



Development of Organic Waste Treatment Facilities, Phase 2

Environmental Monitoring and Audit Manual
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Environmental Protection Department

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1. Introduction

1.1 Purpose of the Manual

The purpose of this Environmental Monitoring and Audit (EM&A) Manual (hereafter referred to as the Manual) is to guide the set up of an EM&A programme to ensure compliance with the Environmental Impact Assessment (EIA) Study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme proposed for the Organic Waste Treatment Facilities, Phase 2 (hereafter referred to as the Project). It aims to provide systematic procedures for monitoring, auditing and minimising environmental impacts associated with construction works and operation activities.

It should be noted that this EM&A Manual would be further reviewed and updated where necessary.

Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines have served as environmental standards and guidelines in the preparation of this Manual. In addition, the EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the Technical Memorandum on Environmental Impact Assessment Ordinance (EIAO-TM).

1.2 Project Description

The Project is a key part of the Hong Kong Government's drive to increase the sustainability of waste management in the HKSAR. The purpose of the facility is to treat large volumes of source-separated organic waste (principally food waste) from Commercial, Institutional and Industrial facilities in order to recover reusable materials and energy, such as compost and biogas, and minimise the volume of waste disposed of at Hong Kong's landfills.

The construction of the Project will involve demolition and removal of the existing above ground structures of the Sha Ling Livestock Waste Composting Plant (SLCP), construction of superstructure for an administration building and enclosed waste reception area, installation of treatment facilities including waste pre-treatment equipment, digesters, biogas holding tanks, composting, wastewater treatment, air treatment systems, and facilities for biogas processing, utilisation and transmission, etc.

When operational, the plant will process around 300 tonnes of organic waste per day to produce biogas and soil enhancement products (e.g. soil conditioner / compost). The organic waste will be source separated and delivered to the Project by road directly from the producers. The plant will either supply biogas directly to the gas network, or use it to generate renewable electricity on site. Surplus power may be exported to the grid. Treated wastewater will be discharged to the local sewerage network.

1.3 Project Location

The Project is located at Sha Ling in the North District, within the Frontier Closed Area (see **Figure 1.1**). The Site has an area of around 2.5 hectares, of which roughly 1.5 hectares has been previously developed. The former SLCP currently occupies the site; although this facility was decommissioned in 2010.

1.4 Construction Programme

The construction programme of the Project is scheduled to commence in mid-2015 for completion by 2017.

1.5 Project Organisation

The proposed project organisation is shown in **Figure 1.2**. The responsibilities of respective parties are outlined below:

The Contractor

The Contractor should report to the ER. The duties and responsibilities of the Contractor include:

- to comply with the relevant contract conditions and specifications on environmental protection;
- to employ an ET to undertake monitoring, laboratory analysis and reporting of EM&A;
- to facilitate ET's monitoring and site inspection activities;
- to participate in the site inspections undertaken by the ET and IEC, and undertake any corrective actions;
- to provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts;
- to submit proposals on mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event / Action Plans;
- to implement measures to reduce impact where Action and Limit levels are exceeded; and,
- to adhere to the procedures for carrying out complaint investigation.

The Engineer or Engineer Representative (ER)

The ER is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A include:

- to monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- to employ an Independent Environmental Checker (IEC) to audit the results of the EM&A works carried out by the Environmental Team (ET);
- to monitor Contractors', ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual;
- to facilitate ET's implementation of the EM&A programme;
- participate in joint site inspection by the ET and IEC;
- to oversee the implementation of the agreed Event / Action Plan in the event of any exceedance; and,
- to adhere to the procedures for carrying out complaint investigation.

The Environmental Team (ET)

The ET should be employed by the Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. ET Leader should have relevant professional qualifications in environmental control and possess at least 7 years experience in EM&A. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in the time under the Contract, to enable fulfilment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET should report to Project Proponent and the duties should include:

- to monitor and audit various environmental parameters as required in this EM&A Manual;
- to analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising;

- to monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications;
- to audit environmental conditions on site;
- to report on the environmental monitoring and audit results to EPD, the ER, the IEC and Contractor or their delegated representatives;
- to recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- to liaise with the IEC on all environmental performance matters, and ensure timely submission of all relevant EM&A pro forma for IEC's approval;
- to provide advice to the Contractor on environmental improvement, awareness and enhancement matters, etc on site;
- to adhere to the procedures for carrying out complaint investigation;
- to prepare reports on the environmental monitoring data and the site environmental conditions;
- to submit the EM&A report to Director of Environmental Protection (DEP) timely;
- to review proposals of mitigation measures from the Contractor in case of exceedance of Action and Limit levels, in accordance with Event and Action Plan; and,
- to carry out site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and mitigation measures.

Independent Environmental Checker (IEC)

The IEC is empowered to audit the environmental performance of construction, but is independent from the management of construction works. As such, the IEC should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should be a person who has relevant professional qualifications in environmental control and at least 7 years' experience in EM&A and environmental management. The duties and responsibilities of the IEC are:

- to provide proactive advice to the ER on EM&A matters related to the project.
- to review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET;
- to arrange and conduct regular, at least monthly site inspections of the works during the construction phase, and to carry out ad hoc inspections if significant environmental problems are identified;
- to check compliance with the agreed Event / Action Plan in the event of any exceedance;
- to check compliance with the procedures for carrying out complaint investigation;
- to check the effectiveness of corrective measures;
- to feedback audit results to the ET by signing off relevant EM&A pro forma;
- to check that mitigation measures are effectively implemented;
- to report the works conducted, and the findings, recommendations and improvements of the site inspections, after reviewing ET's and Contractor's works, to the ER on a monthly basis;
- to verify the investigation result of the environmental complaint cases and the effectiveness of corrective measures;
- to verify EM&A report that has been certified by ET leader; and,
- to audit EIA recommendations and requirements against the status of implementation of environmental mitigation measures on site.

2. Air Quality

2.1 Introduction

In accordance with the EIA Report, with recommended mitigation measures properly in place, no adverse air quality impact is expected during the construction phase of the Project. However, regular inspections of the construction activities and works areas should be conducted during the construction phase to ensure proper implementation of the recommended mitigation measures.

Potential air quality impacts arising from the construction and operation of the Project have been evaluated. Dust impact and SO₂ and NO₂ emissions from plants and site vehicles would be minimal. With the implementation of appropriate dust suppression measures stipulated in the Air Pollution Control (Construction Dust Regulation), adverse air quality impact is not anticipated.

During commissioning and operation, the EIA Report has determined that with the identified operational measures in place, no adverse air quality impact is expected. However, it is proposed that a Continuous Emission Monitoring System (CEMS) is used to monitor air emissions from the stack and confirm effective and satisfactory performance of OWTF2 in compliance with the Air Quality Objectives (AQO). In addition, odour monitoring should be conducted at the site boundary to confirm that the OWTF2 is not causing odour nuisance to its neighbours.

2.2 Construction Phase

With the implementation of the proposed dust suppression measures & good site practices, no unacceptable dust impact would be expected at the ASRs. However, regular inspection and audit of construction activities and works areas should be conducted by the Environmental Team on a weekly basis to ensure that the recommended mitigation measures are carried out by the Contractor. Special attention should be paid to the enforcement of dust control measures during construction process. The ET should consider the programme and site for construction works in determining the location to carry out the auditing.

Mitigation measures for dust control are identified in the EIA Report and include:

Good Site Management

- Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain a high standard of housekeeping to prevent emissions of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.

Disturbed Parts of the Roads

- Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or
- Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.

Exposed Earth

- Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.

Loading, Unloading or Transfer of Dusty Materials

- All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.

Debris Handling

- Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.
- Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.

Transport of Dusty Materials

- Vehicle used for transporting dusty materials/spoil should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.

Wheel washing

- Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.

Use of vehicles

- The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site.
- Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.
- Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.

Site hoarding

- Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.

2.3 Operation Phase

2.3.1 Chimney / Stack Monitoring

During commissioning the odour treatment system, Combined Heat and Power (CHP) units or boiler and the emergency flare should be monitored. During operation a Continuous Emission Monitoring System (CEMS) shall be installed to monitor emissions from the chimney / stack receiving the odour treatment system and Combined Heat and Power (CHP) units or boiler discharges.

Like OWTF1 The parameters to be monitored and analytical methods are presented in **Table 2.1**.

Table 2.1: Chimney / Stack Monitoring parameters and methods

Parameter	Method	Odour treatment Note 2	CHP/ boiler ^{Note 2}	Emergency Flare
Gaseous and vaporious organic substances (including NMVOC)	USEPA Method 18	X	X	X
	USEPA Method 0031			
Particulates	ISO 9096	X	X	X
	ASTM D3685-98			
	USEPA Method 17			
Carbon Monoxide	Combustion Gas Analyser	-	X	X
NO _x	USEPA Reference Methods	-	X	X
	USEPA Method 7 and associated methods			
SO ₂	USEPA Method 8	-	X	X
Hydrogen Chloride (HCl) and Hydrogen Fluoride (HF)	USEPA Method 26	-	X	X
	USEPA Method 13B sampling train			
Oxygen	Combustion Gas Analyser (chemical Cell and paramagnetic)	X	X	X
Velocity and Volumetric Flow	ISO 10780 and ISO 9096	X	X	X
Water Vapor Content and Temperature	USEPA Method 4	X	X	X

Source: OWTF1, EM&A Manual (December 2009) Approved EIA - AEIAR-149/2010

Note 1) Sampling methods are for reference and are subject to the approval of EPD

Note 2) The EIA assumes that the odour treatment system and Combined Heat and Power (CHP) units or boiler discharge through separate flues in the same chimney / stack

During operation the information collected by the CEMS shall be transmitted instantaneously to EPD by a telemetry system in a form and manner to be agreed with EPD.

2.3.2 Odour Monitoring

The odour patrols should be conducted by independent trained personnel / competent persons (at least 2 odour patrol members) patrolling and sniffing along an odour patrol route at the Project site boundary as shown in **Figure 1.1**.

The implementation of the odour patrol should be subject to the prevailing weather forecast condition and no odour patrol should be carried out during rainy day. The independent trained personnel / competent persons should pass a set of screening tests and fulfil the following requirements:

- have their individual odour threshold of n-butanol in nitrogen gas in the range of 20 to 80 ppb/v required by the European Standard Method (EN 13725);
- be at least 16 years of age and willing and able to follow instructions;
- be free from any respiratory illnesses;
- be engaged for a sufficient period to build up and monitor/detect at several monitoring location;
- not be allowed to smoke, eat, drink (except water) or use chewing gum or sweets 30 min before and during odour patrol;
- take great care not to cause any interference with their own perception or that of others by lack of personal hygiene or the use of perfumes, deodorants, body lotions or cosmetics; and
- not communicate with each other about the results of their choices.

The independent trained personnel / competent persons should use their noses (olfactory sensors) to sniff odours at different locations. The main odour emission sources and the areas to be affected by the odour nuisance should be identified. During the patrol, the sequence should start from less odorous locations to stronger odorous locations.

The perceived odour intensity is divided into 5 levels. **Table 2.2** describes the odour intensity for different levels.

Table 2.2: Odour Intensity Level

Level	Odour Intensity
0	Not detected. No odour perceived or an odour so weak that it cannot be easily characterised or described
1	Slight identifiable odour, and slight chance to have odour nuisance
2	Moderate identifiable odour, and moderate chance to have odour nuisance
3	Strong identifiable, likely to have odour nuisance
4	Extreme severe odour, and unacceptable odour level

The independent trained personnel / competent persons should record the findings including date and time, weather condition (e.g. sunny, fine, cloudy, and rainy), odour intensity, odour nature and possible odour sources, local wind speed, and wind direction at each location. In addition, some relevant meteorological data such as daily average temperature, and daily average humidity, on the day of odour patrol should be obtained from the nearest Hong Kong Observatory stations for reference. A sample data record sheet is shown in **Appendix A**.

Odour patrols should be conducted in summer (i.e. from July to September). In the first 2 operational years of the Project, monthly odour patrols should be conducted. Odour patrols should be carried out during daytime and evening / night time when the Project and its on-site wastewater treatment plant are operated under the normal operating condition.

The need to continue the odour patrol after the end of the 2-year monitoring period would depend on the monitoring results and should be agreed with EPD. If the level of odour intensity at any sniffing location is higher than 1 due to potential odour emission from the Project and its on-site wastewater treatment unit in two consecutive months, the odour patrol programme would be extended until the level of odour intensity (that is determined to be due to potential odour emission from the Project and its on-site wastewater treatment unit) at all the sniffing locations have dropped to 0 in three consecutive months.

Table 2.3 shows the action level and limit level to be used for odour patrol. Should any exceedance of the action and limit levels occurs, actions in accordance with the event and action plan in **Table 2.4** should be carried out.

Table 2.3: Action and Limit Levels for Odour Nuisance

Parameter	Action Level	Limit Level
Odour Nuisance (from odour patrol)	When one documented complaint is received ¹ , or Odour Intensity of 2 is measured from odour patrol.	Two or more documented complaints are received ¹ within a week; or Odour intensity of 3 or above is measured from odour patrol.

Note:

- Once the complaint is received by the Project Proponent, the Project Proponent would investigate and verify the complaint whether it is related to the potential odour emission from the Project and its on-site wastewater treatment unit.

Table 2.4: Event and Action Plan for Odour Monitoring

Event	Person-in-charge of Odour Monitoring	Action Project Proponent ¹
Action Level		
Exceedance of action level (Odour Patrol)	Identify source/reason of exceedance; Repeat odour patrol to confirm finding.	Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; Rectify any unacceptable practice; Implement more mitigation measures if necessary.
Exceedance of action level (Odour Complaints)	Identify source/reason of exceedance; Carry out odour patrol to determinate odour intensity.	Carry out investigation and verify the complaint; Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; Rectify any unacceptable practice; Implement more mitigation measures if necessary.
Limit Level		
Exceedance of Limit level	Identify source/reason of exceedance; Inform EPD; Repeat odour patrol to confirm findings; Increase odour patrol frequency to bi-weekly; Assess effectiveness of remedial action and keep EPD informed of the results; If exceedance stops, cease additional odour patrol.	Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 week; Rectify any unacceptable practice; Formulate remedial actions; Ensure remedial actions properly implemented; If exceedance continues, consider what more/enhanced mitigation measures should be implemented.

Note:

- Project Proponent should identify an implementation agent.

In the event when an odour complaint is received, Project Proponent should liaise with the complainant and register the complaint. The complaint register is to record detailed information regarding the odour complaint and hence, facilitates efficient investigation work. The registration should contain, but not be limited to the following information:

- Location of where the odour nuisance occurred;
- Date and time of the complaint and the nuisance event;
- Description of the complaint, i.e. the type and characteristics of the odour; and an indication of the odour strength (highly offensive / offensive / slightly offensive / just continuously detectable / intermittently detectable);
- Meteorological conditions from the nearest HK Observatory station at the time of complaint; and
- Name and contact information of the complainant.

3. Hazard to Life

3.1 Introduction

A hazard assessment (HA) has been conducted in this EIA study. Based on the evaluation of potential safety impacts, the risk associated with the proposed Organic Waste Treatment Facilities is considered to be within the acceptable region of the HK EIAO Societal Risk Guideline. Notwithstanding, risk minimisation measures have been incorporated into the design to further lower the risk and safeguard population in vicinity. As such, no mitigation measures are considered necessary.

3.2 Recommendations

The HA has assumed that the following “Good Practices” and “recommended design measures” for the safe operation of the Project should be carried out as far as reasonably practicable.

- The process plant building will be provided with adequate number of gas detectors distributed over the various areas of potential leak sources to provide adequate coverage.
- All electrical equipment inside the building will be classified in accordance with the electrical area classification requirements. No unclassified electrical equipment will be used during operations or maintenance.
- Reference can be made to Codes of Practice and guidance issued in Europe that applies to places where explosive atmospheres may occur (called ‘ATEX’ requirements). These are covered as part of the European Directive: the Explosive Atmospheres Directive (99/92/EC) and the UK regulations, Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). Where potentially explosive atmospheres may occur in the workplace, the requirements include, identifying and classifying (zoning) areas where potentially explosive atmospheres may occur; avoiding ignition sources in zoned areas, in particular those from electrical and mechanical equipment; where necessary, identifying the entrances to zoned areas; providing appropriate anti-static clothing for employees; and before they come into operation, verifying the overall explosion protection safety of areas where explosive atmospheres may occur.
- All safety valves design should take into account discharging any released fluid to a safe location, or stopping misdirection of fluid flows in order to avoid hazardous outcome.
- Safety markings and crash barriers will be provided to the aboveground piping, digesters and the gas holder near the entrance.
- Lightning protection installations will be installed following IEC 62305, BS EN 62305, AS/NZS 1768, NFPA 780 or equivalent standards.
- A 10m high boundary wall with fire resistance will be provided in the vicinity of the digester tanks, gasholders and gas purification equipment to protect the equipment against external fires, and to provide some protection to external areas from the effects of fire/explosion.
- Suitable fire extinguishers will be provided within the site. An External Water Spray System (EWSS) will be installed in appropriate areas, such as around the gasholders, gas purification, desulphurisation units, and digester areas. The facilities will also be equipped with fire and gas detection system and fire suppression system. Stringent procedures are implemented to prohibit smoking or naked flames to be used on-site.

- Fixed crash barriers will be provided in areas where process equipment is adjacent to the internal roadway to protect against vehicle collision. Adequate warning signage and lighting will also be provided and maximum speed limit will also be in place.

4. Noise

4.1 Introduction

The monitoring programme should be carried out by the ET to ensure that the noise level of construction works complies with the noise standards set in the EIAO-TM and the Technical Memoranda (TM) issued under the Noise Control Ordinance (NCO)

4.2 Construction Phase

4.2.1 Monitoring Requirements

The construction noise level should be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30min)}$ should be used as the monitoring parameter between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq(5 min)}$ should be employed for comparison with Noise Control Ordinance (NCO) criteria.

Supplementary information for data auditing, statistical results such as L10 and L90 should also be obtained for reference. A sample data record sheet is shown in **Appendix A** for reference.

4.2.2 Monitoring Equipment

As reference to the TM issued under the NCO, sound level metres in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications should be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter should be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB.

Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed should be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

The ET is responsible for the provision and maintenance of the monitoring equipment. He should ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation should be clearly labelled. The location of equipment installation should be proposed by the ET Leader and agreed with the ER and EPD in consultation with the IEC.

4.2.3 Monitoring Locations

The noise monitoring locations (refer to **Figure 4.1**) are summarised in **Table 4.1**. The status and locations of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader should propose updated monitoring locations and seek agreement from ER, IEC and EPD.

Table 4.1: Noise Monitoring Locations

ID	Description
N1	Village House No. 308, Sha Ling

ID	Description
N2	Village House No. 319, Sha Ling
N3	Village House No. 265, Sha Ling
N4	Village House in Sha Ling

When alternative monitoring locations are proposed, the monitoring locations should be chosen based on the following criteria:

- Monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts;
- Monitoring at the noise sensitive receivers at defined in the TM; and
- Assurance of minimal disturbance to the occupants during monitoring.

The monitoring station should normally be at a point 1m from the exterior of the sensitive receivers building façade and be at position 1.2m above the ground. If there is a problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements should be made. For reference, a correction of +3dB(A) should be made to the free field measurements. The ET Leader should agree with the IEC on the monitoring positions and the correction adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring should be carried out at the same positions.

4.2.4 Baseline Monitoring

The ET should carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring should be carried out daily for a period of at least two weeks. Before commencing the baseline monitoring, the ET should develop and submit to the IEC the baseline monitoring programme such that the IEC can conduct on-site audit to check accuracy of the baseline monitoring results.

There should not be any construction activities in the vicinity of the stations during the baseline monitoring.

In exceptional case, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader should liaise with IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.

4.2.5 Impact Monitoring

Noise monitoring should be carried out at all the designated monitoring locations. The monitoring frequency should depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:

- One set of measurement between 0700 and 1900 hours on normal weekdays

If construction works are extended to include works during the hours of 1900 – 0700 as well as public holidays and Sundays, additional weekly impact monitoring should be carried out during respective restricted hour periods. Applicable permits under NCO should also be obtained by the Contractor.

If a school exists near the construction activity, noise monitoring should be carried out at the monitoring stations for the schools during the school examination periods. The ET Leader should liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 4.3**, should be carried out. This additional monitoring should be continued until the recorded noise levels are rectified or demonstrated to be unrelated to the construction activities.

4.2.6 Event and Action Plan

The Action and Limit (AL) Levels for construction noise are defined in **Table 4.2**. Should non-compliance of the criteria occurs, action in accordance with the Event and Action Plan in **Table 4.3** should be carried out.

Table 4.2: Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hours on normal weekdays	When one documented complaint is received.	75 dB(A)

Note:

* 70dB(A) for schools and 65dB(A) during school examination periods.

If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Table 4.3: Event and Action Plan for Construction Noise

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to IEC and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation measures. 	<ol style="list-style-type: none"> 1. Review the investigation results submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise ER accordingly. 3. Advise the ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals.

Event	Action			
	ET Leader	IEC	ER	Contractor
Limit Level	<ol style="list-style-type: none"> 1. Inform IEC, ER, EPD and the Contractor. 2. Repeat measurement to confirm findings. 3. Increase monitoring frequency. 4. Identify source and investigate the cause of exceedance. 5. Carry out analysis of Contractor's working procedures. 6. Discuss with the IEC, Contractor and ER on remedial measures required. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise the implementation of remedial measures. 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes exceedance until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Submit further proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.

4.2.7 Mitigation Measures

Recommended construction noise control and mitigation measures are proposed in the EIA report. The Contractor should be responsible for the design and implementation of these measures under the supervision of the ER and monitoring by the ET.

The implementation schedule of the recommended noise mitigation measures is presented in **Appendix B**.

4.3 Operational Phase

With reference to the EIA report, as the design requirement of the plants and the commissioning tests will ensure the noise impact during operation phase will comply with the relevant EIAO-TM criteria, no environmental monitoring and audit for potential noise impact during the operation phase is considered necessary.

5. Water Quality

5.1 Introduction

The water quality impact assessment indicated that no adverse water quality impact would be expected associated with the construction and operation of the Project, with implementation of recommended mitigation measures. No unacceptable residual water quality impact was expected. Water quality monitoring is therefore not considered necessary. Regular site inspection should be undertaken to inspect the construction activities and works areas in order to ensure that the recommended mitigation measures are properly implemented.

5.2 Construction Site Audits

Regular site audits will help to ensure that the recommended mitigation measures are properly implemented during the construction works. It can also provide an effective means of control of any malpractices, and therefore achieve continual improvement of environmental performance on site.

5.2.1 Site Inspection

Site inspections should be carried out by the ET and should be based on the recommended mitigation measures for water pollution control. In the event that the recommended mitigation measures are not fully or properly implemented, deficiency should be recorded and reported to the site management. Suitable actions are to be carried out to:

- Record the problems and investigate the causes;
- Issue action notes to the Contractor who is responsible for the works;
- Implement remedial and corrective actions immediately;
- Re-inspect the site conditions upon completion of the remedial and corrective actions; and
- Record the event and discuss with the Contractor for preventive actions.

5.2.2 Compliance Audits

Compliance audits are to be undertaken to ensure that a valid discharge licence has been issued by EPD prior to the discharge of effluent from the Project site. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the Water Pollution Control Ordinance (WPCO) licence which is under the ambit of the relevant Regional Office (RO) of EPD. The audit results reflect whether the effluent quality is in compliance with the discharge licence requirements. In the event of non-compliance, suitable actions by the relevant parties should be undertaken to:

- Notify the site management on the non-compliance;
- Identify the sources of pollution;
- Check the implementation status of the recommended mitigation measures;
- Investigate the operating conditions of the on-site treatment systems;
- Implement corrective and remedial actions to improve the effluent quality;
- Increase monitoring frequency until the effluent quality is in compliance with the discharge licence requirements; and
- Record the non-compliance and propose preventive measures.

5.3 Mitigation Measures

The mitigation measures recommended for the construction phase of the Project are presented in **Appendix B**.

6. Waste Management

6.1 Introduction

Waste management 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 good waste management practices and EPD's regulations and requirements. The recommended mitigation measures should form the basis of the site Waste Management Plan to be developed by the Contractor in the construction phase.

6.2 Construction Phase Waste Management Implications

During construction phase, regular site inspection as part of the EM&A procedures should be carried out to determine if wastes are being managed in accordance with approved procedures and the site Waste Management Plan. It should look at different aspects of waste management including waste generation, storage, recycling, treatment, transport and disposal.

6.3 Mitigation Measures

The implementation schedule of the recommended waste management mitigation measures is presented in **Appendix B**.

7. Ecology

7.1 Introduction

The ecological impact assessment in the EIA report has evaluated the ecological consequences of the proposed Project and concluded that no unacceptable ecological impact will be resulted. No specific ecological mitigation measure is required while precautionary measures for the plantation area are proposed.

In addition, the mitigation measures for air quality, noise, water quality and landscape proposed in Sections 2, 3, 4 and 7 respectively would control the potential environmental impact to an acceptable level which in turn minimizing the potential ecological impact.

7.2 Ecological Mitigation Measures

The individual of *Aquilaria sinensis* of conservation interest identified within the Project Area will be preserved on-site. For precautionary purpose and to further ensure that no wild flora species of conservation interest will be affected, prior to commencement of any construction works, it is recommended to conduct a detailed vegetation survey as baseline monitoring to update the exact locations, number and condition of individuals of *Aquilaria sinensis* and any other floral species of conservation interest within the Project Area. Since only 0.025ha of plantation will be affected, where no floral species of conservation interest has been recorded, identification of individuals of floral species of conservation interest likely to be affected by the Project in the detailed vegetation survey is not expected. However, should such individuals be identified, mitigation measures, such as transplantation, shall be proposed and agreed with relevant authorities including EPD and AFCD prior to commencement of construction works.

During construction phase, erection of and maintenance temporary protective fence along the plantation area where trees and vegetation, including those of conservation concern identified under the detailed vegetation survey, would be retained within the Project Area is recommended for precautionary purpose to avoid any impact from construction activities such as vehicle movement and materials storage. While the protective fence should be properly maintained, monitoring of individuals of *Aquilaria sinensis* and any other floral species of conservation interest identified in the detailed vegetation survey during construction phase on a monthly basis is proposed to make sure that they are not affected by the construction works of the Project. Any irregularities and effectiveness of the precautionary measure should be monitored as part of the general site inspection and audit exercise during the construction phase.

The implementation schedule of the recommended measures is presented in **Appendix B**.

The mitigation measures for landscape impact proposed, including compensatory planting, would respectively serve as landscaping compensation for the minor number of trees to be felled. In addition, the environmental control/ mitigation measures for air quality, noise and water quality proposed would control the potential environmental impact to an acceptable level.

7.3 Environmental Monitoring and Audit

7.3.1 Baseline Monitoring

According to the EIA, an individual species of conservation interest *Aquilaria sinensis* within the Project Area will be preserved on-site. As the abundance of plants recorded in the EIA stage may be varied in the

detailed design stage, conducting a detailed vegetation survey to confirm the condition of site and the potentially affected plants prior to the commencement of the construction works is recommended. The scope of the vegetation survey should include the following:

- The checking and updating of the number, locations and condition of the *Aquilaria sinensis* identified in the EIA and any other floral species of conservation interest by actively search within the entire Project Area;
- Preparation of an updated location plan showing the individuals of *Aquilaria sinensis* and any other floral species of conservation interest identified within the Project Area during the detailed vegetation survey; and
- Confirmation on whether any of the individuals of *Aquilaria sinensis* and any other floral species of conservation interest identified within the Project Area during the detailed vegetation survey will likely be affected by the proposed works of the Project;
- Recommendation on protective measures of identified individuals of *Aquilaria sinensis* and any other floral species of conservation interest identified within the Project Area during the detailed vegetation survey should *in situ* preservation be considered feasible. Otherwise, remedial actions, such as transplantation, should be proposed.

A Vegetation Survey Report summarizing the findings and recommendations of the detailed vegetation survey should be prepared and submitted to AFCD for approval no later than one month prior to commencement of construction works.

7.3.2 Monitoring of Precautionary Measures

Temporary protective fence should be erected along the plantation area where trees and vegetation, including those of conservation concern identified under the detailed vegetation survey, would be retained within the Project Area. The protective fence should be properly maintained and monitored for the effectiveness. Monthly monitoring of individuals of *Aquilaria sinensis* and any other floral species of conservation interest identified in the detailed vegetation survey should be conducted during the construction phase to make sure that the floral species of conservation interest are not affected by the construction works of the Project. The ET should inspect whether the protective fence is properly erected and maintained during construction for adequate protection of the plantation area and record the conditions of the individuals of *Aquilaria sinensis* and any other floral species of conservation interest identified in the detailed vegetation survey.

7.3.3 Environmental Audit

It is recommended that audits should be carried out by the ET on a weekly basis to ensure that the recommended precautionary measures are carried out by the Contractor. Special attention should be paid to the enforcement of temporary protective fence around floral species of conservation interest. The ET should consider the programme and site for construction works in determining the location to carry out the auditing. Any observations and recommendations should be reported in periodic EM&A reports.

8. Landscape and Visual

8.1 Introduction

Potential landscape and visual impacts arising from the construction and operation of the Project have been evaluated. Landscape and visual impacts are anticipated during the construction and operation phase of the Project, but with the implementation of proposed mitigation measures, the impacts are generally insubstantial and acceptable.

8.2 Mitigation Measures

The EIA has recommended a series of landscape mitigation measures for both the construction and operational phases for the Project. These measures include the following as shown in **Tables 8.1 and 8.2**, which are also summarised in **Appendix B**.

Other than preservation of existing topsoil as good site practice, mitigation measures for reducing, offsetting and compensating for impacts have been designed into the Project during construction phase and are summarised in **Table 8.1**.

Table 8.1: Proposed Construction Phase Landscape Mitigation Measures

Mitigation Code	Mitigation Measure
CP1	Existing trees are retained whenever possible and protected during construction.
CP2	The construction site activities are carefully designed to minimise impact such as light, noise, tree felling and eyesores.
CP3	Transplantation would be performed whenever possible.

Mitigation measures for reducing, offsetting and compensating for impacts have been designed into the Project during operational phase and are summarised in **Table 8.2**.

Table 8.2: Proposed Operational Phase Landscape Mitigation Measures

Mitigation Code	Mitigation Measure
OP1	The location and layout of the proposed Project and associated facilities are designed in a way that has the lowest impact to the proposed site.
OP2	Amenity / compensatory planting will be utilised throughout the site.
OP3	Planting will be added by man-made slopes to give a more natural appearance.
OP4	Vertical and rooftop greening will maximise green space and soften hard structures.

8.3 Construction and Operational Phase Site Audits

The Contractor should implement landscape construction works and subsequent maintenance operations during the 12 month establishment period.

All measures undertaken by the Contractor during the construction phase and first year of the operational phase should be audited by the Environmental Team, on a regular basis to ensure compliance with the intended aims of the measures.

Site inspections should be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase. The scope of the audit is detailed below.

Operational phase auditing would be restricted to the last 12 months of the establishment works of the operational landscape measures.

- The extent of the agreed works areas should be regularly checked during the construction phase. Any trespass by the Contractor outside the limit of the works;
- The progress of the engineering works should be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken;
- All landscaping works are carried out in accordance with the specifications;
- The planting of new trees and other plants, are carried out properly and within the right season; and
- All necessary horticultural operations and replacement planting are undertaken throughout the Establishment Period to ensure the healthy establishment.

9. Environmental Audit

9.1 Introduction

Site Inspections provide a direct mean to trigger and enforce the specified environmental protection and pollution control measures. They should be undertaken routinely by the ET Leader to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works. He should submit a proposal for site inspection, deficiency and action reporting procedures to the IEC for agreement, and to the ER for approval. The Contractor's proposal for rectification would be made known to the ER and IEC.

Regular site inspections should be carried out at least once per week. The areas of inspection should not be limited to the environmental situation, pollution control and mitigation measures within the site; it should also review the environmental situation outside the area which is likely to be affected, directly or indirectly, by the site activities. The ET Leader should make reference to the following information when conducting the inspection:

- The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- The Environmental Permit conditions;
- On-going results of the EM&A program;
- Works progress and programme;
- Individual works methodology proposals (which should include proposal on associated pollution control measures);
- The contract specifications on environmental protection;
- The relevant environmental protection and pollution control laws; and
- Previous site inspection results undertaken the ET and others.

The Contractor should update the ET Leader with all relevant information of the construction contract for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works should be submitted to the IEC and the Contractor within 24 hours, for reference and for taking immediate action. The Contractor should follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.

The ET should carry out ad hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work.

9.2 Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong which the construction activities must comply with.

In order that the works are in compliance with the contractual requirements, relevant sections (e.g. sections related to environmental measures) of works method statements submitted by the Contractor to the ER for approval should also be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included.

The ET Leader should also keep himself informed of the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violation can be prevented.

The Contractor should regularly copy relevant documents to the ET Leader so that works checking can be carried out. The document should at least include the updated Work Progress Reports, the updated Works Programme, any application letters for different license / permits under the environmental protection laws, and copies of all the valid license / permit. The site diary should also be available for the ET Leader's inspection upon his request.

After reviewing the document, the ET Leader should advise the Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow up action, including any potential violation of requirements.

Upon receipt of the advice, the Contractor should undertake immediate action to remedy the situation. The ER should follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

9.3 Environmental Complaints

Complaints should be referred to the ET for action. The ET should undertake the following procedures upon receipt of any valid complaint:

- The Contractor to log complaint and date of receipt onto the complaint database and inform the ER, ET and IEC immediately;
- The Contractor to investigate the complaint to determine its validity, and assess whether the source of the problem is due to construction works of the Project with the support of additional monitoring frequency, stations and parameters, if necessary;
- The Contractor to identify mitigation measures in consultation with the IEC, ET and ER if a complaint is valid and due to the construction works of the Project;
- The Contractor to implement the remedial measures as required by the ER and to agree with the ET and IEC any additional monitoring frequency, stations and parameters, where necessary, for checking the effectiveness of the mitigation measures;
- The ER, ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;
- The ET to undertake additional monitoring and audit to verify the situation if necessary, and oversee that circumstances leading to the complaint do not recur;
- If the complaint is referred by the EPD, the Contractor to prepare interim report on the status of the complaint investigation and follow-up actions stipulated above, including the details of the remedial measures and additional monitoring identified or already taken, for submission to EPD within the time frame assigned by the EPD;
- The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and additional monitoring results in the monthly EM&A reports.

Handling of environmental complaints should follow the environmental complaint flow diagram and reporting channel as presented in **Figure 9.1**.

During the complaint investigation work, the Contractor and ER should cooperate with the ET in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor should promptly carry out the mitigation works. The ER should ensure that the measures have been carried out by the Contractor.

10. Reporting

10.1 Introduction

The reporting requirements of EM&A information are based upon a paper-documented approach. The same information shall also be available in an electronic medium in a format agreed with the IEC, ER and EPD i.e. both hard and electronic copy documents will be required.

Types of reports that the ET Leader should prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports should be made available to the Director of Environmental Protection. The exact details of the frequency, distribution and time frame for submission should be agreed with EPD prior to commencement of works.

10.2 Baseline Monitoring Report

The ET Leader should prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report should be submitted to all parties: the Contractor, the IEC, the ER and the EPD. The ET Leader should liaise with the relevant parties on the exact number of copies required. The format and content of the report, and the representation of the baseline monitoring data should be in a format to the satisfaction of EPD and include, but not be limited to the following:

1. up to half a page executive summary;
2. brief project background information;
3. drawings showing locations of the baseline monitoring stations;
4. monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations;
 - monitoring date, time, frequency and duration;
 - QA/QC results and detection limits;
5. details on influencing factors, including
 - major activities, if any, being carried out on the Site during the period;
 - weather conditions during the period;
 - other factors which might affect the results.
6. statistical analysis of the baseline data; the analysis should conclude if there is any significant difference between control and impact stations for the parameters monitored, and the following information should be recorded:
 - graphical plots of monitored parameters in the month annotated against;
 - the major activities being carried out on site during the period;
7. revisions for inclusion in the EM&A Manual; and

8. comments and conclusions.

10.3 Monthly EM&A Report

The results and findings of all EM&A work required in the Manual should be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report should be prepared by the ER, endorsed by IEC and submitted within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. Before submission of the first EM&A report, the ET Leader should liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium requirement. The ET Leader should review the number and location of monitoring stations and parameters to monitor every 6 months or on as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

i. First Monthly EM&A Report

The First Monthly EM&A Report should include at least the following:

- a. 1-2 pages executive summary;
 - Breaches of AL levels;
 - Complaints Log;
 - Notifications of any summons and successful prosecutions;
 - Reporting Changes; and
 - Future key issues.
- b. Basic Project Information
 - Project organisations including key personnel contact names and telephone numbers;
 - Programme;
 - Management structure; and
 - Works undertaken during the month.
- c. Environmental Status
 - Work undertaken during the month with illustrations (such as location of works daily dredging/filling rates percentage fines in the fill material used); and
 - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- d. Summary of EM&A requirements
 - All monitoring parameters;
 - AL Levels;
 - Event-Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA Report; and
 - Environmental requirements in contract documents.
- e. Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA Report, summarised in the updated implementation schedule (in **Appendix B**).

f. Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
 - Name of laboratory and types of equipment used and calibration details;
 - Parameters monitored;
 - Monitoring locations;
 - Monitoring date, time, frequency, and duration;
 - Weather conditions during the period;
 - Any other factors which might affect the monitoring results; and
 - QA/QC results and detection limits.
- g. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
- Record of all non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
 - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- h. Others
- An account of the future key issues as reviewed from the works programme and work method statements; and
 - Advice on the solid and liquid waste management status.

ii. **Subsequent Monthly EM&A Reports**

The subsequent Monthly EM&A Reports should include the following:

- a. Executive Summary (1-2 pages)
 - Breaches of AL levels;
 - Complaint Log;
 - Notifications of any summons and successful prosecutions;
 - Future key issues.
- b. Environmental Status
 - Works undertaken during the month with illustrations including key personnel contact names and telephone number; and
 - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- c. Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for air, noise, water quality and ecological impacts etc, as recommended in the EIA Report, summarised in the updated implementation schedule (see **Appendix B**).

d. Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
 - Name of laboratory and types of equipment used and calibration details;
 - Parameters monitored;
 - Monitoring locations;
 - Monitoring date, time, frequency, and duration;
 - Weather conditions during the period;
 - Any other factors which might affect the monitoring results; and
 - QA/QC results and detection limits.
- e. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
- Record of all non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
 - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- f. Others
- An account of the future key issues as reviewed from the works programme and work method statements; and
 - Advice on the solid and liquid waste management status.
- g. Appendix
- AL levels
 - Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results
 - Monitoring schedule for the present and next reporting period
 - Cumulative statistics
 - On complaints, notifications of summons and successful prosecutions
 - Outstanding issues and deficiencies

iii. Quarterly EM&A Summary Reports

The Quarterly EM&A Summary Report which should generally be around 5 pages (including about 3 of text and tables and 2 of figures) should contain at least the following information:

- a. up to half a page executive summary;
- b. basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
- c. a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (AL Levels); and
 - environmental mitigation measures, as recommended in the EIA Report.
- d. advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
- e. drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- f. graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
- g. advice on the solid and liquid waste management status;
- h. a summary of non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
- i. an quarterly assessment of constructional impacts on water quality at the project site including but not limited to comparison of the difference between the quarterly mean and 1.3 times of the ambient which is defined as 30% increase of the baseline data or EPD data of the related parameters by using appropriate statistical procedures. Suggestion of appropriate mitigation measures if the quarterly assessment analytical results demonstrate that the quarterly mean is significantly higher than the liaison water quality times of the ambient mean ($p < 0.05$);
- j. a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- k. a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- l. a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

- m. comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
- n. proponents' contacts and any hotline telephone number for the public to make enquiries.

iv. Final EM&A Review Reports

The Final EM&A Report should contain at least the following information:

- a. Executive Summary (1-2 pages);
- b. drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- c. basic project information including a synopsis of the project organisation contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
- d. a brief summary of EM&A requirements including:
 - (i) environmental mitigation measures, as recommended in the project EIA Report;
 - (ii) environmental impact hypotheses tested;
 - (iii) AL Levels;
 - (iv) all monitoring parameters; and
 - (v) Event-Action Plans;
- e. a summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report summarized in the updated implementation schedule;
- f. graphical plots and the statistical analysis of the trends of monitored parameters over the course of the project, including the post project monitoring (for the past twelve months for annual report) for all monitoring stations against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
- g. a summary of non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
- h. a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- i. a description of the actions taken in the event of non-compliance;
- j. a summary record of all complaints received (written or verbal) for each media liaison and consultation undertaken, action and follow-up procedures taken;
- k. a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection pollution control legislations locations and nature of the breaches, investigation, follow-up actions taken and results;

- l. a review of the validity of EIA Report predictions and identification of shortcomings in EIA Report recommendations;
- m. a review of the effectiveness and efficiency of the mitigation measures; and
- n. a review of success of the EM&A programme to cost effectively identify deterioration and to initiate prompt effective mitigatory action when necessary

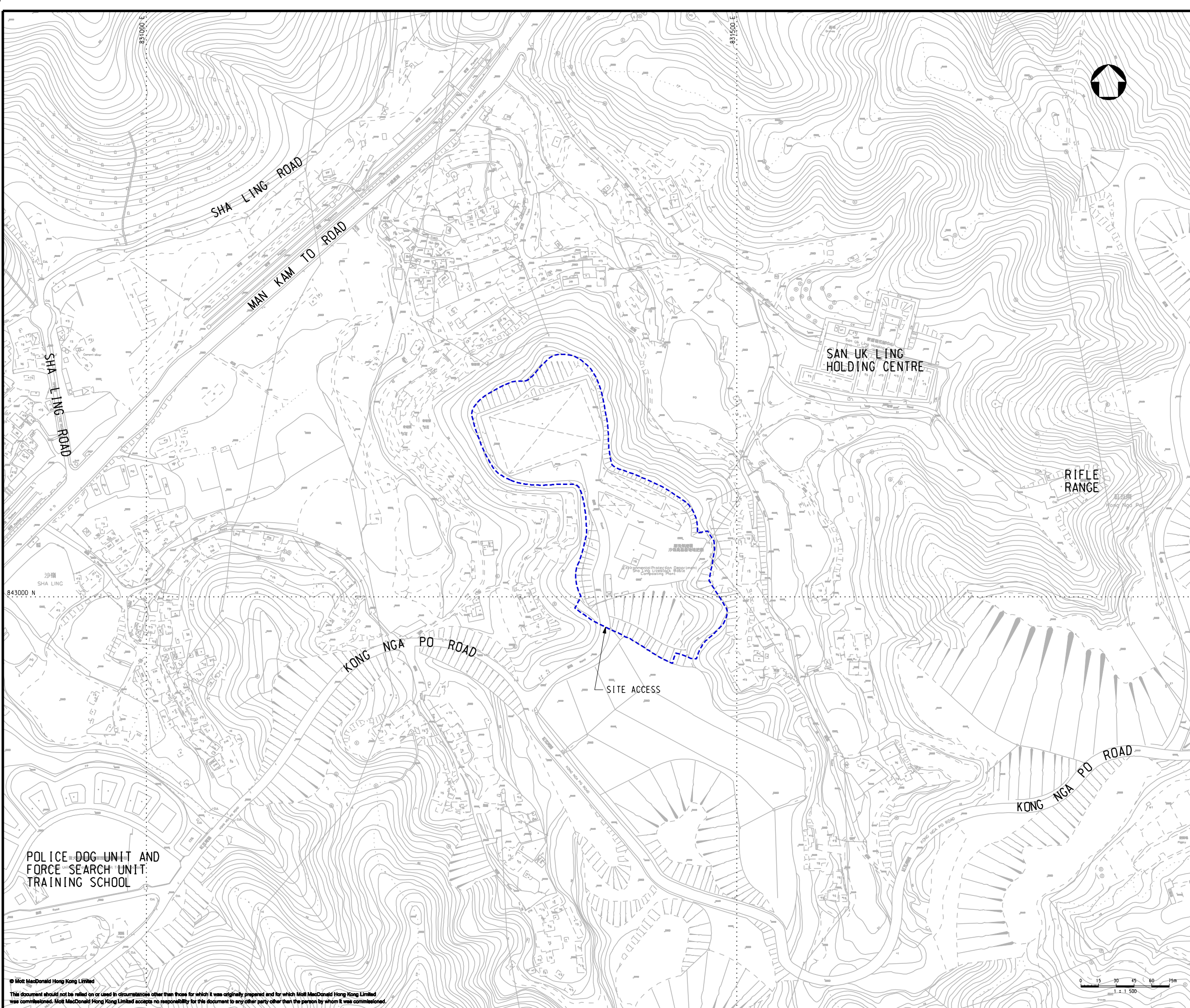
10.4 Data Keeping

The site document such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document should be well kept by the ET Leader and be ready for inspection upon request. All relevant information should be clearly and systematically recorded in the document. The monitoring data should also be recorded in magnetic media form, and the software copy can be available upon request. The water quality data software format should be agreed with EPD. All the documents and data should be kept for at least one year after completion of the construction contract.

10.5 Interim Notifications of Environmental Quality Limit Exceedances


With reference to Event and Action Plan, when the environmental quality limits are exceeded, the ET Leader should immediately notify the ER, the IEC and EPD, as appropriate. The notification should be followed up with advice to IEC and EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in **Appendix C**.

Figures




Notes

Key to symbols

 PROPOSED SITE AREA

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUN 13	MING	GENERAL REVISION	MR	AFK
P1	DEC 12	MING	FIRST ISSUE	MR	AFK



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Client



Environmental Protection Department
The Government of the Hong Kong
Special Administrative Region

Project

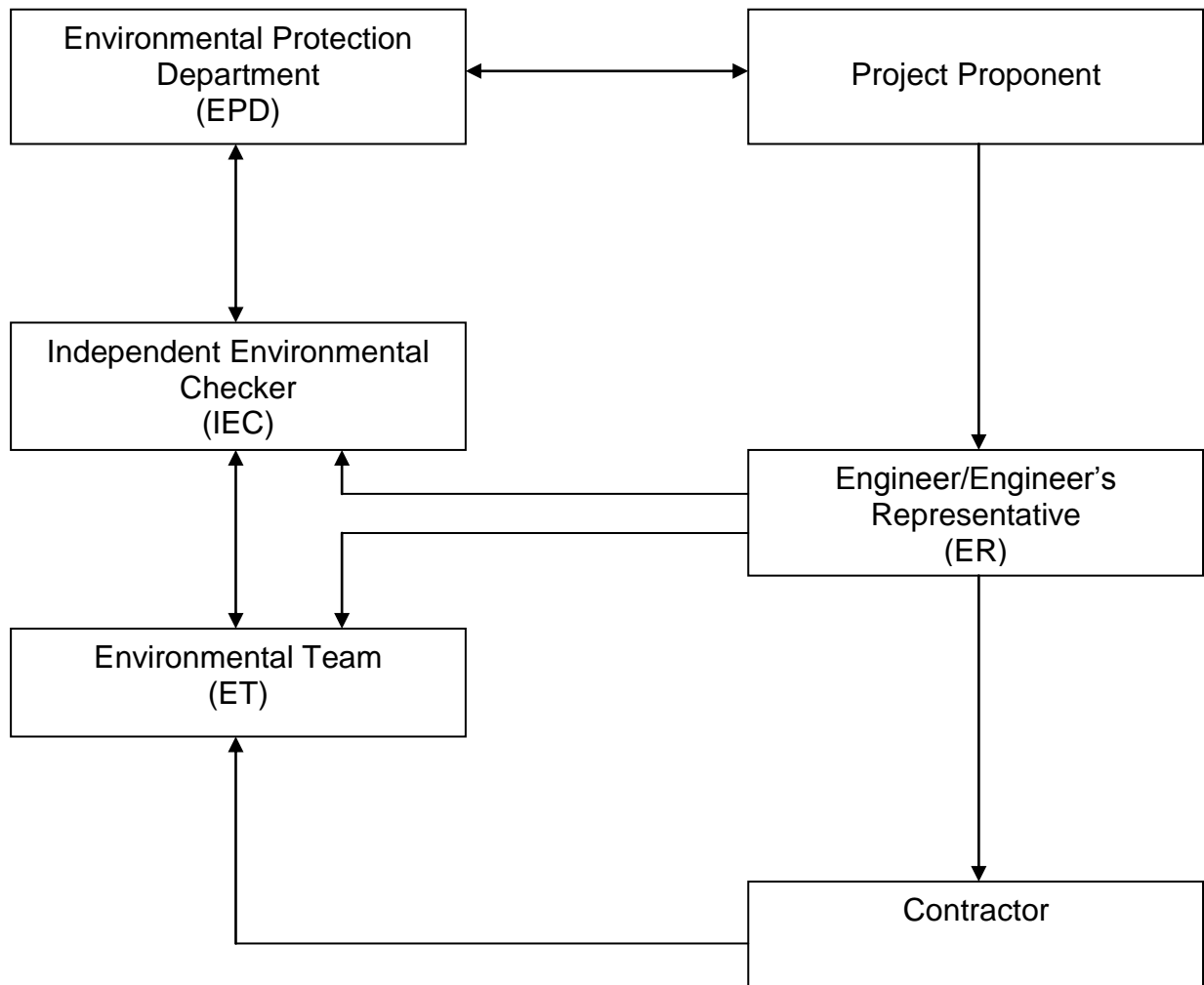
**AGREEMENT NO. CE34/2011(EP)
DEVELOPMENT OF ORGANIC WASTE
TREATMENT FACILITIES PHASE 2 -
FEASIBILITY STUDY**

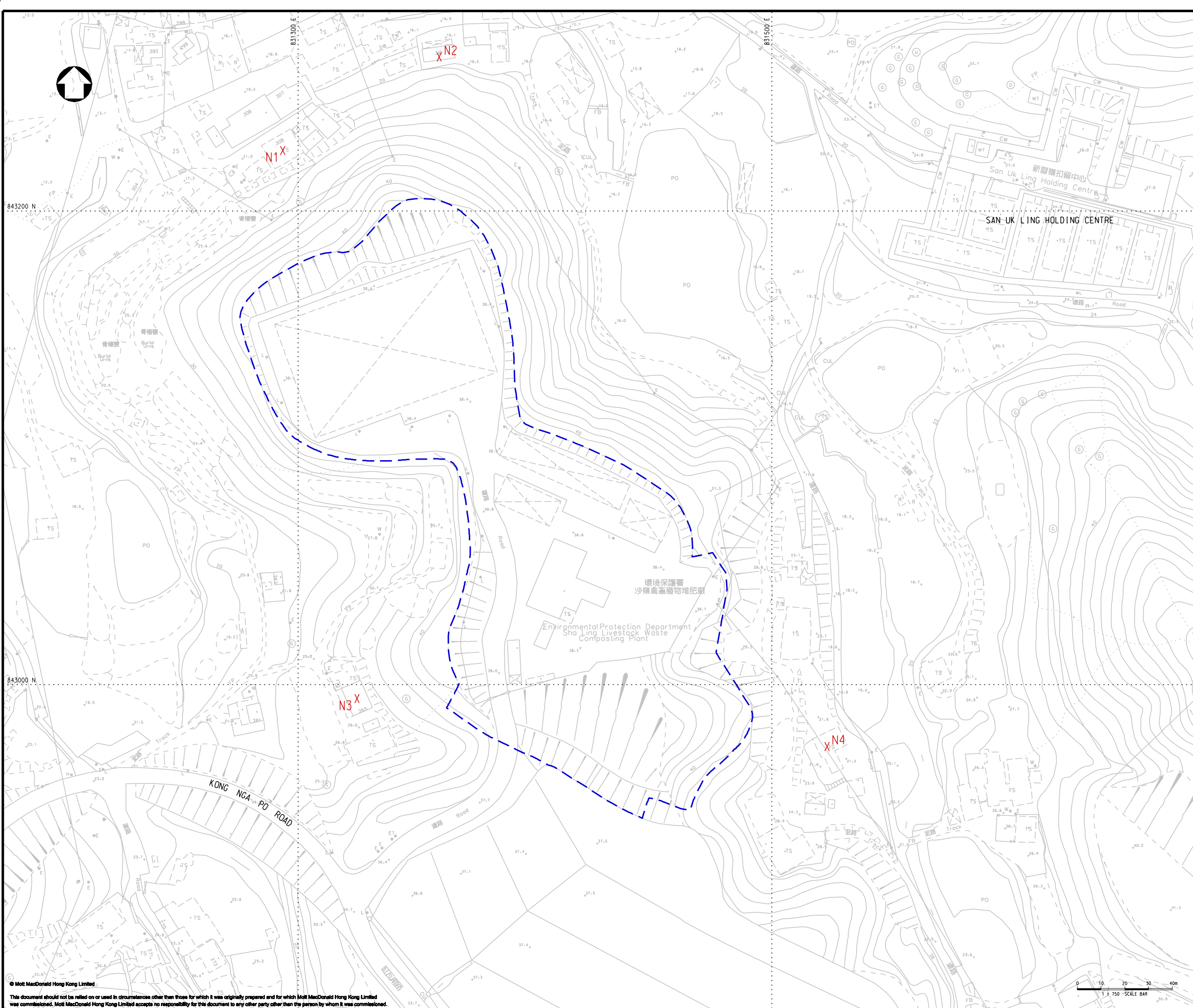
Title

LOCATION OF THE PROJECT

Designed	HY	Eng check	AT
Drawn	MING	Coordination	AT
Dwg check	HY	Approved	AFK
Scale at A1	Status		Rev
1:1500	PRE		P2
Drawing Number	FIGURE 1.1		

Figure 1.2 Typical Organization and Line of Communication





Notes

Key to symbols

— PROPOSED SITE AREA

X CONSTRUCTION NOISE MONITORING STATIONS


Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 13	MING	GENERAL REVISION	AM	AFK
P1	DEC 12	MING	FIRST ISSUE	SC	AFK



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AGREEMENT NO. CE34/2011(EP)
DEVELOPMENT OF ORGANIC WASTE
TREATMENT FACILITIES PHASE 2 -
FEASIBILITY STUDY

Title

PROPOSED LOCATIONS OF
CONSTRUCTION NOISE
MONITORING STATIONS

Designed	SC	Eng check	AT
Drawn	MING	Coordination	AT
Dwg check	EY	Approved	AFK
Scale at A1	1:750	Status	PRE
Drawing Number		Rev	P2

FIGURE 4.1

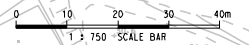
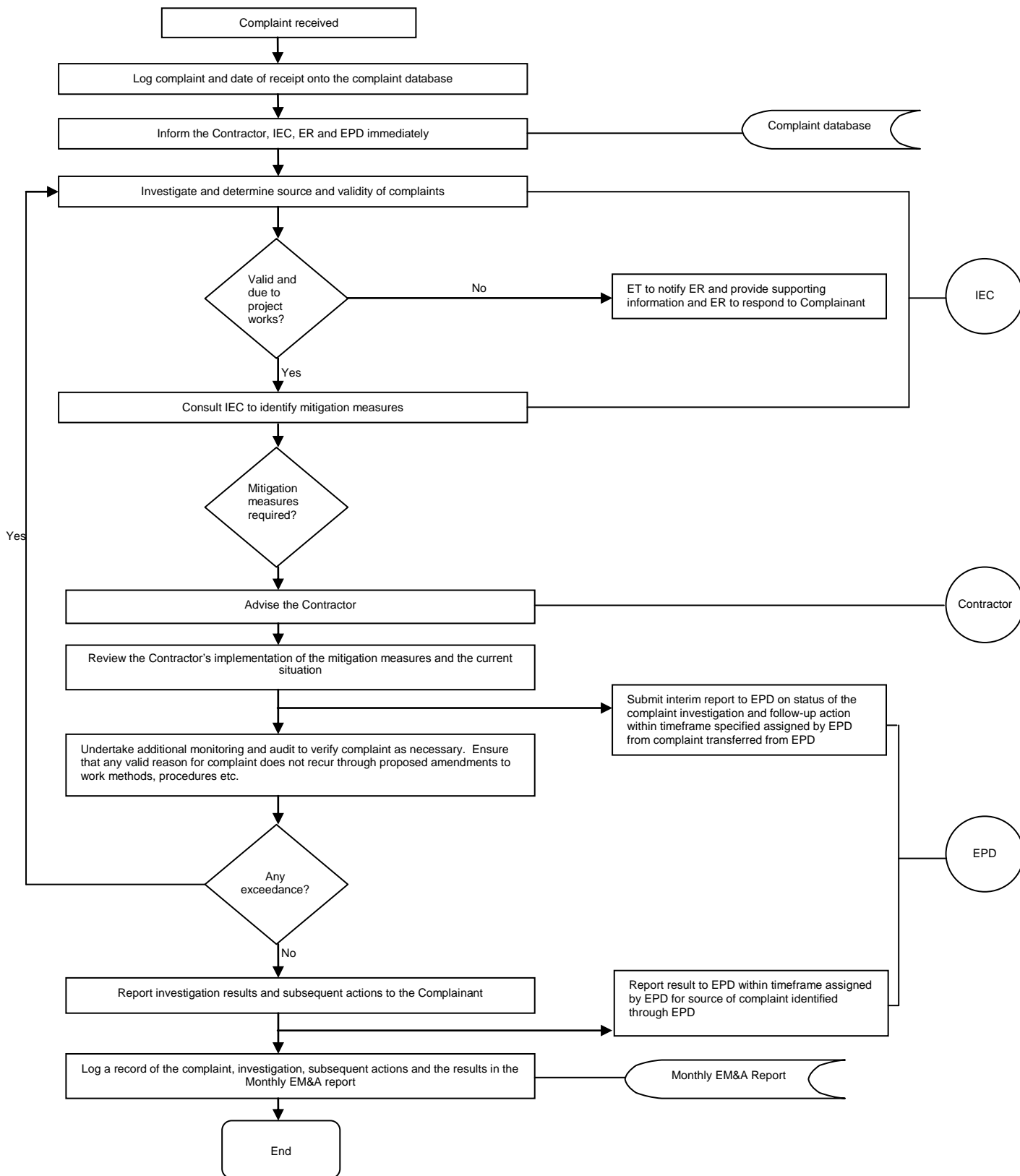


Figure 9.1 Flow Chart of Complaint Investigation Procedures



Appendix A Sample Environmental Monitoring Data Record Sheet

Odour Patrol Record Sheet

General Information	
Monitoring Station	
Date	
Weather	
Temperature	
Hunmidity	

ID	Location	Time	Odour Intensity		Odour Characteristics	Wind Direction	Wind Speed	Remarks
			OI-1	OI-2				

Note:

1. Odour intensity is to be divided into 5 levels which are ranked in the descending order as follows:
 - 0 - Not detected. No odour perceived or an odour so weak that it cannot be easily characterised or described;
 - 1 - Slight Identifiable odour, and slight chance to have odour nuisance;
 - 2 - Moderate Identifiable odour, and moderate chance to have odour nuisance;
 - 3 - Strong Identifiable, likely to have odour nuisance;
 - 4 - Extreme Severe odour, and unacceptable odour level.
2. OI-1 & OI-2: Odour intensity detected by panel member 1 & 2

	<u>Name & Designation</u>	<u>Signature</u>	<u>Date</u>
Record by:	_____	_____	_____
Checked by:	_____	_____	_____

Noise Monitoring Field Record Sheet

Monitoring Location							
Details of Location							
Date of Monitoring							
Measurement Start Time (hh:mm)							
Measurement Time Length (min.)							
Weather Conditions	Fine / Sunny / Cloudy / Rainy						
Wind Speed (m/s)							
Noise Meter Model/Identification							
Calibrator Model/Identification							
Calibration Before Measurement (dB(A))							
Calibration After Measurement (dB(A))							
Measurement Result	5min	5min	5min	5min	5min	5min	30min
L ₉₀ (dB(A))							
L ₁₀ (dB(A))							
L _{eq} (dB(A))							
Major Construction Noise Source(s) During Monitoring							
Other Noise Source(s) During Monitoring							
Remarks							

Name & Designation

Signature

Date

Record by:

Checked by:

Appendix B Environmental Mitigation Implementation Schedule

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
Air Quality Impact (Construction)									
3.8.1.1	2.4	<p>General Dust Control Measures</p> <p>Dust emissions could be suppressed by regular water spraying on site. In general, water spraying twice a day could reduce dust emission from active construction area by 50%. However, for the Project more frequent water spraying is proposed. Watering eight times per day, or once every 1.5 hours, is suggested at all active works areas in order to achieve a higher dust suppression efficiency of 87.5%.</p>	Within construction site / Duration of the construction phase	Contractor		✓			EIA Recommendation and Air Pollution Control (Construction Dust) Regulation
3.8.1.2	2.4	<p>Best Practice For Dust Control</p> <p>The relevant best practices for dust control as stipulated in the <i>Air Pollution Control (construction Dust) Regulation</i> should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good Site Management</i></p> <ul style="list-style-type: none"> ■ Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain a high standard of housekeeping to prevent emissions of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning. <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> ■ Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or ■ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road 	Within construction site / Duration of the construction phase	Contractor		✓			EIA Recommendation and Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>surface wet.</p> <p><i>Exposed Earth</i></p> <ul style="list-style-type: none"> Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. <p><i>Loading, Unloading or Transfer of Dusty Materials</i></p> <ul style="list-style-type: none"> All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. <p><i>Debris Handling</i></p> <ul style="list-style-type: none"> Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides. Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped. <p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards. <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely 							

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.</p> <p><i>Site hoarding</i></p> <ul style="list-style-type: none"> Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit. 							
Air Quality Impact (Operation)									
3.8.2	2.3	Odour patrol at site boundary of the Project	Site boundary / During operation stage (the need to continue the odour patrol after the end of the 2-year monitoring period would depend on the monitoring results and should be agreed with EPD)	OWTF Operator	✓		✓		EIAO-TM
3.8.2	2.4	Install gas cleaning equipment and stack on the CHP and odour treatment unit	CHP and odour treatment unit	Design Consultant / OWTF Operator	✓		✓		EIA Recommendation
		<ul style="list-style-type: none"> The preliminary design suggests the use of a two stage process involving either a biofilter or Ultraviolet Light (UV-C) together with ozone treatment as the first stage, and an activated carbon filter as the second stage for the odour treatment unit. It is recommended to install the UV-C and ozone treatment system with second stage active carbon filters as this has a lower footprint requirement than the biofilter option. However, the actual unit installed depends on the final design by the contractor in the design phase. The preliminary design incorporates a combination of thermal and catalytic treatment processes to remove pollutants from the exhaust gasses from the CHP. Both the odour treatment unit and the CHP emissions are suggested to be directed to a flue to aid the dispersion and minimise effects on ASRs. 							
Hazard Risk Assessment (Operation)									

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
4.9	3.2	<p>The HA has assumed that the following “Good Practices” and “recommended design measures” for the safe operation of OWTF 2 shall be carried out as far as reasonably practicable:</p> <ul style="list-style-type: none"> ■ The process plant building will be provided with adequate number of gas detectors distributed over the various areas of potential leak sources to provide adequate coverage. ■ All electrical equipment inside the building will be classified in accordance with the electrical area classification requirements. No unclassified electrical equipment will be used during operations or maintenance. ■ Reference can be made to Codes of Practice and guidance issued in Europe that applies to places where explosive atmospheres may occur (called ‘ATEX’ requirements). These are covered as part of the European Directive: the Explosive Atmospheres Directive (99/92/EC) and the UK regulations, Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). Where potentially explosive atmospheres may occur in the workplace, the requirements include, identifying and classifying (zoning) areas where potentially explosive atmospheres may occur; avoiding ignition sources in zoned areas, in particular those from electrical and mechanical equipment; where necessary, identifying the entrances to zoned areas; providing appropriate anti-static clothing for employees; and before they come into operation, verifying the overall explosion protection safety of areas where explosive atmospheres may occur. ■ All safety valves design shall take into account discharging any released fluid to a safe location, or stopping misdirection of fluid flows in order to avoid hazardous outcome. ■ Safety markings and crash barriers will be provided to the aboveground piping, digesters and the gas holder near the entrance. ■ Lightning protection installations will be installed following IEC 62305, BS EN 62305, AS/NZS 1768, NFPA 780 or equivalent standards. ■ A 10m high boundary wall with fire resistance will be 	During design and operation phases	Design Consultant / OWTF Operator	✓		✓		EIAO & EIAO TM Annex 4

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>provided in the vicinity of the digester tanks, gasholders and gas purification equipment to protect the equipment against external fires, and to provide some protection to external areas from the effects of fire/explosion.</p> <ul style="list-style-type: none"> ■ Suitable fire extinguishers will be provided within the site. An External Water Spray System (EWSS) will be installed in appropriate areas, such as around the gasholders, gas purification, desulphurisation units, and digester areas. The facilities will also be equipped with fire and gas detection system and fire suppression system. Stringent procedures are implemented to prohibit smoking or naked flames to be used on-site. ■ Fixed crash barriers will be provided in areas where process equipment is adjacent to the internal roadway to protect against vehicle collision. Adequate warning signage and lighting will also be provided and maximum speed limit will also be in place. 							
Noise Impact (Construction)									
5.9.1	4.2.7	<p>Good Site Practice Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during each phase of construction:</p> <ul style="list-style-type: none"> ■ only well-maintained plant to be operated on-site and plant should be serviced regularly during the construction works; ■ machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum; ■ plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs; ■ mobile plant should be sited as far away from NSRs as possible; and ■ material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site 	Within construction site / During construction phase	Contractor		✓			EIAO, EIAO-TM and Noise Control Ordinance

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
construction activities.									
5.9.1	4.2.7	Selection of Quieter PME The recommended quieter PME adopted in the assessment were taken from the EPD's QPME Inventory and British Standard, namely <i>Noise Control on Construction and Open Sites, BS 5228: Part 1: 2009</i> . It should be noted that the silenced PME selected for assessment can be found in Hong Kong.	Within construction site / During construction phase	Contractor		✓			EIAO, EIAO-TM and Noise Control Ordinance
5.9.1	4.2.7	Use of Movable Noise Barriers Movable noise barriers can be very effective in screening noise from particular items of plant when constructing the Project. Noise barriers located along the active works area close to the noise generating component of a PME could produce at least 10 dB(A) screening for stationary plant and 5 dB(A) for mobile plant provided the direct line of sight between the PME and the NSRs is blocked.	Within construction site / During construction phase	Contractor		✓			EIAO, EIAO-TM and Noise Control Ordinance
5.9.1	4.2.7	Use of Noise Enclosure/ Acoustic Shed The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and generator. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the EIAO Guidance Note No.9/2010.	Within construction site / During construction phase	Contractor		✓			EIAO, EIAO-TM and Noise Control Ordinance
5.9.1	4.2.7	Use of Noise Insulating Fabric Noise insulating fabric can also be adopted for certain PME (e.g. pilling machine etc). The fabric should be lapped such that there are no openings or gaps on the joints. According to the approved Tsim Sha Tsui Station Northern Subway EIA report (AEIAR-127/2008), a noise reduction of 10 dB(A) can be achieved for the PME lapped with the noise insulating fabric.	Within construction site / During construction phase	Contractor		✓			EIAO, EIAO-TM and Noise Control Ordinance
Noise Impact (Operation)									
5.9.2	4.2.7	Fixed Plant Noise Specification of the maximum allowable sound power levels of the proposed fixed plants should be followed. The following noise reduction measures should be considered as far as practicable during operation: <ul style="list-style-type: none"> ■ Choose quieter plant such as those which have been effectively silenced; 	Within construction site / During operation phase / Throughout operation phase	Design Consultant / Contractor	✓		✓		EIAO, EIAO-TM and Noise Control Ordinance

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<ul style="list-style-type: none"> ■ Include noise levels specification when ordering new plant (including chillier and E/M equipment); ■ Locate fixed plant/louver away from any NSRs as far as practicable; ■ Locate fixed plant in walled plant rooms or in specially designed enclosures; ■ Locate noisy machines in a completely separate building; ■ Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and ■ Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise. 							
Water Quality Impact (Construction)									
6.8.1.1	5.3	<p>Construction site runoff</p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and sensitive uses of the coastal area, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> ■ At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractor prior to the commencement of construction; ■ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt 	Within construction site / Duration of the construction phase	Contractor		✓			ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractors prior to the commencement of construction.</p> <ul style="list-style-type: none"> ■ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times. ■ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities. ■ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. ■ Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. ■ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into 							

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>foul sewers.</p> <ul style="list-style-type: none"> Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes. Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries. 							
6.8.1.2	5.3	<p>General construction activities</p> <p>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</p>	Within construction site / During construction phase	Contractor		✓			ProPECC Note PN 1/94
6.8.1.3	5.3	<p>Excavation works</p> <p>The construction programme should be properly planned to minimise excavation works during the wet season (April to September), temporarily exposed slope/soil surfaces should be covered by a tarpaulin or other means, as far as practicable. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94.</p>	Within construction site / During construction phase	Contractor		✓			ProPECC Note PN 1/94
6.8.1.4	5.3	<p>Accidental spillage</p> <ul style="list-style-type: none"> The Contractor should register as a chemical waste producer 	Within construction site / During construction phase	Contractor		✓			ProPECC Note PN 1/94 and Waste Disposal

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>if chemical wastes are produced from construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.</p> <ul style="list-style-type: none"> ■ Maintenance of vehicles and equipment, involving activities with potential for leakage and spillage, should only be undertaken within areas appropriately equipped to control these discharges. ■ Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event. ■ Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: <ul style="list-style-type: none"> – Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. – Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. – Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area. 						Ordinance	
6.8.1.5	5.3	<p>Sewage effluent from construction workforce</p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be</p>	Within construction site / During construction phase	Contractor		✓			ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
responsible for appropriate disposal and maintenance.									
Water Quality Impact (Operation)									
6.8.2.1	5.3	<p>Sewage effluent and sewerage impact</p> <p>In order to minimise the risk of exceeding capacity of the sewerage system, on-site underground storage of effluent is recommended for the OWTF 2, with a capacity of 6 hours of peak flow. Using the values presented in the preliminary design, the on-site storage required to buffer excess capacity would be equivalent to 30 m³. A below ground effluent retention tank would function to store effluent produced during peak periods when usage of the Sha Ling pumping station is high. Effluent stored during such periods could then be pumped out of the retention tank and discharged into the public sewer during off-peak times when capacity is sufficient.</p>	Within construction site / During design and operation phase	Design Consultant / OWTF Operator	✓		✓		EIA recommendations
6.8.2.2	5.3	<p>Wastewater generation from organic waste treatment processes</p> <p>Wastewater must be collected and diverted to the wastewater treatment plant (WWTP).</p> <p>An adequately sized WWTP with technologies such as membrane bioreactor, reverse osmosis or multi-phase separation process or system should be provided for the OWTF 2. Polluting parameters in the effluent should be in compliance with the requirements as specified in the TM-DSS.</p> <p><i>Leachate from the waste reception and composting process</i></p> <ul style="list-style-type: none"> A drainage system will be provided at the reception area connecting to the proposed onsite WWTP. The leachate would be treated in the WWTP and there would be no direct discharge of leachate. <p><i>Dewatering of the digestate from the separators</i></p> <ul style="list-style-type: none"> The wastewater generated from the dewatering of digestate from the digesters is expected to be around 229.18 m³/day and a peak flow of 5.31L/s. The on-site WWTP will deploy suitable treatment process in order to reduce the pollution level to an acceptable standard. The effluent shall be treated according to the TM-DSS standard before discharging to foul sewers. 	Within construction site / During design and operation phase	Design Consultant / OWTF Operator	✓		✓		TM-DSS, Water Pollution Control Ordinance

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p><i>Condensate from biogas drying, odour treatment and ventilation system</i></p> <ul style="list-style-type: none"> Condensate from biogas handling and wastewater from the odour treatment process would be collected and transferred to the WWTP. There is no direct discharge of wastewater to the sewer. <p><i>Washing of waste delivery trucks</i></p> <ul style="list-style-type: none"> Surplus wastewater generated from the vehicle washing facilities would be collected and transferred to the WWTP for further treatment before discharging to the foul sewer. <p><i>Untreated wastewater from wastewater treatment plant</i></p> <ul style="list-style-type: none"> Maintenance of the WWTP and its connection pipe work would be conducted regularly to confirm the condition of the holding tank and pipes. This will ensure early detection of any damage for repair or replacement. <p><i>Leakage of materials from WWTP</i></p> <ul style="list-style-type: none"> Regular scheduled maintenance of the WWTP will be carried out to confirm the condition of the facility and detect any damages at an early stage for repair or replacement. 							
6.8.2.3	5.3	<p>Contaminated stormwater runoff and accidental spillages</p> <p>Regular maintenance of plant facilities, as recommended in Section 6.8.2.2 of the EIA report, will be performed to confirm the condition of plant facilities and detect any damage for repair or replacement. Training should be provided to the employees on handling accidental spillage, so that in such cases, actions can be carried out quickly to avoid runoff to nearby streams/drains.</p>	Within construction site / During operation phase / Throughout operation phase	OWTF Operator			✓		TM-DSS; Water Pollution Control Ordinance
Waste Management Implications (Construction)									
7.6.1.1	6.3	<p>Good Site Practices</p> <p>Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> Obtain the relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); 	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor			✓		Waste Disposal Ordinance; Regulation and the Land (Miscellaneous Provisions) Ordinance;

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<ul style="list-style-type: none"> ■ Provide staff training for proper waste management and chemical handling procedures; ■ Provide sufficient waste disposal points and regular waste collection; ■ Provide appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; ■ Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; ■ Separate chemical wastes for special handling and disposal to licensed facilities for treatment; and ■ Employ licensed waste collectors to collect waste. 							Waste Disposal (Chemical Wastes) (General) Regulation; Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site
7.6.1.2	6.3	<p>Waste Reduction Measures</p> <p>Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> ■ Design foundation works to minimise the amount of excavated material to be generated; ■ Provide training on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; ■ Sort demolition debris and excavated materials from demolition works to recover reusable/recyclable portions ■ Segregation and storage of different types of waste in different containers or skips to enhance reuse or recycling of materials and their proper disposal ■ Encourage collection of recyclable waste such as waste paper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the work force ■ Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste 	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor	✓	✓			Waste Disposal Ordinance
7.6.1.3	6.3	<p>Excavated and C&D Materials</p> <p>In order to minimise impacts resulting from collection and transportation of C&D material for off-site disposal, the</p>	Project construction site / Throughout construction stage / Until completion	Contractor	✓	✓			Waste Disposal Ordinance ; DEVB Technical

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>excavated materials should be reused on-site as fill material as backfilling material and for landscaping works far as practicable. Other mitigation requirements are:</p> <ul style="list-style-type: none"> ■ A Waste Management Plan (WMP), which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TC(W) No.19/2005; ■ A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites) should be adopted for easy tracking; and ■ In order to monitor the disposal of excavated and non-inert C&D material at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to DEVB TC(W) No. 6/2010). 	of all construction activities					<p>Circular (Works) No.6/2010 for Trip Ticket System for Disposal of Construction & Demolition Materials;</p> <p>Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site</p>	
7.6.1.4	6.3	<p>Chemical Waste</p> <p>Should chemical wastes be produced at the construction site, the Contractor would be required to register with EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste (such as explosive, flammable, oxidizing, irritant, toxic, harmful, or corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the CWTC in Tsing Yi, or any other licensed facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor		✓		<p>Code of Practice on the Packaging Labelling and Storage of Chemical Wastes;</p> <p>Waste Disposal (Chemical Waste) (General) Regulation</p>	
7.6.1.5	6.3	<p>General Refuse</p> <p>General refuse should be stored in enclosed bins or compaction units separated from excavated and non-inert C&D materials. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from inert C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.</p>	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor		✓		<p>Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances</p>	

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
Regulation									
Waste Management Implications (Operation)									
7.6.2.1	6.3	<p>Good site practices</p> <p>Adoption of the following good operational practices should be recommended to minimise waste management impacts:</p> <ul style="list-style-type: none"> ■ Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation and the Land (Miscellaneous Provision) Ordinance (Cap. 28); ■ Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; ■ Use of a waste haulier licensed to collect specific category of waste; ■ A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at public filling facilities and landfills, and to control fly tipping. Reference should be made to DEVB TC(W) No. 6/2010. ■ Training of site personnel in proper waste management and chemical waste handling procedures; ■ Separation of chemical wastes for special handling and appropriate treatment at a licensed facility; ■ Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors; ■ Provision of sufficient waste disposal points and regular collection for disposal; ■ Adoption of appropriate measures to minimise windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and, ■ Implementation of a recording system for the amount of 	Construction site / On a regular basis / Throughout operation stage	OWTF Operator			✓	<p>Waste Disposal Ordinance;</p> <p>Waste Disposal (Chemical Waste) (General);</p> <p>Regulation and the Land (Miscellaneous Provision) Ordinance;</p> <p>DEVB Technical Circular (Works) No. 6/2010.</p>	

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		wastes generated, recycled and disposed of (including the disposal sites).							
7.6.2.2	6.3	<p>Waste reduction measures</p> <p>Adoption of the following good operational practices should be recommended to ensure waste reduction:</p> <ul style="list-style-type: none"> ■ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; ■ Encourage collection of aluminium cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force; and ■ Any unused chemicals or those with remaining functional capacity should be reused as far as practicable. 	Construction site / On a regular basis / Throughout operation stage	OWTF Operator			✓		Waste Disposal Ordinance; Waste Disposal (Chemical Waste) (General); Regulation and the Land (Miscellaneous Provision) Ordinance
7.6.2.3	6.3	<p>Waste generated from pre-treatment process</p> <p>Wastes generated from pre-treatment process should be recycled as far as possible. Wastes generated from pre-treatment process should also be separated from any chemical waste and stored in covered skips. The recyclables should be collected by licensed collectors, while the rest of the waste should be removed from the site on a daily basis to minimise odour, pest and litter impacts. Open burning must be strictly prohibited.</p>	Pre-treatment process / Throughout operation stage	OWTF Operator			✓		Waste Disposal (Chemical Waste) (General)
7.6.2.4	6.3	<p>Chemical Waste</p> <ul style="list-style-type: none"> ■ Chemical waste generated from machinery maintenance and servicing should be managed in accordance with the Code of Practice on the Packaging, Labelling and storage of Chemical Wastes under the provisions of Waste Disposal (Chemical Waste) (General) Regulation. The chemical waste should be collected by drum-type containers and, when transported off-site, removed by licensed chemical waste contractors. Alternatively, some of the chemical waste may be retained on-site for re-use by the Project in the manufacture of biogas or other products, subject to their composition being confirmed as suitable for such application. 	Construction site Throughout operation stage	OWTF Operator			✓		Code of Practice on the Packaging Labelling and Storage of Chemical Wastes; Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<ul style="list-style-type: none"> Plant / equipment maintenance schedules should be planned in order to minimise the generation of chemical waste. Non-recyclable chemical wastes and lubricants should be disposed of at appropriate facilities, such as CWTC. Copies or counterfoils from collection receipts issued by the licensed waste collector should be kept for recording purpose. Recyclable chemical waste will be transported off-site for treatment by a licensed collector. The Contractor will need to register with EPD as a chemical waste producer. 							
7.6.2.5	6.3	<p>General Refuse</p> <ul style="list-style-type: none"> Waste generated in site offices should be reduced through segregation and collection of recyclables. To promote the recycling of wastes such as used paper, aluminium cans and plastic bottles, it is recommended that recycling bins should be clearly labelled and placed at locations with easy access. For the collection of recyclable materials, they should be collected by licensed collectors. General refuse, other than segregated recyclable wastes, should be separated from any chemical waste and stored in covered skips. The general refuse should be removed from the site on a daily basis to minimise odour, pest and litter impacts. Also, open burning of refuse must be strictly prohibited. 	Construction site / On a regular basis / Throughout operation stage	OWTF Operator			✓		Waste Disposal Ordinance
Ecological Impact (Construction)									
8.7	7.3	For precautionary purposes and to further ensure that no wild flora species of conservation interest will be affected, prior to commencement of any construction works, it is recommended to conduct a detailed vegetation survey as baseline monitoring to update the exact locations, number and condition of individuals of <i>Aquilaria sinensis</i> and any other floral species of conservation interest within the Project Area. A Vegetation Survey Report summarizing the findings and recommendations of the detailed vegetation survey should be prepared and submitted to AFCD for approval no later than one month prior to commencement of construction works.	Before Project commencement	OWTF Operator	✓				EIAO-TM
8.7	7.3	During construction phase, erection of a temporary protective	Throughout construction	OWTF Operator			✓		EIAO-TM

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		fence along the plantation area where trees and vegetation, including those of conservation concern identified under the detailed vegetation survey, would be retained within the Project Area is recommended for precautionary purposes to avoid any potential impact from construction activities such as vehicle movement and materials storage. Establishment of the protective fence could also raise the awareness of personnel to be present and protection of the plants. While the protective fence should be properly maintained, monitoring of individuals of <i>Aquilaria sinensis</i> and any other floral species of conservation interest identified in the detailed vegetation survey during construction phase on a monthly basis should be conducted to make sure that they are not affected by the construction works of the Project.	stage						
Ecological Impact (Operation)									
No mitigation measure is required.									
Landscape and Visual Impact (Construction)									
Table 10.7 (CP1)	Table 8.1 (CP1)	Preservation of Existing Vegetation The development proposals would avoid disturbance to the existing trees as far as practicable within the confines of the development site. A preliminary tree survey has been undertaken to establish the existing resources. A tree survey review with formal tree removal application will be submitted to the relevant government departments for approval in accordance with ETWB TC(W) 03/2006 Tree Preservation, during the detailed design phase of the Project. Based on the preliminary findings it would be possible to retain 441 of the existing trees. If possible, all trees which are not in conflict with the proposals would be retained and shall be protected through the means of fencing, where appropriate, to prevent potential damage to tree canopies and root zones from vehicles and materials storage. Specifications for the protection of existing trees will be circulated to the relevant government authorities for approval together with the formal tree removal application.	Construction site / Throughout construction stage / Until completion of all construction activities	Contractor	✓	✓			Technical Circular (Works) No. 3/2006
Table 10.7 (CP2)	Table 8.1 (CP2)	Control of site construction activities <ul style="list-style-type: none"> ■ Storage of materials should be carefully arranged to minimise potential landscape and visual impact. 	Construction site / Throughout construction stage / Until completion	Contractor	✓	✓			EIAO-TM

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<ul style="list-style-type: none"> ■ The location and appearance of site accommodation should be carefully designed to minimise potential landscape and visual impact. ■ Site lighting should be carefully designed to prevent light spillage, ■ Extent of the works area and construction period should be minimised as far as practicable. ■ Screen hoarding with compatible design to blend into the surrounding natural environment should be considered. ■ Temporary works areas should be reinstated at the earliest possible opportunity. 	of all construction activities						
Table 10.7 (CP3)	Table 8.1 (CP3)	<p>Transplantation of existing trees</p> <p>Under current proposal, no tree is recommended to be transplanted since the trees in conflict with the proposed works are not suitable to be transplanted. However, should transplantation be proposed in the detailed design stage after an update tree survey, the recommended final recipient sites should be adjacent to their current locations. Enough time should be reserved for tree transplantation works to increase the survival rate of the transplanting trees. To ensure the survival of transplanted trees, protection work should be considered. The tree transplantation proposal will be submitted to relevant authorities for approval together with the formal tree removal application.</p>	Construction site / Throughout construction stage / Until completion of all construction activities	Contractor	✓	✓			Technical Circular (Works) No. 3/2006
Landscape and Visual Impact (Operation)									
Table 10.8 (OP1)	Table 8.2 (OP1)	<p>Design of the Proposed OWTF</p> <p>OWTF will incorporate design features as part of design mitigation measures including</p> <ul style="list-style-type: none"> ■ Integrated design approach - the location of OWTF should be within the existing Livestock Waste Composting Plant, as far as technically feasible. The location and orientation of the OWTF should be away from landscape and visually sensitive areas such as ponds and woodlands. ■ Building massing – the proposed use of simple responsive design includes having specific height profile requirement 	Construction site / During design stage	Design Consultant / OWTF Operator	✓				EIAO-TM

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		<p>such as, single-storey, lower than the adjacent building structures, and avoiding large built structure for supporting facilities to reduce the intrusion of mass in the rural areas.</p> <ul style="list-style-type: none"> ▪ Treatment of built structures – the structural design should seek to reduce the apparent visual mass of the facilities further through the use of natural materials such as wooden frames or other sustainable materials such as recycled plastics. ▪ Responsive building finishes – Natural tones should be considered for the colour palette for proposed structures. Non-reflective finishes are recommended on the outward facing building facades to reduce glare effect. ▪ Responsive lighting design – Aesthetic design of architectural and lighting with following glare design measures: <ul style="list-style-type: none"> – Directional and full cut off lighting is recommended within the boundaries of OWTF to minimise light spillage to the surroundings; – Minimise geographical spread of lighting, only applying for safety at the key access points and staircases; and <p>Limited lighting intensity to meet the minimum safety and operation requirement.</p>							
Table 10.8 (OP2)	Table 8.2 (OP2)	<p>Amenity / Compensatory Planting</p> <p>Tree retention within the works area is considered to be important. New tree plantings will be concentrated in the proposed amenity areas along the boundaries of the site and along the exterior of OWTF buildings. Although a preliminary planting proposal is not yet available at the moment of producing this EIA Report, anticipated new tree planting within the Project site should be able to fully compensate for the loss of 14 trees proposed to be felled in terms of both quantity and quality. 441 existing trees will be retained through preserving them at their current locations. Establishment of newly planted trees is expected. Trees with high amenity value will be placed along the access routes to provide shade and soften the hard structures of OWTF buildings. Amenity plantings will utilise native tree species found on existing neighbouring slopes or</p>	Construction site / during design and operation stage	Design Consultant / OWTF Operator	✓		✓		Technical Circular (Works) Nos. 7/2002 and 3/2006

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
		woodland areas to improve the ecological connectivity between existing habitats and create a coherent landscape network. Tree species with aggressive roots should be avoided to prevent damage to OWTF buildings and structures. Trees with high or moderate amenity value and low to medium maintenance should be considered as part of landscape resource enhancement. Recommended tree species include <i>Celtis sinensis</i> and <i>Liquidambar formosana</i> . These proposals will be subjected to review at detail design stage of the Project.							
Table 10.8 (OP3)	Table 8.2 (OP3)	Treatment of Slopes In accordance with GEO Publication No. 1/2011 “Technical Guidelines on Landscape Treatment for Slopes”, these engineering structures will be aesthetically enhanced through the use of soft landscape works including tree and shrub planting to give man-made slopes a natural appearance, blending into the natural landscape. Whip-sized plantings are preferred on the face of soil cut slopes, at the crest and toe of the slope and within berm planters. These smaller, younger plants can adapt to their new growing conditions quicker than larger sized stock and establish a naturalistic effect rapidly. Recommended tree species include <i>Mallotus paniculatus</i> , <i>Broussonetia papyrifera</i> and <i>Alangium chinense</i> .	Construction site / during design and operation stage	Design Consultant / OWTF Operator	✓		✓		GEO Publication No. 1/2011 “Technical Guidelines on Landscape Treatment for Slopes
Table 10.8 (OP4)	Table 8.2 (OP4)	Amenity enhancement Rooftop greening and vertical greening to mitigate the visual impact of taller structures can soften the façade of OWTF structures. Frameworks utilised for vertical greening should appear naturalistic.	Construction site / during design and operation stage	Design Consultant / OWTF Operator	✓		✓		Technical Circular (Works) No. 7/2002

Remarks:

1. Des – Design Stage, C – Construction Stage, O – Operation, Dec - Decommissioning

Appendix C Sample Interim Notification of Environmental Quality Limit Exceedances

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

Location Plan

Prepared by:

Designation:

Signature:

Date:

