14 Summary of Environmental Outcomes

Introduction

14.1.1 The Project would involve upgrading the sewage treatment capacity of the existing Tai Po Sewage Treatment works (TPSTW) and provision of co-digestion facilities for sewage sludge from TPSTW, imported sludge from other sewage treatment works in New Territories and pre-treated food waste from the adjoining Organic Waste Pre-treatment Centre (New Territories East). Biogas generated from the co-digestion process will be utilized for electricity supply.

14.1.2 This Project would form an essential part of urban development in meeting sewage treatment demand. It will also maximize the benefits and efficiency of resource recovery from waste and wastewater, and thus promoting sustainable waste and wastewater management in Hong Kong.

14.1.3 The key environmental outcomes arising from the EIA study of this Project are summarized as follows.

Population and Environmentally Sensitive Areas Protected

14.1.4 The key population and environmentally sensitive areas protected by the Project is presented in **Table 14.1**.

Table 14.1 Population and Environmentally Sensitive Areas Protected

Project Design	Issues of Concern Addressed	Population / Environmentally Sensitive Areas Protected
The Project will ensure adequate sewage treatment capacity for urban development to prevent waterborne pollution / disease and safeguard public health and the ecosystem.	Water quality, public health and hygiene	- Population in Tai Po, Lam Tsuen and Ting Kok areas - Water recreational users of Tolo Harbour and Tolo Channel - Seawater intakes, bathing beach, corals, mangroves, Fish Culture Zones (FCZs), marine park, Sites of Special Scientific Interest (SSSIs), important nursery area for commercial fisheries resources in Tolo Harbour and Tolo Channel
Implementation of this Project will provide opportunity to improve odour management in TPSTW by replacing the existing open surface sewage treatment units, which are major odourous sources, in the West Plant, with new treatment units equipped with odour covers and deodourisation systems.	Air quality	- Population and air sensitive receivers in Tai Po Industrial Estate (TPIE) and the future Shuen Wan Golf Course (SWGC)

Environmentally Friendly Options Considered and Incorporated in the Project, Environmental Design Recommended and Key Environmental Problems Avoided

14.1.5 Environmentally friendly options considered and incorporated in the Project, environmental design recommended and key environmental problems avoided are summarized in **Table 14.2**.

Table 14.2 Recommended Environmentally Friendly Options and Design

Project Options / Design Recommended	Key Environmental Problems Avoided
- Implement co-digestion of sewage sludge and pre-treated food waste to improve nutrient balance and biogas yield, and thus, increase the energy recovery from the co-digestion process	- Avoid up to about 500 wet tonnes of food wastes from disposal to the landfill each day and prevent the associated landfill gas generation

Project Options / Design Recommended	Key Environmental Problems Avoided
- Dispose Treated Sewage Effluent (TSE) of the Project to the Tolo Harbour Effluent Export Scheme (THEES)	- Avoid an increase in the risk of red tide occurrence and prevent adverse water quality, marine ecological and fisheries impacts in Tolo Harbour and Tolo Channel
- Provide secondary treatment level with disinfection for the Project effluent and implement effluent reuse to minimize pollution loading to Victoria Harbour	- Avoid adverse health risk and water quality impact upon the potential water sports area at Kai Tak
- Provide dual power supply or ring main supply from CLP together with standby facilities for the main treatment units and standby equipment parts / accessories	- Avoid emergency discharge and the associated water quality, marine ecological and fisheries impacts in Tolo Harbour and Tolo Channel
- Utilize the existing emergency outfall of TPSTW for this Project (instead of construction of new submarine outfall)	- Avoid marine construction and associated impacts on water quality, marine ecology and fisheries - Prevent loss of marine habitat and fishing ground due to installation of new outfall diffuser
- Implement phasing of construction works to maintain adequate sewage treatment capacity throughout the construction period	- Avoid the chance of sewage bypass during the construction phase and prevent the associated water quality, marine ecological and fisheries impact in Tolo Harbour and Tolo Channel - Minimize total pollutant emissions at a time and avoid adverse environment impacts e.g. on air quality and noise during the construction phase
- Use quiet piling method (pre-bored steel H piles) for Project construction	- Avoid adverse terrestrial ecological impacts due to noise disturbance
- Provide gas treatment facility to remove ammonia and hydrogen sulphide (H_2S) from the biogas before passing the gas to the combined heat and power generator	- Avoid adverse air quality impact due to ammonia and sulphur dioxide (SO_2) emissions from the Project

Compensation Areas and Environmental Protection Measures Recommended and the Associated Environmental Benefits

14.1.6 The compensation areas included and the environmental benefits of environmental protection measures recommended are summarized in **Table 14.3**.

Table 14.3 Key Compensation Areas included and Key Environmental Protection Measures Recommended

Key Compensation Areas Included or Key Environmental Protection Measures Recommended	Environmental Benefits
Air Quality Construction Phase - Implement dust suppression measures - Clean existing treatment facilities before decommissioning / demolition - Adopt good site practices Operational Phase - Provide biogas treatment - Enclose major odorous sources of the Project and provide deodorization systems to treat the odourous gas	- Minimize air pollution - Protect air sensitive receivers in the surroundings
Water Quality Construction Phase - Implement proper construction site drainage - Provide treatment of construction site runoff and wastewater - Clean existing treatment facilities before decommissioning / demolition - Collect and treat contaminated site runoff	- Minimize water pollution. - Protect coastal water quality, marine ecological resources (e.g. coral communities), fisheries resources and

Key Compensation Areas Included or Key Environmental Protection Measures Recommended	Environmental Benefits
- Implement proper chemical handling, storage and disposal measures Operational Phase - Arrange THEES maintenance event outside algae blooming season - Consider any ongoing blooming event in the area, which may occur outside the blooming season, when scheduling of the THEES maintenance event - Provide dual power supply or ring main supply from CLP as well as standby facilities for main treatment units and standby equipment parts / accessories to avoid emergency discharge - Implement contingency plan for emergency discharge - Implement event and action plan and marine water quality monitoring programme for THEES maintenance and emergency discharge event	seawater intakes in Tolo Harbour and Tolo Channel
Tree Group in TPSTW used by Non-breeding Ardeids as an Occasional Night Roost - Transplant or replant the tree group within the new Project layout - Carry out felling / transplantation / removal of the tree group in wet season when the number of roosting ardeids is generally lower and avoid such works at least 1 hour before sunset - Cease noisy construction works within 100 m from the existing / transplanted / compensated tree group at least 1 hour before sunset	- Minimize disturbance to night roosting in the Project site - Provide longer term roosting opportunities for ardeids within the Project layout
Terrestrial Ecological Impacts due to Construction Disturbance - Promote environmental awareness of all construction site personnel particularly on the requirements for protection of species of conservation importance such as the pre-roosting / roosting sites of Collared Crows outside the Project site as well as the occasional night roost and Incense Tree within the Project site - Provide clear delineation and fencing of works areas at different construction stages and strictly prohibit construction outside the works areas - Adopt quieter pilling method, quality powered mechanical equipment and good site practices - Use movable and non-reflective temporary noise barriers (in the form of a vertical barrier with a small-cantilevered upper portion) as needed to screen construction noise towards the pre-roosting / roosting sites of Collared Crows outside the Project site	- Protect ecological resources from construction disturbance.
Landscape and Visual Construction Phase - Erect decorative screen hoarding for construction site - Carry out tree perseveration, transplantation and compensation in accordance with DEVB TCW No. 4/2020 - Implement good construction site management Operational Phase - Implement landscaping works, including tree planting along the Project site boundary, infill planting of tree, vertical greening and green roof, within the Project site as far as practicable - Provide responsive design for new buildings of the Project	- Minimize landscape and visual impact
Hazard to Life - Develop and implement on-site emergency procedures considering accidents at biogas facilities and perform regular drills during the temporary period of concurrent construction - Develop a joint emergency response plan between the Tai Po Gas Production Plant (TPGPP), the TPSTW and other relevant parties such as the Fire Services Department (FSD) in case of emergency in the TPGPP during construction and operational phases of the Project	- Safeguard the safety of population in the Project site and its surroundings

Key Compensation Areas Included or Key Environmental Protection Measures Recommended	Environmental Benefits
- Provide flammable gas and H_2S detectors with alarms in biogas areas of the Project - Restrict speed for vehicle movements in the Project site - Provide safety markings and marked crash barriers to aboveground gas piping, digesters and gas holders near access roads - Carry out risk and safety assessment at detailed design stage to define specific risk mitigation measure and contingency plan for the Project -	
Landfill Gas Hazard - Implement safety measures and landfill gas monitoring during the construction phase - Provide building protection design for new facilities of the Project and implement safety measures for entry into confined space during the operational phase	- Safeguard the occupational safety in the Project site
Waste Management Implications - Give top priority to waste avoidance, followed by minimization, reuse/recycling, treatment and safe disposal of waste (as a last resort) during Project design, construction and operation - Develop Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) in accordance with ETWB TC(W) No. 19/2005 for the Engineer's approval before commencement of Project construction - Manage excavated sediments in accordance with ETWB TC(W) No. 34/2002. - Follow WMP and best Management practices for waste management	- Promote sustainable waste management - Prevent environmental nuisances from waste handling, storage and disposal
Land Contamination - Carry out site re-appraisal and land contamination assessment after decommissioning of existing facilities in the Project site and undertake land remediation (if necessary) prior to commencement of the Project construction in accordance with the Guidance Note for Contaminated Land Assessment and Remediation, Practice Guide for Investigation and Remediation of Contaminated Land and Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management issued by EPD - Implement mitigation measures to control site runoff, wastewater, gaseous emissions from land remediation works if required	- Safeguard the occupational health of Project site personnel - Prevent contaminant release from contaminated lands and soil remediation works