

13. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

13.1 Introduction

13.1.1.1 This section elaborates the requirements of EM&A for the Project, based on the assessment results of various environmental issues.

13.1.1.2 This EIA Report presented 3 assessment scenarios namely: (a) developing a 3,000 tpd IWMF at the TTAL site alone; (b) developing a 3,000 tpd IWMF at an artificial island near SKC alone; and (c) developing a 3,000 tpd IWMF at the TTAL site and another 3,000 tpd IWMF at the artificial island near SKC. It is expected the Scenario (c) would likely give rise to potential cumulative air quality and health impacts of aerial emissions from the IWMFs during operation phase. This EIA report concluded that the monitoring requirement for each site will strictly follow. Therefore, a separate section presents the EM&A requirements for the Scenario (c) was considered not necessary.

13.1.1.3 The objectives of carrying out EM&A for the Project include the following:

- to provide a database against which any environmental impacts of the Project can be determined;
- to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
- to monitor the performance of the Project and the effectiveness of mitigation measures;
- to verify the environmental impacts predicted in this EIA;
- to determine project compliance with regulatory requirements, standards and government policies;
- to take remedial action if unexpected problems or unacceptable impacts arise; and
- to provide data to enable an environmental audit.

13.1.1.4 The EM&A reporting shall be carried out in paper based plus electronic submission upon agreeing the format with the ER and EPD. All the monitoring data (baseline and impact) shall also be submitted in electronic format.

13.1.1.5 The following sections summarise the recommended EM&A requirements. Details of EM&A are provided in the EM&A Manual.

13.2 Tsang Tsui Ash Lagoon Site

13.2.1 Air Quality Impact

13.2.1.1 With the implementation of practicable dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation, adverse construction dust impact is not expected during construction of the Project. Yet, regular site environmental audits during the construction phase of the Project as specified in the EM&A Manual should be conducted to ensure that the recommended dust suppression measures are implemented properly.

13.2.1.2 During the operation of the IWMF, the potential sources of air quality impacts would be the air emissions from the stacks of incineration process and the odour nuisance from the the waste reception halls, the waste storage area, the mechanical treatment plant. Air pollution control and stack monitoring system will be installed for the IWMF to ensure

that the emissions from the IWMF stack will meet the stringent target emission limits and all the potential odour emissions associated with the operation of the IWMF will be collected and destroyed by the incineration process or ventilated to deodorizer before discharge to the atmosphere. Monitoring of air quality parameters of concern due to stack emissions has to be conducted in accordance with the requirements similar to those stipulated in the "A Guidance Note on the Best Practicable Means for Incinerator (Municipal Waste Incineration) BPM 12/1". Besides, odour monitoring should be carried out by odour patrol to demonstrate the effectiveness of the proposed odour mitigation measures and to ensure the odour impact can be minimized to meet the air pollution control requirements.

13.2.2 Noise Impact

13.2.2.1 The study area for the potential noise impacts from the construction and operation of the IWMF is 300m from the boundary of the facilities. After carrying out detailed desktop review and site survey, no noise sensitive receiver (NSR) was identified within the study area. Construction and operation noise monitoring is therefore not considered necessary.

13.2.3 Water Quality Impact

13.2.3.1 To ensure no adverse water quality impact to the nearby stream due to the discharge of surface runoff and drainage from the works areas, water quality monitoring of the Tsang Kok stream is recommended during site formation. Marine water quality monitoring is also recommended during foundation piling of the IWMF to ensure that the foundation construction would not cause unacceptable release of PFA leachate into the Deep Bay waters. Details of the recommended water quality monitoring parameters to be measured and the proposed monitoring locations are provided in the stand-alone EM&A Manual for the Project. It is also recommended that regular site inspections be undertaken to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented.

13.2.4 Waste Management Implications

13.2.4.1 It would be the Contractor's responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and disposed of in accordance with the recommended good waste management practices and EPD's regulations and requirements. A Waste Management Plan (WMP) which would become part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW No.19/2005 by the Contractor. The mitigation measures recommended in Section 6 of this EIA Report should form the basis of the WMP.

13.2.4.2 Waste materials generated from construction activities, such as construction and demolition (C&D) materials, chemical waste and general refuse, are recommended to be audited at regular intervals (at least once per week as part of the regular site inspections described in EM&A Manual) to ensure that proper storage, transportation and disposal practices are being implemented. The Contractor would be responsible for the implementation of the mitigation measures to minimize waste or redress problems arising from the waste materials.

13.2.4.3 Besides, during operational phase of the Project, it is recommended that the incineration by-products should be tested in accordance with the requirements of the proposed Incineration Residue Pollution Control Limits as recommended in Table 6.2 of the EIA Report prior to disposal to landfill. A number of the land contamination preventive measures are also recommended in the EIA Report for the operation of the Project.

13.2.5 Ecological Impact

13.2.5.1 Implementation of the ecological mitigation measures described in **Section 7a.8** should be checked as part of the regular site inspections during the construction and operation phases. Details of environmental monitoring and audit (EM&A) requirement are discussed in the separate EM&A Manual.

13.2.6 Fisheries Impact

13.2.6.1 No unacceptable fisheries impacts would be expected from the Project. No specific monitoring programme for fisheries would be required.

13.2.7 Health Impact

13.2.7.1 Prior to the occupation of the IWMF buildings and quarterly during the first year of operation of the IWMF, radon concentration should be measured by professional persons in accordance with EPD's *ProPECC Note PN 1/99 Control of Radon Concentration in New Buildings Appendix 2, "Protocol of Radon Measurement for Non-residential Building"* to ensure the radon concentration is in compliance with the guidance value.

13.2.8 Landscape and Visual Impact

13.2.8.1 The Contractor shall employ a Registered Landscape Architect (RLA) and a Registered Architect (RA) with substantial construction site experience. The Registered Landscape Architect shall be in charge of the conduction of the baseline review, monitoring of the design, implementation and maintenance of the landscape mitigation measures as described in **Section 10a.10** during the construction and operation phases. The Registered Architect shall be in charge of the monitoring of the design, implementation and maintenance of the visual mitigation measures as described in **Section 10a.10** during the construction and operation phases.

13.2.8.2 The landscape and visual mitigation measures recommended in **Section 10a.10** shall be incorporated as soon as possible during detailed design stage, so as to ensure the mitigation effect and achieve the intended aims. Any changes to the mitigation measures that may be recommended as a result of the baseline review or on-going monitoring of the design, construction and establishment works shall be taken into account.

13.2.9 Impact on Cultural Heritage

13.2.9.1 No monitoring and audit programme on cultural heritage would be required.

13.2.10 Landfill Gas Hazards Assessment

13.2.10.1 During the operation phase of the Project, it is recommended that several landfill gas monitoring wells be installed into the ground on the development side of the gas barrier. Monitoring of landfill gas should be done at these monitoring wells as well as underground service voids and manholes by IWMF contractor to verify the effectiveness and to ensure the continued performance of the implemented protection measures.

13.3 An Artificial Island near SKC

13.3.1 Air Quality Impact

13.3.1.1 With the implementation of practicable dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation, adverse construction dust impact is not expected during construction of the Project. Yet, regular site environmental audits during

the construction phase of the Project as specified in the EM&A Manual should be conducted to ensure that the recommended dust suppression measures are implemented properly.

- 13.3.1.2 During the operation of the IWMF, the potential sources of air quality impacts would be the air emissions from the stacks of incineration process and the odour nuisance from the the waste reception halls, the waste storage area, the mechanical treatment plant. Air pollution control and stack monitoring system will be installed for the IWMF to ensure that the emissions from the IWMF stack will meet the stringent target emission limits and all the potential odour emissions associated with the operation of the IWMF will be collected and destroyed by the incineration process or ventilated to deodorizer before discharge to the atmosphere. Monitoring of air quality parameters of concern due to stack emissions has to be conducted in accordance with the requirements similar to those stipulated in the “A Guidance Note on the Best Practicable Means for Incinerator (Municipal Waste Incineration) BPM 12/1”. Besides, odour monitoring should be carried out by odour patrol to demonstrate the effectiveness of the proposed odour mitigation measures and to ensure the odour impact can be minimized to meet the air pollution control requirements.

13.3.2 Noise Impact

- 13.3.2.1 An EM&A programme is recommended to be established according to the expected occurrence of noisy activities. All the recommended mitigation measures for daytime normal working activities should be incorporated into the EM&A programme for implementation during construction. Details of the EM&A requirements are provided in the EM&A Manual.
- 13.3.2.2 The assessment has indicated that the noise from fixed plant noise would comply with the EIAO-TM criteria. Having said that, monitoring of operation noise from the proposed fixed plants during the testing and commissioning stage would be recommended to verify the compliance of the EIAO-TM criteria.
- 13.3.2.3 No adverse noise impact from operation of the Project is anticipated, therefore, no environmental monitoring and audit is proposed.

13.3.3 Water Quality Impact

- 13.3.3.1 Water quality monitoring and audit is recommended to be carried out during the proposed marine construction works at SKC to ensure that the recommended mitigation measures are implemented properly. During dredging, reclamation and submarine cable laying works, a water quality monitoring programme should be conducted to ensure no unacceptable water quality impacts will occur at the nearby WSRs. If the water quality monitoring data indicate that the proposed marine works result in unacceptable water quality impacts in the receiving water, appropriate actions should be taken to review the construction method and additional measures such as slowing down, or rescheduling of works should be implemented as necessary. During the reclamation, the opening for marine access would be shielded by silt curtains system to control the dispersion of filling material from the reclamation area. To ensure the actual efficiency of the silt curtains system would be at least as high as the level assumed in the assessment, a field trial to verify the reduction effect of the silt curtain during the EM&A stage is recommended. Daily site audit should be performed during the dredging for anti-scouring protection layer to ensure compliance with the recommended dredging rates suggested in the **Water Quality Impact Assessment**. Water quality monitoring and audit is also recommended to be carried out during the first four weeks of the commission of brine water discharge at SKC to ensure that no adverse water quality impact would occur due to the discharge of brine. Details of the water quality monitoring programme and the Event and Action Plan will be provided in the stand-alone EM&A Manual. Monitoring of effluent quality is also recommended for operation stage and under the perspective of the WPCO.

13.3.4 Waste Management Implications

- 13.3.4.1 It would be the Contractor's responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and disposed of in accordance with the recommended good waste management practices and EPD's regulations and requirements. A Waste Management Plan (WMP) which would become part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW No.19/2005 by the Contractor. The mitigation measures recommended in Section 6 of this EIA Report should form the basis of the WMP.
- 13.3.4.2 Waste materials generated from construction activities, such as dredged marine sediment, construction and demolition (C&D) materials, chemical waste and general refuse, are recommended to be audited at regular intervals (at least once per week as part of the regular site inspections described in EM&A Manual) to ensure that proper storage, transportation and disposal practices are being implemented. The Contractor would be responsible for the implementation of the mitigation measures to minimize waste or redress problems arising from the waste materials.
- 13.3.4.3 Besides, during operational phase of the Project, it is recommended that the incineration by-products should be tested in accordance with the requirements of the proposed Incineration Residue Pollution Control Limits as recommended in Table 6.7 of the EIA Report prior to disposal to landfill. A number of the land contamination preventive measures are also recommended in the EIA Report for the operation of the Project.
- 13.3.4.4 If biogas monitoring is required, it is recommended to establish gas boreholes for the monitoring of methane gas emission immediately after reclamation. Details of the recommended monitoring requirements are given in the EM&A Manual.

13.3.5 Ecological Impact

- 13.3.5.1 Implementation of the ecological mitigation measures described in **Section 7b.7** should be checked as part of the regular site inspections during the construction and operation phases. Details of environmental monitoring and audit (EM&A) requirement are discussed in the separate EM&A Manual.

13.3.6 Fisheries Impact

- 13.3.6.1 No unacceptable fisheries impacts would be expected from the Project. No specific monitoring programme for fisheries would be required.

13.3.7 Health Impact

- 13.3.7.1 The predicted health risk levels are complied with the proposed criteria at all receptors. No adverse human health risk impact is expected. Therefore, no monitoring and audit programme on health risk would be required.

13.3.8 Landscape and Visual Impact

- 13.3.8.1 The Contractor shall employ a Registered Landscape Architect (RLA) and a Registered Architect (RA) with substantial construction site experience. The Registered Landscape Architect shall be in charge of the conduction of the baseline review, monitoring of the design, implementation and maintenance of the landscape mitigation measures as described in **Section 10b.10** during the construction and operation phases. The Registered Architect shall be in charge of the monitoring of the design, implementation and maintenance of the visual mitigation measures as described in **Section 10b.10** during the construction and operation phases.

13.3.8.2 The landscape and visual mitigation measures recommended in **Section 10b.10** shall be incorporated as soon as possible during detailed design stage, so as to ensure the mitigation effect and achieve the intended aims. Any changes to the mitigation measures that may be recommended as a result of the baseline review or on-going monitoring of the design, construction and establishment works shall be taken into account.

13.3.9 Impact on Cultural Heritage

13.3.9.1 No monitoring and audit programme on cultural heritage would be required.