1. Introduction

1.1 Background

1.1.1 Current Waste Management Policy

In May 2013, the Environment Bureau issued Hong Kong-Blueprint for Sustainable Use of Resources 2013-2022. The blueprint identifies a need to reduce Municipal Solid Waste (MSW) production by 2022. It specifically identified a need to fill gaps in Hong Kong's waste related infrastructure and the investment in Organic Waste Treatment Facilities (OWTF).

1.1.2 Development and implementation of Waste Management Policy

In December 2005, the Administration published "A Policy Framework for the Management of Municipal Solid Waste (2005-2014)" (Policy Framework) recommended that biodegradable materials (such as food waste) from the commercial and industrial (C&I) establishments should be separated at source for biological treatment to produce useful products.

In 2011, Hong Kong disposed of about 3,600 tonnes of organic waste to the landfills each day, of which about 1,000 tonnes were from the C&I sources, such as restaurants and food processing industries. The disposal of such biodegradable waste direct to landfills is not sustainable as it leads to depletion of the limited landfill void space, and the formation of landfill gas and leachate that impose long-term environmental burden on the environment.

The Environmental Protection Department (EPD) commissioned a Pilot Composting Facility at the Kowloon Bay Waste Recycling Centre in 2008 for the collection and processing of source-separated food waste from the C&I establishments. Building on the experience of the Pilot Facility, the Administration plans to develop OWTFs in two phases with a total daily treatment capacity of about 500 tonnes of organic waste. The OWTFs would adopt biological technologies (composting and anaerobic digestion) to turn the organic waste to useful compost products and biogas for energy recovery

The first OWTF Phase 1 is planned for construction at Siu Ho Wan, Lantau to treat 200 tonnes of source separated organic waste (mostly food waste) every day. Its EIA was approved under the EIA Ordinance in February 2010. According to the Blueprint for Sustainable Use of Resources 2013-2022, the OWTF Phase 1 is expected to commence operations in 2016.

1.1.3 An Organic Waste Treatment Facility at Sha Ling North District

Following the Government's review of the Policy Framework action agenda in 2011, a decision was taken to further address Hong Kong's waste issues through a comprehensive waste management strategy. This included the implementation of a Project to investigate the feasibility for providing an OWTF at Sha Ling, North District to receive and process 300 tonnes per day of source separated food waste generated from the C&I sectors.

Mott MacDonald Hong Kong Limited (MM) has been commissioned by EPD to carry out the second OWTF Project to develop Organic Waste Treatment Facilities at Sha Ling under Agreement No. CE 34/2011(EP). Throughout the document the assignment is referred to at the Organic Waste Treatment Facilities, Phase 2 (OWTF2). The Project commenced on 20 December 2011, will last for a period of 36 months and comprise

four Phases:

- Phase 1 – Feasibility and Environmental Impact Assessment (EIA) studies;
- Phase 2 – Tender Document Preparation;
- Phase 3 – Prequalification of Tenderers; and
- Phase 4 – Tender Evaluation and Contract Documents Preparation.

This document is the Environmental Impact Assessment (EIA) Report, under Phase 1 of the Project.

The purpose of the Project is to identify and adopt proven biological treatment technologies to recover reusable materials and energy, such as compost, heat, electricity and biogas from source-separated organic waste which is currently being disposed of at landfills. The OWTF2 will be constructed and operated in Sha Ling, North District.

1.2 Purpose of the EIA Study

The Project is a designated project under Item G.4 of Part I, Schedule 2 of the EIAO: *"A waste disposal facility (excluding any refuse collection point), or waste disposal activities, for (a) refuse; or (b) chemical, industrial or special wastes"*.

An EIA Study Brief (No. ESB-226/2011) has been issued by the Director of Environmental Protection (DEP) to carry out an EIA study for the Project. As per the requirement in Section 1.6 of the EIA Study Brief for the Project, the purpose of the EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed Project and related activities taking place concurrently. This information will contribute to decisions by the DEP on:

- The acceptability of adverse environmental consequences that are likely to arise as a result of the Project, as well as other interfacing projects in the vicinity of the Project;
- The conditions and requirements for the detailed design, construction and operation of the Project to mitigate against adverse environmental consequences wherever practicable; and,
- The acceptability of residual impacts after the proposed mitigation measures are implemented.

As per the requirement in Section 3.4 of the EIA Study Brief, the EIA has been conducted using the best and latest information available during the course of the EIA study. Details of the construction programme and methodologies of the Project have been included in this EIA Report. The time frame and work programmes of the Project and other concurrent projects have been included where information is available. The cumulative environmental impacts from the Project and other interacting projects have been identified and assessed.

1.3 Objectives of the EIA Study

The objectives of the EIA study as detailed in Section 2 of the EIA Study Brief (No. ESB-226/2011) are as follows:

- to describe the Project together with the requirements, implementation programme and any phasing programme for carrying out the Project;

- to identify and describe elements of the community and environment likely to be affected by the Project and/or likely to cause adverse impacts to the Project and associated works, including both the natural and man-made environment and the associated environmental constraints;
- to provide information on the consideration of alternatives (such as location / siting of the Project, size, layout, configuration, shape and design of the Project; scale, scope, extent, programme, sequence, method of construction and use of biogas) with a view to avoiding or minimising the potential adverse environmental impacts on environmentally sensitive areas and other sensitive uses and to compare the environmental benefits and disbenefits of each of the different options; to provide reasons, justifications and constraints for selecting the preferred option;
- to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and affected uses with respect to air quality, noise, water quality, waste management implication, ecology, fisheries impacts, landscape and visual, hazard to life and sites of cultural heritage;
- to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- to identify and quantify any potential ecological impacts arising from the construction and operation of the Project and to propose measures to mitigate these impacts;
- to identify and quantify any potential fisheries impacts arising from the construction and operation of the Project and to propose measures to avoid in the first instance or mitigate these impacts if the Project would affect any active or inactive fishponds;
- to identify any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- to describe the composition of the biogas, location / quantity / design of the biogas storage, operation of the biogas system and the safety measures to be adopted;
- to propose measures to avoid or the provision of infrastructure or mitigation measures to minimise pollution, environmental disturbance and nuisance during construction and operation of the Project and associated works;
- to investigate the feasibility, practicability, effectiveness and implications of the proposed mitigation measures;
- to identify, predict and evaluate the residual environmental impacts (i.e. after practicable mitigation) and the cumulative effects expected to arise during the construction and operation of the Project in relation to the sensitive receivers and potentially affected uses;
- to identify, assess and specify methods, measures and standards to be included in the detailed design, construction and operation of the Project which are necessary to mitigate these environmental impacts and reduce them to acceptable levels;
- to investigate the extent of the secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification; and,
- to design and specify environmental monitoring and audit requirements to check the effective implementation of the recommended environmental protection and pollution control measures.

1.4 Approach to the EIA Study

1.4.1 Overview

The EIA covers the Project proposed in the Project Profile (April, 2011). The EIA study addresses the key issues described below, together with any other key issues identified during the course of the EIA study and the cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed, planned and known potential developments in the vicinity of the Project:

- the potential air quality impact and noise impact from the construction and operation of the Project on the existing, committed and planned nearby sensitive receivers taking into account the cumulative impact from the construction and operation of existing, committed and planned sources of pollution in the vicinity of the Project;
- the potential hazard to life due to generation, transfer, storage and usage of biogas on the existing, committed and planned off-site population;
- the potential impacts to water quality and ecological habitat due to the discharge of stormwater, surface runoff and treated effluent generated from the facilities during the construction and operation phases, taking into account the cumulative impact from the construction and operation of existing, committed and planned projects in the vicinity of the Project;
- the potential aquatic and terrestrial ecological impacts arising from the construction and operation phases, including loss of habitats, removal of vegetation, the impact and disturbance to animals and plants and identify and evaluate all direct, indirect and cumulative impacts resulting from the proposed Project during the construction and the operation phases;
- the potential impacts of various types of wastes to be generated from the construction and operation of the Project and the potential waste management issue associated with the use of filling materials such as inert Construction and Demolition Material (C&DM) during construction of the Project;
- the potential fisheries impacts arising from the construction and operation of the Project;
- the potential landscape and visual impacts during the construction and operation of the Project on the nearby sensitive receivers;
- the potential impacts from the Project on sites of cultural heritage from construction and operation of the Project; and,
- the potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects in the vicinity of the Project. Particular attention shall be focused on those impacts identified to have a bearing on the environmental acceptability of the Project.

1.4.2 Baseline Conditions

The relevant aspects of the existing environment have been identified and described to provide a baseline for the identification and prediction of potential impacts which are likely to arise from implementing the Project. Baseline environmental surveys were undertaken and relevant reports / documents have been reviewed (and information incorporated where appropriate) to determine the existing environmental conditions at the Project site and all surrounding areas likely to be affected by the Project.

1.4.3 Impact Prediction

Individual aspect assessments have been undertaken in accordance with the relevant guideline on assessment methodology from the EIAO-TM. Digital models have been used to quantitatively predict environmental impacts for air quality and noise during the construction and operation phases. The modelling predictions have been based on approved / recognised local and international methods as described in the relevant sections of this report.

1.4.4 Impact Evaluation

The methodologies used in the assessments have previously been applied in similar EIA studies in Hong Kong which have been accepted for use in assessing environmental impacts and for the comparison of predicted results with the EIAO-TM standards. While there are some limitations in the methodologies, for example the accuracy of the predictive base data for future conditions such as weather conditions, such uncertainties have been considered during the formulation of assessment conclusions. These have been addressed by the adoption of realistic but worst case assumptions to provide a conservative assessment of environmental impacts. Where worst case assumptions have been used, it has been stated in the assessment methodologies.

1.4.5 Impact Mitigation

The designs have been developed to proactively avoid impacts in the first instance. Thereafter, mitigation has sought to control, reduce and minimise or remedy the impacts. The effectiveness of the proposed mitigation has been assessed and any residual environmental impacts have been identified and considered for their acceptability.

An implementation schedule for the mitigation measures has been prepared for each mitigation measure, which identifies when and where it is required, the parties responsible for its implementation and where necessary, for its maintenance.

1.5 Structure of the EIA Report

Following this introductory section, the remainder of this EIA is arranged as follows:

- **Section 2** presents a description of the Project;
- **Section 3** presents the approach and methodology to and findings of the *Air Quality Impact Assessment*;
- **Section 4** presents the approach and methodology to and findings of the *Hazard to Life Assessment*;
- **Section 5** presents the approach and methodology to and findings of the *Noise Impact Assessment*;
- **Section 6** presents the approach and methodology to and findings of the *Water Quality Impact Assessment*;
- **Section 7** presents the approach and methodology to and findings of the *Waste Management Implications*;
- **Section 8** presents the approach and methodology to and findings of the *Ecological Impact Assessment*;
- **Section 9** presents the approach and methodology to and findings of the *Fisheries Impact Assessment;*

- **Section 10** presents the approach and methodology to and findings of the *Landscape and Visual Impact Assessment;*
- **Section 11** presents the approach and methodology to and findings of the *Cultural Heritage Impact Assessment;*
- **Section 12** presents the *Environmental Monitoring and Audit Requirements;*
- **Section 13** presents the *Conclusions and Recommendations* of the EIA study; and
- **Section 14** presents the *Implementation Schedule of Mitigation Measures*.