OSCAR Bioenergy JV
Room 702, 7/F, Lee Garden Two,
28 Yun Ping Road,
Causeway Bay, HONG KONG
Tel : 2563 0661
Fax : 2565 8336

OSCAR Bioenergy Joint Venture

Your Ref: Nil
Our Ref: EPSP6110/LT/6687

16 July 2019

By Email & By Hand
(Ingo@epd.gov.hk)

Environmental Protection Department
The EIA Ordinance Register Office
27/F, Southern Centre,,
130 Hennessy Road,
Wanchai,,
HONG KONG

Attention: Mr. Lawrence K.L. Ngo - Senior Environmental Officer (Regional Assessement)

Dear Sirs,

Contract No EP/SP/61/10
Organic Resources Recovery Centre (Phase 1)
Re-submission of Environmental Monitoring & Audit (EM&A) Manual (Revision F)

The EM&A Manual for the Project was updated based on the findings in the Environmental Review Report (November 2015) submitted to EPD to support the application for Variation for an Environmental Permit (VEP-487/2015).

In accordance with Paragraph 5.1 of the Environmental Permit (FEP-01/395/2010/C), the revised EM&A Manual was certified by the ET Leader and verified by the IEC.

We are pleased to re-submit 3 copies of the revised EM&A Manual (Revision F) together with CD Rom for your approval.

Please do not hesitate to contact our Edwin Wong at 9388 8482 if further information is required.

Yours faithfully,
For and on behalf of
OSCAR Bioenergy Joint Venture

Laurent BICKERT
Project Manager

Our Ref: EPSP6110/LT/6687 (cont'd) Date : 15 July 2019

Encl. 3 copies of EM&A Manual Revision F

3 copies of Technical Note

3 copies of Environmental Team Check Certificate (CE-OSC-00-0-PM-0184-F)

3 copies 0f Independent Environmental Checker Verification Certificate

1 CD ROM

cc.	EPD	–	Ms. Theresa WU	(By Email)
	AECOM	–	Mr. Tim LEE	(By Email)
	MEINHARDT	-	Mr. Alan Wan	(By Email)
	ERM	-	Mr. Frank Wan	(By Email)

LBI/MTS/KHT/jlwk

Meinhardt Infrastructure and Environment Limited

Organic Waste Treatment Facilities, Phase I

Proposed update on Environmental Monitoring & Audit Manual

(July 2019)

Verified by: Helen Cochrane

Position: Independent Environmental Checker

Date: 16/7/19

ENVIRONMENTAL MONITORING REPORT CHECK CERTIFICATE

ENVIRONMENTAL PROTECTION DEPARTMENT
THE HONG KONG SAR GOVERNMENT

CONTRACT NO. EP/SP/61/10
ORGANIC WASTE TREATMENT FACILITIES PHASE 1

Environmental Monitoring Report Check Certificate : CE-OSC-00-0-PM-0184-F

Report No. & Rev. : NIL

Report Title: EM&A Manual Rev. F

Documents subject to this certification:

ENVIRONMENTAL MONITORING : We warrant, in accordance with Clause 50 of the Conditions of Contract, the environmental monitoring has been carried out as set out in the Specification:

Attachments

Ref:

Any departures from the above and/or the Employer's Directives are attached.

Signed		Signed	
Name	Frank Wan	Name	Laurent BICKERT
Position	Environmental Team Leader (Director/Partner)	Position	Project Manager (Director)
Organisation	ERM Hong Kong Limited (Environmental Team)	Organisation	OSCAR Bioenergy Joint Venture (Contractor)
Date	15 July 2019	Date	15 July 2019

CHECK : We certify in accordance with Clause 50 of the Conditions of Contract.

Attachments

Ref:

Signed		Signed	
Name		Name	
Position	(Director/Partner)	Position	(Director/Partner)
Organisation	(Sub-Consultant to Independent Consultants)	Organisation	(Independent Environmental Checker)
Date		Date	

1 JUSTIFICATION FOR REMOVAL OF ON LINE MONITORING OF NMVOC FOR CHP STACKS

1.1 BACKGROUND

The Organic Resources Recovery Centre Phase 1 (ORRC1) is a biological treatment facility with a capacity of about 200 tonnes per day converting source-separated organic waste from the commercial and industrial sectors (mostly food waste) into biogas and compost through proven biological treatment technologies. The facility is located at Siu Ho Wan in North Lantau with a site area of about 2 hectares.

The environmental acceptability of the construction and operation of the Facility had been confirmed by an Environmental Impact Assessment (EIA) Study completed in 2009. The EIA Report was approved by the Environmental Protection Department (EPD) (Register No.: AEIAR-149/2010) in February 2010 (approved EIA report). An Environmental Permit (EP) (No. EP-395/2010) was issued by EPD on 21 June 2010.

The Design, Build and Operate (DBO) Contract for the Facility (Contract No. EP/SP/61/10 Organic Waste Treatment Facilities Phase I) was awarded to a Joint Venture company (OSCAR Bioenergy Joint Venture), consisting of SITA Waste Services Limited, ATAL Engineering Limited and Ros-Roca, Sociedad Anonima (hereinafter referred to as OSCAR).

The EP was most recently varied on 21 December 2015 (No. EP-395/2010/C) due to the change of stack design parameters, site layout plan and on-site population during construction phase, and an Environmental Review Report (2015 ERR) was submitted in support of the variation of EP (VEP). A Further EP (No. FEP-01/395/2010/C) was issued to OSCAR on 21 December 2015.

1.2 MONITORING OF VOLATILE ORGANIC COMPOUNDS (VOC) AND NON-METHANE VOLATILE ORGANIC COMPOUNDS (NMVOC) FOR CHECKING OF ENVIRONMENTAL PERFORMANCE OF THE CHP EMISSIONS

Continuous monitoring of the total VOC is required at the stacks of the Centralised Air Pollution Control System (CAPCS), Cogeneration Units (CHP), and Ammonia Stripping Plant (ASP) as recommended in the Project's EM&A Manual. With reference to Table 2.3 of the previous version of the EM&A Manual (Revision D), the emission limit for total VOC for the CHP is 150 mg/Nm^3. A *Technical Note for Review of Air Quality Impact Assessment for the Proposed Change of VOC Emission Limit for Cogeneration Units* (hereafter referred to as the "Technical Note") submitted to EPD in February 2019 has demonstrated that the emission limit of 150 mg/Nm^3 for CHP is in fact referred to NMVOC, not total VOC. As presented in the Technical Note, the emission limit for total VOC for CHP was proposed to be 1,500 mg/Nm^3 with justifications provided. It has been demonstrated in the Technical Note that, with a total VOC emission limit of 1,500 mg/Nm^3 for CHP, the potential air quality impact due to total VOC emissions during ORRC1 operation is still

acceptable and well below the assessment criterion of 600,000 μg/m³ (1-hour average) as adopted in the approved EIA report. Based on the findings presented in the Technical Note, Table 2.3 of the Project's EM&A Manual was updated. Based on the latest Project's EM&A Manual (Revision E) submitted to EPD in February 2019, both total VOC and NMVOC are required to be continuously monitored at the stacks of CHP. The emission limits for total VOC and NMVOC for the CHP are 1,500 mg/Nm³ (at 6% O_2) and 150 mg/Nm³ (at 6% O_2), respectively. Monitoring parameters for CAPCS and ASP remain unchanged and thus NMVOC monitoring for these facilities are not required during ORRC1 operation according to the latest Project's EM&A Manual (Revision E).

Total VOC was identified as one of the air pollutants of concern arising from ORRC1 operation in the approved EIA report and 2015 ERR. According to the Technical Note, the air quality impact due to total VOC (including NMVOC and methane (1)) emissions from ORRC1 operation based on the latest emission limits and stack parameters is considered acceptable. It should be noted that as NMVOC form part of the total VOC, the potential air quality impact due to its emission from the CHP has been considered under the air quality impact assessment for total VOC emission. Therefore, if there total VOC concentration is below the emission limit, there will be no concern about the air quality impact regarding to NMVOC emission. As such, it is considered that the on-line monitoring of total VOC (which includes NMVOC) for CHP emission should be able to address the potential air quality impact associated with the NMVOC emission.

From an environmental performance monitoring perspective, it is considered not necessary to conduct on-line monitoring of NMVOC for the operation of the CHPs. It should also be noted that NMVOC was not part of the EM&A requirements for CHP in the first few approved manuals (i.e. original EM&A Manual approved with the EIA report and subsequent revisions A to D).

1.3 *TECHNICAL ISSUES ASSOCIATED WITH ON-LINE MONITORING OF NMVOC*

As indicated in *Table 1*, the VOC emitted from the CHP stacks mainly consist of methane and the NMVOC concentrations are well below the emission limit. Measurement of NMVOC emitted from CHP using on-line monitoring equipment is not common, and therefore no job reference can be provided by the continuous environmental monitoring system (CEMS) suppliers. Furthermore, direct measurement of NMVOC is not offered by the CEMS suppliers approached. As a result, the NMVOC concentration in the CHP emission has to be determined from separate on-line monitoring of total VOC and methane. The concentration of NMVOC is then calculated by subtracting the total VOC concentration by the respective methane concentration.

(1) From the results of the gas sampling and laboratory analysis of the CHP emissions during the initial stage of the operation, it indicates that majority (over 95%) of the VOC is methane, which is not considered as a health risk air pollutant. NMVOC contributes only to about 0.3 to 2.1% of total VOC.

Table 1 *Gas Sampling and Laboratory Analysis Results for CHP Emissions*

Sampling Date	30 Nov 18	10 Dec 18	18 Apr 19	3 May 19	29 Jan 19	10 Apr 19	30 Nov 18	7 Dec 18	18 Dec 18	18 Jan 19	14 May 19
Stack	CHP1				CHP2		CHP3				
Total VOC mg/Nm³	833	833	919	658	789	871	972	737	963	789	781
CH_4 mg/Nm³	830	816	911	652	786	858	967	725	960	781	776
NMVOC (a) mg/Nm³	2.8	17.2	8.0	5.7	2.9	13.0	5.1	11.3	3.2	8.2	5.2
% of NMVOC to VOCs	0.34 %	2.06 %	0.87 %	0.87 %	0.37 %	1.49 %	0.52 %	1.53 %	0.33 %	1.04 %	0.67 %

Note:

(a) The gas sampling and laboratory analysis results indicated that the NMVOC concentrations emitted from the CHP stacks are well below the emission limit of 150 mg/Nm³.

OSCAR has approached four reputable and world leading CEMS suppliers for the provision of on-line monitoring system for NMVOC (1), including Opsis (Sweden) (2), ABB China (3), SICK (Germany) (4) and Environmental SA (France) (5). Opsis and ABB declined to quote because they were concerned about the required accuracy for the measurement with respect to the high ratio of total VOC and NMVOC concentrations.

The CEMS suppliers can provide on-line analysers for measurement of VOC or methane with an accuracy or uncertainty of 1 to 2%. With respect to the anticipated level of total VOC in the CHP emission, a limit level of 1,500 mg/Nm³ is set for the CHP stacks in the EM&A Manual (Version E). To cover the potential fluctuation of the VOC concentrations, the measurement range of the on-line analyser was selected as 0 – 2,000 mg/Nm³ to ensure that if there is an exceedance of the emission limit the analysers it can still be measured. With respect to the high proportion of methane in the total VOC emission of the CHP stack (over 95%), the measurement range for the on line analyser of methane will also have to be 0 – 2,000 mg/Nm³.

With the intrinsic accuracy of the on-line analysers for both VOC and methane and the potential concentrations of VOC and methane in the CHP emissions, the potential uncertainty of the calculated NMVOC concentration using the in-direct on line monitoring system will be in the range of 20 to 80 mg/Nm³ (i.e.

(1) VOCs is commonly measured by Flame Ionisation Detector (FID) and methane is either measured by FID or Fourier Transform Infrared (FTIR) Spectroscopic Gas Analyser.

(2) https://www.opsis.se/en/Products OPSIS is a global supplier of environmental monitoring systems for gas analysis and related services. It has provided thousands of systems both for ambient air quality monitoring (AQM), for CEM, and for process control applications.

(3) http://www.abb.com/cawp/seitp202/ed166bde649bd8a8c12579190030d99a.aspx ABB is one of the world leaders in providing continuous stack gas monitoring systems and have than 40 years of experience.

(4) https://www.sick.com/ag/en/analyzer-solutions/cems-solutions/c/g284257 SICK is one of the world leading supplier of CEMS, with a proven track record in the Power, Waste-to-energy and Biomass sectors. SICK can offer the latest in measurement technology to help meet the demands placed on a modern process whether it be Environmental or financially driven.

(5) http://www.environnement-sa.com/continuous-stack-emission-monitoring-cems/ Environment SA is one of the world leading suppliers of CEMS for stack monitoring. Since its beginnings, the company has always designed and manufactured an advanced range of gas and particulate analysers, micro-sensors and samplers, for both air quality analysis and stack emission control.

about 13 to 53% with respect to an emission limit of 150 mg/Nm^3), which is considered too high for compliance monitoring purpose.

- Case 1: for 1% uncertainty/accuracy, the potential uncertainty for the measured VOC or methane concentration is 2000 x 1% = 20 mg/Nm^3 or 40 mg/Nm^3 for both analysers.

- Case 2: for 2% uncertainty/accuracy, the highest potential uncertainty for the measured VOC and methane is 2000 x 2% + 2000 x 2% = 80 mg/Nm^3

In summary, the relatively high uncertainty of the calculated NMVOC concentration (using the best available CEMS equipment) with respect to the emission limit of 150 mg/Nm^3, it is considered that there is a genuine technical difficulty in undertaking on-line monitoring the NMVOC concentration with measurements which can be accurately compared with the emission limit.

Taken account of the potential air quality impact of NMVOC can be evaluated based on the monitoring of total VOC, and there is technical issue related to the on line monitoring of NMVOC, it is proposed to remove the on line monitoring requirement of NMVOC for CHP stacks. To provide further data to demonstrate NMVOC is not a concern with the gradual increase of waste input to ORRC1, it is proposed to undertake air sampling and laboratory analysis of NMVOC for the CHP stack emission at quarterly intervals for another 12 months (starting from August 2019) and then reduce the monitoring frequency to half-yearly for another 12 months (starting from August 2020). The need for further monitoring of NMVOC and maintaining an emission limit of NMVOC for the CHP stack emission will be reviewed taking account the additional monitoring data.

OSCAR Bioenergy Joint Venture

Contract Number: EP/SP/61/10
Organic Waste Treatment Facilities Phase 1

Proposed update on

Environmental Monitoring & Audit Manual

According to the updated Environmental Review Report (November 2015) and Environmental Permit: FEP-01/395/2010/C

July 2019
Revision F

Contract No. EP/SP/61/10	Signature	
	Prepared and Checked by	Reviewed & Approved by
Revision **F**		
Date **15 July 2019**	**KH TANG**	**Marshall TSOI**
	Environmental Officer	**Deputy Project Manager**

This page is intentionally left blank

Amendment History

Date:	Rev.	Description
05/2016	A	The EM&A Manual was updated based on the findings in the Environmental Review Report (November 2015) submitted to EPD to support the application for Variation for and Environmental Permit (VEP-487/2015) and matched with the current Environmental Permit (FEP-01/395/2010/C) i. Update programme in Table 1.1 ii. Add ammonia stripping plant in section 2.3, 2.7 & 2.10 iii. Add ammonia stripping plant in Table 2.1 iv. Insert Table 2.5 Emission Limit for ASP v. New layout plan This update also based on the comments from ET leader and IEC.
01/2017	B	The "Ammonia" was been inserted in Table 2.1
02/2017	C	Add ammonia stripping plant to all parameters in Table 2.1
07/2017	D	Table 2.2 was updated
02/2019	E	Table 2.2, 2.3, 2.4 and 2.5 were updated regarding changes in VOCs discharge limits and descriptions substantiated by the *Technical Note – ORRC1 Review of Air Quality Impact Assessment for the Proposed Change of VOC Emission Limit for Cogeneration Units*
07/2019	F	Table 2.1 - Analytical Parameters and Methodology was updated with the analytical methodologies approved by the EPD. Table 2.3 was updated to remove on-line monitoring requirements for NMVOC, and replace it with gas sampling and laboratory testing for NMVOC which was substantiated by a note on *Justification for Removal of On-line Monitoring of NMVOC for CHP Stacks*

This page is intentionally left blank

ENVIRONMENTAL MONITORING AND AUDIT MANUAL

Contents

List of Tables

List of Figures

List of Appendices

1. INTRODUCTION

Purpose of Manual

1.1 The Environmental Monitoring and Audit (EM&A) Manual was updated based on findings in Environmental Review Report (November 2015) submitted to EPD to support the Application for Variation for Environmental Permit (VEP-487/2015) and matched with the current Environmental Permit (FEP-01395/2010/C).

1.2 The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the setup of an EM&A programme for the implementation of the Environmental Impact Assessment (EIA) Study recommendations, to evaluate the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the EM&A programme for the construction and operation phases of the proposed Project, namely "Organic Waste Treatment Facilities Phase I" (hereinafter referred to as "the Project"). It aims to provide systematic procedures for monitoring, auditing and minimising environmental impacts associated with construction works and operational activities.

1.3 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 the EIA Process (EIAO-TM).

1.4 This Manual contains the following information:

- Responsibilities of the Contractor, the Supervising Officer (SO)[1], Supervising Officer's representative (SOR)[1], Environmental Team (ET)[2], the Independent Environmental Checker (IEC), Environmental Protection Department (EPD) and Monitoring Team (MT) with respect to the EM&A requirements during the course of the Project;
- project organization for the Project;
- the basis for, and description of the broad approach underlying the EM&A programme;
- requirements with respect to the construction programme and the necessary EM&A programme to track the varying environmental impact;
- methodologies to be adopted, including all field, laboratories and analytical procedures, and quality assurance and quality control programme (e.g. calibration of monitoring equipment);
- definition of Action and Limit levels;
- establishment of Event and Action plans;

- procedures for environmental complaints handling;
- requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints;
- requirements for presentation of EM&A data and appropriate reporting procedures; and
- requirements for review of EIA predictions and the effectiveness of the mitigation measures / environmental management system and the EM&A programme.

1.5 For the purpose of this manual, the ET leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the EM&A requirements.

Project Description

Introduction

1.6 The proposed Organic Waste Treatment Facilities (OWTF) Phase I development is to construct and build a biological treatment facility with a capacity of about 200 tonnes per day and convert the source-separated organic waste into compost and biogas through proven biological treatment technologies.

1.7 The OWTF Phase I development is proposed to be located in the Siu Ho Wan, North Lantau. The location plan of the Project is shown in **Figure 1.1**. The total area of the Project site is approximately 2 hectares and it is bounded northeast by North Lantau Highway and southeast by Siu Ho Wan Water Treatment Works (SHWWTW) located. The project area boundary of the OWTF Phase I development is shown in **Figure 1.2**.

Project Scope

1.8 The Project is planned to be implemented through a Design, Build and Operate (DBO) contract. A reference design for the OWTF Phase I development has been prepared, and the Contractor will be responsible for the detailed design of the facilities; provision and installation of the facilities; testing and commissioning of equipment; operation of the facilities; and monitoring of operation.

1.9 The preliminary layout plan of the proposed buildings and facilities in the Project site is shown in **Figure 1.3**. The key elements of OWTF Phase I developments include:

- Pre-treatment facilities;
- Anaerobic digestion process;
- Post-treatment of digestate;
- Energy recovery system; and
- Air and wastewater treatment facilities.

1.10 The OWTF Phase I development will be operated in 24-hour basis daily, while the reception of organic waste would be 14 hours per day, tentatively.

Project Programme

1.11 The construction of OWTF Phase I was commenced in 2014. The OWTF is tentatively scheduled for commissioning by early 2017. The tentative project programme is shown in **Table 1.1**.

Table 1.1 Construction Program

Description	Tentative Date
Site Handover to EPD	May 2011
Award of Contract	December 2014
Site Establishment and Temporary Works Preparation	December 2014– May 2015
Construction of OWTF Phase I and Ancillary Facilities	May 2015 – Sept 2017
Testing and Commissioning	April – November 2017

Project Organization

Introduction

1.12 The roles and responsibilities of the various parties involved in the construction phase and operation phase EM&A process and the implementation of the EM&A programme are outlined below. The proposed project organization and lines of communication during construction and operation phases with respect to environmental protection works are shown in **Figure 1.4** and **Figure 1.5** respectively.

Construction Phase

Supervising Officer (SO) and Supervising Officer's Representative (SOR)

1.13 The term SO and SOR refers to the organization responsible for overseeing the construction works of the Project undertaken by the Contractor, and for ensuring that they are undertaken by the Contractor in accordance with the specification and contractual requirements. The responsibilities for SO and SOR include the following:

- Monitor the Contractor's compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and ensure their effectiveness, and other aspects of the EM&A programme;
- Monitor the Contractor's, the ET's and the IEC's compliance and ensure that the requirements in the Environmental Permit (EP) and EM&A Manual are fully complied with;
- Provide assistance to the ET as necessary in the implementation of the M&A programme;
- Participate in joint site inspection undertaken by the ET and the IEC;
- Comply with the agreed Event / Action Plan in the event of any exceedance; and

- Adhere to the procedures for carrying out complaint investigation.

Contractor

1.14 The term "Contractor" should be taken to mean all construction contractors and sub- contractors, working on site at any one time. Besides reporting to the SOR, the Contractor should also be responsible for the following tasks:

- Work within the scope of the relevant contract and other tender conditions;
- Provide assistance to the ET in carrying out monitoring;
- Participate in the site inspections undertaken by the ET as required, and undertake any corrective actions;
- Provide information / advice to the ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Submit proposals on mitigation measures in case of exceedances of Action or Limit levels in accordance with the Event / Action plans;
- Implement measures to reduce impact where Action or Limit levels are exceeded; and
- Adhere to the procedures for carrying out complaint investigation.

Independent Environmental Checker (IEC)

1.15 The IEC should not be in any way an associated body of the Contractor for the Project. The responsibilities for IEC should include the following:

- Advise the SOR on environmental issues related to the Project, independent from the management of construction works, but empowered to audit the environmental performance of construction and operation;
- Provide proactive advice to the SOR and the Employer of the Project on environmental matters;
- Review and audit all aspects of the EM&A programme, including the implementation of environmental mitigation measures, submission relating to the EP and EM&A, and any other submission required under the EP and EM&A Manual;
- Review and verify the monitoring data and all submissions relating to or under the EP and EM&A Manual submitted by the ET, including but not limited to the EM&A reports;
- Monitor the implementation of the EM&A programme and the overall level of environmental performance being achieved;
- Arrange and conduct regular, at least monthly site inspections of the works during

construction phase, and ad hoc inspections if significant environmental problems are identified;

- Comply with the agreed Event / Action Plan in the event of any exceedance;
- Check and ensure the procedures for carrying out complaint investigation being followed and check the effectiveness of corrective measures;
- Feedback audit results to ET by signing off relevant EM&A proforma;
- Ensure the impact monitoring is conducted at the correct locations at the frequency identified in the EM&A Manual;
- Check that the mitigation measures are effectively implemented; and
- Report the works conducted, the findings, recommendation and improvement of the site inspections, the findings, recommendation, and improvement after reviewing the ET's and the Contractor's wor.ks, and any advices to the SOR and the Employer of the Project on a monthly basis.

Environmental Team

1.16 The ET shall not be in any way an associated body of the Contractor, and shall be responsible to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person who has at least 7 years' experience in EM&A and have relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in 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 shall report to the SOR and the duties of ET shall include the following:

- Monitor and audit various environmental parameters as required in this EM&A Manual;
- Analyse the EM&A data and review the success of EM&A programme to cost- effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- Carry out regular site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems;
- Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications;
- Audit environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to EPD, the SOR, the IEC and

Contractor or their delegated representative;

- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action or Limit levels in accordance with the event and action plans;
- Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by the IEC;
- Advise the Contractor on environmental improvement, awareness, enhancement matters, etc., on site;
- Adhere to the procedures for carrying out complaint investigation; and
- Timely submit the EM&A Reports to the EPD.

1.17 Sufficient and suitably qualified professional and technical staff should be employed to ensure full compliance with their duties and responsibilities, as required under the EM&A programme during the construction phase of the Project.

Operation Phase

1.18 Under the DBO contract, the Contractor will be responsible for the operation of the OWTF. The Contractor shall ensure full compliance with the conditions of the EP during its operation. A Monitoring Team (MT) should be employed by the Contractor to carry out the monitoring works during the operation phase as required in this EM&A Manual.

1.19 The MT shall be managed by the MT Leader to analyze the monitoring results. The MT Leader shall be a person who has at least 7 years' experience in EM&A and have relevant professional qualifications. Suitably qualified staff should be included in the MT, and resources for the implementation of the monitoring programme should be allocated in time under the Contract, to enable fulfilment of the Project's monitoring requirements as specified in the EM&A Manual during operation of the Project. The responsibilities for MT should include the following:

- Monitor various environmental parameters as required in this EM&A Manual;
- Report on the environmental monitoring results to the Contractor, the SOR, and the IEC;
- Analyze monitoring results collected from the monitoring works;
- Prepare monitoring reports to provide the impact evaluation results to the Contractor, the SOR and the IEC; and
- Recommend suitable actions to the Contractor and SOR in case of exceedance of any assessment criteria.

Structure of this Manual

1.20 Following this introductory section, the structure of the EM&A Manual is set out below:-

- Section 2 details the requirement for impact monitoring for dust during the construction phase and for air emission from OWTF and odour during the operation phase.
- Section 3 details the audit requirements with regard to hazard to life issues.
- Section 4details the requirements for baseline and impact monitoring for water quality during the construction phase.
- Section 5 details the audit requirements with regard to waste management issues as well as the waste control and mitigation measures recommended in the EIA.
- Section 6details the requirements with regard to landscape and visual issues.
- Section 7details the requirements with regard to noise issues
- Section 8 details the requirements on site environmental audit and the environmental complaints handling procedure.
- Section 9 details the EM&A reporting requirements.

2 AIR QUALITY

Introduction

2.1 This section presents the requirements, methodology, equipment, criteria and protocols for the monitoring and audit of air quality impacts during the construction and operational phases of the Project.

2.2 The objectives of the air quality monitoring include the following:-

- to identify the extent of construction dust and operational odour impacts;
- to determine the effectiveness of mitigation measures to control dust emission from activities during construction phase and odour control measures during operational phase;
- to audit the compliance of the Contractor with regard to dust control, contract conditions and the relevant dust impact criteria;
- to recommend further mitigation measures if found to be necessary; and
- to comply with action and limit levels for air quality as defined in this Manual.

2.3 During construction phase of the Project, dust impacts would be the major air quality impacts. While during operation phase of the Project, stack emissions from the centralized air pollution control unit (CAPC), the cogeneration units, the ammonia stripping plant (ASP) and the standby flare would be the key environmental issue. Odour emission from the operation of OWTF would be another environmental issue.

Monitoring during Construction Phase

2.4 With the implementation of practicable dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation, adverse construction dust impact at the Air Sensitive Receiver (ASR) is not expected during construction of the Project. Yet, regular site environmental audits during the construction phase of the Project as described in **Section 8** of this Manual should be conducted to ensure that the recommended dust suppression measures are implemented properly.

2.5 Mitigation measures for dust control have been recommended in the EIA Report and are listed below:

- Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather;
- Use of frequent watering for particularly dusty construction areas and areas close to ASRs;
- Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be applied

to aggregate fines;

- Open stockpiles should be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs;
- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations;
- Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;
- Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading points, and use of water sprinklers at the loading area where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods;
- Imposition of speed controls for vehicles on unpaved site roads. 8 kilometers per hour is the recommended limit;
- Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs;
- Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;
- Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; and
- Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system.

2.6 The Contractor shall be responsible for the design and implementation of these measures.

Monitoring during Commissioning Stage and Operation Phase

Stack Monitoring

2.7 Monitoring of air quality parameters of concern due to stack emissions from centralized air pollution control unit, the ammonia stripping plant, the cogeneration units and the standby flaring gas unit should be conducted during commissioning stage. During the operation phase of the Project, stack monitoring shall be installed for the centralized air pollution control unit, the ammonia stripping plant and the cogeneration units of OWTF.

2.8 The parameters for measurement and the analytical methods are listed in **Table 2.1** which have been

approved by EPD.

Table 2.1 Analytical Parameters and Methodology

Parameters	Method	Stacks to be Monitored
Gaseous and vaporous organic substances	USEPA Method 18	• Centralized Air Pollution Control Unit • Cogeneration Units • Standby Flaring Gas • Ammonia Stripping Plant
Particulate	USEPA Method 5	• Centralized Air Pollution Control Unit • Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
Carbon monoxide	USEPA Method 10	• Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
NOx	USEPA Method 7E	• Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
SO2	USEPA Method 6	• Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant

Parameters	Method	Stacks to be Monitored
HCl and HF	USEPA Method 26A	• Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
Oxygen	USEPA Method 3A	• Centralized Air Pollution Control Unit • Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
Velocity and Volumetric Flow	USEPA Method 2	• Centralized Air Pollution Control Unit • Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
Water Vapour Content and Temperature	USEPA Method 4	• Centralized Air Pollution Control Unit • Cogeneration Units • Standby Flaring Gas Unit • Ammonia Stripping Plant
Ammonia	USEPA CTM 027	• Ammonia Stripping Plant
Odour	EN 13725	• Centralized Air Pollution Control Unit

2.9 Necessary monitoring equipment and techniques should be provided and used to demonstrate that the process is properly operated and the emissions can be minimized to meet the air pollution control requirements as tabulated in **Tables 2.2, 2.3, 2.4** and **2.5** below.

Table 2.2 Emission Limit for Centralized Air Pollution Control Unit

Parameter	Emission Level (mg/Nm^3)
VOCs (including methane)	680
Dust (or Total Suspended Particulates)	6
Odour (including NH3 & H2S)	220 (1)

Note:(1) The odour unit is ou/Nm^3.

Table 2.3 Emission Limit for Cogeneration Units

Parameter	Maximum Emission Level (mg/Nm^3) (1)
Dust (or Total Suspended Particulates)	15
Carbon Monoxide	650
NO_x	300
SO_2	50
NMVOCs	150
VOCs (including methane) (2)	1,500
HCl	10
HF	1

Note: (1) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.
(2) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

Table 2.4 Emission Limit for Standby Flaring Gas Unit

Parameter	Maximum Emission Level (mg/Nm^3) (1)
Dust (or Total Suspended Particulates)	5
Carbon Monoxide	100
NO_x	200
SO_2	50
VOCs (including methane) (2)	20
HCl	10
HF	1

Note: (1) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
(2) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

Table 2.5 Emission Limit for ASP

Parameter	Maximum Emission Level (mg/Nm^3) (1)
Dust (or Total Suspended Particulates)	5
Carbon Monoxide	100
NOx	200
SO_2	50
VOCs (including methane) (2)	20
NH_3	35
HCl	10
HF	1

Note: (1) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
(2) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

2.10 On-line monitoring should be carried out for centralized air pollution control unit, cogeneration (except for NMVOCs which should be monitored by periodic gas sampling and laboratory analysis) and ASP units during the operation phase of the OWTF. The continuous monitoring data should be transmitted instantaneously to EPD by telemetry system in such manner and the format to be agreed with EPD. The record should be retained at the premises for a minimum of two years, or other period specified by EPD, after the date of last entry and be made available for examination as and when required by EPD.

2.11 Evidence should be provided to demonstrate quality assurance procedures are in place to ensure all monitoring results are sufficiently accurate and reliable. Calibration on the monitoring equipment has to be done by means of parallel measurements with the

reference methods as agreed by EPD.

2.12 The on-line monitoring of the in-stack exhaust gas shall be carried out. The continuous monitoring data should be transmitted instantaneously to EPD by telemetry system in such manner and format agreed with EPD. The parameters to be continuously monitored are listed below:

- nitrogen oxides
- hydrogen chloride
- hydrogen fluoride
- sulphur dioxide
- ammonia
- gaseous and vaporous organic substances (except for NMVOCs for CHP stacks)
- carbon monoxide
- oxygen
- pressure
- temperature
- water vapour content (continuous measurement of the water vapour content should not be required if the sample exhaust gas is dried before the emissions are analysed.)

2.13 Periodic gas sampling and laboratory analysis of NMVOCs should be carried out for the CHP stack emission for 24 months for the initial stage of operation (starting from August 2019). For the first 12 months (starting from August 2019), monitoring should be carried at quarterly intervals. The monitoring frequency should then be reduced to half-yearly for next 12 months (starting from August 2020). The need for further monitoring of NMVOC and maintaining an emission limit of NMVOC for the CHP stack emission should be reviewed taking account the monitoring data.

Odour Monitoring

Commissioning Stage

2.14 Odour sampling works should be conducted weekly in the first month of the commissioning stage of the Project. The air samples at the stack of Centralized Air Pollution Control Unit under full

capacity of operation should be collected for olfactometry analysis. Duplicate samples should be collected for each sampling exercise.

2.15 The following items should be recorded during sampling:

- the prevailing weather condition;
- the wind direction;
- any odour detected during sampling and the flavours of odour with detailed description of characteristics (e.g. sewage or rotten-egg smell, decayed vegetables, ammonical, dischargeable odour, putrefaction, sharp, pungent, fish, irritating, fruit, vinegar, etc);
- downwind or upwind direction from the odour source;
- duration of odour (intermittent or continuous) during sampling; and
- photo showing the sampling locations relative to existing land features The relevant meteorological data (e.g. ambient temperature, wind speed and direction, etc.) from the nearest Hong Kong Observatory station during the sampling period should also be recorded for reference.

2.16 The collected air samples should be delivered to the laboratory for olfactometry analysis within 24 hours.

2.17 The odour concentration of the collected air samples should be determined by a forced- choice dynamic olfactometer with a panel of human assessors being the sensor in accordance with the European Standard Method: Air Quality – Determination of Odour Concentration by Dynamic Olfactometry (EN13725) within 24 hours after collection.

2.18 The odour laboratory should be ventilated to maintain an odour-free environment and to provide fresh air to the panel members. Each odour testing session should comprise at least five qualified panellists. All of the panellists should be screened beforehand by using 50 ppm solution/mixture of certified n-butanol standard gas.

2.19 During each odour sampling day, one blank sample should be collected for quality control. The sample should be taken by purging pure nitrogen gas into the odour bag directly on site as a blank sample.

2.20 The olfactometry analysis should be conducted by the testing laboratories complying with the European Standard EN13725:2003. The laboratories should provide the QA/QC results in the laboratory analysis report.

Operation Phase

2.21 To determine the effectiveness of the proposed odour mitigation measures and to ensure the odour impacts arising from operation of the OWTF and the on-site wastewater treatment unit meeting the air pollution control requirements, odour patrol shall be conducted.

2.22 The odour patrols shall be conducted by an odour patrol team. The odour patrol team will patrol and sniff along an odour patrol route at the OWTF site boundary as shown in **Figure 1.2**. The implementation of the odour patrol shall be subject to the prevailing weather forecast condition and no odour patrol should be carried out during rainy day. The odour patrol team should be comprised of at least two independent trained personnel / competent persons, who 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.

2.23 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 shall be identified. During the patrol, the sequence should start from less odorous locations to stronger odorous locations.

2.24 The perceived odour intensity is divided into 5 levels. **Table 2.6** describes the odour intensity for different levels.

Table 2.6 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

2.25 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 including Siu Ho Wan Weather Station and Chek Lap Kok Airport Weather Station for reference.

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

2.27 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 OWTF 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 OWTF and its on-site wastewater treatment unit) at all the sniffing locations have dropped to 0 in three consecutive months.

2.28 **Table 2.7** 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 2.8** should be carried out.

Table 2.7 Action and Limit Levels for Odour Nuisance

Parameter	Action Level	Limit Level
Odour Nuisance (from odour patrol)	When one documented compliant 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:

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

Table 2.8 Event and Action Plan for Odour Monitoring

EVENT	ACTION	
	Person-in-charge of Odour Monitoring	**Project Proponent**[(1)]
ACTION LEVEL		
Exceedance of action level (Odour Patrol)	1. Identify source/reason of exceedance; 2. Repeat odour patrol to confirm finding.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; 2. Rectify any unacceptable practice; 3. Implement more mitigation measures if necessary; 4. Inform DSD or the operator of the Siu Ho Wan Sewage Treatment Works (SHWSTW) if exceedance is considered to be caused by the operation of the SHWSTW. 5. Inform North Lantau Refuse Transfer Station (NLTS) operator if exceedance is considered to be caused by the operation of NLTS.

EVENT	ACTION	
	Person-in-charge of Odour Monitoring	**Project Proponent**[(1)]
Exceedance of action level (Odour Complaints)	1. Identify source/reason of exceedance; 2. Carry out odour patrol to determinate odour intensity.	1. Carry out investigation and verify the complaint whether it is related to potential odour emission from the nearby SHWSTW; 2. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; 3. Rectify any unacceptable practice; 4. Implement more mitigation measures if necessary; 5. Inform DSD or the operator of the SHWSTW if exceedance is considered to be caused by the operation of the SHWSTW. 6. Inform North Lantau Refuse Transfer Station (NLTS) operator if exceedance is considered to be caused by the operation of NLTS.

EVENT	ACTION	
	Person-in-charge of Odour Monitoring	**Project Proponent**(1)
LIMIT LEVEL		
Exceedance of Limit level	1. Identify source/reason of exceedance; 2. Inform EPD; 3. Repeat odour patrol to confirm findings; 4. Increase odour patrol frequency to bi-weekly; 5. Assess effectiveness of remedial action and keep EPD informed of the results; 6. If exceedance stops, cease additional odour patrol.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 week; 2. Rectify any unacceptable practice; 3. Formulate remedial actions; 4. Ensure remedial actions properly implemented; 5. If exceedance continues, consider what more/enhanced mitigation measures should be implemented; 6. Inform DSD or the operator of the SHWSTW if exceedance is considered to be caused by the operation of the SHWSTW.

Note: (1) Project Proponent shall identify an implementation agent.

2.29 In the event when an odour compliant is received, Project Proponent should liaise with the complainant and register the complaint. The compliant register is to record detailed information regarding the odour compliant and hence, facilities 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

Introduction

3.1 A hazard assessment has been conducted in this EIA study and it is concluded that construction and operation of the OWTF would not increase the risk of chlorine release at the Siu Ho Wan Water Treatment Works (SHWWTW). Impact of chlorine store and chlorine delivery operation at SHWWTW on construction workers and on-site personnel could be reduced with all the recommended practicable mitigation measures.

3.2 Mitigation/safety measures for hazard to life have been recommended in the EIA Report and are presented below.

Mitigation Measures

3.3 Construction Phase

- The number of workers on site during construction stage should be kept at the same level as the assessment.
- Construction works should be suspended when delivery of chlorine takes place.
- 3m high fence should be constructed along the boundary facing the SHWWTW.
- Emergency evacuation procedures should be formulated and the Contractor should ensure all workers on site should be familiar with these procedures as well as the route to escape in case of gas release incident. Relevant Departments, such as Fire Services Department (FSD), should be consulted during the development of Emergency procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. A copy of the latest version emergency procedures should be dispatched to Tung Chung Fire Station for reference once available.
- The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to construction workers in the event of chlorine gas release in the SHWWTW.
- The Contactor should establish a communication channel with the SHWWTW operation personnel and FSD during construction stage. In case of any hazardous incidents in the treatment works, operation personnel of SHWWTW should advise the Contractor to inform construction workers to proceed with emergency procedure. The Contractor should appoint a Liaison Officer to communicate with FSD Incident Commander on site in case of emergency.
- Introduction training should be provided to any staff before carryout construction works at the Project site.
- Periodic drills should be coordinated and conducted to ensure all construction personnel are familiar with the emergency procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement. Prior notice of periodic drills should be given to Station Commander of Tung Chung Fire Station. Joint operational exercise with FSD and SHWWTW is recommended.

3.4 Operation Phase

- The site office should be close to the western boundary of the Project site and away from the SHWWTW's chlorine store as far as possible.
- 3m high fence should be constructed along the boundary facing the SHWWTW.

- Emergency evacuation procedures should be formulated and the Contractor should ensure on site staff should be familiar with these procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. A copy of the latest version emergency procedures should be dispatched to Tung Chung Fire Station for reference once available.

- The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to personnel on site in the event of chlorine gas release in the SHWWTW.

- The Contractor should establish a communication channel with the SHWWTW operation personnel and FSD. In case of any hazardous incidents in the treatment works, operation personnel of SHWWTW should advise the Contractor to inform personnel on site to proceed with emergency procedure. The Contractor should appoint a Liaison Officer to communicate with FSD Incident Commander on site in case of emergency.

- Periodic drills should be coordinated and conducted to ensure all on site personnel are familiar with the emergency procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement. Prior notice of periodic drills should be given to Station Commander of Tung Chung Fire Station. Joint operational exercise with FSD and SHWWTW is recommended.

4 WATER QUALITY

Introduction

4.1 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 shall be undertaken to inspect the construction activities and works areas in order to ensure that the recommended mitigation measures are properly implemented.

Construction Site Audits

4.2 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.

Site Inspection

4.3 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.

Compliance Audits

4.4 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.

Mitigation Measures

4.5 Mitigation measures for water quality control have been recommended in the EIA Report and listed in the implementation schedule given in **Appendix A**.

4.6 In the event of complaints or non-compliance / area of improvement being observed, the ET and the Contractor should review the effectiveness of these mitigation measures, design alternative or additional mitigation measures as appropriate and propose to the IEC for approval and implement these alternative or additional measures.

5 WASTE MANAGEMENT

Introduction

5.1 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 the recommended good waste management practices and EPD's regulations and requirements.

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

5.3 Mitigation measures for waste management as recommended in the EIA Report are summarised below. With proper handling, storage and disposal of waste arisings during the construction phase of the Project, the potential to cause adverse environmental impacts would be minimized.

Waste Management and Control During Construction Phase

Good Site Practices

5.4 Adverse environmental impacts in related to waste management are not expected, provided that good site practices are strictly followed. Recommendations for good site practices during the construction phase would include:

- Obtain 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);
- Provide staff training for proper waste management and chemical handling procedures;
- Provide sufficient waste disposal points and regular waste collection;
- Provide appropriate measures to minimize 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 disposed of to licensed facility for treatment; and
- Employ licensed waste collector to collect waste.

Waste Reduction Measures

5.5 Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:

- Design foundation works that could minimise the amount of excavated material to be generated;
- Provide training to workers on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling;
- Sort out demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.);
- Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Encourage the collection of aluminum cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce; and

- Plan and stock construction materials carefully to minimize the amount of waste to be generated and to avoid unnecessary generation of waste.

5.6 In addition to the above measures, specific mitigation measures are recommended below for the identified waste so as to minimise environmental impacts during handling, transportation and disposal of waste.

Construction & Demolition Materials

5.7 In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below:

- A WMP, which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW 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 C&D material at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to ETWB TCW No. 31/2004).

5.8 The Contractor should prepare and implement an EMP in accordance with ETWB TCW No. 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Supervising Officer (SO) and Supervising Officer's Representative (SOR) for approval. The Contractor should implement waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor, preferably on a monthly basis.

5.9 All surplus excavated and C&D materials arising from or in connection with works should become the property of the Contractor when it is removed unless otherwise stated. The Contractor would be responsible for devising a system to work for on-site sorting of excavated and C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimize temporary stockpiling on- site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.

Chemical Waste

5.10 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.

General Refuse

5.11 General refuse should be stored in enclosed bins or compaction units separated from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'windblown' light material.

Waste Management and Control During Operation Phase

Good Site Practices

5.12 It is recommended that the following good operational practices should be adopted to minimise waste management impacts:

- 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 ETWB TCW No. 31/2004.
- 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 minimize 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 wastes generated, recycled and disposed of (including the disposal sites).

Waste Reduction Measures

5.13 Good management and control can prevent the generation of significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction:

- 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 aluminum 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.

Wastes Generated from Pre-Treatment Process

5.14 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.

Chemical Wastes

5.15 Chemical waste generated from machinery maintenance and servicing should be managed in accordance with 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 removed by licensed chemical waste contractors.

5.16 Plant / equipment maintenance schedules should be planned in order to minimize the generation of chemical waste.

5.17 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.

5.18 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. Where possible, chemical wastes (e.g. waste lubricants) would be recycled at appropriate facilities, such as Dunwell's oil re-refinery.

General Refuse

5.19 Waste generated in 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.

5.20 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.

Approaches to Prevent Land Contamination

Fuel Oil Spillage Prevention

5.21 Precautionary measures to prevent fuel oil spillage are as follows:

(i) Fuel Oil Containers

- Fuel oil should be stored in suitable containers.
- All fuel oil containers should be securely closed.
- Appropriate labels showing the name of fuel oil should be posted on the containers.
- Drip trays should be provided for all containers.

(ii) Storage Area

- Distance between the fuel oil refuelling points and the fuel oil containers should be minimized.
- The storage area should be used for fuel oil storage only.
- No surface water drains or foul sewers should be connected to the storage area.
- The storage area should be enclosed by three sides by a wall and have an impermeable floor or surface.

(iii) Fuel Oil Spillage Response

- An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incidents in detail. General procedures to be taken in case of fuel oil spillage are presented below.

  - <u>Training</u>

    Training on oil spill response actions should be given to relevant staff. The training should cover the followings:

- Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and firefighting equipment;
- General methods to deal with oil spillage and fire incidents;
- Procedures for emergency drills in the event of oil spills and fire; and
- Regular drills should be carried out.

- Communication

Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department could be quickly sought.

- Response Procedures

Any fuel oil spillage within the Project Site should be immediately reported to the Site Manager with necessary details including location, source, possible cause and extent of the spillage.

Site Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures should include the following:

- Identify and isolate the source of spillage as soon as possible.
- Contain the oil spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels.
- Remove the oil spillage.
- Clean up the contaminated area.
- If the oil spillage occurs during refuelling, the refuelling operation should immediately be stopped.
- Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The handling and disposal procedures for chemical wastes are discussed in the following paragraphs.

Chemicals and Chemical Wastes Handling & Spillage Prevention

5.22 The precautionary measures to prevent improper handling / use of chemicals and chemical waste spillage are presented below:

(i) Chemicals and Chemical Wastes Handling & Storage

- Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas.
- The storage of chemical wastes should comply with the requirements of the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.
- The storage areas for chemicals and chemical wastes should have an impermeable floor or surface. The impermeable floor / surface should possess the following properties:
  - Not liable to chemically react with the materials and their containers to be stored.
  - Able to withstand normal loading and physical damage caused by container handling
  - The integrity and condition of the impermeable floor or surface should be inspected at regular intervals to ensure that it is satisfactorily maintained
- For liquid chemicals and chemical wastes storage, the storage area should be bunded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater.

- Storage containers should be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed.
- Chemical handling should be conducted by trained workers under supervision.

(ii) Chemicals and Chemical Wastes Spillage Response

- A Chemicals and / or Chemical Wastes Spillage Response Plan should be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals / chemical waste spillages are presented below:

  - Training

    Training on spill response actions should be given to relevant staff. The training should cover the followings:

    - Tools & resources to handle spillage, e.g. locations of spill handling equipment;
    - General methods to deal with spillage; and
    - Procedures for emergency drills in the event of spills.

  - Communication

    Establish communication channel with Fire Services Department (FSD) and EPD to report the spillage incident so that necessary assistance from relevant department could be quickly sought.

  - Response Procedures

    Any spillage within OWTF site should be reported to the Site Manager.

    Site Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures should include the followings:

    - Identify and isolate the source of spillage as soon as possible;
    - Contain the spillage and avoid infiltration into soil / groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas);
    - Remove the spillage; the removal method / procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed;
    - Clean up the contaminated area (in case the spillage occurs at locations out of the designated storage areas); and
    - The waste arising from the cleanup operation should be considered as chemical wastes.

Incident Record

5.23 After any spillage, an incident report should be prepared by the Site Manager. The incident report should contain details of the incident including the cause of the incident, the material spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary.

5.24 The incident report should provide sufficient details for the evaluation of any environmental impacts due to the spillage and assessment of the effectiveness of measures taken.

5.25 In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the Project operator should be responsible for the cleanup of the affected area. The responses procedures described in Sections 6.65 - 6.66 of the EIA Report should be followed accordingly together with the land contamination assessment and remediation guidelines stipulated in the Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land Assessment and Remediation.

6. LANDSCAPE AND VISUAL

Introduction

6.1 EM&A for landscape and visual resources shall be undertaken by the Contractor during the design, construction and operation phases of the Project. This section presents the requirements of the baseline review, and the monitoring of the design, implementation and maintenance of the landscape and visual mitigation measures during the design, construction and operation phases of the Project.

Baseline Review

6.2 A baseline review shall be undertaken prior to the commencement of the construction works. The purposes of the review are as follows:-

- To check the status and any changes of the baseline Landscape Resources, Landscape Character areas and Visually Sensitive Receivers (VSRS) within and immediately adjacent to the works areas;
- To determine whether amendments in the design of the landscape and visual mitigation measures are required; and
- To recommend any necessary amendments to the design of the landscape and visual mitigation measures due to the above changes, if any.

6.3 Any changes to the mitigation measures that may be recommended as a result of the baseline review shall be taken into account.

Mitigation Measures

6.4 The landscape and visual impact assessment of the EIA Study recommended a series of mitigation measures to ameliorate the potential landscape and visual impacts of the Project. The measures for both the construction and operation phases as recommended in the EIA Report are summarised in **Table 6.1** and **Table 6.2**.

Table 6.1 Proposed Landscape and Visual Mitigation Measures for Construction Phase

ID No.	Landscape and Visual Mitigation Measures	Funding Agency	Implementation	Maintenance/ Management Agency
CM1	Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical.	EPD	EPD (via Contractor)	EPD (via Contractor)
CM2	Compensatory tree planting should be provided to compensate for felled trees.	EPD	EPD (via Contractor)	EPD (via Contractor)
CM3	Control of night-time lighting.	EPD	EPD (via Contractor)	EPD (via Contractor)
CM4	Erection of decorative screen hoarding compatible with the surrounding setting.	EPD	EPD (via Contractor)	EPD (via Contractor)

Table 6.2 Proposed Landscape and Visual Mitigation Measures for Operation Phase

ID No.	Landscape and Visual Mitigation Measures	Funding Agency	Implementation	Maintenance / Management
OM1	Aesthetic design of the façade, including its colour theme, pattern, texture, materials, finishing, and associated structures to harmonize with the surrounding settings.	EPD	EPD (via Contractor)	EPD (via Contractor)
OM2	Grass/ groundcover planting to soften the roof.	EPD	EPD (via Contractor)	EPD (via Contractor)
OM3	Heavy standard tree planting to screen proposed associated structures.	EPD	EPD (via Contractor)	EPD (via Contractor)
OM4	Grasscrete paving to soften the harshness of large paved surface areas wherever possible.	EPD	EPD (via Contractor)	EPD (via Contractor)

Design Phase Audit

6.5 The Contractor shall incorporate the recommended mitigation measures, including the design theme and urban design concept, master layout, building form, massing, façade, overall design and landscape treatment, in the detailed design and shall ensure the potential conflicts of the mitigation measures with the works under the Project and other interfacing projects are resolved prior to construction.

6.6 Audits of the detailed design against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken by a Registered Landscape Architect (RLA) to ensure that they fulfil the intentions of mitigation measures.

Construction and Operational Phase Audits

6.7 A specialist Landscape Sub-Contractor (on the approved Government list) shall be employed by the Contractor for the implementation of landscape establishment works and the compensatory planting, as well as the subsequent maintenance operations during the one-year maintenance period which will be the first operational year of the Project.

6.8 All measures, including compensatory planting, undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the construction phase and the first year of the operation phase shall be audited by a Registered Landscape Architect on a regular basis to ensure compliance with the intended aims of the measures and the effectiveness of the mitigation measures.

6.9 Site inspections should be undertaken at least once every two weeks throughout the construction period, and once every month during the first operational year. After the one-year maintenance period, the landscape maintenance and monitoring shall be carried out by the Contractor.

6.10 If there is repeated non-compliance of the landscape and visual mitigation measures, EPD shall be notified as necessary.

7. NOISE

Introduction

7.1 As the noise sensitive receivers identified in this EIA study are located more than 1km away from the Project boundary and substantially screened by natural terrain, no adverse construction and operation noise impact would be anticipated. In this regard, EM&A programme for both construction and operation phases of the Project would not be considered necessary. Notwithstanding this, the Contractor shall be responsible for implementation of good site practices to minimize the noise nuisance as far as practicable.

Good Site Practices

7.2 Good site practices during construction phase are suggested as below:

- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
- Mobile plant, if any, should be sited as far from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.

7.3 The implementation schedule for the recommended mitigation measures is presented in **Appendix A**.

8 ENVIRONMENTAL AUDITING

Site Inspection

8.1 Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. These should be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. The site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

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

8.3 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, the site inspections should also review the environmental situation outside the works area which is likely to be affected, directly or indirectly, by the site activities. The ET Leader should make reference to the following information in conducting the inspection:

(i) The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;

(ii) Ongoing results of the EM&A programme;

(iii) Work progress and programme;

(iv) Individual work methodology proposals (which shall include proposal on associated pollution control measures);

(v) Contract specifications on environmental protection;

(vi) Relevant environmental protection and pollution control laws; and

(vii) Previous site inspection results undertaken by the ET and others.

8.4 The Contractor should keep the ET Leader updated with all relevant information on the construction contract necessary for him / her 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 deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.

8.5 The ET should also carry out ad hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of environmental complaint, or as part of the investigation work, as specified in the Action Plan for EM&A.

Compliance with Legal and Contractual Requirements

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

8.7 In order to ensure that the works are undertaken in compliance with the contractual requirements on environmental aspects, all works method statements submitted by the Contractor to the SOR for approval should be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarised in Appendix A.

8.8 The ET Leader should also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating laws could be prevented.

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

8.10 After reviewing the documentation, the ET Leader should advise the IEC and the Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he / she should also advise the Contractor and the SOR accordingly.

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

Environmental Complaints

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

(i) log complaint and date of receipt onto the complaint database and inform the IEC immediately;

(ii) investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;

(iii) identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;

(iv) advise the Contractor if mitigation measures are required;

(v) review the Contractor's response on the identified mitigation measure(s) and the updated situation;

(vi) if the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;

(vii) undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;

(viii) report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results should be reported within the timeframe assigned by the EPD); and

(ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

8.13 A flowchart indicating the complaint handling procedures is presented in **Figure 1.6**

9. REPORTING

General

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

9.2 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.

Baseline Monitoring Report

9.3 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 the Contractor, the IEC, the SOR and the EPD. The ET Leader should liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format should be agreed with the EPD prior to submission.

9.4 The baseline monitoring report should include at least the followings:

(i) up to half a page executive summary;

(ii) brief project background information;

(iii) drawings showing locations of the baseline monitoring stations;

(iv) monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- types of equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency and duration; and
- quality assurance (QA) / quality control (QC) results and detection limits;

(v) details of influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period; and
- other factors which might affect results;

(vi) determination of the action and limit levels for each monitoring parameter and 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;

(vii) revisions for inclusion in the EM&A Manual; and

(viii) comments, recommendations and conclusions.

Monthly EM&A Report

9.5 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 and submitted within 10 working days of the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report should be submitted to the following parties: the Contractor, the IEC, the SOR and the EPD. Before submission of the first EM&A report, the ET Leader should liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

9.6 The ET leader should review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

First Monthly EM&A Report

9.7 The first monthly EM&A report should include at least the following:

(i) executive summary (1-2 pages):

- breaches of Action and Limit levels;
- complaint log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) basic project information:

- project organisation including key personnel contact names and telephone numbers;
- construction programme;

- management structure, and
- works undertaken during the month;

(iii) environmental status:

- works undertaken during the month with illustrations (such as location of works); and
- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring locations);

(iv) a brief summary of EM&A requirements including:

- all monitoring parameters;
- environmental quality performance limits (Action and Limit levels);
- Event-Action Plans;
- environmental mitigation measures, as recommended in the project EIA Final Report; and
- environmental requirements in contract documents;

(v) implementation status:

- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Final Report;

(vi) monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- name of 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;

(vii) report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit 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 notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, 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;

(viii) others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status; and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent Monthly EM&A Reports

9.8 Subsequent monthly EM&A reports should include the following:

(i) executive summary (1 - 2 pages):

- breaches of Action and Limit levels;
- complaints log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) environmental status:

- works undertaken during the month with illustrations (such as location of works etc.); and
- drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.

(iii) implementation status:

- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA;

(iv) monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- name of 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.

(v) report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- record of all non-compliance (exceedances) of the environmental quality performance limits (action and limit 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 notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, 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.

(vi) others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status; and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

(vii) appendix

- action and limit 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 that might affect the monitoring results.

- monitoring schedule for the present and next reporting period;
- cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- outstanding issues and deficiencies.

Quarterly EM&A Summary Reports

9.9 A quarterly EM&A summary report of around five pages should be produced and should contain at least the following information.

(i) up to half a page executive summary;

(ii) basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of works undertaken during the quarter;

(iii) a brief summary of EM&A requirements including:

- monitoring parameters;
- environmental quality performance limits (action and limit levels); and
- environmental mitigation measures, as recommended in the project EIA Final Report;

(iv) advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Final Report, summarised in the updated implementation schedule;

(v) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(vi) graphical plots of any trends in monitored parameters over the past four 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;

(vii) advice on the solid and liquid waste management status;

(viii) a summary of non-compliance (exceedances) of the environmental quality performance limits (action and limit levels);

(ix) a brief review of the reasons for and the implications of any non-compliance, including a review of pollution sources and working procedures;

(x) a summary description of actions taken in the event of non-compliance and any follow-up procedures related to any earlier non-compliance;

(xi) a summarised record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xii) comments (for examples, a review of the effectiveness and efficiency of the mitigation measures); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and

(xiii) proponents' contacts and any hotline telephone number for the public to make enquiries.

Final EM&A Review Report

9.10 The final EM&A report should include, inter alia, the following information:

(i) an executive summary;

(ii) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(iii) basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period;

(iv) a brief summary of EM&A requirements including:

- monitoring parameters;
- environmental quality performance limits (action and limit levels); and
- environmental mitigation measures, as recommended in the project EIA Final Report;
- Event-Action Plans.

(v) a summary of the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA Report, summarised in the updated implementation schedule;

(vi) graphical plots of the trends of monitored parameters over the construction period for

representative monitoring stations, including the post-project monitoring 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.

(vii) a summary of non-compliance (exceedances) of the environmental quality performance limits (action and limit levels);

(viii) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;

(ix) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;

(x) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xi) 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;

(xii) a review of the validity of EIA predictions and identification of shortcomings in EIA recommendations; and

(xiii) comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme);

(xiv) recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigation action when necessary).

Data Keeping

9.11 No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such 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. Monitoring data should also be recorded in magnetic media form, and the software copy must be available upon request. Data format should be agreed with EPD. All documents and data should be kept for at least one year following completion of the construction contract.

Interim Notifications of Environmental Quality Limit Exceedances

9.12 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader should immediately notify 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 actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in **Appendix B**.

---

[1] The OWTF Phase I Development will be procured using a design-build-operate (DBO) contract form. Under such type of contract, the contract administration and site supervision works are to be undertaken by the Supervising Officer (SO) and the Supervising Officer's Representative (SOR), which are equivalent to the roles of the Engineer and the Engineer's Representative respectively in traditional form of construction contracts.

[2] The Environmental Team, i.e. the Team Leader and his supporting staff, will be employed by the Employer of the Project, i.e. the Environmental Protection Department (EPD).

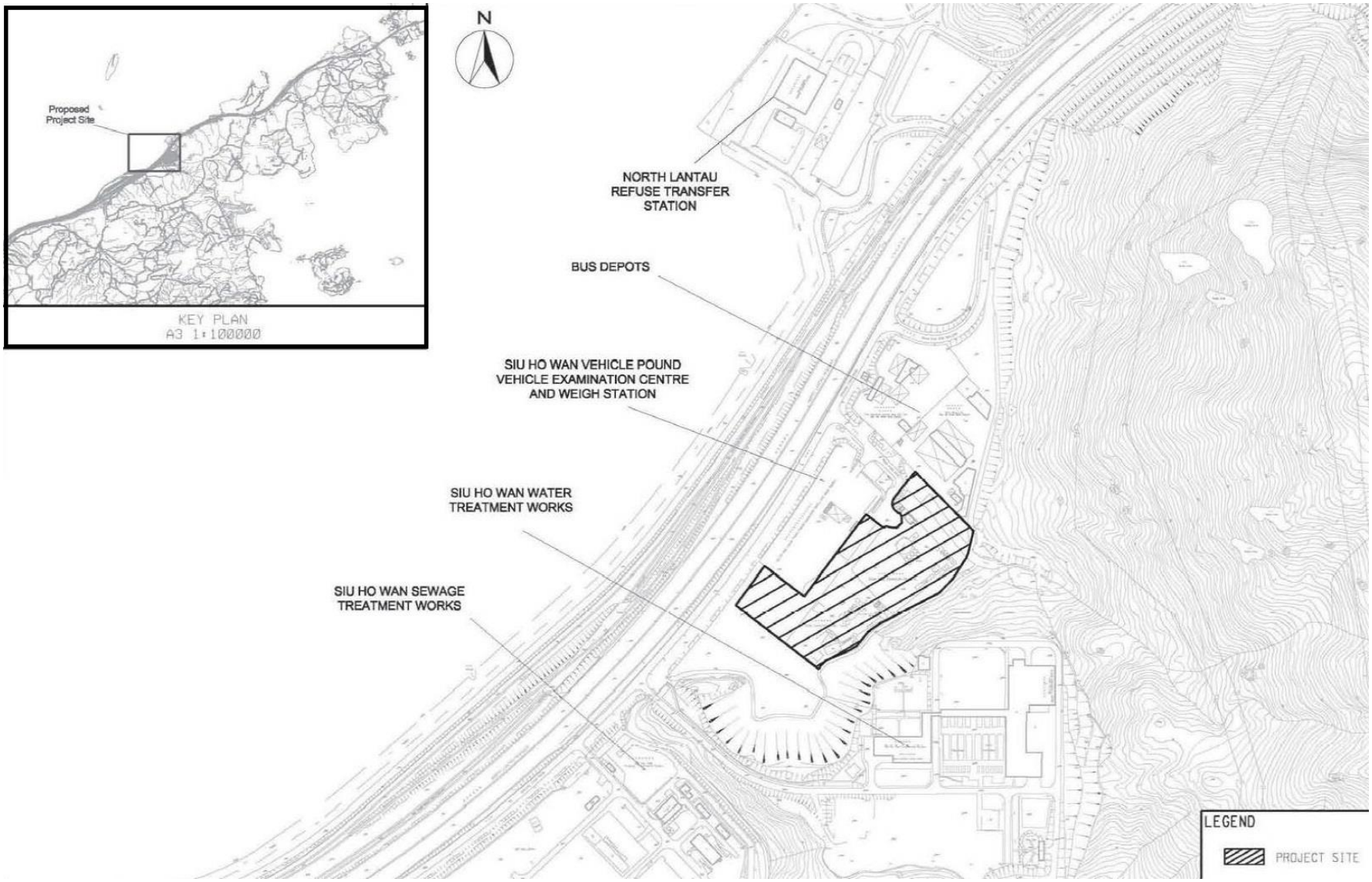

Figure 1.1 Location Plan of Proposed OWTF Phase 1 Development

OSCAR Bioenergy Joint Venture

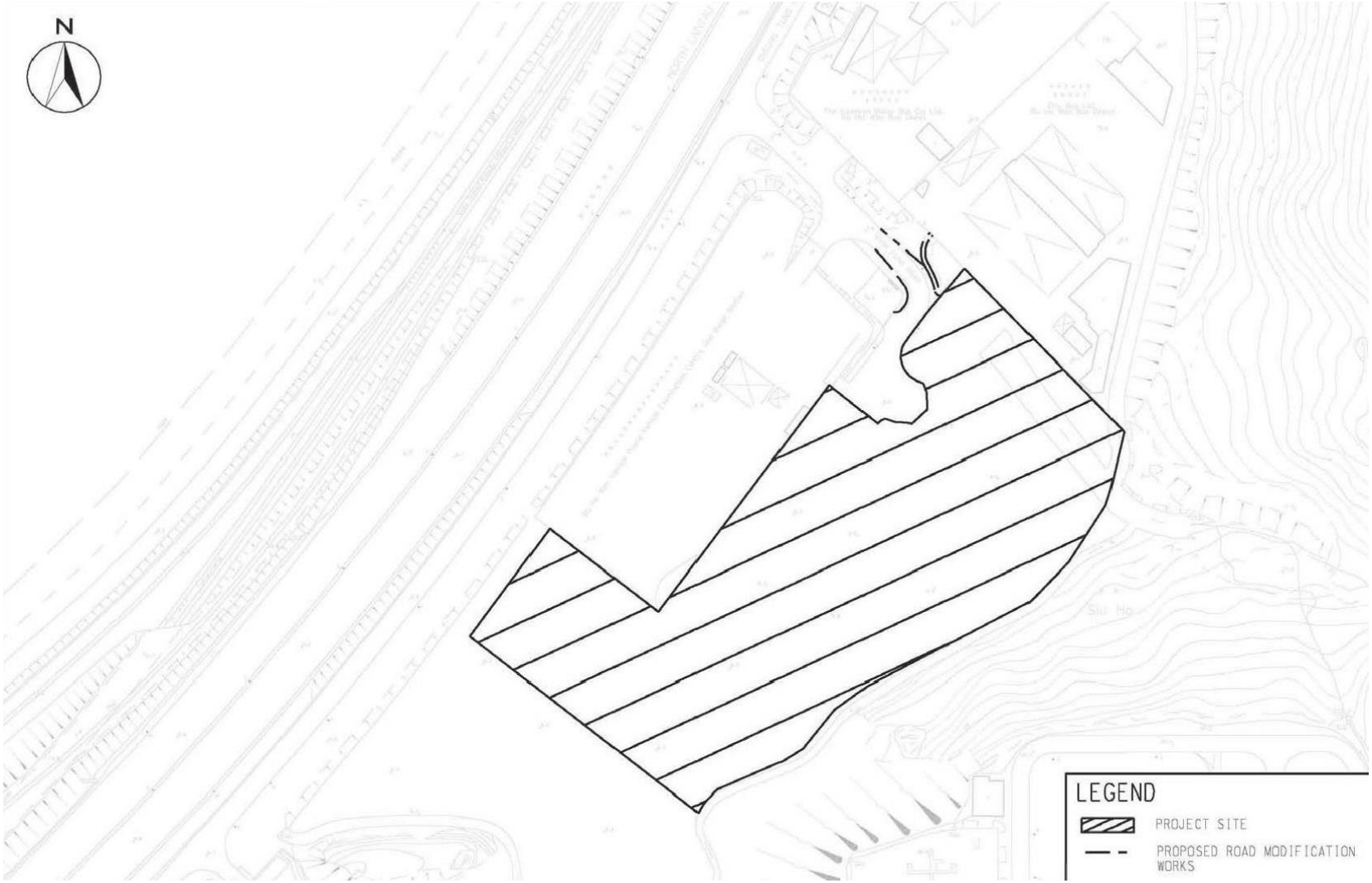

Figure 1.2 Project Area Boundary of Proposed OWTF Phase 1 Development

OSCAR Bioenergy Joint Venture

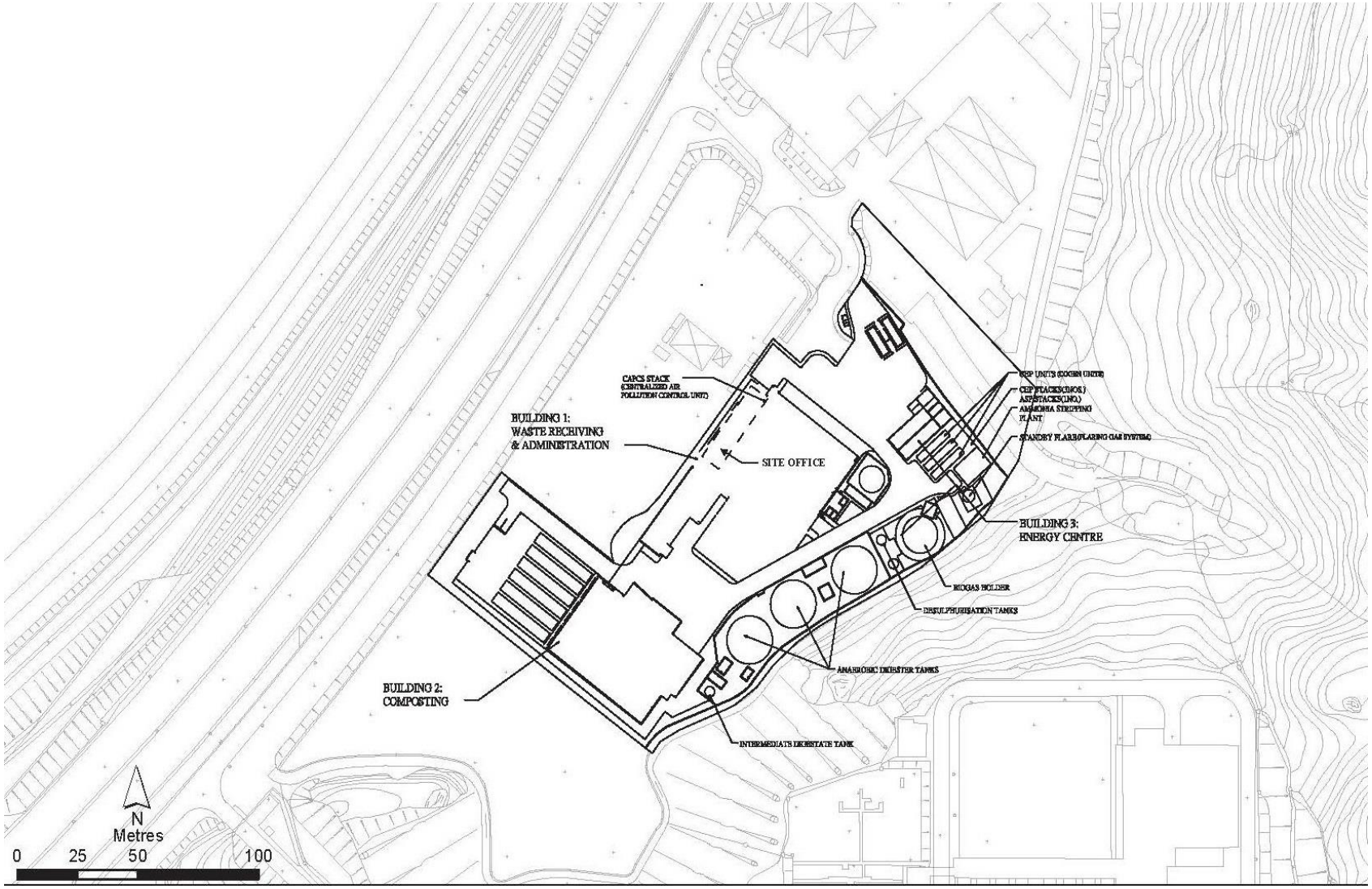

Figure 1.3 Site Layout Plan

OSCAR Bioenergy Joint Venture

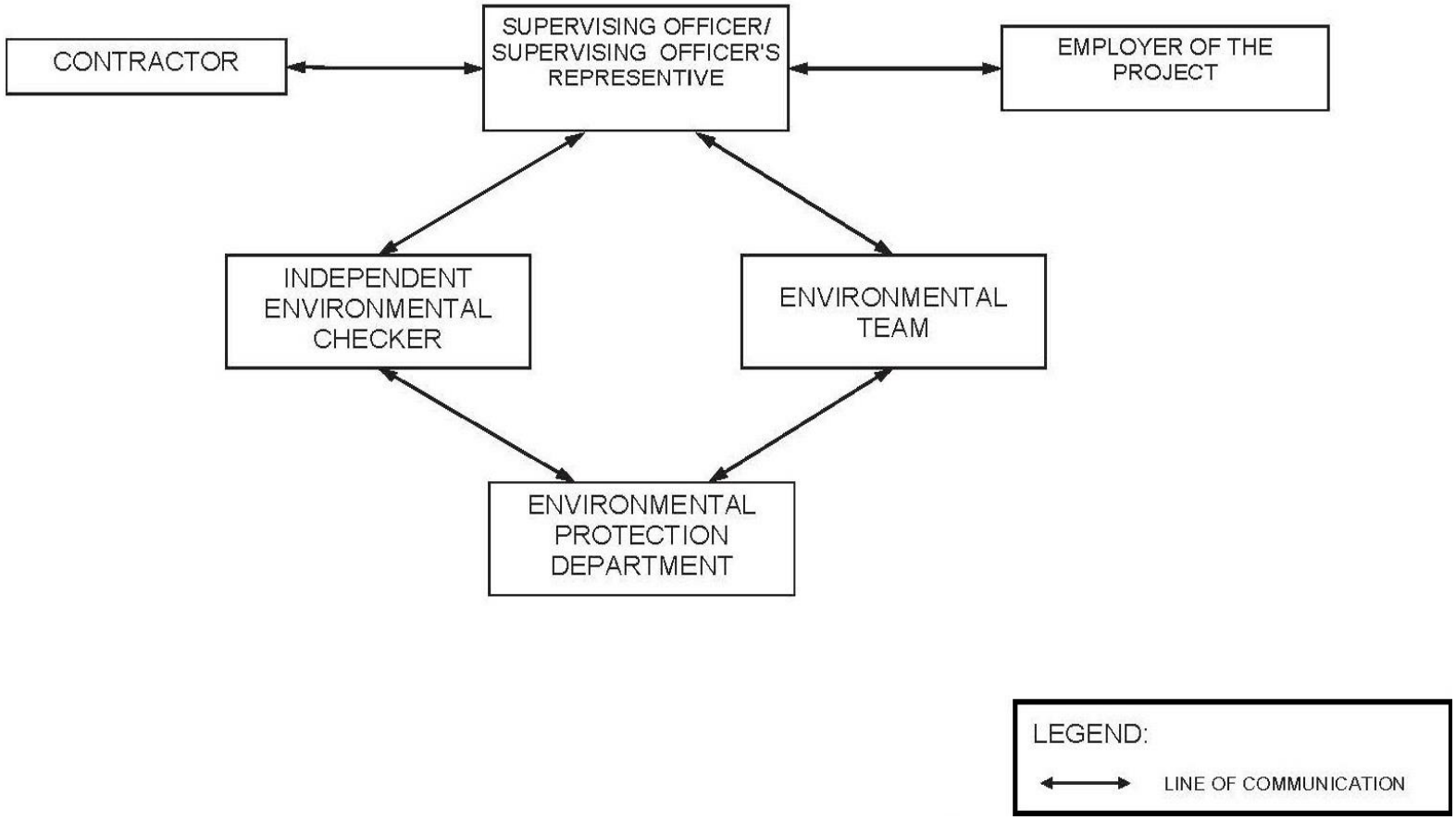

Figure 1.4 Project Organization – EM&A Program For Construction Phase

OSCAR Bioenergy Joint Venture

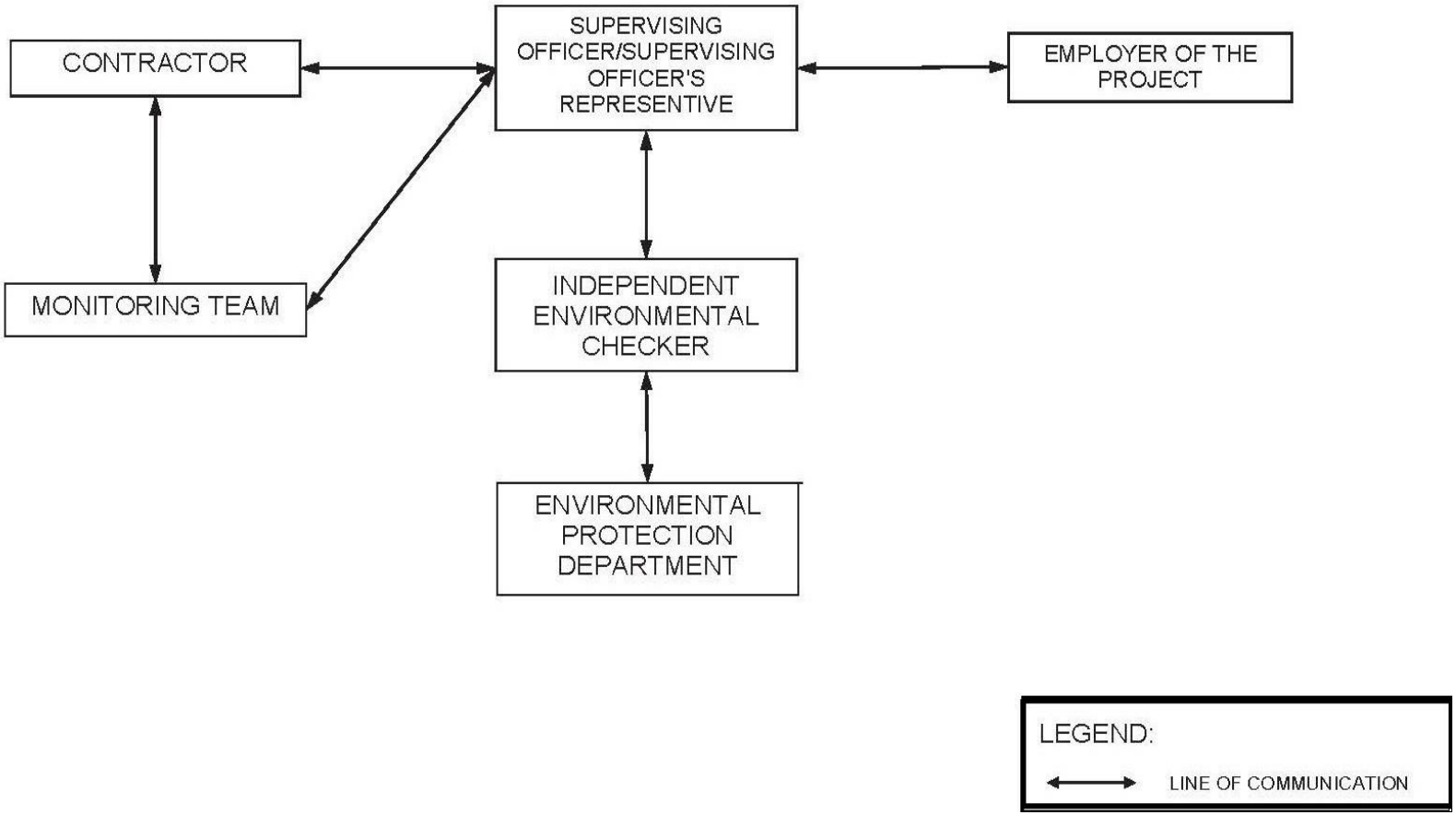

Figure 1.5 Project Organization – EM&A Program for Operation Phase

OSCAR Bioenergy Joint Venture

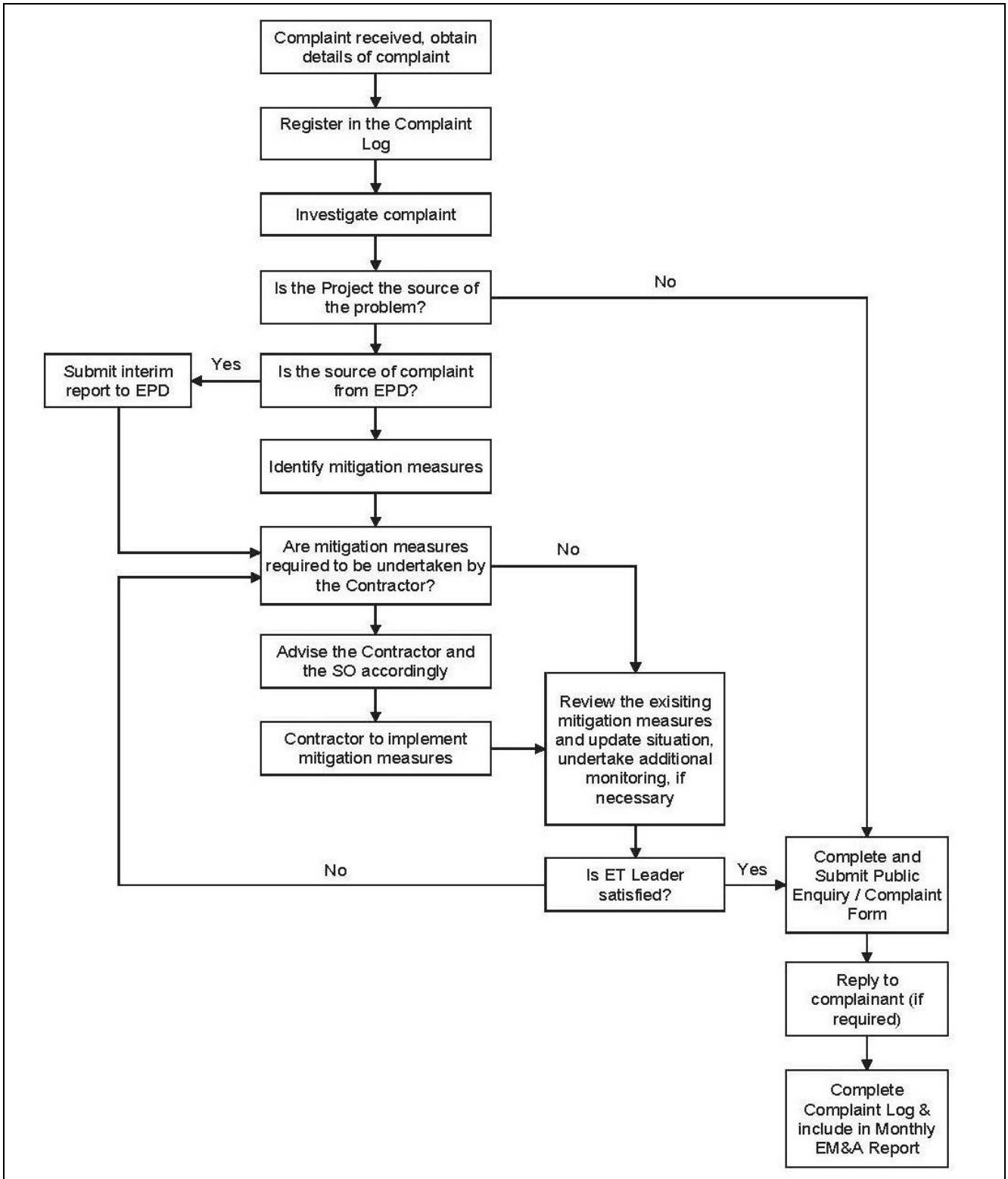

Figure 1.6 Environmental Complaint Flow Diagram

Appendix A
Implementation Schedule of Mitigation Measure

This page is intentionally left blank

Appendix A Implementation Schedule of Mitigation Measures

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
A Air Quality									
3.73	2.5	*Air Pollution Control (Construction Dust) Regulation & Good Site Practices* • Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be applied to aggregate fines. • Open stockpiles should be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading points, and use of water sprinklers at the loading area where dust generation is likely during the loading	Construction Site/During Construction Period	Contractor		√			Air Pollution Control (Construction Dust) Regulation

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		process of loose material, particularly in dry seasons/ periods. • Imposition of speed controls for vehicles on unpaved site roads. 8 kilometers per hour is the recommended limit. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed. • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system.							
3.78	2.7 & 2.13 – 2.19	• Commissioning tests shall be conducted to confirm the centralized air pollution control unit, the cogen units, the standby flaring unit and ASP against the design emission levels as stated in **Tables 2.2 – 2.5.** • Odour monitoring shall be conducted at the stack exhaust of the centralized air pollution control unit weekly in the first month of the commissioning stage.	OWTF Stacks/ During Design & Commissioning Stage	Contractor	√		√		EIAO-TM

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
3.78	2.7-2.12	*Air Pollution Control and Stack Monitoring* • Stack monitoring shall be installed for the centralized air pollution control unit, cogen units and ASP of OWTF to ensure that the air emissions from OWTF would meet the design emission limits as well as EPD criteria.	OWTF Stacks/ During design & Operation	OWTF Operator	√		√		ElAO-TM
3.78	2.20-2.28	• Odour Patrol at site boundary of OWTF	OWTF Site Boundary/During Operation (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	√		√		ElAO-TM
B Hazard to Life									
4.102	3.3	*Construction Phase* • The number of workers on site during construction stage should be kept at the same level as the assessment. • Construction works should be suspended when delivery of chlorine takes place. • 3m high fence should be constructed along the boundary facing the SHWWTW.	Construction Site/ During Construction Period	Contractor		√			

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		• Emergency evacuation procedures should be formulated and the Contractor should ensure all workers on site should be familiar with these procedures as well as the route to escape in case of gas release incident. Relevant Departments, such as Fire Services Department (FSD), should be consulted during the development of Emergency procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. A copy of the latest version emergency procedures should be dispatched to Tung Chung Fire Station for reference once available. • The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to construction workers in the event of chlorine gas release in the SHWWTW. • The Contractor should establish a communication channel with the SHWWTW operation personnel and FSD during construction stage. In case of any hazardous incidents in the treatment works, operation personnel of SHWWTW should advise the Contractor to inform construction workers to proceed with emergency procedure. The Contractor should appoint a Liaison Officer to communicate with FSD Incident Commander on site in case of emergency. • Introduction training should be provided to any staff before carryout construction works at the Project site. • Periodic drills should be coordinated and conducted to ensure all construction personnel are familiar with the emergency procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement. Prior								

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		notice of periodic drills should be given to Station Commander of Tung Chung Fire Station. Joint operational exercise with FSD and SHWWTW is recommended.							
4.103	3.4	*Design Phase* • The site office should be close to the western boundary of the Project site and away from the SHWWTWs chlorine store as far as possible.	Work Site *I* During Design Period	OWTF operator	√				
4.103	3.4	*Operation Phase* • 3m high fence should be constructed along the boundary facing the SHWWTW • Emergency evacuation procedures should be formulated and the Contractor should ensure on site staff should be familiar with these procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. A copy of the latest version emergency procedures should be dispatched to Tung Chung Fire Station for reference once available. • The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to personnel on site in the event of chlorine gas release in the SHWWTW. • The Contractor should establish a communication channel with the SHWWTW operation personnel and FSD. In case of any hazardous incidents in the treatment works, operation personnel of SHWWTW	Work Site *I* During Operation Period	Contractor			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		should advise the Contractor to inform personnel on site to proceed with emergency procedure. The Contractor should appoint a Liaison Officer to communicate with FSD Incident Commander on site in case of emergency. • Periodic drills should be coordinated and conducted to ensure all on site personnel are familiar with the emergency procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement. Prior notice of periodic drills should be given to Station Commander of Tung Chung Fire Station. Joint operational exercise with FSD and SHWWTW is recommended.							
C	***Water Quality***								
5.44	4.5	*Construction site run-off and general construction activities:* The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO
5.45	4.5	*Excavation of Soil Materials* The construction programme should be properly planned to Minimize soil excavation, if any, in rainy seasons. This prevents soil erosion from exposed soil	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		surfaces. Any exposed soil surfaces should also be properly protected to Minimize dust emission. In areas where a large amount of exposed soils exist, earth bunds or sand bags should be provided. Exposed stockpiles should be covered with tarpaulin or impervious sheets at all times. The stockpiles of materials should be placed at locations away from any stream courses so as to avoid releasing materials into the water bodies. Final surfaces of earthworks should be compacted and protected by permanent work.							
5.46	4.5	*Accidental spillage of Chemicals:* Contractor must register as a chemical waste producer if chemical wastes would be produced from the 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.	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO, WDO
5.47	4.5	Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas which appropriately equipped to control these discharges.	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO, WDO
5.48	4.5	Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO, WDO

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
5.49	45	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: • 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 labeled, 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.	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO, WDO
5.50	45	Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid entering to the nearby watercourses. Stockpiles of cement and other construction materials should be kept covered when not being used. Rubbish and litter from construction sites should also be collected to prevent spreading of rubbish and litter from the site area. It is recommended to clean the construction sites on a regular basis.	Construction Site/ During Construction Period	Contractor		√			EIAO-TM, ProPECC PN 1/94; WPCO, WDO
5.51	45	<u>Sewage *Effluent*</u> The presence of construction workers generates sewage. It is recommended to provide sufficient chemical toilets in the works areas. The toilet facilities should be more than 30m from any watercourse. A licensed waste collector should be deployed to clean the	Work Site / During Construction Period	Contractor		√			EIAO-TM, WPCO

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		chemical toilets on a regular basis.							
5.52	4.5	Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the project. Regular environmental audit on the construction site can provide an effective control of any malpractices and can achieve continual improvement of environmental performance on site.	Work Site / During Construction Period	Contractor		√			EIAO-TM, WPCO
5.53	4.5	*Nullah Decking* To minimize the potential water quality impacts from the nullah reconstruction works, the practices outlined below should be adopted where applicable: • The proposed works should be carried out within the dry season between October and March when the flow in the open nullah is low. • The use of less or smaller construction plants may be specified to reduce the disturbance to the nullah bed. • Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from the nullah and any water courses during carrying out of the construction works. • Stockpiling of construction materials and dusty materials should be covered and located away from the nullah any	Work Site / During Construction Period	Contractor		√			EIAO-TM, WPCO

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		• Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nullah and nearby water receivers. • Construction activities, which generate large amount of wastewater, should be carried out in a distance away from the nullah, where practicable. • Construction effluent, site run-off and sewage should be properly collected and/or treated. • Any works site inside the nullah should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props to prevent adverse impact on the water quality. • Proper shoring may need to be erected in order to prevent soil/mud from slipping into the nullah and nearby watercourse. • Supervisory staff should be assigned to station on site to closely supervise and monitor the works.							
5.54	4.5	*Wastewater from Organic Waste Treatment Process* The Project site will be equipped with an adequately sized wastewater treatment plant. A high rate type of active sludge system specifically designed for the removal of nitrogen components from the wastewater in combination with conversion of residual BOD and COD would be deployed. The wastewater treatment plant would also be incorporated with SHARON or annamox technology or equivalent to achieve high total overall nitrogen removal. Wastewater generated from the OWTF (including wastewater from dewatering process, leachate from waste reception area, condensate from biogas handling, wastewater from scrubber of air treatment system and any surplus water from truck	Work Site / During Design & Operation Period	OWTF Operator			√		TM-DSS;WPCO;WDO

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		washing facility) will be diverted to the wastewater treatment plant. Treated effluent will then be stored temporarily in order to be used as process water within the plants. The storage volume would be around 20 m^3. Overflow from the tank will be discharged to foul sewers. The polluting parameters in effluent shall be in compliance with the requirements specified in the TM- DSS. The design, installation and operation of the wastewater treatment plant shall be licensed under the Waste Disposal Ordinance and subject to the effluent monitoring as required under the WPCO which is under the ambit of regional office (RO) of EPD. To ensure that wastewater can be adequately treated and effluent from treatment plant can meet the standards listed in TM- DSS, the following mitigation measure should be conducted. • Cleaning and maintenance of treatment facilities should be conducted on a regular basis to ensure that removal rate of each treatment facility would not be reduced. • Cleaning and maintenance of pipelines should be carried out on a regular basis to prevent block of pipeline and leaching of wastewater, and therefore prevent overflowed or leached wastewater discharging into nearby drainages and water streams. • Regular site inspection should be conducted to ensure that no wastewater can be directly discharged into nearby water streams.							

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
5.55	4.5	In the scrubber, spraying water should be re-circulated to minimize the need for external water. The spraying water would be collected at the bottom of the scrubber. Excess water would be discharged to the wastewater treatment plant as described in Section 5.54.	Work Site / During Design & Operation Period	OWTF Operator	√		√		TM-DSS; WPCO; WDO
5.56	4.5	The waste reception, treatment facilities and compost storages of OWTF should be located in enclosed buildings to prevent generation of contaminated rain runoff. All surface runoff such as washed water generated in the treatment processes areas should be properly collected and diverted to the on-site wastewater treatment plant as described in Section 5.54.	Work Site / During Design & Operation Period	OWTF Operator	√		√		TM-DSS; WPCO; WDO
5.57	4.5	All drainage system for collection and transferring wastewater generated in the OWTF to the on-site wastewater treatment plant as described in Section 5.54 should be capable of preventing clogging and easy maintenance and cleaning.	Work Site /During Design & Operation Period	OWTF Operator	√		√		TM-DSS; WPCO; WDO
D.1 Waste Management									
6.41	5.4	Good Site Practices Recommendations for good site practices during the construction phase would include: • Obtain relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions)	Work Site/During Construction Period	Contractor		√			WDO; LDO; ETWB TCW No. 19/2005

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		Ordinance (Cap. 28); • Provide staff training for proper waste management and chemical handling procedures; • Provide sufficient waste disposal points and regular waste collection; • Provide appropriate measures to minimize 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 disposed of to licensed facility for treatment; and • Employ licensed waste collector to collect waste.							
6.42	5.5	<u>Waste Reduction Measures</u> Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: • Design foundation works that could minimize the amount of excavated material to be generated; • Provide training to workers on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; • Sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); • Segregate and store different types of waste in different containers, skips or stockpiles to enhance	Work Site/During Design & Construction Period	Contractor	√	√			

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		reuse or recycling of materials and their proper disposal; • Encourage the collection of aluminum cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce; and • Plan and stock construction materials carefully to minimize the amount of waste to be generated and to avoid unnecessary generation of waste.							
6.44	5.7	Excavated and C&D Materials In order to minimize the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below • A WMP, which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW 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 C&D material at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to ETWB TCW No. 31/2004).	Work Site / During Design & Construction Period	Contractor	√	√			ETWBTCW No. 33/2002; ETWB TCW No. 19/2005 ETWBTCW No. 31/2004
6.45-6.46	5.8-5.9	An EMP should be prepared and implemented in accordance with ETWB TCW No. 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and	Work Site/ During Design& Construction Period	Contractor	√	√			ETWBTCW No. 19/2005

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		disposal of different categories of waste to be generated from construction activities. The EMP should be submitted to the Supervising Officer (SO) and Supervising Officer's Representative (SOR) for approval. The EMP should be reviewed regularly and updated, preferably on a monthly basis. A system should be devised to work for on-site sorting of excavated and C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimize temporary stockpiling on-site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.							
6.47	5.10	<u>Chemical Waste</u> 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)	Work Site/During Construction Period	Contractor		√			Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		(General) Regulation.							
6.48	5.11	<u>General Refuse</u> General refuse should be stored in enclosed bins or compaction units separated from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'windblown' light material.	Work Site / During Construction Period	Contractor		√			Public Health and Municipal Services Ordinance
6.50	5.12	<u>Good Site Practices</u> Good operational practices should be adopted to Minimize waste management impacts: • 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	During Operation Period	OWTF Operator			√		WDO; Waste Disposal (Chemical Waste) (General) Regulation; Land (Miscellaneous Provision) Ordinance (Cap. 28); ETWB TCW No. 31/2004

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		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 ETWB TCW No. 31/2004. • 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 minimize 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 wastes generated, recycled and disposed of (including the disposal sites).							
6.51	5.13	<u>Waste Reduction Measures</u> Good management and control can prevent the generation of significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction: • 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 aluminum cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors.	During Operation Period	OWTF Operator			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		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.							
6.52	5.14	Wastes Generated from Pre-Treatment Process 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 minimize odour, pest and litter impacts. Open burning must be strictly prohibited.	Pre-Treatment Process/ During Operation Period	OWTF Operator			√		
6.53-6.56	5.15-5.18	Chemical Wastes • Chemical waste generated from machinery maintenance and servicing should be managed in accordance with 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 removed by licensed chemical waste contractors. • Plant / equipment maintenance schedules should be planned in order to minimize the generation of chemical waste. • Non-recyclable chemical wastes and lubricants should be disposed of at appropriate facilities, such	Whole Site / During Operation Period	OWTF Operator			√		Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		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. Where possible, chemical wastes (e.g. waste lubricants) would be recycled at appropriate facilities, such as Dunwell's oil re-refinery.							
6.57-6.58	5.19-5.20	<u>General Refuse</u> • Waste generated in offices should be reduced through segregation and collection of recyclables. To promote the recycling of wastes such as used paper, aluminum 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 minimize odour, pest and litter impacts. Also, open burning of refuse must be strictly prohibited.	Whole Site / During Operation Period	OWTF Operator			√		Public Health and Municipal Services Ordinance
D.2 Proposed Land Contamination Preventive Measures									
6.65	5.21 (i)	<u>Fuel Oil Containers</u> • Fuel oil should be stored in suitable containers. • All fuel oil containers should be securely closed. • Appropriate labels showing the name of fuel oil	Fuel Oil Storage Containers /During Operation Period	OWTF Operator			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		should be posted on the containers. • Drip trays should be provided for all containers.							
6.65	5.21 (ii)	Storage Area • Distance between the fuel oil refuelling points and the fuel oil containers should be minimized. • The storage area should be used for fuel oil storage only. • No surface water drains or foul sewers should be connected to the storage area. • The storage area should be enclosed by three sides by a wall and have an impermeable floor or surface.	Fuel Oil Storage Area /During Operation Period	OWTF Operator			√		
6.65	5.21 (iii)	Fuel Oil Spillage Response An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incident in detail. General procedures to be taken in case of fuel oil spillage are presented below. • Training Training on oil spill response actions should be given to relevant staff. The training should cover the followings: - Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and firefighting equipment; - General methods to deal with oil spillage and fire incidents; - Procedures for emergency drills in the event of	Whole Site / During Operation Phase	OWTF Operator			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		oil spills and fire; and - Regular drills should be carried out. • Communication Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department could be quickly sought. • Response Procedures Any fuel oil spillage within the Project Site should be immediately reported to the Site Manager with necessary details including location, source, possible cause and extent of the spillage. Site Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures should include the following: - Identify and isolate the source of spillage as soon as possible. - Contain the oil spillage and avoid infiltration into soil / groundwater and discharge to storm water channels. - Remove the oil spillage. - Clean up the contaminated area. - If the oil spillage occurs during refuelling, the refuelling operation should immediately be stopped. - Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The							

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		handling and disposal procedures for chemical wastes are discussed in the following paragraphs.							
6.66	5.22 (i)	<u>Chemicals and Chemical Wastes Handling & Storage</u> ● Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas. ● The storage of chemical wastes should comply with the requirements of the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. ● The storage areas for chemicals and chemical wastes should have an impermeable floor or surface. The impermeable floor *I* surface should possess the following properties: - Not liable to chemically react with the materials and their containers to be stored. - Able to withstand normal loading and physical damage caused by container handling - The integrity and condition of the impermeable floor or surface should be inspected at regular intervals to ensure that it is satisfactorily maintained ● For liquid chemicals and chemical wastes storage, the storage area should be bonded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater. ● Storage container should be checked at regular intervals for their structural integrity and to ensure	Whole Site / During Operation Period	OWTF Operator			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		that the caps or fill points are tightly closed. ● Chemical handling should be conducted by trained workers under supervision.							
6.66	5.22 (ii)	Chemicals and Chemical Wastes Spillage Response A Chemicals and / or Chemical Wastes Spillage Response Plan should be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals *I* chemical waste spillages are presented below ● Training Training on spill response actions should be given to relevant staff. The training should cover the followings: - Tools & resources to handle spillage, e.g. locations of spill handling equipment; - General methods to deal with spillage; and - Procedures for emergency drills in the event of spills. ● Communication Establish communication channel with Fire Services Department (FSD) and EPD to report the spillage incident so that necessary assistance from relevant department could be quickly sought. ● Response Procedures Any spillage within OWTF site should be reported to the Site Manager.	Whole Site / During Operation Period	OWTF Operator			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		Site Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures should include the followings: - Identify and isolate the source of spillage as soon as possible; - Contain the spillage and avoid infiltration into soil / groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas); - Remove the spillage; the removal method / procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed; - Clean up the contaminated area (in case the spillage occurs at locations out of the designated storage areas); and - The waste arising from the cleanup operation should be considered as chemical wastes.							
6.67 – 6.69	5.23-5.25	Incident Record ● After any spillage, an incident report should be prepared by the Site Manager. The incident report should contain details of the incident including the cause of the incident, the material spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary. ● The incident report should provide sufficient details for the evaluation of any environmental impacts due	Whole Site / During Operation Period	OWTF Operator			√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
		to the spillage and assessment of the effectiveness of measures taken. ● In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the Project operator should be responsible for the cleanup of the affected area. The responses procedures described in Sections 6.65 - 6.66 of the EIA Report should be followed accordingly together with the land contamination assessment and remediation guidelines stipulated in the *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management* and the *Guidance Note for Contaminated Land Assessment and Remediation.*							

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
E Landscape and Visual									
7.99 & Table 7.7	Table 6.1	*Construction Phase* • Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical • Compensatory tree planting should be provided to compensate for felled trees. - Compensation tree species shall be chosen from both indigenous and ornamental species - Compensatory tree planting quantities shall be as per DLO approved requirement. • Control of night-time lighting • Erection of decorative screen hoarding compatible with the surrounding setting	Construction Site/During Design & Construction Stages	Contractor	√	√			
7.98 & Table 7.8	Table 6.2	*Operation Phase* • Aesthetic design of the facade, including its colour theme, pattern, texture, materials, finishing and associated structures to harmonize with the surrounding settings • Grass / groundcover planting to soften the roof • Heavy standard tree planting to screen proposed associated structures • Grasscrete paving to soften the harshness of large paved surface areas wherever possible	Within Project Area / During Design & Operation Stages	OWTF Operator	√		√		

EIA Ref	EM&A Log Ref.	Environmental Protection Measures*	Location /Duration of measures/ Timing of completion of measures	Implementation Agent	Implementation Stages**				Relevant Legislation and Guidelines
					Des	C	O	Dec	
F Noise									
8.25	7.3	Good Site Practice: • Only well-maintained plant should be operated on- site and plant should be serviced regularly during the construction program; • Mobile plant, if any, should be sited as far from noise sensitive receivers (NSRs) as possible; • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.	Work Site *I* During Construction Period	Contractor		√			EIAO-TM, NCO

* All recommendations and requirements resulted during the course of EIA Process.

* Des=Design; C=Construction; O=Operation; Dec=Decommissioning

Appendix B
Sample of Incident Report on Action Level or Limit Level Non-compliance

This page is intentionally left blank

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	

Prepared by: _____

Designation: _____

Signature: _____

Date: _____