

1 PURPOSE OF PROJECT PROFILE

This project profile is to set out the scope of environmental issues associated with a project of development of Organic Waste Treatment Facilities (OWTF) Phase 1 at Siu Ho Wan, North Lantau for the application of an Environmental Impact Assessment (EIA) study brief. The project is regarded as a designated project under Item G4 of Part 1, Schedule 2 of Environmental Impact Assessment Ordinance (EIAO).

2 BASIC INFORMATION

2.1 Project Title

Development of Organic Waste Treatment Facilities Phase 1

2.2 Purpose and Nature of the Project

The Director of Environmental Protection proposes to construct and operate an organic waste treatment plant in Siu Ho Wan, North Lantau to convert source-separated organic waste into compost and biogas through proven biological treatment technologies. The main purpose of the Project is to recover reusable materials and energy, such as compost, heat and electricity from sourced-separated organic waste, which is currently being disposed of at landfills. The Project is expected to positively contribute to the Hong Kong SAR Government's MSW management policy.

2.3 Name of Project Proponent

Environmental Protection Department (EPD)

2.4 Location and Scale of Project

The Project will be located at Siu Ho Wan Area 3, North Lantau (the Site) (Figure 1). Presently, the site is designated as "Government" in the Siu Ho Wan Layout Plan No. L/I-SHW/1.

The Project is expected to receive and process approximately 73,000 tonnes of source-separated organic waste for treatment per year. Besides

reducing the amount of waste being disposed of landfills, the plant is able to produce biogas and compost for reuse and recycle.

The total area of the Site is approximately 2.3 hectares and part of it is currently occupied by tenants under the following Short Term Tenancies:

- i) STT CX 1569, storage purposes by CLP on quarterly basis
- ii) STT CX 1602, concrete production, expires on 21.7.2009 and thereafter on quarterly basis
- iii) STT CX 1603, concrete production, expires on 16.6.2009 and thereafter on quarterly basis

Upon expiry of the above tenancies, all the aboveground structures in the Site will be demolished and removed. The Site will then be available for the development of OWTF Phase 1.

2.5 Number and Types of Designated Projects to be covered by the Project Profile

There is only one Designated Project (DP) under this Project Profile. The Project Profile has been prepared in accordance with Annex 1 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). This Project is classified as DP under Item G4 of Part 1, Schedule 2 of Environmental Impact Assessment Ordinance (EIAO) Cap. 499.

2.6 Name and Telephone Number of Contact Person(s)

| | |
|----------------|-----------|
| Steven HL WONG | 2872 1683 |
| Michael HL LUI | 2872 1623 |

3. **OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

3.1 Project Planning and Implementation

The Project Proponent will employ consultancy firms to conduct the overall feasibility and EIA studies.

3.2 The Project is planned to be implemented through a Design, Build and Operate (DBO) contract. The Contractor will be selected through a competitive tendering exercise. Under the contract, the Contractor will be responsible for:

- i) detailed design of facilities for waste reception and treatment,
- ii) provision and installation of facilities,
- iii) testing and commissioning of equipment,
- iv) operation of facilities,
- v) monitoring of operation

3.3 Project Programme

The development programme is scheduled as follows:

| Key Stage of the Project | Indicative Date |
|--|-----------------|
| Commencement of Feasibility and EIA studies | July 2008 |
| Tendering for Design, Build and Operate Contract | July 2010 |
| Construction of the Project | July 2011 |
| Commencement of the Operation of the Project | March 2013 |

3.4 Interaction with broader programme requirements or other proposed/committed projects (all of which are subject to confirmation by the relevant project proponents) that will be considered in the EIA study include:

- Lantau Logistic Park Development
- Infrastructure connecting the Hong Kong-Zhuhai-Macao Bridge with NLH
- Transport hub on top of the existing Siu Ho Wan MTR Depot
- Extension of the Siu Ho Wan Water Treatment Works
- Upgrading works for Siu Ho Wan Sewage Treatment Works
- Salt water pumping station intake at Ta Pang Po
- Integration of Siu Ho Wan and Silver Mine Bay Water Treatment

Works

4. Possible Impacts on the Environment

4.1 General Description of the project

4.1.1 Construction Phase

The Site is currently occupied by concrete batching plants and for storage of equipment. The temporary tenants are required to remove all the plants and equipment and then return the site in good conditions to the government. As the site surface has been paved with concrete and the level is appropriate for the Project, extensive site formation works will not be required. The construction of the Project is expected to involve removal of the existing ground slab, construction of foundations, excavation of underground utilities, construction of superstructure for the office and storage, installation of treatment facilities including screening and shredding plants, digesters, biogas holding tanks, composting sheds, wastewater treatment units, air treatment units, etc.

4.1.2 Operational Phase

The operation of the Project will involve four main stages:

- Waste Acceptance
- Digestion
- Composting
- Post-treatment process

Waste Acceptance

Source separated organic waste will be delivered to the OWTF Phase I in bulk and drums by means of road transportation. All bulk waste collection vehicles entering and exiting the facility will be weighed on a weighbridge. The information of weight, waste type and waste producers will be recorded. Trucks delivering waste in drums will not be required to pass over the weighbridge. All collection vehicles will then be directed to a waste reception building. The waste reception building will be equipped

with unloading bays for bulk waste and drums reception equipment for drum waste. The building will operate under negative pressure and any air circulating inside will be directed to a biofilter.

The incoming organic waste will pass through pre-treatment process. The process will involve the use of mechanical and/or optical equipment to separate out unsuitable materials such as plastics, metals and oversized components from the waste. Following this, size reduction will be carried out to produce a homogenous material which will aid fermentation and facilitate processing.

Digestion

The mixed organic waste which has high moisture content will be directed to digesters for processing. The digesters will operate at the temperature range from 40 to 60°C depending on the design. Each digester may be equipped with mixing devices to maintain suitable conditions for microbiological activities. The retention time inside the digester will be approximately 20 days to ensure good degradation and maximize biogas production.

Composting

The mixed organic waste which has low moisture content will be directed to composting facilities for processing. Supply of air is required by regular aeration to maintain aerobic conditions. Microbiological activity will release heat energy to cause rise in temperature. The composting facilities may operate at the temperature up to 70 °C to destruct pathogenic micro-organisms. The retention time inside the composting equipment will be one to two weeks.

Post-treatment process

After the digestion process, the residual will be passed through a separator which separates out fibrous material from liquid. Waste water will be re-circulated in the treatment process. The surplus waste water will be directed to the waste water treatment unit before it is discharged into nearby sewers. The fibrous material will be transported to the composting

plant for further treatment. After two to four weeks' maturation, the material will turn into stabilized compost.

4.2 Identification of Key Environmental Issue

The construction and operation of the project may give rise to potential environmental impacts.

4.3 Construction Phase

4.3.1 Air Quality

Dust may arise from general construction and demolition works. The scale of works is expected to be small and also the extent will be confined to the site area. As the identified air sensitive receivers are far away and with the implementation of dust suppression measures, no construction dust impact is expected.

The operation of diesel-powered construction equipment may also emit gaseous pollutants. Providing the small scale and limited extent of construction works, the total number of diesel-powered construction plant will be small. Hence no air quality impact from the construction equipment is expected.

4.3.2 Noise

Powered Mechanical Equipment like generators, excavators, concrete breakers, concrete lorry mixers, and mobile cranes will be used for the demolition and construction works. The demolition and construction activities will be confined inside the site area. Providing that the small scale and limited extent of construction and the closest noise sensitive receivers are located at a distance of about 40 m, adverse construction noise impacts are not envisaged.

4.3.3 Water Quality

The construction of the Project will not require any substantive site formation and a small scale excavation works will be carried out for

foundations and utilities works. With the implementation of good site practice and appropriate mitigation measures, no water quality impacts from the construction activities are expected.

4.3.4 Waste Management

The construction and demolition activities associated with the project will result in the following broad categories of waste:

- Construction and demolition (C&D) materials, mainly from the demolition of existing ground slab;
- Chemical waste, such as batteries and lubricating oils from the maintenance of construction vehicles and equipment; and
- General refuse, including food waste from the on-site work force and the packaging from the construction materials.

C & D materials generated from the construction works will be properly segregated and scrap metals will be recovered for recycling. The amount of C & D waste requiring disposal at landfills and the associated potential impacts will be minimal.

The construction activities of the project are not expected to generate significant amount of chemical waste, and therefore no impact is expected in this respect. With proper housekeeping measures and refuse collection arrangements in place, no impact is expected to result from refuse generated from the construction phase of the project.

4.4 Operational Phase

4.4.1 Air Quality

Potential air quality impacts may arise from waste reception and pre-treatment process. All these processes will take place inside a building. Air circulating in the building will pass through filtration equipment which can remove dust, particles and odours before it is discharged from the building. With installation of filtration equipment, no air quality impact is expected from waste reception and pre-treatment.

The anaerobic digestion will take place in an air-tight reactor. Discharge of gaseous emissions from the process is not expected. Produced biogas will be transmitted to gas holders for storage before it is utilized for electricity generation. To protect the gas holders from over-pressure, a gas flare will be provided. As this control device will only be operated under emergency situations, no adverse air quality impact is expected to arise from their normal operation.

Composting of fibrous materials and treatment of waste water may emit gaseous pollutants. The composting equipment and wastewater treatment plant will be enclosed inside buildings. Air circulating in the buildings will pass through filtration equipment which can remove dust, particles and odours before it is discharged from the buildings. With installation of filtration equipment, no air quality impact is expected from composting of digestate and treatment of waste water.

4.4.2 Noise

The waste reception building will be operated during daytime. Key potential noise sources during the operational phase will include shredding machine, conveying belts, metal separators and waste mixers. Providing that all these machineries will be enclosed in a building, no adverse noise impact from these fixed noise sources is expected.

The anaerobic digestion plant will be operated 24 hours a day. The waste inside the digester may be mixed by means of rotating paddles. As the required rotation speed is slow, adverse noise impacts are not envisaged.

The waste delivery will only require a small number of transportation vehicles. The traffic induced by the Project onto the existing roads will be minimal. As a result, adverse traffic noise impact associated with the project is not envisaged.

4.4.3 Water Quality

Water quality impacts may arise from the discharge of effluents to the drainage, sewerage system and/or water bodies nearby. The operation of the Project is not expected to generate a substantial amount of effluents as

the process water will be re-circulated or reused. The surplus of waste water from the process will be treated in a wastewater treatment unit before it is discharged to the sewerage system. Discharge standards will follow the Technical Memorandum on Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (WPCO-TM) issued under Section 21 of the Water Pollution Control Ordinance (WPCO).

A small quantity of domestic sewage is expected to be generated during the operation of the project as there will be no canteen facilities or kitchens provided on site and the number of staff will be very small.

Proper connection to the nearest public sewer will be provided. With provision of appropriate treatment facilities and implementation of practice of process water reuse, adverse water quality impacts will not be expected.

4.4.4 Waste Management

Chemical waste such as lubricating oils, paint and oil filters from equipment maintenance will be properly collected and disposed of in accordance with Waste Disposal (Chemical Waste) (General) Regulation. Providing the small number of equipment items on site, the quantity of chemical waste to be generated is expected to be small.

General refuse such as food packaging and food waste will be collected in enclosed bins and collected by waste collector in a regularly basis. Given the small number of staff and the absence of canteen or kitchen facilities, the amount of general refuse generated during the operational phase is expected to be small.

The operation of pre-treatment process will sort out those unsuitable materials for further treatment process. The amount of the waste is expected to be small because waste producers should properly separate out organic waste for collection. The operation of the plant will not generate any waste by-product but useful compost. The compost will be used as fertilizer or soil-conditioners for agricultural, horticultural or landscaping uses.

4.4.5 Landscape and Visual

The site is located within the zones specified for industrial and government facilities uses. Currently it has been developed for concrete batching plant use. The implementation of the project, which itself is an industrial establishment, will have no effect on the existing landscape character within and around Siu Ho Wan.

The site is bounded to the north by North Lantau Highway and Cheung Tung Road; to the south by a cut-slop of 20 metres height; to the east by bus depots and to the west of a vacant site pending for development. Certain structures of the project, such as digesters and gas holding tanks, may be visible to the drivers and passengers while commuting roads and personnel of bus depots and other future developments nearby.

4.4.6 Hazard to Life

Biogas is continuously produced within the digesters. A maximum of 1,000 cum of biogas will be stored in gas holding tanks on site during the operational phase of the project. Under normal operating conditions, the biogas will be converted into electricity in the generator. The plant will be equipped with an emergency flare to burn the surplus biogas. This will occur only in emergency or abnormal circumstances. Potential hazards from the storage of biogas will need to be considered.

Siu Ho Wan Water Treatment Works stores and uses liquefied chlorine for the primary disinfection. Liquefied chlorine is stored in a 1-tonne drum inside the Chlorine Building. The cumulative hazard to life will need to be considered.

5. Major Elements of the Surrounding Environment

The 2.3 ha Site is located at Siu Ho Wan Area 3 of North Lantau Island. Presently the Site is zoned as “G” in the Siu Ho Wan Layout Plan No. L/I-SHW/1. The existing environment of the Site and its surroundings were reviewed and sensitive receivers were identified as follows:

- i) Siu Ho Wan Water Treatment Works

- ii) Siu Ho Wan Sewage Treatment Works
- iii) North Lantau Highway
- iv) North Lantau Refuse Transfer Station
- v) Siu Ho Wan Vehicle Pound Vehicle Examination Centre and Weigh Station
- vi) Bus Depot of City Bus Ltd.
- vii) Bus Depot of Kowloon Motor Bus Ltd.
- viii) Undetermined use area and open space

6. Environmental Protection Measures to be Incorporated in the Design and Any Further Environmental Implications

6.1 Construction Phase

6.1.1 Air Quality

The potential dust impacts associated with the construction of the Project will be mitigated by the implementation of construction site management practices for dust control. This includes erection of hoardings, watering of exposed soil surfaces, covering of stockpile of dusty material with impervious sheeting.

6.1.2 Noise

The construction noise management measures for the construction and demolition works are proposed as follows:

- Only well-maintained equipment will be operated on-site and equipment will be serviced regularly during the works;
- Machines and equipment that are in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Silencers or mufflers on construction equipment will be utilized and will be properly maintained during the works; and
- Mobile noise barriers will be positioned with a few metres of noisy plant items, where necessary.

6.1.3 Water Quality

Appropriate measures will be implemented in accordance with the guidelines stipulated in EPD's Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 1/94) during the construction and demolition works to properly control site run-off and drainage and to minimize potential water quality impacts.

6.1.4 Waste Management

To minimize the amount of construction waste, the contractor will be required to adopt good site management practice and have careful design and planning. On-site waste segregation will be implemented to increase the amount of recycling and reuse.

Chemical waste generated during the construction of the Project will be properly stored in accordance with EPD's Code of Practice on the Packaging, Labelling and Storage of Chemical Waste before collection for disposal by a licensed Chemical Waste Collector. General refuse generated on-site will be stored in refuse bins and collected by waste collector for disposal on a regular basis.

6.2 Operational Phase

6.2.1 Air Quality

A detailed air impact assessment will be conducted during the further design of the plant process and components of the Project to determine the degree and extent of impacts from its gaseous emissions during the operational phase. Appropriate emissions control systems will be incorporated in the Project to ensure potential air quality impacts on the ASRs are minimized. Odour management plan will be prepared to ensure odour level outside the Site does not exceed limits.

6.2.2 Noise

Given that the NSRs are far away from the Site and the screening provided by the other industrial premises in Siu Ho Wan, adverse noise impacts to the NSRs are not envisaged. A detailed fixed plant noise assessment will be conducted to identify and confirm the requirements for mitigation

measures, if any. In addition, traffic speed restriction on site will be implemented.

6.2.3 Water Quality

Appropriate waste water treatment facilities will be provided to ensure that the effluent discharge to the public sewerage system will meet the relevant standards in the WPCO-TM.

6.2.4 Waste Management

Chemical waste generated during the construction of the Project will be properly stored in accordance with EPD's Code of Practice on the Packaging, Labelling and Storage of Chemical Waste before collection for disposal by a licensed Chemical Waste Collector. General refuse generated on-site will be stored in enclosed bins and collected by waste collection on a regular basis.

Arrangements will be made with potential users for compost generated from the Project to ensure recovered materials are utilized as far as possible.

6.2.5 Landscape and Visual

The Project will conform to the existing landscape character of Siu Ho Wan and the potential visual impact associated with the Project is considered as minor. No mitigation measure is considered necessary in this respect.

6.2.6 Hazard to Life

Arrangements and facilities for the storage and flaring of biogas for the Project will be in strict compliance with relevant legislation and guidelines. An assessment of the potential hazards associated with the Project will be conducted in accordance with the EIAO-TM.

