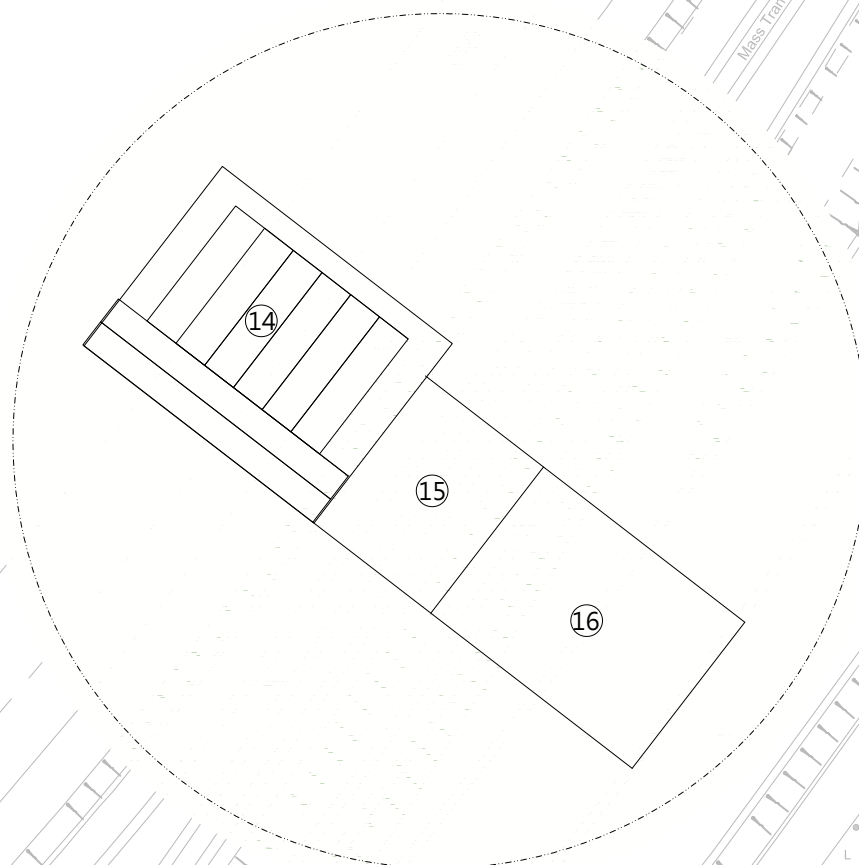
小蠔灣污水處理廠
SIU HO WAN SEWAGE
TREATMENT WORKS

北大嶼山公路
NORTH LANTAU HIGHWAY

819400 N

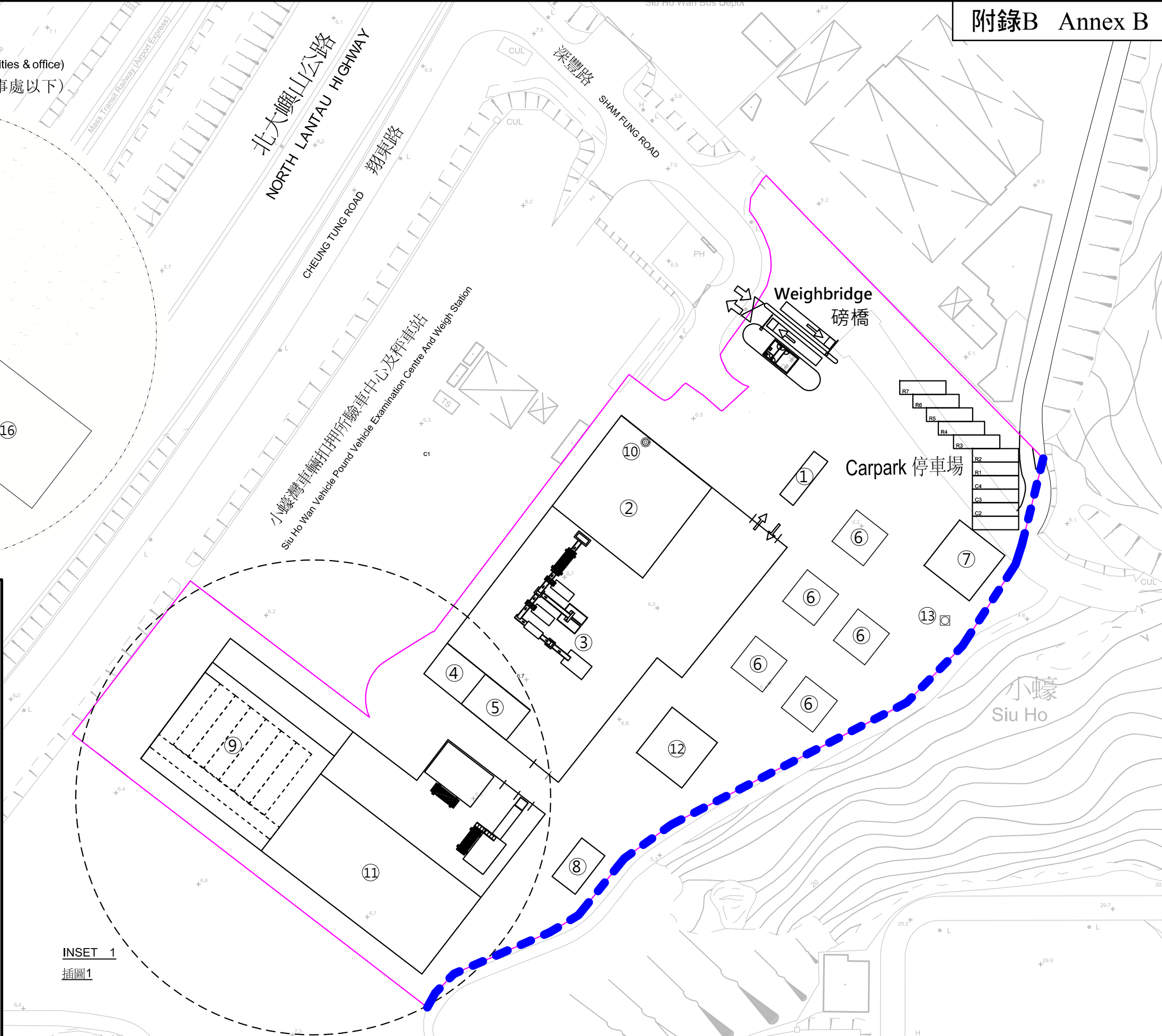


INSET 1 - Ground Floor (under the air pollution control facilities & office)
 插圖1 - 地下(位於空氣污染控制設施與辦事處以下)



Legend

- Site Boundary 工地範圍
- - - Proposed 3m height solid fence 擬建的3米高實心欄
- ⊗ Site Access 出入口
- 1) Vehicle Washing Facilities 廢物車輛清洗設施
- 2) Waste Reception Area 廢物接收區
- 3) Pretreatment Units 預處理設施
- 4) Workshop 工場
- 5) Dewatering Facilities 脫水設施
- 6) Anaerobic Digesters 厭氧分解缸
- 7) Combined Heat & Power Generators 熱電聯產系統
- 8) Wastewater Treatment System 污水處理系統
- 9) Office 辦事處
- 10) Stack 煙囪
- 11) Air Pollution Control Facilities 空氣污染控制設施
- 12) Gas Buffer Tank 生物氣暫存缸
- 13) Emergency Flare 應急生物氣燃燒設備
- 14) Tunnel Composting Area 堆肥區
- 15) Maturation Area 熟化區
- 16) Compost Storage 堆肥產品儲存倉



INSET 1
 插圖1

172DR – Organic waste treatment facilities phase 1

Breakdown of the estimates for consultants' fees and resident site staff costs
(in September 2014 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	116	38	2.0	16.6
		Technical	82	14	2.0	4.0
					Sub-total	20.6
(b)	Resident site staff costs (Note 3)	Professional	142	38	1.6	16.2
		Technical	100	14	1.6	3.9
					Sub-total	20.1
Comprising –						
(i)	Consultants' fees for management of resident site staff					2.4
(ii)	Remuneration of resident site staff					17.7
(c)	Consultants' fees for operational performance reviews (Note 2)	Professional	14	38	2.0	2.0
		Technical	10	14	2.0	0.5
					Sub-total	2.5
Total						43.2

* MPS = Master Pay Scale

Notes

- (a) A multiplier of 2.0 is applied to the average MPS point to arrive at the full staff costs, including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultants. (Subject to approval of the Finance Committee, MPS point 38 = \$71,385 per month and MPS point 14 = \$24,380 per month.)
- (b) The actual man-months and actual fees will only be known after the selection of consultants through the usual competitive lump sum fee bidding system.
- (c) The actual man-months and actual costs will only be known after completion of the construction works.
-

本署檔案
OUR REF: EP165/08/231/1
來函檔案
YOUR REF: ---
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Central Government Offices,
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香港添馬
添美道二號
政府總部東翼
十五及十六樓

26 September 2014

Clerk to Finance Committee
Legislative Council Secretariat
Legislative Council Complex
1 Legislative Council Road
Central
Hong Kong
(Attn: Mr. Andy LAU)

Dear Mr. LAU,

Legislative Council Finance Committee
Follow-up to meeting on 11 July 2014
5172DR – Organic waste treatment facilities phase 1

At the FC meeting held on 11 July 2014, Members raised concern about the cost of the organic waste treatment facilities phase 1 project and other related food waste treatment issues. We now submit supplementary information at the **Annex** in response to Members' concerns. Grateful if you could circulate it to Members for their reference.

Yours sincerely,

(Elvis W KAU)
Assistant Director
for Director of Environmental Protection

Encl.

c.c. Secretary for Financial Services and the Treasury (Attn: Ms. Jasmine S Y CHOI)
(Fax: 2147 5240)

**Meeting of Finance Committee held on 11 July 2014
Supplementary Information**

5172DR – Organic waste treatment facilities phase 1

Purpose

At the Finance Committee meeting on 11 July 2014, Members discussed the proposed organic waste treatment facilities (OWTF) phase 1 (PWSC(2014-15)1. This paper provides the supplementary information on cost issues raised by the Members. In addition, the Administration's responses to other related food waste treatment issues are given in the **Appendix**.

Could the Government explain why the construction of OWTF phase 1 costs \$1,500M, while it was said only \$300M would be needed for a private sector proposal?

2. The Environment Bureau noted an idea from a private company that it could make use of a piece of Government land of about 8,000 m² adjacent to Tai Po Industrial Estate for the private company to develop a food waste treatment plant to recycle 200 tonnes of food waste per day into biogas (see also paragraph 5 about the estimation of treatment capacity,). According to the information provided by the concerned party, the estimated construction cost was around \$300 million.

3. The Environment Bureau and the Environmental Protection Department had met with the proponent to learn about the details of the idea. We understand from the meeting that the private company has initially explored the viability of setting up such a treatment facility at the Tai Po Government site. Nonetheless, the private company indicated that the idea could similarly be pursued at other available sites of suitable size that are connected or close to the existing gas pipes. At present, given that the idea is at the preliminary and conceptual stage, no detailed feasibility studies or environmental impact studies have been conducted for the Tai Po Government site or any other sites. While a ballpark construction cost figure of around \$300 million was estimated some years ago for some key treatment

components including waste reception facilities, pre-treatment facilities, anaerobic digestion facilities, and biogas cleaning and storage system, etc, the ballpark estimate has not included the cost for other supporting facilities such as geotechnical engineering works, wastewater treatment, environmental and pollution control systems, digestate treatment facilities (i.e. composting facilities that convert digestate to compost products in the OWTF design), equipment for complying with fire services and safety requirements, environmental mitigation measures for construction works, and other ancillary facilities (eg. for waste handling/vehicle washing, office buildings etc). After anaerobic digestion, the digestate would have to be disposed of at landfills. In addition, the ballpark figure has not made provision for the possible demolition and re-provisioning of the existing Government facilities at the proposed Tai Po site. Up to this stage, no cost breakdown is available from the private company for more detailed evaluation.

4. The OWTF phase 1 project, which is now awaiting approval of the Finance Committee, has undergone detailed planning procedures and has been endorsed by the Legislative Council Panel on Environmental Affairs and the Public Works Subcommittee. Siu Ho Wan was confirmed to be the site for OWTF Phase 1. The current project estimate is based on the returned tender prices of an open tendering exercise to reflect the latest market price for the construction of this facility. Given that this project and the above mentioned conceptual idea by a private company are at different planning stages and that there are differences in project details and cost estimation basis (including the site location and area, treatment process, residual wastes treatment, ancillary facilities and treatment capacity, etc), both the private company and we consider that it would not be appropriate to directly compare the ballpark figure with the current project estimate of OWTF phase 1. Nonetheless, we have analyzed and presented in the following paragraphs several key differences between OWTF Phase 1 and the private sector proposal.

Site Location and Treatment Capacity

5. The proposed OWTF phase 1 has a treatment capacity of 200 tonnes per day and is located at Siu Ho Wan in North Lantau with a site area of approximately 2.2 hectares, while the private sector proposal is to build a food waste treatment plant at a Government site of about 8,000 m² at the Drainage Services Department's existing leachate pre-treatment plant serving the restored Shuen Wan Landfill adjacent to the Tai Po Industrial Estate. This

site is still required for pre-treatment of the leachate. Our initial assessment shows that only part of the Tai Po site (about 2,000 m²) could be vacated, which would only be adequate for accommodating an anaerobic treatment facility with a capacity of about 30 to 90 tonnes per day.

Treatment Process

6. There is only one food waste treatment process in the private proposal, i.e. anaerobic digestion, and the digestate, which amounts to 10% of the food waste treated, has to be disposed of at landfills. In contrast, there are two food waste treatment processes in the OWTF's design, i.e. anaerobic digestion process and a composting process to convert digestate to compost products. All anaerobic digestate would be transformed into stable and useful compost products and therefore it will not put extra pressure on landfills.

Anaerobic Digestion System Cost Estimate

7. In the private proposal, it is composed mainly of a waste receiving system, a pretreatment system, anaerobic digestion system and a biogas cleaning and storage system, and the concerned party indicated that the total investment estimated some years ago was about \$300 million. These systems are also included in OWTF phase 1 and the total cost for these items is estimated at \$241.6M in September 2014 prices, including waste receiving system (\$93.1M), pre-treatment system (\$56.2M), anaerobic digestion system (\$67.9M), and biogas cleaning and storage system (\$24.4M).

How much is the total investment in the next 20 years? Is it considered expensive to spend \$1,500M on an organic waste treatment facility with a treatment capacity of 200 tonnes per day?

8. We estimate that the annual recurrent expenditure arising from the proposed OWTF phase 1 to be about \$72.4 million, equivalent to about \$992 per tonne of repair, maintenance and operation costs comprising (i) waste receiving, pre-treatment, anaerobic digestion, biogas cleaning and storage systems (about \$546 per tonne); (ii) composting system (about 109 per tonne); (iii) power generation and surplus electricity export systems (about \$99 per tonne); and (iv) fire services, environmental and pollution control systems (about \$238 per tonne). It should be noted that under the OWTF phase 1 contract, the contractor shall have the obligation to repair, renew, replace the major systems during the operation period and ensure the major systems to

have a residual service life of at least 5 years at the expiry of the operation period of 15 years. The cost of such repair, renewal and replacement is included in the operation cost of OWTF phase 1. In the private proposal, it is mainly composed of a waste receiving system, a pretreatment system, anaerobic digestion system and a biogas cleaning and storage system. We have not received the detailed operation cost breakdown of the private sector proposal. Nevertheless, according to the information provided, the estimated operation cost of these systems for OWTF phase 1 is about \$546 per tonne.

Is the design and development of OWTF phase 1 cost-effective?

Choice of Technology

9. The choice of treatment technology was thoroughly studied in the feasibility study. The study has confirmed that the recommended treatment technologies, i.e. anaerobic digestion and composting, are justified on the grounds that it is in line with latest international practices, and is consistent with the policy of sustainable use of resources, maximization of energy and material recovery, and minimization of landfilling as stipulated in the “Hong Kong: Blueprint for Sustainable Use of Resources 2013-2022”. Anaerobic digestion and composting can turn food waste, which is a source of renewable energy, into energy and good quality compost, reduce landfilling, and reduce greenhouse gas emission. The OWTF phase 1 proposal has been endorsed by the relevant District Councils, the Legislative Council Panel on Environmental Affairs and the Public Works Subcommittee. This project estimate is based on an open tender exercise through open and competitive bidding without prequalification, and hence the tender prices returned have already reflected the latest market prices for the construction of the proposed facility.

Private Public Participation

10. Hong Kong needs to build a network of OWTFs in order to meet the target of reducing food waste disposal at landfills by 40% by 2022. We envisage Hong Kong needs to build a network of around five to six OWTFs with a total recycling capacity of about 1,300-1,500 tonnes per day. Currently, there are individual private food waste treatment plants with relatively small treatment scale in Hong Kong. Recently, there is also a tenant in EcoPark who has invested in building a plant with an estimated initial treatment capacity of 100 tonnes per day to collect food waste treatment for recycling into fish

feed. The plant construction is near completion and the tenant indicates that preparation for operation is being arranged.

11. We welcome the private sector to participate in the development of further organic waste recycling and are willing to communicate with private companies on the details of their idea. For the above-mentioned idea concerning the Tai Po site, we have met with the private company and shared our preliminary analysis and views. We have also informed the private company and concerned party that if they have any further specific recommendations on the idea, we are willing to consider appropriate follow-up works in an open and proactive manner and examine them from the perspectives of public finance, the existing policy, the speeding up of food waste treatment and the alleviation of pressure on landfills, etc.

**Environment Bureau
Environmental Protection Department
September 2014**

**Other Questions Raised by the Members and
the Responses Provided by the Administration**

Does the Government have plan to implement comprehensive food waste separation and recycling, and how will the Government tackle the food waste problem at source? Given that only a limited amount of food waste could be treated at the OWTF phase 1, how many OWTF does the Government plan to build? How much food waste is expected to be treated? Will it result a mismatch between development and demand?

Comprehensive Food Waste Management Strategy

1. Approximately 9,000 tonnes of municipal solid waste (MSW) are thrown away at landfills every day, in which some 3,000 tonnes are food waste. The Environment Bureau in February 2014 unveiled "A Food Waste & Yard Waste Plan for Hong Kong 2014-2022" (the Plan), which analyses the current situation of food waste and yard waste in Hong Kong, and maps out a comprehensive strategy, targets, policies and action plans for the management of such waste in the coming years with a view to tackling the challenge faced in Hong Kong. The Plan outlines a target of reducing food waste disposal to landfills by 40% in 2022 in Hong Kong. The Government has mapped out four strategies as the backbone in order to face the challenge of food waste, namely reduction at source, refuse and donation, recyclable collection, and turning food waste into energy.

Avoid and Reduce Food Waste at Source

2. To promote public awareness of the food waste problem in Hong Kong and instill behavioural changes in various sectors of the community with a view to reducing food waste generation, the Environment Bureau set up the Food Wise Hong Kong Steering Committee in December 2012 to drive leadership in food waste avoidance and reduction. The Campaign was officially launched in May 2013. The campaign has a variety of activities and is designed to galvanize the community, from individuals to households to commercial and industrial (C&I) operators, to avoid and reduce food waste at source. There is sympathy within the community to avoid food waste. With strong and sustained public communication, and with the commitment of the C&I sector, we can make food waste avoidance a core Hong Kong value – that

is, it becomes a fundamental aspect of our lifestyle. By encouraging a new “Food Matters” culture, it can help Hong Kong’s catering and hospitality C&I sector, as well as the community as a whole, to innovate.

Support Food Donation

3. We have been encouraging the trade and business to donate surplus food to the needy through food bank or food donation programme, so as to provide them adequate food supply and balanced nutrition, also to reduce their financial burden. In this regard, the Government plays an active role, through the Social Welfare Department, to match the NGOs who participate in food waste recycling and the needy to ensure the resources could be fully utilized. We will strengthen our support of the work of NGOs to increase the collection of surplus food from the C&I sector, such as supermarkets, fresh food markets, restaurants, clubs and hotels. NGOs may consider applying for the Environment and Conservation Fund (ECF) to support food donation projects that could help reduce waste to landfill.

Implement Food Waste Collection and Delivery

4. We will commence a detailed consultancy study on the appropriate means, mechanism and mode of source-separated food waste collection and delivery in Hong Kong in 2015. We will develop a practical territory food waste collection and delivery plan to cope with the commissioning of OWTFs network. Our view is to take a similar approach of overseas examples (like South Korea) – get the wheel in motion on food separation and iron out the details step by step with the community first.

Food Waste Collection and Development of OWTFs

5. With reference to the experience from other cities, we estimate that about 50% of food waste could be source separated and collected for treatment. It will take some years before Hong Kong has the recycling capability to deal with approximately 50% of the city’s food waste. When public and C&I sectors actively participate in source separation but recycling capability could not be completely cope with, there could well be a mismatch between public expectation to participate in food waste separation schemes and the availability of treatment capacity. Before having adequate food waste recycling facilities, food waste has to be disposed of with other MSW. We will continue our educational activities on food waste reduction and recycling in community and housing estates, and lay a solid foundation for food waste separation at source.

In the short run the Government will continue to encourage members of the community to make behavioural changes and try their best to treasure and make good use of food resources to avoid food waste generation. The Government will also continue to support food waste recycling and relevant projects through the ECF as far as possible to encourage and educate members of the public to cultivate a habit of separating food waste. More importantly, such food waste recycling actions could raise public awareness on the quantity of food waste generated and demonstrate that there is room for food waste reduction at source, thereby encouraging people to treasure food.

Food Waste Recycling

6. The Government plans to develop more OWTFs in different districts for collecting and recycling source separated food waste. It is envisaged that Hong Kong needs to build a network of around five to six OWTFs with a total treatment capacity of 1,300 to 1,500 tonnes per day. OWTF phase 1 is expected to be commissioned in 2017 and the EIA study for OWTF phase 2 has been completed. The Government has also identified a suitable site for constructing OWTF phase 3 and the EIA study for the project will be taken forward shortly.

Will the Government subsidize private buildings or estates to install composting machine?

Funding Support to Estates for Installation of Composting Machine

7. Through the ECF, “Food Waste Recycling Projects in Housing Estates” was rolled out in July 2011 to subsidize installation and operation of on-site food waste treatment facilities at participating housing estates. Housing estates are encouraged to hold education and promotion programmes to engage resident’s active participation and raise their awareness of food waste recycling. The ECF has set aside \$50 million for this scheme and it is estimated that about 50 housing estates could participate in the scheme. The subsidized lease period is 24 months. As of August 2014, 39 of them have received funding under the ECF to install composters at the estates for source-separated food waste recycling. Education programmes organized by these estates would cover about 89,000 households, of which about 4,400 would participate in food waste source separation and recycling. It is expected that a total of 1,400 tonnes of food waste (i.e. about 4 tonnes per day) would be recycled each year and 280 tonnes of compost would be produced

annually, which can be used as fertilizers by the estates for their plants and gardens.

Emphasis on Food Waste-to-energy

8. On-site recycling of food waste into compost is not the most suitable solution in Hong Kong because of cost-effectiveness and limited demand of compost products. Our plan is to develop a network of OWTFs with due speed to recycle food waste mainly into renewable energy because Hong Kong can use large quantities of energy either in the form of biogas or electricity.

What would be the logistic arrangement for food waste collection? Can we make use of interim collection points to lower the collection cost? Would the Government consider to make use of refuse collection points managed by the Housing Department and the Food and Environmental Hygiene Department for interim collection? Has the Government considered the collection, logistics and cost issues?

Food Waste Collection and Delivery

9. In light of the fact that Hong Kong generates a very large amount of food waste each day, and that food waste in general decomposes quickly and is unsuited to compaction at RTS for long-haul transport, the most suitable method to recycle food waste is to create a network of recycling plants. This approach enables food waste to be transported quickly from population centres to the facilities that are not too far away thereby reducing potential nuisance. Transporting food waste requires special attention. Food waste collection vehicles are needed to ensure there is no leakage or odour. In future the vehicles will likely be different from the ones operating in Hong Kong today transporting MSW. Thus, a new fleet of food waste vehicles will need to be used or the existing fleet will need to be upgraded. Currently, C&I establishments are responsible for delivering their waste either to refuse transfer stations (RTS) or landfills. Our plan is for C&I establishments to be responsible for separating their food waste from their other MSW and deliver the separated food waste to the recycling facilities.

10. The collection of food waste from domestic sources is more challenging than for C&I establishments because there are many types of residential dwellings. We will initiate a study on the food waste collection and delivery in 2015 to consider the different types of circumstances in Hong

Kong, including dwellings with/without storage space for separated food waste, the conditions of C&I buildings, the collection and delivery arrangement, the suitable types of vehicles, appropriate ancillary and supporting facilities for any onsite interim storage, the appropriate arrangement for prioritization in the collection and delivery of food waste as well as the social, institutional and resource implications. The study scope will include the feasibility of utilizing the existing government facilities such as refuse collection points and RTS to enhance the effectiveness of food waste collection and delivery and its potential synergy.

Will the operation of OWTF phase 1 cause any environmental impact and odour nuisance to the surrounding? What kind of measures could minimize the impact during food waste delivery?

Environmental Impact Assessment

11. The OWTF phase 1 is a designated project under the EIA Ordinance and an environmental permit (EP) is required for its construction and operation. The EIA report was approved under the EIA Ordinance on 24 February 2010. The EIA Authority issued the EP for the project on 21 June 2010. The project would comply with the established standards stipulated under the EIA Ordinance. The EIA study covered various aspects such as air quality, hazard to life, waste quality, noise, waste management, landscape and visual impacts. The EIA report concluded that, with the implementation of recommended mitigation measures, the project would comply with the requirements stipulated under the EIA technical memorandum.

Odour and Treatment

12. During the operation, the air extracted from the main buildings, including the waste reception area, pre-treatment system, composting system and wastewater treatment system, would be passed to the central air pollution control unit to remove air pollutants, dust and odourous gas. A stack monitoring unit would be installed to ensure that air emissions from OWTF phase 1 during operation will meet the design emission limits and EPD criteria. The EIA study also recommended conducting odour patrol at the site boundary during the operation to ensure that there is no odour impact to the vicinity. There is no nearby residential development. The nearest residential development is Discovery Bay, which is about 1.5 km away from the project site and is substantially screened by natural terrain.

Measures to Minimize Odour during Food Waste Delivery

13. Transporting food waste requires special attention. Food waste collection vehicles are needed to ensure there is no leakage or odour. In future the vehicles will likely be different from the ones operating in Hong Kong today transporting MSW. Thus, a new fleet of food waste vehicles will need to be used or the existing fleet will need to be upgraded. We will commence a detailed consultancy study in 2015 on the appropriate means, mechanism and mode of source-separated food waste collection and delivery in Hong Kong. We will develop a practical territory food waste collection and delivery plan to cope with the commissioning of OWTFs network.

Would the OWTF phase 1 cause any traffic impact? How would the Government deal with it?

No Adverse Impact to the Traffic

14. The cumulative traffic impact has been studied in detail under the OWTF phase 1 feasibility study. The proposed OWTF site at Siu Ho Wan is accessible via Cheung Tung Road and Sham Fung Road adjacent to the North Lantau Highway. It is estimated that about 50 nos. of refuse collection vehicles per day (i.e. 100 nos. of trip) entering/leaving the OWTF during the operation. The impact of the additional traffic generated from the project to the existing road network in Lantau, including Cheung Tung Road, is minimal.

Restaurants and the trade need to pay the private recyclers for food waste recycling, while the Government would provide free collection and treatment service. Will it affect development and survival of the private recyclers? How does the Government avoid competing with private business? Noted that limited amount of food waste could be processed at OWTFs and some people could enjoy the free services from Government while some have to pay for private treatment, how could the Government avoid unfair situation?

C&I Establishments Responsible for Food Waste Delivery

15. Currently, C&I establishments are responsible for delivering their waste either to refuse transfer stations (RTS) or landfills. Our plan is for C&I establishments to be responsible for separating their food waste from their other MSW and deliver the separated food waste to the recycling facilities.

Before having adequate food waste recycling facilities, food waste has to be disposed of with other MSW. We will continue our educational activities on food waste reduction and recycling in community and housing estates, and lay a solid foundation for food waste separation at source. In addition, we will commence a detailed consultancy study in 2015 on the appropriate means, mechanism and mode of source-separated food waste collection and delivery in Hong Kong. We will develop a practical territory food waste collection and delivery plan to cope with the commissioning of OWTFs network.

Private Food Waste Recycling Project

16. Development of the EcoPark is one of the Government's initiatives to provide long-term land at affordable rent for the development of the recycling industry in Hong Kong with a view to encouraging investment in advanced technology and value-added recycling processes. In August 2012, a land lease contract for a lot at EcoPark was awarded by EPD to South China Reborn Resources (Zhongshan) Co Ltd for recycling food waste into high protein content feed for livestock farming and aquaculture. The company plans to develop at least two production lines with a treatment capacity of 100 tonnes food waste per day. It is expected to start operation later and at least 2,800 tonnes of food waste could be processed per month.

Private Participation

17. Hong Kong needs to build urgently a network of OWTFs with due speed in order to meet our disposal at landfill reduction target of 40% by 2022. We envisage Hong Kong needs to build a network of around five to six OWTFs. We welcome the private sector to participate in the development of further OWTFs. We are open to options and proposals from the private sector either on sites identified by the Government or other sites proposed by the private sector.

What are the food waste sources of OWTF phase 1? How would the problem of insufficient food waste be tackled?

Food Waste Sources of OWTF phase 1

18. The Administration started to explore suitable sites for OWTF in 2006. Siu Ho Wan was confirmed a suitable site on the basis of various factors such as transport accessibility, planning and land use compatibility, etc. The OWTF phase 1 will provide treatment for source separated organic waste

from the C&I establishments located in districts near Siu Ho Wan, such as Lantau Island, Tsuen Wan, Kwai Tsing, Sham Shui Po, Yau Tsim Mong and Kowloon City. It is anticipated that these C&I establishments would include hotels, food processing establishments, restaurants, shopping malls, food catering services provided for airlines and wet markets managed by Food and Environmental Hygiene Department and the Link.

Sufficient Amount of Food Waste for Treatment

19. In preparation for recycling food waste on a large scale, the Administration has gained experience on food waste source separation and collection over the past few years through the Food Waste Recycling Partnership Scheme ("the Partnership Scheme") launched by the Environment Bureau together with the C&I sector in June 2010 with a view to promoting good food waste management practice and gaining experience in food waste source separation and recycling. The participating organizations have responded positively that they would deliver their food waste to OWTF phase 1 as far as possible when the facilities begins operation. We expect that OWTF phase 1 would reach its design capacity in a short time after commissioning, in which about 50% of food waste would come from markets and cooked food centres managed by the Food and Environmental Hygiene Department and the Link.

What are the food waste delivery routes of OWTF phase 1?

20. For the food waste delivery routes, please refer to **Table 1**.

At this stage, is there any mechanism for the restaurants and food factories within the OWTF phase 1 catchment to carry out food waste source separation? In the Food Waste Recycling Partnership Scheme, how many participants are located within the OWTF phase 1 catchment?

Promotion of Food Waste Source-separation in C&I Sector

21. In preparation for recycling food waste on a large scale, we have gained experience on food waste source separation with the C&I sector over the past few years through the operation of the Kowloon Bay Pilot Food Waste Composting Plant and the Food Waste Recycling Partnership Scheme. The plant was initially used in 2008 to treat food waste from the venues hosting the Olympic and Paralympic Equestrian Games, followed by the Partnership

Scheme with C&I participants to collect source-separated food waste for delivery to the Kowloon Bay plant. Today, the scheme has over 150 participants and food waste treated at the pilot plant has increased from 40 tonnes in 2008 to about 300 tonnes in 2013.

Participants in the Food Waste Recycling Partnership Scheme

22. A list of Food Waste Recycling Partnership Scheme participants within the OWTF phase 1 catchment is at **Table 2**.

Table 1

Organic Waste Treatment Facilities Phase 1
Food Waste Delivery Route

District	Route	Estimated Number of Vehicles for Food Waste Delivery (per day)
1. Tung Chung/ Airport	Cheung Tung Road-> Siu Ho Wan	5
2. Tsuen Wan	Tsing Tsuen Road-> Tsing Yi North Coastal Road-> Tsing Ma Bridge-> North Lantau Highway-> Sunny Bay Road-> Cheung Tung Road-> Siu Ho Wan	7
3. Kwai Tsing	Kwai Tsing Road-> Tsing Kwai Highway-> Cheung Tsing Tunnel-> Cheung Tsing Highway-> Tsing Ma Bridge-> North Lantau Highway-> Sunny Bay Road-> Cheung Tung Road-> Siu Ho Wan	8
4. Sham Shui Po	West Kowloon Express-> Tsing Kwai Highway-> Cheung Tsing Tunnel-> Cheung Tsing Highway-> Tsing Ma Bridge-> North Lantau Highway-> Sunny Bay Road-> Cheung Tung Road-> Siu Ho Wan	8
5. Yau Ma Tei, Tsim Sha Tsui, Mong Kok	West Kowloon Express-> Tsing Kwai Highway-> Cheung Tsing Tunnel-> Cheung Tsing Highway-> Tsing Ma Bridge-> North Lantau Highway-> Sunny Bay Road-> Cheung Tung Road-> Siu Ho Wan	16
6. Kowloon City	Prince Edward Road West->Lai Chi Kok Rd -> West Kowloon Express-> Tsing Kwai Highway-> Cheung Tsing Tunnel-> Cheung Tsing Highway-> Tsing Ma Bridge-> North Lantau Highway-> Sunny Bay Road-> Cheung Tung Road-> Siu Ho Wan	6
Total (per day)		50 nos.

Table 2

Food Waste Recycling Partnership Scheme
Participants from Year 2010 to 2014

District	Participants	Quantities
1. Tung Chung/ Airport	Cathay Pacific Catering Services (CPCS)	1
2. Tsuen Wan	Discovery Park Commerical Service Ltd. Chao Dynasty (Discovery Park) Cheung Lung Restaurant (Discovery Park) Classic in Shun Tak (Discovery Park) Delifrance (Discovery Park) Federal Palace Restaurant (Discovery Park) Maxim's (Discovery Park) McDonald's (Discovery Park) Pokka Café (Discovery Park) ParkNShop Superstore (Discovery Park) Yeung Uk Road Market (Food and Environmental Hygiene Department)	11
3. Kwai Tsing	Maritime Square (MTR Corporation Ltd.) McDonald's (Maritime Square) Cafe de Coral (Maritime Square) Tao Heung (Maritime Square) Wonderland Villas Complex Wellcome Supermarket (Wonderland Villas Complex) Cheung Fat Modern Market	7
4. Sham Shui Po	Manhattan Hill (Royal Elite Service Company Ltd.) Pacific Coffee (Manhattan Hill) Tao Square (Manhattan Hill) Manhattan Hill Club House Restaurants	4
5. Yau Ma Tei, Tsim Sha Tsui,	Sheraton HK Hotel & Towers Novotel Nathan Road Kowloon Hong Kong	15

District	Participants	Quantities
Mong Kok	The Peninsula Hong Kong Intercontinental Hong Kong Langham Place, Mongkok , HK The Mira Hong Kong Holiday Inn Goldenmile Macro Polo Hong Kong Hotel The Langham, Hong Kong Hotel W Hotel Queen Elizabeth Hospital (Hospital Authority) Dutch Kitchen (Queen Elizabeth Hospital) Pacific Coffee (Queen Elizabeth Hospital) Asia Pacific Catering (Queen Elizabeth Hospital) Kowloon Hospital (Hospital Authority)	
6. Kowloon City	Yew Chung Education Foundation PentaHotel	2
	Total	40
Other Districts	Total (Other Districts)	110
7. Kwun Tong	Amoy Plaza (Hang Lung Properties Ltd.) McDonald's (Amoy Plaza) Loving Hut (Amoy Plaza) Riso (Amoy Plaza) Cafe de Coral (Amoy Plaza) Tao Heung (Amoy Plaza) apm (Sun Hung Kai Properties Ltd.) JUSCO Supermarket (apm) Table 18(apm) China House (apm) King & I (apm) Gyu Jin Shabu Shabu & Sukiyaki (apm)	18

District	Participants	Quantities
	Yummy (apm) Neway Karaoke Box(apm) Exchange Tower (Sino Property Services) King Palace Chinese Restaurant (Exchange Tower) Naruto (Exchange Tower) MegaBox	
8. Wong Tai Sin	Lucky Market(The Link Management Ltd.) Well Sighted Limited(The Link Management Ltd.) Plaza Hollywood Limited Beppu Ramen (Plaza Hollywood) Yummy (Plaza Hollywood) Chao and Hak (Plaza Hollywood) HEICHINROU (Plaza Hollywood) Modern China Restaurant (Plaza Hollywood) ParkNShop Superstore (Plaza Hollywood) Pizza Hut (Plaza Hollywood) Xia Mian Quan (Plaza Hollywood) Lok Fu Plaza (The Link Management Ltd.) MouMouClub (Lok Fu Plaza) Sushi Dai (Lok Fu Plaza) ParkNShop Superstore (Lok Fu Plaza) Pizza Hut (Lok Fu Plaza) Starbucks (Lok Fu Plaza) McDonald's (Lok Fu Plaza) Lok Fu Market	19
9. Tuen Mun	Tuen Mun Town Plaza (Sino Properties Service) Crystal Jade La Mian Xiao Long Bao (TMT Plaza) Dondonya Shokudo (TMT Plaza) Beppu Ramen (TMT Plaza) Yummy (TMT Plaza) Shanghai Min (TMT Plaza) Spaghetti House (TMT Plaza)	15

District	Participants	Quantities
	AEON Tuen Mun Store (TMT Plaza) Café de Coral (TMT Plaza) Café de Coral (K-Point) K-point (Sun Hung Kai Properties) Spaghetti360 (K-Point) Morihachi Kitchen Tamago (K-Point) MOS Burger (K-Point) San Hui Market (Food and Environmental Hygiene Department)	
10. Wan Chai	Sun Hung Kai Centre (Sun Hung Kai Properties Ltd.) Harbour Centre (Sun Hung Kai Properties Ltd.) Ajisen Ramen (Sun Hung Kai Centre) Duetto Italian & Indian Dining (Sun Hung Kai Centre) Itacho Sushi (Sun Hung Kai Centre) K.F.C. (Sun Hung Kai Centre) Maxim's Deluxe (Sun Hung Kai Centre) McDonald's (Sun Hung Kai Centre) Oliver's Super Sandwiches (Sun Hung Kai Centre) RAMAS Oysters Bar and Grill (Sun Hung Kai Centre) Starbucks Coffee (Sun Hung Kai Centre) Starbucks Coffee (The Great Eagle Centre) Super Jika Udon (Sun Hung Kai Centre) Victoria City Restaurant (Sun Hung Kai Centre) Crabtree & Evelyn The Tearoom (Sun Hung Kai Centre) U & Me (Harbour Centre) East Ocean Seafood Restautant (Harbour Centre) Super Super Congee & Noodles (Harbour Centre) 7-Eleven (Harbour Centre)	44

District	Participants	Quantities
	Cheese Pizza (Harbour Centre) Café De Coral (Harbour Centre) Triple - O's (Harbour Centre) The Great Eagle Centre (Sun Hung Kai Properties Ltd.) Pacific Coffee (The Great Eagle Centre) Yat Tung Heen (The Great Eagle Centre) The Excelsior, Hong Kong Mandarin Oriental Hong Kong Renaissance Harbour View Hotel Hong Kong Hysan Place (Hysan Property Management Limited) Holly Brown(Hysan Place) Shelter Italian Bar & Restaurant (Hysan Place) The Herbivores(Hysan Place) Agetate(Hysan Place) Pepper Lunch Express(Hysan Place) Ramen Ganpachi (Hysan Place) Chilli N Spice(Hysan Place) Izumi Curry(Hysan Place) Honeymoon Dessert(Hysan Place) BB1 Vietnamese Bistro (Hysan Place) Eight Grand(Hysan Place) Ho Hung Kee (1946) (Hysan Place) Moments(Hysan Place) Bologne Café(Hysan Place) Wired Café(Hysan Place)	
11. Central and Western	Four Seasons Hotel HK The Peak Galleria (Hang Lung Properties Ltd.) McDonald's (The Peak Galleria) Delifrance (The Peak Galleria) Spaghetti 360 (The Peak Galleria) Queen Mary Hospital (Hospital Authority)	6

District	Participants	Quantities
12. Sha Tin	A&W Food Services Ltd. Kam Ying Court Market, (The Link Management Ltd.) Wang On Commercial Management Ltd. (The Link Management Ltd.) Swire Coca-Cola HK Ltd. Hyatt Regency HK, Sha Tin Luncheon Star	6
13. Tai Po	Tai Po Hui Market (Food and Environmental Hygiene Department) Fu Shin Market (The Link Management Ltd.)	2