

## 13 Environmental Monitoring and Auditing Requirements

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### 13.1 Introduction

**13.1.1.1** This section summarises the requirements on environmental monitoring and audits for the construction and operation of the Schedule 2 Designated Project (DP) item, i.e. an outdoor golf course and all managed turf areas, based on the assessment results of various environmental issues. Details of the Environmental Monitoring and Auditing (EM&A) programme can be referred to the separate EM&A Manual.

### 13.2 Project Organisation

**13.2.1.1** A project organisation consisting of the Engineer's Representative (ER), Independent Environmental Checker (IEC), Environmental Team (ET), Project Proponent and Contractor should be established to take on the responsibilities for environmental protection for the Project. The IEC will be appointed by the Project Proponent to conduct independent auditing on the overall EM&A programme including environmental and operation monitoring, implementation of mitigation measures, EM&A submissions, and any other submission required under the Environmental Permit (EP). The organisation, responsibilities of respective parties and lines of communication with respect to environmental protection works are given in the EM&A Manual.

### 13.3 EM&A Manual

**13.3.1.1** EM&A is an important aspect in the Environmental Impact Assessment (EIA) process which specifies the timeframe and responsibilities for the implementation of environmental mitigation measures. The requirements on environmental monitoring (including baseline and impact monitoring) are given in the EM&A Manual.

**13.3.1.2** A project specific EM&A Manual to the Project has been prepared as a part of the Environmental Impact Assessment Ordinance (EIAO) submission with reference to the latest design information available and Environmental Protection Department (EPD)'s generic EM&A Manual. The project specific EM&A Manual highlights the following issues:

- Organisation, hierarchy and responsibilities of the Contractor, the Engineer or ER, ET and IEC with respect to the EM&A requirements during construction phase of the Project;
- Information on project organisation and programming of construction activities for the Project;

- Requirements with respect to the construction schedule and necessary EM&A programme to track the varying environmental impacts;
- Full details of methodologies to be adopted, including all field, laboratory and analytical procedures, and details on quality assurance;
- Procedure for undertaking on-site environmental audits;
- Definition of Action and Limit Levels;
- Establishment of Event and Action Plans;
- Requirements of reviewing pollution sources and working procedures required in the event of non-compliance of environmental criteria and complaints;
- Requirements for reviewing the implementation of mitigation measures, and effectiveness of environmental protection and pollution control measures adopted; and
- Presentation of requirements for EM&A data and appropriate reporting procedures.

**13.3.1.3** The Contractor shall be requested to review the mitigation measures and Environmental Mitigation Implementation Schedule (EMIS) with respect to the design developments and construction methodology. Any proposed changes to the mitigation measures shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report.

## **13.4 Environmental Mitigation Implementation Schedule**

**13.4.1.1** An EMIS has been prepared alongside the Environmental Monitoring and Audit Manual (EM&A) of this EIA to summarise all the required mitigation measures need to be implemented during the design, the construction and operational phases of the Project. The implementation responsibilities have also been identified in the EMIS. The EM&A Manual has also presented the requirements for environmental monitoring and audit (e.g. monitoring and audit frequency).

**13.4.1.2** The Contractor should review the mitigation measures and EMIS with respect to the design developments and construction methodology. In case the Contractor needs to update the mitigation measures and EMIS, changes to the mitigation measures shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report.

## 13.5 EM&A Programme

**13.5.1.1** The Contractor and the future operator will be requested to implement and operate a monitoring programme throughout the entire construction period and the first two years of the operational phase of the Project. In case exceedance is found, the Contractor, future operator and ET should take immediate actions to implement remediation measures following the procedures specified in the EM&A Manual.

**13.5.1.2** Detailed requirements of the EM&A programme has been described in the EM&A Manual. Measurements and activities that shall be conducted in accordance with the requirements in the EM&A Manual are summarised as follows:

- Baseline monitoring (construction dust, noise and water quality etc.);
- Impact monitoring (construction dust, noise and water quality etc.);
- Remedial actions in accordance with the Event and Action Plans within the timeframe in case the specified criteria in the EM&A Manual were exceeded;
- Commissioning tests for the operation of the Project (fixed noise impact);
- Logging and keeping records of monitoring results; and
- Preparation and submission of Baseline, Monthly and Final EM&A Reports.

## 13.6 EM&A Requirement

### 13.6.1 Air Quality

#### **Construction Phase**

**13.6.1.1** With the implementation of dust suppression measures, no adverse environmental impact anticipated during the construction phase. However, construction dust monitoring, regular audits and site inspections at least once per week should be carried out during construction phase to ensure that dust level will comply with the relevant criterion and the recommended best management practices as recommended in this EIA Report and the EM&A Manual are properly implemented by the Contractor.

#### **Operational Phase**

**13.6.1.2** The amount of induced traffic generated by the Project is limited and no adverse impact from existing pollution sources is anticipated. Hence mitigation measure or monitoring and audits are not required.

## 13.6.2 Hazard to Life

### Construction Phase

**13.6.2.1** With proper population arrangement, no significant changes to the prevailing risks level is anticipated. Hence, mitigation measure or monitoring and audits are not required.

### Operational Phase

**13.6.2.2** With proper population arrangement, no significant changes to the prevailing risks level is anticipated. Hence, mitigation measure or monitoring and audits are not required.

## 13.6.3 Noise

### Construction Phase

**13.6.3.1** With the implementation of noise control measures, no adverse environmental impact anticipated during the construction phase. However, construction noise monitoring, regular audits and site inspections at least once per week should be carried out during construction phase to ensure that the construction noise levels will comply with the relevant criterion and the recommended best management practices as recommended in this EIA Report and the EM&A Manual are properly implemented by the Contractor

### Operational Phase

**13.6.3.2** The Contractor shall carry out a fixed noise commissioning test for planned fixed noise sources before its operation, and implement all necessary measures to ensure compliance with the noise standards stipulated in the TM-EIAO and NCO for fixed plant operations.

## 13.6.4 Water Quality

### Construction Phase

**13.6.4.1** With the implementation of good site practices to control construction site runoff, no adverse environmental impact anticipated during the construction phase. However, regular water quality impact monitoring at least 3 days per week should be carried out during the entire construction phase to ensure that water quality will comply with the relevant criterion and the mitigation measures recommended in this EIA Report and EM&A Manual are properly implemented by the Contractor.

### Operational Phase

**13.6.4.2** With the installation of a drainage system with a 50-year return period to reduce the chance of surface overflow, water storage tanks with a

total volume of 30,000m<sup>3</sup> to avoid and limit uncontrolled surface runoff and soil erosion, a proper location of the outfall from water storage tanks to minimise the water quality impact to the Water Sensitive Receivers (WSRs) in the vicinity from surface runoff, etc., potential environmental impact would be minimised during the operational phase.

**13.6.4.3** However, regular water quality impact monitoring at least once per 2 weeks should be carried out during the first 12 months of the operational phase and to be reviewed for the rest 12 months to ensure that water quality will comply with the relevant criterion recommended in this EIA Report.

## **13.6.5 Waste Management Implications**

### **Construction Phase**

**13.6.5.1** During construction phase, the Contractor shall manage all generated wastes in accordance with relevant legislation and guidelines. The recommended mitigation measures which include good site practice, waste reduction measures, employing trucks equipped with mechanical cover and GPS or equivalent system for transportation as well as maintaining record of trip-tickets should be implemented.

**13.6.5.2** Regular audits and site inspections should be carried out to ensure proper waste management measures recommended in this EIA Report and EM&A Manual are implemented by the Contractor.

### **Operational Phase**

**13.6.5.3** During operational phase, reputable waste collector should be employed to remove general refuse regularly. In addition, chemical waste which cannot be recycled should be disposed of at Chemical Waste Treatment Centre (CWTC). Furthermore, grass clippings and food waste should be composed on-site and used as fertilizer or soil conditioner in the golf course.

**13.6.5.4** As it is anticipated that there would not be any insurmountable impacts during the operational phase, monitoring and audit requirements are not required.

## **13.6.6 Land Contamination**

### **Construction Phase**

**13.6.6.1** Project Proponent (PP) is recommended to conduct further land contamination assessment at the storage/ workshop area at later stage of the Project after the area within the boundary of the Project and the works of the Project is handed over to the PP. Further land contamination assessment should include site re-appraisal, submission

of Land Contamination Review (LCR) or Contamination Assessment Plan (CAP), Site Investigation (SI) and submission of Contamination Assessment Report (CAR), if necessary. Necessary monitoring and audit requirements would be determined based on the findings of the further land contamination assessment. If land contamination is confirmed, a Remediation Action Plan (RAP) should be submitted to formulate viable remedial measures. Possible remediation methods include air sparging, biopile, stabilisation / solidification, thermal desorption, etc. The contaminated land should then be remediated according to the approved RAP, and a Remediation Report (RR) should be submitted to demonstrate the land has been remediated adequately.

### **Operational Phase**

**13.6.6.2** By following the procedures on the application, handling and storage of agrochemicals as well as measures to be carried out in the occurrence of chemical spillage as stated in the Environmental Conscious Turfgrass Management Plan (TMP) which will be prepared by the future operator and submitted to EPD for approval, it is anticipated that there would not be any insurmountable land contamination impacts during the operational phase, and thus monitoring and audit requirements are not required.

## **13.6.7 Landfill Gas Hazards**

### **Construction Phase**

**13.6.7.1** Periodically during ground-works construction, the works area should be monitored by the site Safety Officer for oxygen, methane and carbon dioxide gas concentrations using appropriately calibrated portable gas detection equipment. Routine monitoring should be carried out in all excavations, manholes, chambers and any other confined spaces that may have been created. The monitoring requirement of excavations stated in the Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/ 97) sections 8.25 to 8.27 will be followed. All measurements of landfill gas (LFG) should be recorded and documented by a standard record form to be approved by EPD. The form will detail the location, time of monitoring and equipment used, together with the gas concentrations measured to ensure all relevant data are recorded.

**13.6.7.2** Adequate site supervision will be required to ensure that protection measures are implemented and constructed in accordance with the design. In addition, a maintenance and monitoring programme should be established to ensure the continued performance of the implemented protection measures. Mitigation measures (such as gas detection system, mechanical ventilation system, etc.) should be regularly maintained and calibrated (if appropriate). Regular maintenance and calibration shall be properly recorded as one of the good site management measures.

**13.6.7.3** Settlement and slope stability should also be monitored. The monitoring proposal as well as the reporting requirement of the settlement and slope stability should be further agreed with relevant departments (e.g. Buildings Department and/or Civil Engineering and Development Department) during the detailed design stage.

#### **Operational Phase**

**13.6.7.4** Regular monitoring of LFG should be conducted to verify the effectiveness of the implemented protection measures. LFG monitoring would continuously be undertaken by EPD's landfill operator during the operational phase of the Project at the existing monitoring locations. In addition, always-on gas detection system should also be installed at the rooms, houses and indoor environment, such as car park, lift and staircases, golf shop, changing rooms, staff quarters and overnight accommodation etc. which will be occupied by medium and highly sensitive targets and be involved in the long-term uses to monitor the methane, carbon dioxide and oxygen gas concentrations. They should also be installed in confined spaces with significant size where entry of person is possible. Exceedance signal generated by the gas detection system would be delivered to the golf course operator, EPD and the existing landfill contractor. All exceedance should be recorded and reported to EPD according to the EM&A programme. Settlement and slope stability should also be monitored accordingly as discussed in **Section 13.6.7.3**.

**13.6.7.5** Adequate site supervision will be required to ensure that protection measures are implemented and maintained in accordance with the design. In addition, a maintenance and monitoring programme should be established to ensure the continued performance of the implemented protection measures. Mitigation measures (such as gas detection system, mechanical ventilation system, etc.) should be regularly maintained and calibrated (if appropriate). Regular maintenance and calibration shall be properly recorded as one of the good site management measures.

### **13.6.8 Ecology**

#### **Construction Phase**

**13.6.8.1** Tree groups at various locations within the Project Site, covering some of the tree groups with records of night roosting by Collared Crow and Black Kite, would be preserved. These included a major tree group at the southern end of the Project Site which was more frequently used by Collared Crows and Black Kite would be preserved. The construction phasing, practices and working hours should be duly adjusted to reduce impact on roosting birds in particular Collared Crows. The two individuals of Incense Tree *Aquilaria sinensis* recorded within the Project Site would be preserved in-situ together with the existing tree groups. Should further individuals of Incense Trees be found and having direct conflict with the golf course layout, transplantation plan

for *Aquilaria sinensis* would be prepared prior to commencement of site formation works to minimize the potential impact. Furthermore, good site practices are required to minimise the potential indirect impact.

**13.6.8.2** Collared Crow and Black Kite roost surveys are recommended at least monthly during the Phase 1 and Phase 2 of the construction programme, and at least weekly during the Phase 3 of the construction programme during construction of the Project.

**13.6.8.3** Site inspections and water quality monitoring during construction phase shall be carried out to monitor any malpractice leading to deterioration of water quality of the surrounding which may in turn affect marine ecology.

#### **Operational Phase**

**13.6.8.4** Collared Crow and Black Kite roost surveys are recommended to be carried out at least monthly for first year operations of the Project to review the status of these bird species of conservation importance.

**13.6.8.5** Water monitoring is also required during operational phase to verify the prediction of no anticipated adverse impact.

### **13.6.9 Fisheries**

#### **Construction Phase**

**13.6.9.1** Though fisheries impact is unlikely, precautionary practices to prevent fisheries impacts due to the deterioration of marine water quality should be implemented. Good site practices as listed in the water quality section shall be maintained. Site inspections during construction phase shall be carried out at least once per week to monitor any malpractice leading to deterioration of water quality of the surrounding which may in turn affect the fisheries resources. The proposed construction phase water quality monitoring programme stated in **Section 6** should cover the closest FCZ (i.e. Yim Tin Tsai FCZ).

#### **Operational Phase**

**13.6.9.2** During operational phase, the chance of affecting the water quality by the residual agrochemicals and fertilizers in turf area runoff should be minimised by the provision of storage tanks. As there is no anticipated adverse impact during operational phase, monitoring and audit requirements are not required. The proposed operational phase water quality monitoring programme stated in **Section 6** should cover the closest FCZ (i.e. Yim Tin Tsai FCZ).



## 13.6.10 Landscape and Visual

### Construction Phase

**13.6.10.1** The landscape and visual mitigation measures proposed should be incorporated in the landscape and engineering design. Mitigation measures to be implemented during construction should be adopted from the start of construction and be in place throughout the entire construction period. Site audits should be undertaken during the construction phase of the Project to check that the proposed landscape and visual mitigation measures are properly implemented and maintained as per their intended objectives. Site inspections should be undertaken at least twice a month during the construction period to ensure that the mitigation measures recommended in this EIA Report and EM&A Manual are properly implemented by the Contractor.

### Operational Phase

**13.6.10.2** Mitigation measures to be implemented during operation should be integrated into the detailed design and built as part of the construction works so that they are in place on commissioning of the Project. As there is no anticipated adverse impact during operation phase, monitoring and audit requirements are not required.