

14 ENVIRONMENTAL MONITORING & AUDIT MEASURES

14.1 Introduction

This EIA Study has focused on the assessment and mitigation of the potential impacts associated with the construction and operation of the Project. One of the key outputs has been the identification of mitigation measures to be undertaken so that residual impacts comply with regulatory requirements including the *EIAO-TM*. To confirm effective and timely implementation of the mitigation measures, it is considered necessary to develop Environmental Monitoring and Audit (EM&A) procedures and mechanisms by which the *Implementation Schedule (Annex 14A)* may be tracked and its effectiveness assessed.

14.2 Objectives of EM&A

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

- Providing baseline information against which any short or long term environmental impacts of the projects can be determined;
- Providing an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
- Monitoring the performance of the Project and the effectiveness of mitigation measures;
- Verifying the environmental impacts identified in the EIA;
- Determining project compliance with regulatory requirements, standards and government policies;
- Taking remedial action if unexpected results or unacceptable impacts arise; and
- Providing data to enable an environmental audit to be undertaken at regular intervals.

The following sections summarise the recommended EM&A requirements and further details are provided in the EM&A Manual.

14.3 Air Quality

The EIA study concluded that no air sensitive receivers (ASRs) will be affected by construction dust through the implementation of mitigation measures to reduce dust levels. During the operation phase, emissions will be controlled by integrated measures, regular inspections and relevant emissions licenses. Emissions from construction or operation phase are not predicted to yield concentrations that would lead to significant air quality impacts at the ASRs. Therefore, no air quality monitoring will be required for either the construction or operation phase, aside from that required by specific emissions licenses.

Regular site inspections and audits will be carried out during the construction phase in order to confirm that the mitigation measures are implemented and are working effectively. The detailed EM&A measures are presented in *Section 4.10* of the EIA Report and *Annex 14A*.

14.4 Noise

The EIA study of the Project concluded that with the proper implementation of practicable mitigation measures, including use of quiet construction plant, movable noise barriers, noise insulation sheet, scheduling of construction activities and noise enclosure, no adverse noise impacts are anticipated during construction phase and noise levels at all Noise Sensitive Receivers (NSRs) are predicted to comply with the EIAO requirements. During operation phase, all equipment will be accommodated inside the plant rooms and hence fully enclosed. Operational noise from the pumping station is assumed to be emitted through louvres. No adverse noise impacts are anticipated at the representative NSRs during the operational phase due to the large horizontal separation between the Project and the NSRs.

Regular site inspections and audits, and regular noise monitoring at NSRs as part of the EM&A programme during the construction stage is recommended in order to verify compliance with the regulatory requirements and conformity of the Contractor with regard to noise control and contract conditions. The detailed EM&A measures are presented in *Section 5.10* of the EIA Report and the EM&A Manual for this Project.

14.5 Water Quality

Computational modelling has been conducted to predict various potential water quality impacts from the proposed marine dredging operation under this Project, including Suspended Solids (SS) elevation, sedimentation, Dissolved Oxygen (DO) depletion, release of nutrient, heavy metal and trace organic pollutants. With the implementation of silt curtains around grab dredger and reduction of dredging rate at the seawater intake, the predicted SS elevation at the Water Sensitive Receivers (WSRs) nearby dredging works would be significantly reduced and would be in compliance to the Water Quality Objectives (WQOs) SS criteria. To ensure environmental compliance, marine water monitoring for the marine dredging works is recommended. Site audit would also be conducted throughout the marine and land-based construction under this Project. In situ testing of TRC should also be conducted for the discharge of chlorinated water for pipeline disinfection to ensure sufficient dechlorination. The marine works contractor is required to complete a silt curtain efficiency test for the combined use of floating silt curtain type and cage type silt curtain for dredging at seawater intake prior to intake dredging works to confirm the silt curtain reduction efficiency assumptions of the assessment.

Whilst the discharge of RO concentrate from the desalination process is the main environmental concern for the Project operation, no adverse water quality impact from the discharge of RO concentrate would be expected. To ensure environmental compliance, monitoring of discharge effluent quality and marine water quality at nearby selected WSRs are recommended. The detailed EM&A measures are detailed in *Section 6.12* and the EM&A Manual for this Project.

14.6 Sewerage and Sewage Implication

The proposed strategy, discharge of sewage directly via a sewerage system to the Tseung Kwan O Primary Treatment Works, is considered feasible in terms of regional sewerage strategy, land, environmental impact and construction considerations. The proposed plant is considered sustainable in terms of sewerage.

The configuration and alignment of the proposed new sewerage system will be confirmed in the detail design stage of this project, while the infrastructure design especially the road alignment and sewerage system of TKO Area 137 is proposed. Gravity sewer is a preferable option in term of cost-benefit consideration by constructing the sewer from the plant to connect the existing manhole. The detailed EM&A measures are provided in *Section 7.7* of the EIA Report.

14.7 Waste Management

A Waste Management Plan and C&D Material Management Plan (C&DMMP) will be devised which incorporates mitigation measures that have been proposed in the EIA Report to avoid or reduce potential adverse environmental impacts associated with handling, collection and disposal of waste arising from the construction and operation of this Project. Proposed measures are based on good management, control and site practices. The Project Proponent will implement the project in accordance with the Dumping At Sea Ordinance (DASO) and the requirements as stipulated in *ETWB TC(W) No. 34/2002*, prior to the application and allocation of space for dredging and disposal of marine sediment arising from the Project.

In order to confirm that the construction Contractor(s) has(have) implemented the recommendations of the EIA Report, regular site inspections and audits will be conducted of the waste streams, to determine if wastes are being managed in accordance with the approved procedures and the site Waste Management Plan. The inspections/audits will look at all aspects of waste management including waste generation, storage, recycling, transport and disposal. The first inspection/audit will be conducted at the commencement of the construction works. The detailed EM&A measures are presented in *Section 8.7* of the EIA Report.

14.8 Land Contamination

Before the hand-over of the TMS Site to WSD for further development, the owner of TMS Site and its contractor shall ensure the TMS site is properly cleaned up before handover to CEDD. After the TMS Site is handed over to WSD and before the commencement of any construction work, the contractor of WSD shall prepare a Contamination Assessment Plan (CAP) for EPD endorsement prior to the commencement of site investigation. A Contamination Assessment Report (CAR) shall be prepared to summarise the results of the site investigation. If land contamination is identified, a Remediation Action Plan (RAP) shall be prepared to identify feasible remediation methods and a Remediation Report (RR) shall be prepared to demonstrate completion of remedial actions for EPD endorsement.

In order to confirm that the construction Contractor(s) has(have) implemented the recommendations of the EIA Report, regular site inspections and audits during construction phase will be conducted in accordance with the approved procedures in CAP. The visual inspections/audits will look at all aspects of construction activities that disturb soil. The first inspection/audit will be conducted at the commencement of the construction works. The detailed EM&A measures are provided in *Section 8A.6* of the EIA Report.

14.9 Ecology

The assessment presented in *Section 9* of the *EIA Report* indicates that unacceptable construction and operation phase impacts are not expected to occur to terrestrial

ecological resources. The implementation of the ecological mitigation measures described in *Section 9.7* will be inspected regularly as part of the EM&A procedures during the construction period.

At the detailed design stage prior to the commencement of the slope mitigation works, a vegetation survey shall be carried out at the slope mitigation areas within the Clear Water Bay Country Park to assess the condition and identify the location of each individual of *Marsdenia lachnostoma* and other flora species of conservation interest that may be directly affected by the construction works. A specification for fencing and demarcating individuals of *Marsdenia lachnostoma* (or other flora species of conservation interest, if found) adjacent to the proposed alignment of the flexible barriers will be prepared to protect the species, and a detailed specification describing the exact locations of the flexible barrier foundation plates, soil nails and rock dowels will be prepared to illustrate how the setback distance from existing trees would be implemented for tree avoidance. Details of all the recommended mitigation measures are included within the Implementation Schedule provided in *Annex 14A*. No terrestrial ecology specific operational phase monitoring is considered necessary.

The dredging operations have been shown to proceed at rates that maintain environmental impacts to within acceptable levels following application of mitigation measures. The mitigation measures designed to mitigate impacts to water quality to acceptable levels (compliance with assessment criteria) are expected to mitigate impacts to marine ecological resources and thus specific measures are not deemed necessary. The water quality monitoring programme will provide management actions and supplemental mitigation measures to be employed should impacts arise, thereby ensuring the environmental acceptability of the Project.

The detailed EM&A measures for ecology are presented in *Section 9.10* of the EIA Report.

14.10 Fisheries

Results from the review indicate that fisheries importance of the Project Area and its vicinity is low when compared to other waters of Hong Kong. Sensitive receivers including spawning ground, nursery ground, artificial reefs and Fish Culture Zone area have been identified; however, the assessment of water quality impacts demonstrated that these areas will not be affected.

Monitoring activities designed to detect and mitigate any unacceptable impacts to water quality during construction phase are also expected to serve to protect against unacceptable impacts to fisheries. The details of the water quality monitoring programme are presented in the EM&A Manual attached to this EIA. The detailed EM&A measures are presented in *Section 10.10* of the EIA Report.

14.11 Landscape and Visual Impact

The Landscape and Visual Assessment of the EIA recommended a series of mitigation measures for the construction phase to mitigate the landscape and visual impacts of the Project. Details of all the recommended mitigation measures are included in *Sections 11.10.3* and *11.11.3* of the EIA Report and summarized in the Implementation Schedule provided in *Annex 14A*.

Implementation of the mitigation measures for landscape and visual resources recommended by the EIA will be monitored through the site inspection and audit programme.

14.12 Landfill Gas Hazard

The Landfill Gas Hazard Assessment of the EIA recommended a series of precautionary mitigation measures for the construction phase to mitigate the potential landfill gas hazard impacts of the Project. Details of all the recommended mitigation measures presented in *Section 12.7* of the EIA Report are summarized in the Implementation Schedule provided in *Annex 14A*.

Implementation of the mitigation measures for landfill gas hazard recommended by the EIA will be monitored through the site inspection and audit programme.

14.13 Hazard to Life

The EIA study concluded that no unacceptable risks are foreseen as a result of the operation of the desalination plant. No mitigation measures are thus deemed necessary and no monitoring will be required for the construction and operation phases. Safeguard measures in *Section 13.5.8* and *Annex L* are recommended to ensure the risk associated with the use, storage, and transport of chlorine and DGs at the proposed Desalination Plant complies with the Hong Kong Risk Guidelines and stays in "Acceptable" region. They are summarized in the Implementation Schedule provided in *Annex 14A*.

14.14 Summary of EM&A Measures

EM&A procedures are required during the design, construction and operational phases of the project implementation and a summary of the requirements for each of the environmental parameters is detailed in *Table 14.1*.

Table 14.1 Summary of EM&A Requirements

Parameters	EM&A Phase		
	Design Phase ^{(1) (2)}	Construction Phase	Operation Phase
Air Quality	-	✓(SI)	-
Noise	-	✓	-
Water Quality	-	✓	✓
Waste	-	✓ (SI)	-
Land Contamination	-	✓ (SI)	-
Ecology (Terrestrial & Aquatic)	✓	✓ (SI)	-
Fisheries	-	-	-
Landscape & Visual	✓	✓ (SI)	✓ (SI)
Landfill Gas Hazard	✓ ⁽³⁾	✓	✓ (SI)
Hazard to Life	✓	✓	✓

Notes:

" (SI) " = Site Inspection forms the main checking method; " - " = no EM&A required

(1) Pre-construction monitoring may overlap the design phase

(2) EM&A requirements in the design phase shall include confirmation on the compliance for environmental designs which were specified in the EIA Report and the EP for all parameters.

(3) The monitoring of landfill gas during construction would act as baseline monitoring.