

OSCAR Bioenergy Joint Venture

Contract No. EP/SP/61/10
Organic Resources Recovery
Centre (Phase 1):
*Thirty-fourth Quarterly EM&A
Summary Report*

1 September 2023 - 30 November 2023

Environmental Resources Management

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Meinhardt Infrastructure and Environment Limited

**Organic Resources Recovery Centre,
Phase I**

34th Quarterly EM&A Report
(1 Sept 2023 – 30 Nov 2023)

(August 2024)

Verified by: Claudine Lee



Position: Independent Environmental Checker

Date: 1st August 2024

OSCAR Bioenergy Joint Venture

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1 September 2023 – 30 November 2023

Reference 0279222

For and on behalf of ERM-Hong Kong, Limited	
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CONTENTS

EXECUTIVE SUMMARY

1	INTRODUCTION	1
1.1	PURPOSE OF THE REPORT	1
1.2	STRUCTURE OF THE REPORT	1
2	PROJECT INFORMATION	3
2.1	BACKGROUND	3
2.2	GENERAL SITE DESCRIPTION	4
2.3	MAJOR ACTIVITIES UNDERTAKEN	4
2.4	PROJECT ORGANISATION AND MANAGEMENT STRUCTURE	4
2.5	STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS	4
3	ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS	6
3.1	ENVIRONMENTAL MONITORING	6
3.1.1	<i>Air Quality</i>	6
3.1.2	<i>Odour</i>	8
3.2	SITE AUDIT	10
3.2.1	<i>Water Quality</i>	10
3.2.2	<i>Landscape and Visual</i>	11
4	MONITORING RESULTS	13
4.1	AIR QUALITY	13
4.1.1	<i>Operation Phase Monitoring</i>	13
4.2	ODOUR	17
4.2.1	<i>Operation Phase Monitoring</i>	17
4.3	WATER QUALITY	18
4.3.1	<i>Operation Phase Monitoring</i>	18
4.4	WASTE MANAGEMENT	20
4.4.1	<i>Operation Phase Monitoring</i>	20
5	SITE AUDIT	22
5.1	ENVIRONMENTAL SITE AUDIT	22
5.1.1	<i>Operation Phase</i>	22
5.2	LANDSCAPE AND VISUAL AUDIT	23
6	ENVIRONMENTAL NON-CONFORMANCE	24
6.1	SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE	24
6.2	SUMMARY OF ENVIRONMENTAL COMPLAINT	25
6.3	SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION	25
7	FUTURE KEY ISSUES	26
7.1	KEY ISSUES FOR THE COMING REPORTING PERIOD	26

LIST OF TABLES

Table 2.1	Summary of Activities Undertaken in the Reporting Period
Table 2.2	Summary of Environmental Licensing, Notification and Permit Status
Table 3.1	Sampling and Laboratory Analysis Methodology
Table 3.2	Emission Limit for CAPCS Stack
Table 3.3	Emission Limit for CHP Stack
Table 3.4	Emission Limit for ASP Stack
Table 3.5	Emission Limit for Standby Flaring Gas Unit 0
Table 3.6	Odour Intensity Level
Table 3.7	Action and Limit Levels for Odour Nuisance
Table 3.8	Event and Action Plan for Odour Monitoring
Table 3.9	Discharge Limits for Effluent from the Effluent Storage Tank (as stipulated in WT00038391-2021)
Table 3.10	Discharge Limits for Effluent from the Petrol Interceptor(s) (as stipulated in TW00038391-2021)
Table 4.1	Hourly Average of Parameters Recorded for CAPCS
Table 4.2	Hourly Average of Parameters Recorded for CHP 1
Table 4.3	Hourly Average of Parameters Recorded for CHP 2
Table 4.4	Hourly Average of Parameters Recorded for CHP 3
Table 4.5	Hourly Average of Parameters Recorded for ASP
Table 4.6	Hourly Average of Parameters Recorded for the Standby Flaring Gas Unit
Table 4.7	Results of the Discharge Sample Collected from the Outlet Chamber of the Effluent Storage Tank in September 2023
Table 4.8	Results of the Discharge Sample Collected from the Outlet Chamber of the Effluent Storage Tank in October 2023
Table 4.9	Results of the Discharge Sample Collected from the Outlet Chamber of the Effluent Storage Tank in November 2023
Table 4.10	Results of the Discharge Sample from the Petrol Interceptor 1 on 12 October 2023
Table 4.11	Results of the Discharge Sample from the Petrol Interceptor 2 on 12 October 2023
Table 4.12	Results of the 2 nd Discharge Sample from the Petrol Interceptor 2 on 31 October 2023 (Follow-up Sample)
Table 4.13	Quantities of Waste Generated from the Operation of the Project
Table 8.1	Exceedances for Stack Emissions
Table 8.2	Exceedances for Petrol Interceptor 2

LIST OF ANNEXES

<i>ANNEX A</i>	<i>LOCATION OF PROJECT</i>
<i>ANNEX B</i>	<i>PROJECT ORGANISATION CHART AND CONTACT DETAIL</i>
<i>ANNEX C</i>	<i>IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES</i>
<i>ANNEX D</i>	<i>WASTE FLOW TABLE</i>
<i>ANNEX E</i>	<i>ENVIRONMENTAL COMPLAINT, ENVIRONMENTAL SUMMONS AND PROSECUTION LOG</i>

ANNEX F INVESTIGATION REPORT
ANNEX G ODOUR PATROL RESULT

EXECUTIVE SUMMARY

The construction works of *No. EP/SP/61/10 Organic Resources Recovery Centre Phase 1 (the Project)* commenced on 21 May 2015. This is the 34th Quarterly Environmental Monitoring and Audit (EM&A) report presenting the EM&A works carried out during the period from 1 September 2023 to 30 November 2023 in accordance with the EM&A Manual. Substantial completion of the construction works was confirmed on 3 December 2018. In the meantime, the operation phase EM&A programme had commenced in March 2019. Substantial Completion in respect of substantial part of the Works was confirmed on 24 February 2020. The construction phase EM&A programme was completed in the end of February 2020.

Summary of Works undertaken during the Reporting Period

Works undertaken in the reporting period included:

- Operation of the Project, including organic waste reception, and operation of the pre-treatment facilities, anaerobic digesters, composting facilities, air pollution control systems, on-line emission monitoring system for the Centralised Air Pollution Control Unit (CAPCS), Co-generation Units (CHP)s and Ammonia Stripping Plant (ASP), and the wastewater treatment plant;
- Grab crane lights repaired without the use of an external contractor;
- Repair to SBR1 Aeration system after a flange and pipe burst within the SBR;
- CAPCS flow transmitter repaired using a different model;
- Repairs to Biogas NRV valve and pressure transmitter (a safety issue which needed urgent attention);
- Feeding screw for PT 1 hopper replaced within 3 days;
- Pretreatment line 1 Trommel motor and gearbox repaired;
- CAPCS Fan 3 overhaul;
- Checking of the CHPs and ASP;
- Replaced weather rubbers on Building No. 2 roof windows;
- Completed works on CAPCS fans and NRV's chemical scrubber fans 6091F102 and 6091F202;
- Installed new loader bucket on wheel loader machine; and
- Started changing tubing on all AD mixers (this work will continue into the next month).

Environmental Monitoring and Audit Progress

Air Quality Monitoring

Non-compliance of emission limits of NO_x and SO₂ from CHP1; NO_x, SO₂, and HCl from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂, NH₃, and HCl from the ASP were recorded during September 2023.

Non-compliance of emission limits of NO_x, SO₂, and HCl from CHP1; NO_x and SO₂ from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂ and NH₃ from ASP were recorded during October 2023.

Non-compliance of emission limits of NO_x, SO₂, and HCl from CHP1; NO_x, SO₂, and HCl from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂, NH₃, and HCl from the ASP were recorded during November 2023.

Odour

Odour patrols were conducted by the independent odour patrol team of ALS Technichem (HK) Pty Ltd on 14 September 2023. No Level 2 Odour Intensities was recorded during the reporting period. The odour patrol results are shown in *Annex G*.

Water Quality

All analytes from the outlet chamber of the effluent storage tank were recorded to be in compliance with discharge limits during September, October, and November 2023.

Non-compliance of discharge limits of Suspended Solids, Chemical Oxygen Demand, Oil & Grease from Petrol Interceptor 2 was recorded during the sampling on 12 October 2023. The exceedances in these parameters may have been due to the increased cleaning of the roads. Proper cleaning of the petrol interceptor was arranged to maintain a better effluent quality.

In light of these exceedances in the results of the discharge sample from Petrol Interceptor 2 and after measures implemented by the Contractor, a second discharge sample from Petrol Interceptor 2 was collected on 31 October 2023 as a follow-up, with all parameters recorded to be in compliance with discharge limits.

All analytes from the Petrol Interceptor 1 sampling on 12 October 2023 were recorded to be in compliance with discharge limits. Petrol Interceptor sampling was not required during September 2023 and November 2023.

The Contractor has reviewed the organic waste treatment processes (i.e., waste reception, waste pre-treatment, anaerobic digesters, and composting processes) and found that they were operated normally during the reporting period.

Waste Management

Waste generated from the operation of the Project includes chemical waste, waste generated from pre-treatment process and general refuse.

A total of 6,600 kg of Spent Activated Carbon was disposed of at CWTC in September 2023; no chemical waste was disposed of a CWTC in October 2023; and among the 1,440 L of chemical waste disposed of at CWTC in November 2023, 1,400L were of spent lube oil and 40 L were of spent acid and alkaline (lab).

2,657.41 tonnes of waste generated from pre-treatment process from the operation of the Project was disposed of at landfill. Among the recyclable waste generated from pre-treatment process from the operation of the Project, 0.000 tonnes of metals, 1.250 tonnes of papers/cardboard packing, and 0.000 tonnes of plastics were sent to recyclers for recycling during the reporting period.

Around 8.295 tonnes of general refuse from the operation of the Project were disposed of at landfill. Among the recycled general refuse from the operation of the Project, 0.016 tonnes of metals, 0.122 tonnes of papers/cardboard packing, and 0.026 tonnes of plastics were sent to recyclers for recycling during the reporting period.

Findings of Environmental Site Audit

A summary of the monitoring activities undertaken in this reporting period is listed below:

- Joint Environmental Site Inspections 3 times
- Landscape & Visual Inspections 3 times

Monthly joint environmental site inspections were carried out. The environmental control/mitigation measures (related to air quality, water quality, waste (including land contamination prevention), hazard-to-life, and landscape and visual) recommended in the approved EIA Report and the EM&A Manual were properly implemented by the Contractor during the reporting period.

Environmental Exceedance/Non-conformance/Compliant/Summons and Prosecution

Exceedances for the air emission limits for the CHPs and ASP stacks as well as discharge limits for Petrol Interceptor 2 were recorded during the reporting period.

No complaint/ summon/prosecution was received in this reporting period.

Future Key Issues

Activities to be undertaken in the next reporting period include:

- Operation of the Project;

- Wastewater Treatment Plant (WWTP) mixer repair work;
- ASP heat exchanger cleaning work;
- CAPCS Fan 1 overhaul; and
- CEMS quarterly PM.

ERM-Hong Kong, Limited (ERM) was appointed by OSCAR Bioenergy Joint Venture (the Contractor) as the Environmental Team (ET) to undertake the construction Environmental Monitoring and Audit (EM&A) programme for the *Contract No. EP/SP/61/10 of Organic Waste Treatment Facilities Phase I*, which the project name has been updated to *Organic Resources Recovery Centre (Phase I) (the Project)* since November 2017. ERM was also appointed by the Contractor to undertake the operation EM&A programme starting 1 March 2019.

1.1 PURPOSE OF THE REPORT

This is the 34th Quarterly EM&A report which summarises the monitoring results and audit findings for the EM&A programme during the reporting period from **1 September 2023 to 30 November 2023**.

1.2 STRUCTURE OF THE REPORT

The structure of the report is as follows:

Section 1: Introduction

It details the scope and structure of the report.

Section 2: Project Information

It summarises the background and scope of the Project, site description, project organisation and status of the Environmental Permits (EP)/licences.

Section 3: Environmental Monitoring and Audit Requirements

It summarises the environmental monitoring requirements including monitoring parameters, programmes, methodologies, frequency, locations, Action and Limit Levels, Event/ Action Plans, as well as environmental audit requirements as recommended in the EM&A Manual and approved EIA report.

Section 4: Monitoring Results

It summarises monitoring results of the reporting period.

Section 5: Site Audit

It summarises the audit findings of the environmental as well as landscape and visual site audits undertaken within the reporting period.

Section 6: Environmental Non-conformance

It summarises any exceedance of environmental performance standard, environmental complaints and summons received within the reporting period.

Section 7: Further Key Issues

It summarises the impact forecast for the next reporting month.

Section 8: Conclusions

2.1**BACKGROUND**

The Organic Resources Recovery Centre (ORRC) Phase I development (hereinafter referred to as “the Project”) is to design, construct and operate a biological treatment facility with a capacity of about 200 tonnes per day and convert source-separated organic waste from commercial and industrial sectors (mostly food waste) into compost and biogas through proven biological treatment technologies. The location of the Project site is shown in *Annex A*.

The environmental acceptability of the construction and operation of the Project had been confirmed by findings of the associated Environmental Impact Assessment (EIA) Study completed in 2009. The Director of Environmental Protection (DEP) approved this EIA Report under the *Environmental Impact Assessment Ordinance* (EIAO) (Cap. 499) in February 2010 (Register No.: AEIAR-149/2010) (hereafter referred to as the approved EIA Report). Subsequent Report on Re-assessment on Environmental Implications and Report on Re-assessment on Hazard to Life Implications were completed in 2013, respectively.

An Environmental Permit (EP) (No. EP-395/2010) was issued by the DEP to the EPD (Project Team), the Permit Holder, on 21 June 2010 and varied on 18 March 2013 (No. EP-395/2010/A) and 21 May 2013 (No. EP-395/2010/B), respectively. The Design Build and Operate Contract for the ORRC Phase 1 (Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1) (the Contract)) was awarded to SITA Waste Services Limited, ATAL Engineering Limited and Ros-Roca, Sociedad Anonima jointly trading as the OSCAR Bioenergy Joint Venture (OSCAR or the Contractor). A Further EP (No. FEP-01/395/2010/B) was issued by the DEP to the OSCAR on 16 February 2015. Variation to both EPs (Nos. EP-395/2010/B and FEP-01/395/2010/B) were made in December 2015. The latest EPs, Nos. EP-395/2010/C and FEP-01/395/2010/C, were issued by the DEP on 21 December 2015.

Under the requirements of Condition 5 of the EP (No. FEP-01/395/2010/C), an Environmental Monitoring and Audit (EM&A) programme as set out in the approved EM&A Manual (hereinafter referred to as EM&A Manual) is required to be implemented during the construction and operation of the Project. ERM-Hong Kong, Ltd (ERM) has been appointed by OSCAR as the Environmental Team (ET) for the construction phase EM&A programme and the Monitoring Team (MT) for the operation phase EM&A programme for the implementation of the EM&A programme in accordance with the requirements of the EP and the approved EM&A Manual.

The construction works commenced on 21 May 2015. The operation phase of

the EM&A programme commenced on 1 March 2019 ⁽¹⁾. The construction phase EM&A programme was completed in the end of February 2020.

2.2 GENERAL SITE DESCRIPTION

The Project Site is located at Siu Ho Wan in North Lantau with an area of about 2 hectares. The layout of the Project Site is illustrated in *Annex A*. The facility received an average of 149.25 to 160.45 tonnes and treated an average of 119.58 to 129.15 tonnes of source separated organic waste per day during the reporting period.

2.3 MAJOR ACTIVITIES UNDERTAKEN

A summary of the major activities undertaken in the reporting period is shown in *Table 2.1*.

Table 2.1 *Summary of Activities Undertaken in the Reporting Period*

Activities Undertaken in the Reporting Period
<ul style="list-style-type: none">• Systems being operated – waste reception, pre-treatment, CAPCS extraction, the digesters, the centrifuge, the composting tunnels, the desulphurisation, the emergency flare, the CHPs, the ASP and the biological wastewater treatment plant (about 149.25 – 160.45 t/d SSOW received);• Grab crane lights repaired without the use of an external contractor;• Repair to SBR1 Aeration system after a flange and pipe burst within the SBR;• CAPCS flow transmitter repaired using a different model;• Repairs to Biogas NRV valve and pressure transmitter (a safety issue which needed urgent attention);• Feeding screw for PT 1 hopper replaced within 3 days;• Pretreatment line 1 Trommel motor and gearbox repaired;• CAPCS Fan 3 overhaul;• Checking of the CHPs and ASP;• Replaced weather rubbers on Building No. 2 roof windows;• Completed works on CAPCS fans and NRV's chemical scrubber fans 6091F102 and 6091F202;• Installed new loader bucket on wheel loader machine; and• Started changing tubing on all AD mixers (this work will continue into next month).

2.4 PROJECT ORGANISATION AND MANAGEMENT STRUCTURE

The project organisation chart and contact details are shown in *Annex B*.

2.5 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS

A summary of the valid permits, licences, and/or notifications on environmental protection for this Project is presented in *Table 2.2*.

(1) As some of the minor items are yet to be closed out in March 2019, the construction phase EM&A programme and Operation Phase EM&A programme were undertaking in parallel in March 2019.

Table 2.2 Summary of Environmental Licensing, Notification and Permit Status

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Environmental Permit	FEP-01/395/2010/C	Throughout the Contract	Permit granted on 21 December 2015
Notification of Construction Works under the Air Pollution Control (Construction Dust) Regulation	Ref No. 386715	Throughout the Contract	-
Effluent Discharge License	WT00038391-2021	7 July 2021 – 30 June 2026	Approved on 7 July 2021
Chemical Waste Producer Registration	WPN 5213-961-O2231-01	Throughout the Contract	Approved on 29 April 2015
Chemical Waste Producer Registration	WPN 5213-961-O2231-02	Throughout the implementation of the Project	Approved on 10 November 2017
Waste Disposal Billing Account	Account number: 702310	Throughout the Contract	-

3.1 ENVIRONMENTAL MONITORING

The air quality (including odour) monitoring to be carried out during the operation phase of the Project are described below. Although water quality monitoring is not required for the operation phase under the EM&A programme, there are water quality monitoring requirement under the Water Discharge Licence of the plant under the *Water Pollution Control Ordinance* (WPCO). As part of this EM&A programme, the monitoring results will be reviewed to check the compliance with the WPCO requirements.

3.1.1 Air Quality

According to the EM&A Manual and EP requirements, stack monitoring is required during the operation phase of the Project.

On-line monitoring (using continuous environmental monitoring system (CEMS) shall be carried out for the centralised air pollution unit (CAPCS), cogeneration units (CHP) and the ammonia stripping plant (ASP) during the operation phase. The most recent span calibrations for the CHPs and ASP CEMS systems were carried out from 26 to 28 September 2023. Annual CAPCS CEMS calibration was carried out from 10 to 12 October 2023.

The monitoring data is transmitted instantaneously to EPD (Regional Office) by telemetry system.

When the on-line monitoring for certain parameter cannot be undertaken, monitoring will be carried out using the following methodology approved by the EPD.

Table 3.1 Sampling and Laboratory Analysis Methodology

Parameters	Method	Stacks to be Monitored
Gaseous and vaporous organic substances (including methane)	USEPA Method 18	<ul style="list-style-type: none"> • CAPCS • CHP • ASP
Particulate	USEPA Method 5	<ul style="list-style-type: none"> • CAPCS • CHP • ASP
Carbon monoxide (CO)	USEPA Method 10	<ul style="list-style-type: none"> • CHP • ASP
Nitrogen oxides (NO _x)	USEPA Method 7E	<ul style="list-style-type: none"> • CHP • ASP
Sulphur dioxide (SO ₂);	USEPA Method 6	<ul style="list-style-type: none"> • CHP • ASP
Hydrogen chloride (HCl)	USEPA Method 26A	<ul style="list-style-type: none"> • CHP • ASP

Parameters	Method	Stacks to be Monitored
Hydrogen fluoride (HF)	USEPA Method 26A	<ul style="list-style-type: none"> • CHP • ASP
Oxygen (O ₂);	USEPA Method 3A	<ul style="list-style-type: none"> • CAPCS • CHP • ASP
Velocity and Volumetric Flow	USEPA Method 2	<ul style="list-style-type: none"> • CAPCS • CHP • ASP
Ammonia (NH ₃)	USEPA CTM 027	<ul style="list-style-type: none"> • ASP
Odour (including NH ₃ and H ₂ S)	EN 13725	<ul style="list-style-type: none"> • CAPCS
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)	USEPA Method 4	<ul style="list-style-type: none"> • CAPCS • CHP • ASP
Temperature	USEPA Method 4	<ul style="list-style-type: none"> • CAPCS • CHP • ASP

With reference to the EM&A Manual, the air emission of the stacks shall meet the following emission limits as presented in *Tables 3.2 to 3.5*.

Table 3.2 *Emission Limit for CAPCS Stack*

Parameter	Emission Level (mg/Nm ³) ^(a)
VOCs (including methane)	680
Dust (or Total Suspended Particulates (TSP))	6
Odour (including NH ₃ & H ₂ S)	220 ^(b)
Notes:	
(a) Hourly average concentration	
(b) The odour unit is OU/Nm ³	

Table 3.3 *Emission Limit for CHP Stack*

Parameter	Maximum Emission Level (mg/Nm ³) ^{(a) (b)}
Dust (or Total Suspended Particulates)	15
Carbon Monoxide	650
NO _x	300
SO ₂	50
NMVOCs [€]	150
VOCs (including methane) ^(d)	1,500
HCl	10
HF	1
Notes:	
(a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.	
(b) Hourly average concentration	
(c) NMVOCs should be monitored by gas sampling and laboratory analysis at an agreed interval. For the first 12 months (starting from August 2019), monitoring should be carried out at quarterly intervals. The monitoring frequency should then be reduced to half-yearly for next 12 months (starting from August 2020).	

Parameter	Maximum Emission Level (mg/Nm ³) (a) (b)
(d) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.	

Table 3.4 *Emission Limit for ASP Stack*

Parameter	Maximum Emission Level (mg/Nm ³) (a) (b)
Dust (or Total Suspended Particulates)	5
Carbon Monoxide	100
NO _x	200
SO ₂	50
VOCs (including methane) (c)	20
NH ₃	35
HCl	10
HF	1

Notes:

- (a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
- (b) Hourly average concentration
- (c) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

Table 3.5 *Emission Limit for Standby Flaring Gas Unit* ⁽¹⁾

Parameter	Maximum Emission level (mg/Nm ³) (a) (b)
Dust (or Total Suspended Particulates)	5
Carbon Monoxide	100
NO _x	200
SO ₂	50
VOCs (including methane) (c)	20
HCl	10
HF	1

Notes:

- (a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
- (b) Hourly average concentration
- (c) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

3.1.2 Odour

To determine the effectiveness of the proposed odour mitigation measures and to ensure that the operation of the ORRC1 will not cause adverse odour impacts, odour monitoring of the CAPCS stack (see *Section 3.1.1*) and odour patrol will be carried out.

Odour patrol shall be conducted by independent trained personnel/ competent persons in summer months (i.e., from July to September) for the first two operational years of ORRC1 at monthly intervals along an odour patrol route at the Project Site boundary as shown in *Annex A*.

(1) A standby facility. Only operate when the CHPs are not in operation or when the biogas generated exceeded the utilisation rate of the CHPs.

The perceived odour intensity is divided into 5 levels. *Table 3.6* describes the odour intensity for different levels.

Table 3.6 *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 odour, likely to have odour nuisance
4	Extreme severe odour, and unacceptable odour level

Table 3.7 shows the action level and limit level to be used for odour patrol. Should any exceedance of the action and limit levels occur, actions in accordance with the event and action plan in *Table 3.8* should be carried out.

Table 3.7 *Action and Limit Levels for Odour Nuisance*

Parameter	Action Level	Limit Level
Odour Nuisance (from odour patrol)	When one documented compliant is received ^(a) , or Odour Intensity of 2 is measured from odour patrol.	Two or more documented complaints are received ^(a) within a week; or Odour intensity of 3 or above is measured from odour patrol.
Note:		
(a) Once the complaint 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 ORRC1 and its on-site wastewater treatment unit.		

Table 3.8 *Event and Action Plan for Odour Monitoring*

Event	Action	
	Person-in-charge of Odour Monitoring	Project Proponent ^(a)
Action Level		
Exceedance of action level (Odour Patrol)	<ol style="list-style-type: none"> 1. Identify source/ reason of exceedance; 2. Repeat odour patrol to confirm finding. 	<ol style="list-style-type: none"> 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 Drainage Services Department (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; and 5. Inform North Lantau Refuse Transfer Station (NLTS) operator if exceedance is considered to be caused by the operation of NLTS.

Exceedance of action level (Odour Complaints)	<ol style="list-style-type: none"> 1. Identify source/reason of exceedance; 2. Carry out odour patrol to determinate odour intensity. 	<ol style="list-style-type: none"> 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; and 6. Inform NLTS operator if exceedance is considered to be caused by the operation of NLTS.
Limit Level		
Exceedance of limit level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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; and 6. Inform DSD or the operator of the SHWSTW if exceedance is considered to be caused by the operation of the SHWSTW.
Note:		
(a) Project Proponent shall identify an implementation agent.		

3.2

SITE AUDIT

Environmental mitigation measures (related to air quality, water quality, waste, land contamination, hazard-to-life, and landscape and visual) to be implemented during the operation phase of the Project are recommended in the approved EIA Report and EM&A Manual and are summarised in *Annex C*. Monthly site audits for operation phase will be carried out to check the implementation of these measures.

3.2.1

Water Quality

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 operation of the Project site. Under Effluent Discharge Licence WT00038391-2021 (effective from July 2021), the effluent quality shall meet the discharge limits as described in *Table 3.9* and *Table 3.10*.

Table 3.9 *Discharge Limits for Effluent from the Effluent Storage Tank (as stipulated in WT00038391-2021)*

Parameters	Discharge Limit (mg/L)
Flow Rate (m ³ /day) ^(a)	645
pH (pH units) ^(b)	6-10 ^(c)
Suspended Solids ^(b)	800
Biochemical Oxygen Demand (5 days, 20°) ^(b)	800
Chemical Oxygen Demand ^(b)	2,000
Oil & Grease ^(b)	40
Total Nitrogen ^(b)	200
Total Phosphorus ^(b)	50
Surfactants (total) ^(b)	25

Notes:

- (a) Flow rate is not a parameter required to be monitored and reported by the Contractor in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.
- (b) Parameters required to be monitored and reported by the Contractor in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.
- (c) Range.

Table 3.10 *Discharge Limits for Effluent from the Petrol Interceptor(s) (as stipulated in TW00038391-2021)*

Parameters	Discharge Limit (mg/L)
Flow Rate (m ³ /day) ^(a)	245 ^(a)
Suspended Solids ^(b)	30
Chemical Oxygen Demand ^(c)	80
Oil & Grease ^(c)	20
Surfactants (total) ^(b)	15

Notes:

- (a) The surface runoff flow rate limit was estimated by the overall yearly rainfall data. As the actual flowrate from the petrol interceptors depends on the weather condition instead of the performance of the petrol interceptor, monitoring and reporting of this parameter is not required. Hence this parameter is not reported in *Table 4.10* and *Table 4.11*.
- (b) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.
- (c) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

3.2.2 *Landscape and Visual*

In accordance with EM&A Manual, the landscape and visual mitigation measures shall be implemented.

For operation phase, site inspection shall be conducted once a month for the first year of operation of the Project. All measures as stated in the implementation schedule of the EM&A Manual (see *Annex C*), including compensatory planting, undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the first year of the operation phase shall be audited by a Registered Landscape Architect (RLA) to ensure compliance with

the intended aims of the measures and the effectiveness of the mitigation measures.

4 MONITORING RESULTS

4.1 AIR QUALITY

4.1.1 Operation Phase Monitoring

The concentrations of concerned air pollutants emitted from the stacks of the CAPCS, CHP, and ASP during the reporting period are monitored on-line by the continuous environmental monitoring system (CEMS).

During the reporting period, the standby flare was operated on 12 September 2023 from 4:00PM – 7:00PM, 12 October 2023 8:00PM to 13 October 2023 2:00AM, 15 November 2023 from 12:00PM – 4:00PM, and 19 November 2023 from 1:00AM – 6:00AM. During these time periods, the Biogas Holder was required to be bypassed to allow for the blowers to be repaired, and so the standby flare needed to be operated manually to adjust for the biogas pressure. Since the standby flare was under maintenance, no values are included in *Table 4.6* for these dates as this is not the normal condition/operation of the flare.

Also during the reporting period, H₂S span testing was conducted on the CAPCS stack during the first two weeks of November, specifically from 4-5 November 2023 and from 8-9 November 2023. Since the CAPCS was under testing condition during these time periods, no values are included in *Table 4.1* for these dates as this is not the normal condition/operation of the CAPCS stack.

With reference to the emission limits shown in *Tables 3.2, 3.3 and 3.4*, the hourly average concentrations and the number of exceedances of the concerned air emissions monitored for the CAPCS, CHP and ASP during this reporting period are presented in *Tables 4.1 to 4.5*.

It should be noted that measurements recorded under abnormal operating conditions, e.g., start up and stopping of stacks and unstable operation, as well as test runs and interference of sensor, are disregarded.

Table 4.1 *Hourly Average of Parameters Recorded for CAPCS*

Parameter	Range of Hourly Average Conc. (mg/Nm ³)	Emission Limit (mg/Nm ³)	Exceedance Identified	Remarks
VOCs (including methane) ^(a)	0.00 – 29.63	680	Nil	Nil
Dust (or TSP)	0.00 – 1.22	6	Nil	Nil
Odour (including NH ₃ & H ₂ S) ^(b)	0.00 – 219.24	220	Nil	Nil

Note:
 (a) The VOCs emission limit includes methane as biogas is adopted, as fuel in the combustion process.
 (b) The odour unit is OU/Nm³.

Table 4.2 Hourly Average of Parameters Recorded for CHP 1

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedance Identified	Remarks
Dust (or TSP)	0 – 13	15	Nil	Nil
Carbon Monoxide	0 – 527	650	Nil	Nil
NO _x	0 – 3,129	300	Identified ^(c)	System unstable (e.g., low efficiency, unstable column temperature)
SO ₂	0 – 521	50	Identified ^(d)	System unstable (e.g., low efficiency, unstable column temperature)
VOCs (including methane) ^(b)	0 – 1,420	1,500	Nil	Nil
HCl	0 – 29	10	Identified ^(e)	System unstable (e.g., low efficiency, unstable column temperature)
HF	0 – 1	1	Nil	Nil

Notes:

- (a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.
- (b) The VOCs emission limit includes methane as biogas is adopted as fuel in the combustion process.
- (c) Dates with NO_x exceedances (number of exceedances on that day) were identified on 1(15), 2(22), 3(21), 4(24), 5(17), 6(24), 7(14), 8(24), 9(24), 10(23), 11(24), 12(21), 13(21), 14(24), 15(16), 16(24), 17(24), 18(24), 19(19), 20(21), 21(8), 22(24), 23(24), 24(24), 25(24), 26(24), 27(20), 29(16), and 30(14) September 2023; 1(18), 2(24), 3(18), 4(24), 5(23), 6(24), 7(24), 8(16), 9(20), 10(24), 11(24), 12(20), 13(20), 14(24), 15(24), 16(24), 17(24), 18(24), 19(16), 20(5), 21(21), 22(24), 23(24), 24(24), 25(17), 26(19), 27(5), 28(13) and 29(2) October 2023; 7(20), 8(24), 9(16), 10(24), 11(24), 12(24), 13(23), 14(24), 15(10), 16(1), 17(4), 19(10), 20(23), 21(15), 22(14), 23(20), 24(5), 25(2), 26(3), 28(8), 29(24), and 30(10) November 2023.
- (d) Dates with SO₂ exceedances (number of exceedances on that day) were identified on 1(15), 2(20), 3(21), 4(24), 5(17), 6(24), 7(14), 8(24), 9(24), 10(23), 11(23), 12(21), 13(21), 14(24), 15(16), 16(24), 17(24), 18(24), 19(19), 20(21), 21(8), 22(24), 23(23), 24(24), 25(24), 26(24), 27(20), 29(14), and 30(11) September 2023; 1(18), 2(24), 3(18), 4(24), 5(23), 6(23), 7(24), 8(15), 9(7), 10(24), 11(24), 12(20), 13(19), 14(21), 15(24), 16(24), 17(24), 18(23), 19(16), 20(5), 21(21), 22(24), 23(24), 24(24), 25(15), 26(15), 27(5), 28(13) and 29(2) October 2023; 7(20), 8(24), 9(15), 10(24), 11(24), 12(23), 13(23), 14(12), 15(5), 16(1), 17(1), 19(5), 20(8), 21(7), 22(12), 28(6), 29(16), and 30(8) November 2023.
- (e) Dates with HCl exceedances (number of exceedances on that day) were identified on 25(1) October 2023; 13(1) and 29(1) November 2023.

Table 4.3 Hourly Average of Parameters Recorded for CHP 2

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedance Identified	Remarks
Dust (or TSP)	0 – 7	15	Nil	Nil
Carbon Monoxide	0 – 638	650	Nil	Nil

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedance Identified	Remarks
NO _x	0 – 1,909	300	Identified ^(c)	System unstable (e.g., low efficiency, unstable column temperature)
SO ₂	0 – 456	50	Identified ^(d)	System unstable (e.g., low efficiency, unstable column temperature)
VOCs (including methane) ^(b)	0 – 1,495	1,500	Nil	Nil
HCl	0 – 24	10	Identified ^(e)	System unstable (e.g., low efficiency, unstable column temperature)
HF	0 – 1	1	Nil	Nil

Notes:

- (a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.
- (b) The VOCs emission limit includes methane as biogas is adopted as fuel in the combustion process.
- (c) Dates with NO_x exceedances (number of exceedances on that day) were identified on 7(10), 12(10), 13(20), 14(24), 15(18), 16(21), 17(19), 18(23), 19(16), 20(17), 21(17), 22(23), 23(24), 24(24), 25(12), 26(24), 27(17) 28(14), 29(11), and 30(11) September 2023; 1(8), 2(21), 3(21), 4(24), 5(10), 9(2), 10(18), 11(15), 13(6), 14(13), 15(23), 16(14), 17(12), 18(3), 20(1), 21(6), 23(1), 24(1), 25(1), 26(2), 27(3), 29(1) and 31(3) October 2023; 2(1), 4(12), 5(9), 6(11), 7(1), 16(1), 18(1), 21(5), 22(4), 23(6), 24(3), 25(19), 26(9), and 30(1) November 2023.
- (d) Dates with SO₂ exceedances (number of exceedances on that day) were identified on 12(2) and 15(2) September 2023; 5(1), 9(1), 10(2), 11(2), 24(1), 25(5), 26(4), 27(17), 28(4), 29(12) and 30(5) October 2023; 2(3), 3(5), 4(13), 5(19), 6(15), 15(5), 16(21), 17(19), 18(24), 19(1), 21(14), 22(23), 23(21), 24(17), 25(18), 26(5), 27(21), 28(12), 29(4), and 30(10) November 2023.
- (e) Date with HCl exceedance (number of exceedances on that day) was identified on 21(1) September and 18(1) November 2023.

Table 4.4 *Hourly Average of Parameters Recorded for CHP 3*

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedances Identified	Remarks
Dust (or TSP)	0 – 10	15	Nil	Nil
Carbon Monoxide	0 – 86	650	Nil	Nil
NO _x	0 – 679	300	Identified ^(c)	System unstable (e.g., low efficiency, unstable column temperature)
SO ₂	0 – 152	50	Identified ^(d)	System unstable (e.g., low efficiency, unstable column temperature)
VOCs (including methane) ^(b)	0 – 1,322	1,500	Nil	Nil
HCl	0 – 6	10	Nil	Nil
HF	0 – 1	1	Nil	Nil

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedances Identified	Remarks
Notes:				
(a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.				
(b) The VOCs emission limit includes methane as biogas is adopted as fuel in the combustion process.				
(a) Dates with NO _x exceedances (number of exceedances on that day) were identified on 1(7), 2(2), 3(4), 4(11), 6(13), 7(13), 8(11), 9(21), 10(24), 11(19), 12(6), 15(6), 20(1), 21(13), 22(4), 24(9), 25(6), 27(2), 28(24), 29(13), and 30(19) September 2023; 1(7), 5(12), 6(24), 7(20), 8(11), 9(11), 18(7), 19(16), 20(12), 26(1) and 28(3) October 2023; 7(3), 8(2), 9(13), 10(17), 11(19), 12(11), 13(23), 14(13), 15(17), 16(14), 17(12), 18(24), 19(24), 20(14), 27(20), and 28(13) November 2023.				
(c) Dates with SO ₂ exceedances (number of exceedances on that day) was identified on 1(5), 3(1), 6(5), 7(1), 8(8), 9(8), 10(8), 11(6), 15(6), 20(1), 21(7), 23(4), 24(9), 25(4), 27(2), 28(23), 29(13), and 30(19) September 2023; 1(1), 5(12), 6(24), 7(20), 8(11), 9(11), 19(2), 20(2), 26(1) and 28(3) October 2023; 14(1), 15(17), 16(14), 17(12), 18(24), 19(20), 20(14), 27(20), and 28(13) November 2023.				

Table 4.5 *Hourly Average of Parameters Recorded for ASP*

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedances Identified	Remarks
Dust (or TSP)	0 – 4	5	Nil	Nil
Carbon Monoxide	0 – 99	100	Nil	Nil
NO _x	0 – 20,107	200	Identified ^(c)	System unstable (e.g., low efficiency, unstable column temperature)
SO ₂	0 – 945	50	Identified ^(d)	System unstable (e.g., low efficiency, unstable column temperature)
VOCs (including methane) ^(b)	0 – 19	20	Nil	Nil
NH ₃	0 – 19,516	35	Identified ^(e)	System unstable (e.g., low efficiency, unstable column temperature)
HCl	0 – 1,071	10	Identified ^(f)	System unstable (e.g., low efficiency, unstable column temperature)
HF	0 – 1	1	Nil	Nil

Notes:

- (a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
- (b) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.
- (c) Dates with NO_x exceedances (number of exceedances on that day) were identified on 1(1), 2(3), 8(7), 10(3), 11(4), 12(7), 13(2), 15(2), 16(1), 17(2), 18(2), 20(2), 23(14), 25(4), 26(3), 27(2), 28(3), 29(9), and 30(7) September 2023; 1(9), 2(4), 3(1), 5(11), 6(10), 7(12), 8(17), 9(15), 10(13), 11(10), 12(21), 13(5), 15(3), 16(13), 17(3), 18(10), 19(1), 21(4), 22(9), 23(13), 24(16), 25(2), 27(3), 28(10), 29(2), 30(21) and 31(2) October 2023; 2(1), 4(2), 5(2), 7(3), 8(3), 10(1), 14(12), 15(1), 16(7), 17(23), 18(22), 19(24), 20(15), 21(14), 22(8), 23(16), 24(13), 25(2), 26(14), 27(15), 28(17), 29(14), and 30(8) November 2023.

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^(a)	Max. Emission Limit (mg/Nm ³)	Exceedances Identified	Remarks
(d)	Dates with SO ₂ exceedances (number of exceedances on that day) were identified on 6(5), 7(1), 9(1), 14(6), 15(9), 16(17), 17(17), 18(11), 19(7), 20(14), 21(5), 22(6), 23(6), 24(1), 25(9), 26(13), 27(5), 28(11), 29(16), and 30(6) September 2023; 5(8), 6(20), 7(24), 8(23), 9(16), 10(15), 11(23), 12(24), 13(2), 16(1), 20(1), 21(1) and 23(1) October 2023; 4(2), 5(1), 14(7), 16(2), 17(17), 18(11), 19(20), 20(14), 21(9), 23(10), and 24(9) November 2023.			
(e)	Dates with NH ₃ exceedances (number of exceedances on that day) were identified on 1(2), 2(4), 3(13), 4(1), 5(13), 6(21), 7(20), 9(10), 10(1), 11(2), 12(4), 13(3), 14(6), 15(3), 16(1), 17(7), 18(6), 19(19), 20(14), 21(6), 22(6), 23(10), 24(2), 25(4), 27(3), 28(2), 29(5), and 30(1) September 2023; 1(2), 2(2), 3(1), 4(1), 5(2), 11(3), 14(5), 15(7), 16(3), 17(9), 18(2), 19(4), 20(9), 21(6), 22(1), 23(2), 27(5), 28(8), 29(4) and 31(15) October 2023; 1(12), 2(6), 3(11), 4(9), 5(6), 8(9), 9(14), 10(22), 11(14), 12(14), 13(15), 14(14), 15(10), 16(9), 17(23), 18(23), 19(24), 20(16), 21(9), 23(11), 24(9), 25(2), 28(4), and 30(1) November 2023.			
(f)	Dates with HCl exceedances (number of exceedances on that day) were identified on 23(1) and 28(1) September 2023; 14(11), 16(3), 17(22), 18(22), 19(24), 20(15), 21(9), 23(10), 24(9), and 30(1) November 2023.			

Table 4.6 *Hourly Average of Parameters Recorded for the Standby Flaring Gas Unit*

Parameter	Range of Hourly Average Conc. (mg/Nm ³) ^{(a)(c)}	Max. Emission Limit (mg/Nm ³)	Exceedances Identified	Remarks ^(d)
Dust (or TSP)	0 - 0	5	Nil	Nil
Carbon Monoxide	0 - 0	100	Nil	Nil
NO _x	0 - 0	200	Nil	Nil
SO ₂	0 - 0	50	Nil	Nil
VOCs (including methane) ^(b)	0 - 0	20	Nil	Nil
HCl	0 - 0	10	Nil	Nil
HF	0 - 0	1	Nil	Nil

Notes:

- (a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
- (b) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.
- (c) The standby flare did not operate during the reporting period.

4.2 ODOUR

4.2.1 Operation Phase Monitoring

Odour patrol was conducted by the independent odour patrol team of ALS Technichem (HK) Pty Ltd on 14 September 2023. According to the EM&A Manual and EP requirements, it is considered an exceedance if the odour intensity recorded by the panellists is Level 2 or above. During this reporting period, no Level 2 Odour Intensity was recorded. The odour patrol results are shown in *Annex G*.

4.3

WATER QUALITY

4.3.1

Operation Phase Monitoring

Effluent discharge was sampled monthly from the outlet chamber of the Effluent Storage Tank as stipulated in the operation phase discharge licence. Discharge from the Petrol Interceptors were sampled bi-monthly since July 2021 as stipulated in the operation phase discharge licence. The results of the discharge samples from the outlet chamber of the Effluent Storage Tank are recorded in *Table 4.7* to *4.9*. The results of the discharge samples from the Petrol Interceptors are recorded in *Table 4.10* to *4.12*.

Table 4.7 *Results of the Discharge Sample Collected from the Outlet Chamber of the Effluent Storage Tank in September 2023*

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Flow Rate (m ³ /day) ^(a)	0 – 326 ^(e)	645	Yes
pH (pH units) ^(b)	7.91 – 8.60 ^(e)	6-10 ^(c)	Yes
Suspended Solids ^{(b) (d)}	419 ^(d)	800	Yes
Biochemical Oxygen Demand (5 days, 20°) ^{(b) (d)}	20 ^(d)	800	Yes
Chemical Oxygen Demand ^{(b) (d)}	1,030 ^(d)	2,000	Yes
Oil & Grease ^{(b) (d)}	<5 ^(d)	40	Yes
Total Nitrogen ^{(b) (d)}	111 ^(d)	200	No
Total Phosphorus ^{(b) (d)}	6.2 ^(d)	50	No
Surfactants (total) ^{(b) (d)}	1.1 ^(d)	25	Yes

Notes:

- (a) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.
 (b) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.
 (c) Daily Range.
 (d) Effluent sample collected on 13 September 2023.
 (e) Data collected daily in the reporting month.

Table 4.8 *Results of the Discharge Sample Collected from the Outlet Chamber of the Effluent Storage Tank in October 2023*

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Flow Rate (m ³ /day) ^(a)	0 – 336 ^(e)	645	Yes
pH (pH units) ^(b)	8.00 – 8.70 ^(e)	6-10 ^(c)	Yes
Suspended Solids ^{(b) (d)}	356 ^(d)	800	Yes
Biochemical Oxygen Demand (5 days, 20°) ^{(b) (d)}	71 ^(d)	800	Yes
Chemical Oxygen Demand ^{(b) (d)}	1,070 ^(d)	2,000	Yes
Oil & Grease ^{(b) (d)}	<5 ^(d)	40	Yes
Total Nitrogen ^{(b) (d)}	152 ^(d)	200	No
Total Phosphorus ^{(b) (d)}	3.4 ^(d)	50	No

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Surfactants (total) ^{(b) (d)}	<1.0 ^(d)	25	Yes

Notes:

(a) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(b) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(c) Daily Range.

(d) Effluent sample collected on 5 October 2023.

(e) Data collected daily in the reporting month.

Table 4.9 *Results of the Discharge Sample Collected from the Outlet Chamber of the Effluent Storage Tank in November 2023*

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Flow Rate (m ³ /day) ^(a)	41 – 255 ^(e)	645	Yes
pH (pH units) ^(b)	7.50 – 8.20 ^(e)	6-10 ^(c)	Yes
Suspended Solids ^{(b) (d)}	71 ^(d)	800	Yes
Biochemical Oxygen Demand (5 days, 20°) ^{(b) (d)}	11 ^(d)	800	Yes
Chemical Oxygen Demand ^{(b) (d)}	540 ^(d)	2,000	Yes
Oil & Grease ^{(b) (d)}	<5 ^(d)	40	Yes
Total Nitrogen ^{(b) (d)}	96.5 ^(d)	200	Yes
Total Phosphorus ^{(b) (d)}	37.1 ^(d)	50	Yes
Surfactants (total) ^{(b) (d)}	<1.0 ^(d)	25	Yes

Notes:

(a) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(b) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(c) Daily Range.

(d) Effluent sample collected on 9 November 2023.

(e) Data collected daily in the reporting month.

Table 4.10 *Results of the Discharge Sample from the Petrol Interceptor 1 on 12 October 2023*

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Suspended Solids ^(b)	8 ^(a)	30	Yes
Chemical Oxygen Demand ^(c)	8 ^(a)	80	Yes
Oil & Grease ^(c)	<5 ^(a)	20	Yes
Surfactants (total) ^(b)	<1.0 ^(a)	15	Yes

Notes:

(a) Effluent sample collected on 12 October 2023.

(b) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(c) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

Table 4.11 *Results of the Discharge Sample from the Petrol Interceptor 2 on 12 October 2023*

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Suspended Solids ^(b)	115 ^(a)	30	No
Chemical Oxygen Demand ^(c)	202 ^(a)	80	No
Oil & Grease ^(c)	21 ^(a)	20	No
Surfactants (total) ^(b)	<1.0 ^(a)	15	Yes

Notes:

(a) Effluent sample collected on 12 October 2023.

(b) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(c) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

Table 4.12 *Results of the 2nd Discharge Sample from the Petrol Interceptor 2 on 31 October 2023 (Follow-up Sample)*

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
Suspended Solids ^(b)	5 ^(a)	30	Yes
Chemical Oxygen Demand ^(c)	8 ^(a)	80	Yes
Oil & Grease ^(c)	<5 ^(a)	20	Yes
Surfactants (total) ^(b)	<1.0 ^(a)	15	Yes

Notes:

(d) Effluent sample collected on 31 October 2023.

(e) Parameter not required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

(f) Parameters required to be reported in accordance with Section B2 of the Effluent Discharge Licence under the WPCO.

4.4 WASTE MANAGEMENT

4.4.1 Operation Phase Monitoring

Wastes generated from the operation of the Project include chemical waste, wastes generated from pre-treatment process and general refuse ⁽¹⁾. Reference has been made to the Monthly Summary Waste Flow Tables prepared by the Contractor (see *Annex D*). With reference to the relevant handling records and trip tickets of this Project, the quantities of different types of waste generated from the operation of the Project in the reporting period are summarised in *Table 4.13*.

(1) Public fill and construction waste may only be generated during maintenance works when there are civil or structural works.

Table 4.13 Quantities of Waste Generated from the Operation of the Project

Month/Year	Chemical Waste	Waste Generated from Pre-treatment Process		General Refuse	
		Disposed of at Landfill (a)	Recycled (b)	Disposed of at Landfill (a) (e)	Recycled (c)
September 2023	4,459 L (d)	721.42 tonnes	1.250 tonnes	2.650 tonnes (e)	0.016 tonnes
October 2023	0 L (d)	919.56 tonnes	0.000 tonnes	2.650 tonnes (e)	0.048 tonnes
November 2023	1,440 L (d)	1016.43 tonnes	0.000 tonnes	2.995 tonnes (e)	0.100 tonnes

Notes:

- (a) Waste generated from pre-treatment process and general refuse other than chemical waste and recyclables were disposed of at NENT landfill by sub-contractors.
- (b) Among waste generated from pre-treatment process, 0.000 tonnes of metals, 1.250 tonnes of papers/ cardboard packing and 0.000 tonnes of plastics were sent to recyclers for recycling during the reporting period.
- (c) Among general refuse, 0.016 tonnes of metals, 0.122 tonnes of papers/ cardboard packing and 0.026 tonnes of plastics were sent to recyclers for recycling during the reporting period.
- (d) A total of 6,600 kg of Spent Activated Carbon was disposed of at CWTC in September 2023 (for unit consistency, this value was converted to 4,459 L both here and in Annex D - Waste Flow Table); no chemical waste was disposed of at CWTC in October 2023; among the 1,440 L of chemical waste disposed of at CWTC in November 2023, 1,400 L were of spent lube oil and 40 L were of spent acid and alkaline (lab).
- (e) It was assumed that four 240-litre bins filled with 80% of general refuse were collected at each collection. The general refuse density was assumed to be around 0.15 kg/L.

5 *SITE AUDIT*

5.1 *ENVIRONMENTAL SITE AUDIT*

5.1.1 *Operation Phase*

The monthly inspections of the operation phase of the Project covered the operation phase environmental site inspections. The inspections checked the implementation of the recommended mitigation measures for air quality, landscape and visual, water quality, waste (land contamination) and hazard-to-life stated in the Implementation Schedule (see *Annex C*).

Follow-up actions resulting from the site inspections were generally taken as reported by the Contractor. The Contractor has implemented environmental mitigation measures recommended in the approved EIA Report and EM&A Manual.

September 2023

The monthly inspection of the operation phase of the Project on 26 September 2023 covered the operation phase environmental site audit. Joint site inspections were conducted by representatives of the Contractor, IEC and the MT on 26 September 2023 as required for the operation of the Project.

During the site walk, the WPCO license was not observed at the site entrance/exit. The Contractor shall display the WPCO license at the site entrance for the public's information and shall provide rectification photo for the record.

Accordingly, the Contractor sent a rectification photo displaying the WPCO license at the site entrance to both the MT and IEC via email dated 28 September 2023.

Apart from the observation above, the Contractor has implemented environmental mitigation measures recommended in the approved EIA Report and EM&A Manual.

October 2023

The monthly inspection of the operation phase of the Project on 30 October 2023 covered the operation phase environmental site audit. Joint site inspections were conducted by representatives of the Contractor, IEC and the MT on 30 October 2023 as required for the operation of the Project.

November 2023

The monthly inspection of the operation phase of the Project on 21 November 2023 covered the operation phase environmental site audit. Joint site inspections were conducted by representatives of the Contractor, IEC and the MT on 21 November 2023 as required for the operation of the Project.

It was confirmed that the necessary landscape and visual mitigation measures during the operation phase as summarised in *Annex C* were generally implemented by the Contractor. No non-compliance in relation to the landscape and visual mitigation measures was identified during the site audits in this reporting period and therefore no further actions are required. The ET/MT will keep track of the EM&A programme to check compliance with environmental requirements and the proper implementation of all necessary mitigation measures.

September 2023

Monthly inspection of the landscape and visual mitigation measures for the operation phase of the Project was performed on 26 September 2023.

October 2023

Monthly inspection of the landscape and visual mitigation measures for the operation phase of the Project was performed on 30 October 2023.

November 2023

Monthly inspection of the landscape and visual mitigation measures for the operation phase of the Project was performed on 21 November 2023.

6.1

SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

September 2023

Non-compliance of emission limits of NO_x and SO₂ from CHP1; NO_x, SO₂, and HCl from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂, NH₃, and HCl from the ASP were recorded during the reporting period.

All analytes from the outlet chamber of the effluent storage tank were recorded to be in compliance with discharge limits during the reporting period. Petrol Interceptor sampling was not required during the reporting period.

The Contractor has reviewed the organic waste treatment processes (i.e., waste reception, waste pre-treatment, anaerobic digesters, and composting processes) and found that they were operated normally during the reporting period. The Contractor has investigated the de-sulphurisation system, CHPs, and the ASP; the potential causes for the exceedances were identified.

The investigation reports of the above exceedances are presented in *Annex F*.

October 2023

Non-compliance of emission limits of NO_x, SO₂ and HCl from CHP1; NO_x and SO₂, from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂ and NH₃ from the ASP were recorded during the reporting period.

The Contractor has reviewed the organic waste treatment processes (i.e., waste reception, waste pre-treatment, anaerobic digesters, and composting processes) and found that they were operated normally during the reporting period. The Contractor has investigated the de-sulphurisation system, CHPs, and the ASP; the potential causes for the exceedances were identified.

Non-compliance of discharge limits of Suspended Solids, Chemical Oxygen Demand and Oil & Grease from Petrol Interceptor 2 were recorded during the reporting period. The exceedances in these parameters may have been due to the increased cleaning of the roads. Proper cleaning of the petrol interceptor was arranged to maintain a better effluent quality.

In light of these exceedances in the results of the discharge sample from the Petrol Interceptor 2 and after measures implemented by the Contractor, a second discharge sample from the Petrol Interceptor 2 was collected on 31 October 2023 as a follow-up, with all parameters recorded to be in compliance with discharge limits.

The investigation reports of the above exceedances are presented in *Annex F*.

November 2023

Non-compliance of emission limits of NO_x, SO₂, and HCl from CHP1; NO_x, SO₂ and HCl from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂, NH₃, and HCl from the ASP were recorded during the reporting period.

All analytes from the outlet chamber of the effluent storage tank were recorded to be in compliance with discharge limits during the reporting period. Petrol Interceptor sampling was not required during the reporting period.

The Contractor has reviewed the organic waste treatment processes (i.e., waste reception, waste pre-treatment, anaerobic digesters, and composting processes) and found that they were operated normally during the reporting period. The Contractor has investigated the de-sulphurisation system, CHPs, and the ASP; the potential causes for the exceedances were identified.

The investigation reports of the above exceedances are presented in *Annex F*.

6.2 *SUMMARY OF ENVIRONMENTAL COMPLAINT*

No complaint was received during the reporting period.

6.3 *SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION*

No summon/prosecution was received during the reporting period. The cumulative summons/prosecution log is shown in *Annex E*.

7 *FUTURE KEY ISSUES*

7.1 *KEY ISSUES FOR THE COMING REPORTING PERIOD*

Activities to be undertaken for the coming reporting period are:

- Operation of the Project;
- Replace bearings on Venturi scrubber fan 6091F103;
- Remove jet mixing pump for AD 1 and 2, pump number 2034P201 for overall;
- Remove lobe pump at SBT, pump number 2031P201; and
- Repair RCV bay doors and air curtains.

CONCLUSIONS

This EM&A Report presents the EM&A programme undertaken during the reporting period from **1 September to 30 November 2023** in accordance with EM&A Manual (Version F) and requirements of EP (FEP-01/395/2010/C).

For the operation phase, exceedances of the emission limits for stack monitoring (including CHP and ASP stacks) were recorded under normal operating conditions during the reporting period (see *Table 8.1*).

Table 8.1 *Exceedances for Stack Emissions*

Stack	Exceedances During the Reporting Period
Cogeneration Unit (CHP) 1	<ul style="list-style-type: none"> Exceeded emission limit of NO_x on 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, and 30 September 2023; 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29 October 2023; 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, and 30 November 2023. Exceeded emission limit of SO₂ on 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, and 30 September 2023; 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29 October 2023; 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 28, 29, and 30 November 2023. Exceeded emission limit of HCl on 25 October 2023; 13 and 29 November 2023.
Cogeneration Unit (CHP) 2	<ul style="list-style-type: none"> Exceeded emission limit of NO_x on 7, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30 September 2023; 1, 2, 3, 4, 5, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 21, 23, 24, 25, 26, 27, 29 and 31 October 2023; 2, 4, 5, 6, 7, 16, 18, 21, 22, 23, 24, 25, 26, and 30 November 2023. Exceeded emission limit of SO₂ on 12 and 15 September 2023; 5, 9, 10, 11, 24, 25, 26, 27, 28, 29 and 30 October 2023; 2, 3, 4, 5, 6, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30 November 2023. Exceeded emission limit of HCl on 21 September 2023; 18 November 2023.
Cogeneration Unit (CHP) 3	<ul style="list-style-type: none"> Exceeded emission limit of NO_x on 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 15, 20, 21, 22, 24, 25, 27, 28, 29, and 30 September 2023; 1, 5, 6, 7, 8, 9, 18, 19, 20, 26 and 28 October 2023; 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 27, and 28 November 2023. Exceeded emission limit of SO₂ on 1, 3, 6, 7, 8, 9, 10, 11, 15, 20, 21, 23, 24, 25, 27, 28, 29, and 30 September 2023; 1, 5, 6, 7, 8, 9, 19, 20, 26 and 28 October 2023; 14, 15, 16, 17, 18, 19, 20, 27, and 28 November 2023.

Stack	Exceedances During the Reporting Period
Ammonia Stripping Plant (ASP)	<ul style="list-style-type: none"> Exceeded emission limit of NO_x on 1, 2, 8, 10, 11, 12, 13, 15, 16, 17, 18, 20, 23, 25, 26, 27, 28, 29, and 30 September 2023; 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 27, 28, 29, 30 and 31 October 2023; 2, 4, 5, 7, 8, 10, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30 November 2023. Exceeded emission limit of SO₂ on 6, 7, 9, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30 September 2023; 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 20, 21 and 23 October 2023; 4, 5, 14, 16, 17, 18, 19, 20, 21, 23, and 24 November 2023. Exceeded emission limit of NH₃ on 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, and 30 September 2023; 1, 2, 3, 4, 5, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 27, 28, 29 and 31 October 2023; 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 28, and 30 November 2023. Exceeded emission limit of HCl on 23 and 28 September 2023; 14, 16, 17, 18, 19, 20, 21, 23, 24, and 30 November 2023.

Non-compliance of emission limits of NO_x and SO₂ from CHP1; NO_x, SO₂ and HCl from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂, NH₃, and HCl from ASP were recorded during September 2023. The exceedances of NO_x, SO₂ and HCl from CHPs, as well as the exceedances of NO_x, SO₂, NH₃, and HCl from ASP occurred due to system instability.

Non-compliance of emission limits of NO_x, SO₂ and HCl from CHP1; NO_x and SO₂, from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂ and NH₃ from the ASP were recorded during October 2023. The exceedances of NO_x, SO₂ and HCl from CHPs, as well as the exceedances of NO_x, SO₂ and NH₃, and from ASP occurred due to system instability.

Non-compliance of emission limits of NO_x, SO₂, and HCl from CHP1; NO_x, SO₂ and HCl from CHP2; NO_x and SO₂ from CHP3; and NO_x, SO₂, NH₃, and HCl from the ASP were recorded during November 2023. The exceedances of NO_x, SO₂, and HCl from CHPs as well as the exceedances of NO_x, SO₂, NH₃, and HCl from the ASP occurred due to system instability.

All analytes from the outlet chamber of the effluent storage tank were recorded to be in compliance with discharge limits during the reporting period.

Table 8.2 *Exceedances for Petrol Interceptor 2*

Effluent Discharge Point	Exceedances During the Reporting Period
Petrol Interceptor 2	<ul style="list-style-type: none"> Exceeded discharge limit of Suspended Solids, Chemical Oxygen Demand, and Oil & Grease on 12 October 2023

Non-compliance of discharge limits of Suspended Solids, Chemical Oxygen Demand, Oil & Grease from Petrol Interceptor 2 was recorded during the sampling on 12 October 2023. The exceedances in these parameters may have

been due to the increased cleaning of the roads. Proper cleaning of the petrol interceptor was arranged to maintain a better effluent quality.

In light of these exceedances in the results of the discharge sample from Petrol Interceptor 2 and after measures implemented by the Contractor, a second discharge sample from Petrol Interceptor 2 was collected on 31 October 2023 as a follow-up, with all parameters recorded to be in compliance with discharge limits.

All analytes from the Petrol Interceptor 1 sampling on 12 October 2023 were recorded to be in compliance with discharge limits. Petrol Interceptor sampling was not required during September 2023 and November 2023.

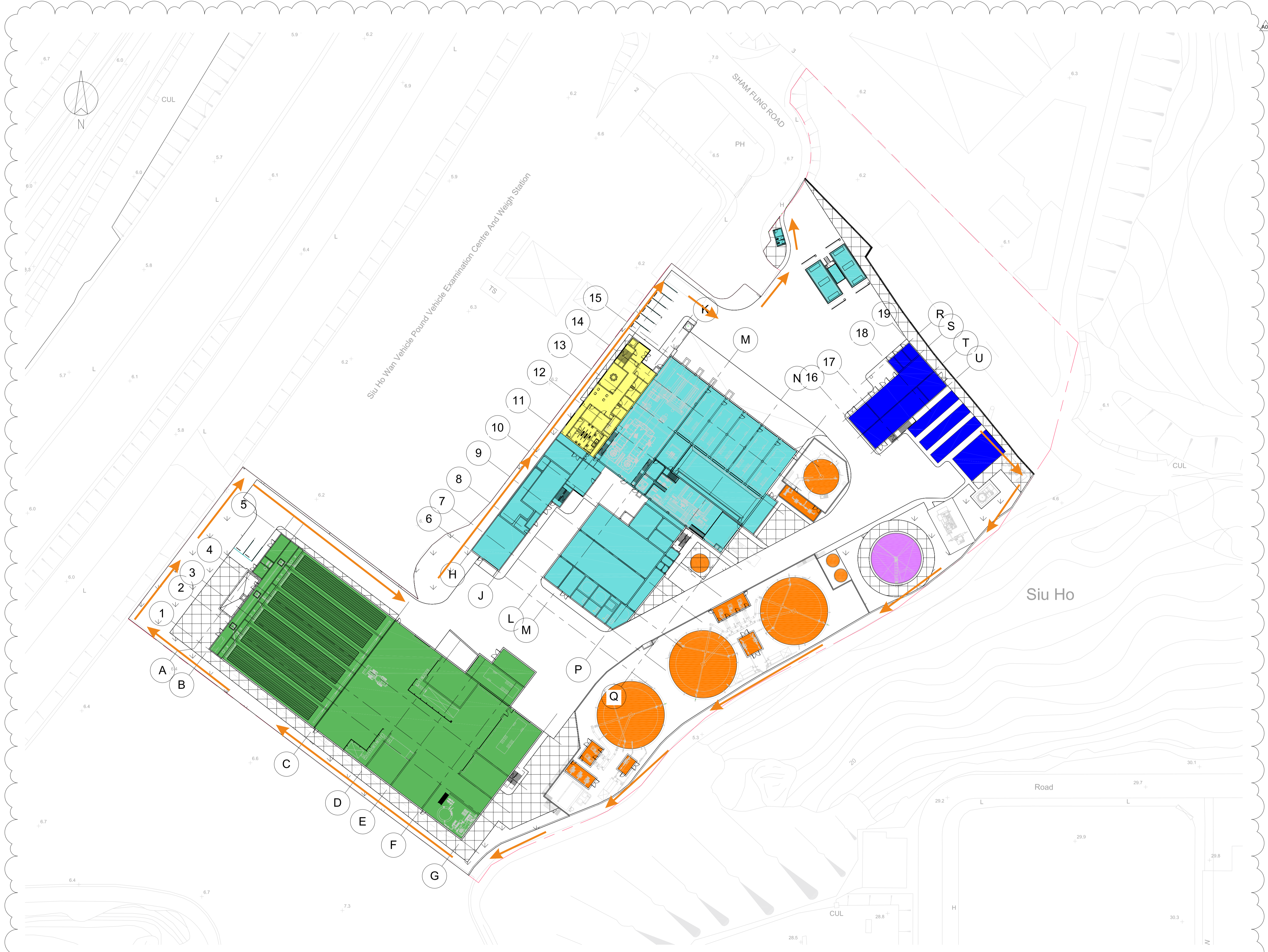
The environmental control /mitigation measures related to air quality, water quality, waste (including land contamination prevention), hazard-to-life and landscape and visual recommended in the approved EIA Report and the EM&A Manual were properly implemented by the Contractor during the reporting period.

Monthly landscape and visual monitoring were conducted in the reporting period. The necessary landscape and visual mitigation measures recommended in the approved EIA Report were generally implemented by the Contractor.

No complaint/summon/prosecution was received.

Annex A

Project Layout



Key
 Patrol Route

A01	05/03/15	CW	MB	IMTECH BACKGROUNDS UPDATED
A00	18/02/15	CW	MB	DRAFT ISSUE
REV	DATE	BY	APP	DESCRIPTION

CLIENT
 ENVIRONMENTAL PROTECTION DEPARTMENT
 GOVERNMENT OF THE HKSAR


CLIENT'S CONSULTANT

 AECOM ASIA CO. LTD.

CONTRACTOR
  
 OSCAR BIOENERGY JV

LEAD DESIGNER

 Ove Arup & Partners Hong Kong Limited

ENVIRONMENTAL TEAM

 ERM HONG KONG LIMITED

INDEPENDENT CONSULTANTS

 Meinhardt Infrastructure and Environment Limited
 邁達基建築環保工程顧問有限公司

PROJECT
 ORGANIC WASTE TREATMENT FACILITIES
 PHASE 1
 EP/SP/61/10

STATUS
 DRAFT ISSUE

DRAWING TITLE
 SITE LAYOUT

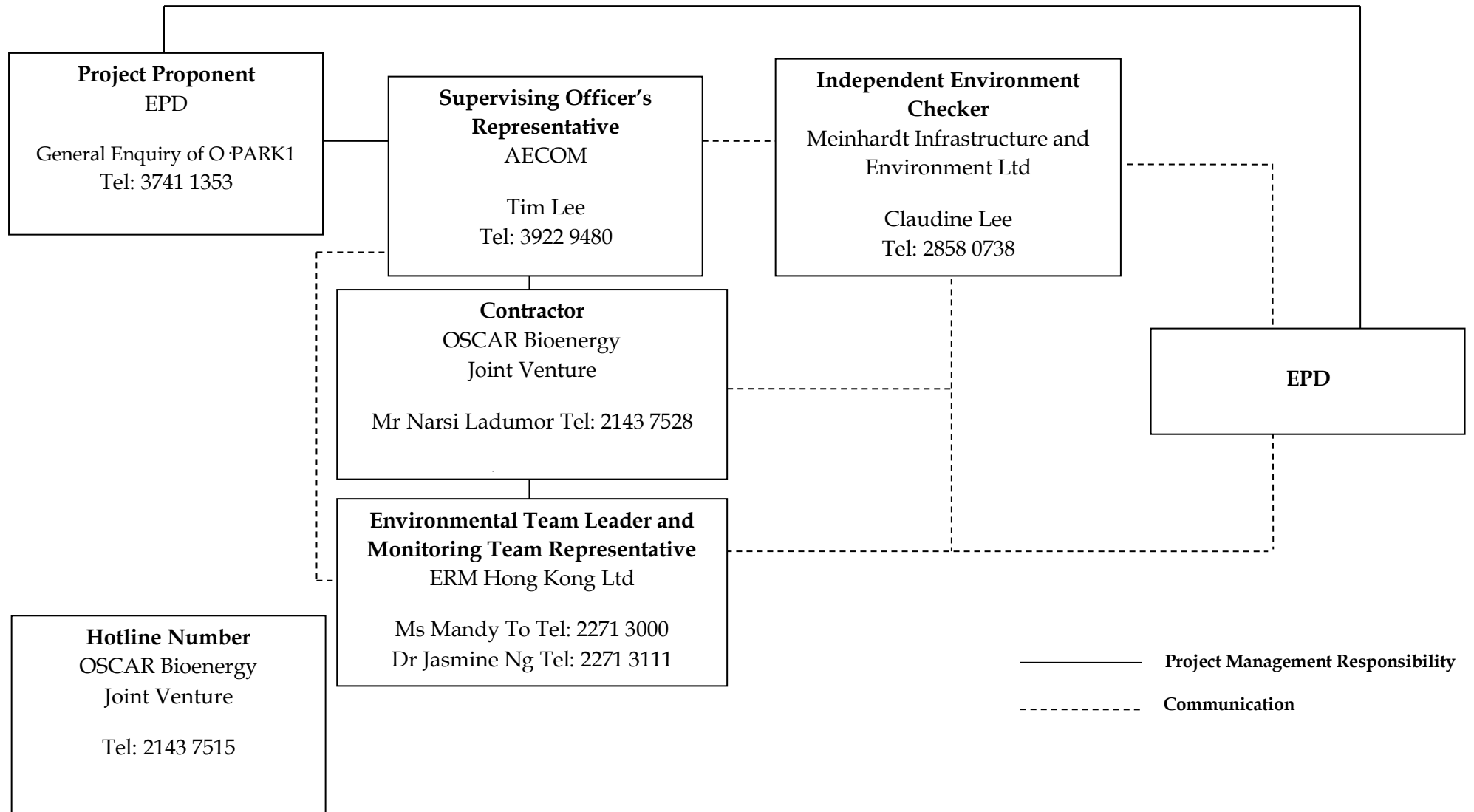
DRAWN	CW	CHECKED	RS	APPROVED	DP
SCALE	1:500@A1 / 1:1000@A3		DATE	12/02/15	
JOB NO.	239956	DRAWING NO.	DR-OAP-20-0-CA-1001	REV.	A01

Plot Time: 05/03/15 21:20:07
 Plot Location: C:\Users\mathew.brown\Documents\QWTF_Architectural_Working_Models (Combined) CEH_mathew.brown.rvt

Annex B

Project Organisation Chart with Contact Details

Project Organization (with contact details)



Annex C

Implementation Schedule of Mitigation Measures

Annex C Summary of Mitigation Measures Implementation Schedule for Operation Phase

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
<i>Summary of Environmental Mitigation Measures in the EIA and EM&A Manual</i>				
<i>A. Air Quality</i>				
3.78	2.7 & 2.13 – 2.19	<p><u>Air Pollution Control (Construction Dust) Regulation & Good Site Practices</u></p> <ul style="list-style-type: none"> •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 Commissioning Stage	√
3.78	2.7-2.12	<p><u>Air Pollution Control and Stack Monitoring</u></p> <ul style="list-style-type: none"> •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. 	During Operation	√
3.78	2.20- 2.28	<ul style="list-style-type: none"> •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)	N/A
<i>B. Hazard to Life</i>				
4.103	3.4	<p><u>Operation Phase</u></p> <ul style="list-style-type: none"> •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. 	Work Site / During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		<ul style="list-style-type: none"> •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. 		
<i>C. Water Quality</i>				
5.44	4.5	<p><u>Wastewater from Organic Waste Treatment Process</u></p> <p>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 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 m³. 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.</p> <ul style="list-style-type: none"> • 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. 	Work Site / During Design & Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
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	√
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	√
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	√
<i>D. Waste Management</i>				
6.50	5.12	<p><u>Good Site Practices</u> Good operational practices should be adopted to Minimize waste management impacts:</p> <ul style="list-style-type: none"> •Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation and the Land (Miscellaneous Provision) Ordinance (Cap. 28); •Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; •Use of a waste haulier licensed to collect specific category of waste; •A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at public filling facilities and landfills, and to control fly tipping. Reference should be made to 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 	During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		disposed of (including the disposal sites).		
6.51	5.13	<p><u>Waste Reduction Measures</u></p> <p>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:</p> <ul style="list-style-type: none"> •Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; •Encourage collection of 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. 	During Operation Period	√
6.52	5.14	<p><u>Wastes Generated from Pre-Treatment Process</u></p> <p>Wastes generated from pre-treatment process should be recycled as far as possible. Wastes generated from pre-treatment process should also be separated from any chemical waste and stored in covered skips. The recyclables should be collected by licensed collectors, while the rest of the waste should be removed from the site on a daily basis to minimize odour, pest and litter impacts. Open burning must be strictly prohibited.</p>	Pre-Treatment Process/ During Operation Period	√
6.53-6.56	5.15-5.18	<p><u>Chemical Wastes</u></p> <ul style="list-style-type: none"> •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 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. 	Whole Site / During Operation Period	√
6.57-6.58	5.19-5.20	<u>General Refuse</u>	Whole Site / During Operation	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		<ul style="list-style-type: none"> •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. 	Period	
<i>E. Proposed Land Contamination Preventive Measures</i>				
6.65	5.21 (i)	<u>Fuel Oil Containers</u> <ul style="list-style-type: none"> •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. 	Fuel Oil Storage Containers /During Operation Period	√
6.65	5.21 (ii)	<u>Storage Area</u> <ul style="list-style-type: none"> •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	√
6.65	5.21 (iii)	<u>Fuel Oil Spillage Response</u> 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. <ul style="list-style-type: none"> • <u>Training</u> Training on oil spill response actions should be given to relevant staff. The training should cover the followings: <ul style="list-style-type: none"> - 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. • <u>Communication</u> Establish communication channel with the Fire Services Department (FSD) and EPD to 	Whole Site / During Operation Phase	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		<p>report any oil spillage incident so that necessary assistance from relevant department could be quickly sought.</p> <ul style="list-style-type: none"> • <u>Response Procedure</u> 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: <ul style="list-style-type: none"> - 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. 		
6.66	5.22 (i)	<p><u>Chemicals and Chemical Wastes Handling & Storage</u></p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> - 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. 	Whole Site / During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		<ul style="list-style-type: none"> Storage container 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. 		
6.66	5.22 (ii)	<p><u>Chemicals and Chemical Wastes Spillage Response</u> 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</p> <ul style="list-style-type: none"> Training Training on spill response actions should be given to relevant staff. The training should cover the followings: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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. 	Whole Site / During Operation Period	√
6.67 - 6.69	5.23- 5.25	<p><u>Incident Record</u></p> <ul style="list-style-type: none"> 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 	Whole Site / During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		<p>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.</p> <ul style="list-style-type: none"> • 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. • 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 <i>Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management</i> and the <i>Guidance Note for Contaminated Land Assessment and Remediation</i>. 		
<i>F. Landscape and Visual</i>				
7.98 & Table 7.8	Table 6.2	<p><u>Operation Phase</u></p> <ul style="list-style-type: none"> • 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	√

Remark:

- √ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by OSCAR Bioenergy JV
- Δ Deficiency of Mitigation Measures but rectified by OSCAR Bioenergy JV
- N/A Not Applicable in Reporting Period

Annex D

Waste Flow Table

**No. EP/SP/61/10 of Organic Resources Recovery Centre (Phase 1)
Monthly Summary Waste Flow Table**

Month	Chemical Waste	Waste Generated from Pretreatment Process				General Refuse							
		Disposed of at Landfill (see Note 1)	Metals (see Note 2)	Paper/ cardboard packaging (see Note 2)	Plastics (see Note 3)	Disposed of at Landfill (see Note 1 & 4)		Metals (see Note 2)		Paper/ cardboard packaging (see Note 2)		Plastics (see Note 3)	
	Litre	tonne	tonne	tonne	tonne	No. of collection	tonne	No. of collection	tonne	No. of collection	tonne	No. of collection	tonne
March 2019	1,200	477.08	0	0	0	26	1.50	0	0	0	0	0	0
April 2019	0	455.60	0	0	0	22	1.27	0	0	0	0	0	0
May 2019	1,000	528.22	0	0	0	25	2.88	0	0	0	0	1	0.39
June 2019	0	459.23	0	0	0	24	2.76	0	0	0	0	0	0
July 2019	0	521.79	0	0	0	26	3.00	0	0	0	0	0	0
August 2019	40	441.05	0	0	0	27	3.11	0	0	0	0	0	0
September 2019	1,800	576.28	0	0	0	24	2.76	0	0	0	0	0	0
October 2019	0	441.22	0	0	0	25	2.88	0	0	0	0	0	0
November 2019	1,600	451.57	0	0	0	26	3.00	0	0	0	0	0	0
December 2019	1,009	488.13	0	0	0	24	2.76	0	0	0	0	0	0
January 2020	0	388.20	0	0	0	23	2.65	0	0	0	0	0	0
February 2020	4,525	372.97	0	0	0	24	2.76	0	0	0	0	0	0
March 2020	1,200	351.71	0	0	0	27	3.11	0	0	0	0	0	0
April 2020	0	363.92	0	0	0	21	2.42	0	0	0	0	0	0
May 2020	800	294.36	0	0	0	25	2.88	0	0	0	0	0	0
June 2020	0	347.23	0	0	0	25	2.88	0	0	0	0	0	0
July 2020	200	852.07	0	0	0	26	3.00	0	0	0	0	0	0
August 2020	0	700.25	0	1.20	0	25	2.88	0	0	0	0	0	0
September 2020	400	579.64	0	5.31	0	26	3.00	0	0	0	0	0	0
October 2020	0	840.75	0	5.83	0	24	2.76	0	0	0	0	0	0
November 2020	0	688.20	0	0.80	0	25	2.88	0	0	0	0	0	0
December 2020	766	685.47	0	0	0	25	2.88	0	0	0	0	0	0
January 2021	1,800	634.00	0	0	0	25	2.88	0	0	0	0	0	0
February 2021	6,120	377.72	0	0	0	21	2.42	0	0	0	0	0	0
March 2021	6,000	325.21	0	0	0	27	3.11	0	0	0	0	0	0

Month	Chemical Waste	Waste Generated from Pretreatment Process				General Refuse							
		Disposed of at Landfill (see Note 1)	Metals (see Note 2)	Paper/ cardboard packaging (see Note 2)	Plastics (see Note 3)	Disposed of at Landfill (see Note 1 & 4)		Metals (see Note 2)		Paper/ cardboard packaging (see Note 2)		Plastics (see Note 3)	
		Litre	tonne	tonne	tonne	tonne	No. of collection	tonne	No. of collection	tonne	No. of collection	tonne	No. of collection
April 2021	9,700	651.29	0	0	0	22	2.53	0	0	0	0	0	0.00
May 2021	4,000	671.03	0	0	0	24	2.76	0	0	0	0	0	0.00
June 2021	0	558.72	0	0	0	25	2.88	0	0	0	0	0	0.00
July 2021	0	382.74	0	0	0	26	3.00	0	0	0	0	0	0.00
August 2021	3,420	687.05	0	0	0	26	3.00	0	0	0	0	0	0.00
September 2021	2,400	304.01	0	0	0	25	2.88	0	0	0	0	0	0.00
October 2021	0	342.38	0	0	0	23	2.65	0	0	0	0	0	0.00
November 2021	2,000	394.26	0	0	0	26	3.00	0	0	0	0	0	0.00
December 2021	0	392.44	0	0.67	0	22	2.53	0	0	0	0	0	0.00
January 2022	0	359.27	0	0	0	23	2.65	0	0	0	0	0	0.00
February 2022	0	260.57	0	0	0.00	21	2.42	0	0	0	0	0	0.00
March 2022	0	253.75	0	0	0.00	23	2.65	0	0	0	0	0	0.00
April 2022	1,240	253.45	0	0	0.00	22	2.53	0	0	0	0	0	0.00
May 2022	0	354.94	0	0	0.00	24	2.76	0	0	0	0	0	0.00
June 2022	0	383.41	1.73	0.08	0.00	25	2.88	0	0	0	0	0	0.00
July 2022	0	430.90	4.87	1.15	0.00	24	2.76	0	0	0	0	0	0.00
August 2022	1,000	427.52	0	0	0.00	23	2.65	0	0	0	0	0	0.00
September 2022	0	476.92	0	0	0.00	21	2.419	0	0	0	0	0	0.000
October 2022	0	615.87	0	0	0.00	24	2.765	0	0	0	0	0	0.000
November 2022	0	585.38	0	0	0.00	26	2.995	1	0.020	1	0.035	1	0.020
December 2022	0	666.42	0	0	0.00	31	3.571	1	0.001	1	0.040	1	0.050
January 2023	1,200	581.55	0.969	0.000	0.021	23	2.650	0	0.000	1	0.004	0	0.000
February 2023	5,540	643.75	0.000	0.360	0.000	24	2.765	1	0.003	0	0.000	1	0.015
March 2023	0	682.00	0.000	0.000	0.000	27	3.110	2	0.011	2	0.065	2	0.012
April 2023	0	578.25	0.260	0.000	0.000	21	2.419	0	0.000	1	0.015	1	0.012
May 2023	0	662.27	0.000	0.000	0.000	25	2.880	0	0.000	0	0.000	2	0.130

Month	Chemical Waste	Waste Generated from Pretreatment Process				General Refuse							
		Disposed of at Landfill (see Note 1)	Metals (see Note 2)	Paper/ cardboard packaging (see Note 2)	Plastics (see Note 3)	Disposed of at Landfill (see Note 1 & 4)		Metals (see Note 2)		Paper/ cardboard packaging (see Note 2)		Plastics (see Note 3)	
		tonne	tonne	tonne	tonne	No. of collection	tonne	No. of collection	tonne	No. of collection	tonne	No. of collection	tonne
June 2023	1,000	653.92	0.000	0.040	0.000	25	2.880	1	0.015	1	0.060	1	0.035
July 2023	0	713.68	0.000	0.000	0.000	24	2.765	0	0.000	2	0.080	1	0.005
August 2023	0	677.43	0.000	0.000	0.000	27	3.110	2	0.015	2	0.090	2	0.025
September 2023	4,459	721.42	0.000	1.250	0.000	23	2.650	2	0.010	0	0.000	2	0.006
October 2023	0	919.56	0.000	0.000	0.000	23	2.650	2	0.006	2	0.022	2	0.020
November 2023	1,440	1,016.43	0.000	0.000	0.000	26	2.995	0	0.000	1	0.100	0	0.000
Total	65,859.00	29,944.46	7.83	16.69	0.02	1392	157.59	12	0.081	14	0.511	17	0.720

Notes:

1. General refuse was disposed of at NENT by subcontractors.
2. Metal and paper/cardboard packaging were collected by recycler for recycling.
3. Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material collected by recycler for recycling.
4. It was assumed that four 240-litre bins filled with 80% of general refuse were collected at each collection. The general refuse density was assumed to be around 0.15 kg/L.

Annex E

Environmental Complaint,
Environmental Summons
and Prosecution Log

Annex E Cumulative Complaint and Summons/Prosecutions Log

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
May 2015	0	0
June 2015	0	0
July 2015	0	0
August 2015	0	0
September 2015	0	0
October 2015	0	0
November 2015	0	0
December 2015	0	0
January 2016	0	0
February 2016	0	0
March 2016	0	0
April 2016	0	0
May 2016	0	0
June 2016	0	0
July 2016	0	0
August 2016	0	0
September 2016	0	0
October 2016	0	0
November 2016	0	0
December 2016	0	0
January 2017	0	0
February 2017	0	0

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
March 2017	0	0
April 2017	0	0
May 2017	0	0
June 2017	0	0
July 2017	0	0
August 2017	0	0
September 2017	0	0
October 2017	0	0
November 2017	0	0
December 2017	0	0
January 2018	0	0
February 2018	0	0
March 2018	0	0
April 2018	0	0
May 2018	0	0
June 2018	0	0
July 2018	0	0
August 2018	0	0
September 2018	1	0
October 2018	0	0
November 2018	0	0
December 2018	0	0
January 2019	0	0
February 2019	0	0

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
March 2019	0	0
April 2019	0	0
May 2019	0	0
June 2019	0	0
July 2019	0	0
August 2019	0	0
September 2019	0	0
October 2019	0	0
November 2019	0	0
December 2019	0	0
January 2020	0	0
February 2020	0	0
March 2020	0	0
April 2020	0	0
May 2020	0	0
June 2020	0	0
July 2020	0	0
August 2020	0	0
September 2020	0	0
October 2020	0	0
November 2020	0	0
December 2020	0	0
January 2021	0	0
February 2021	0	0

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
March 2021	0	0
April 2021	0	0
May 2021	0	0
June 2021	0	0
July 2021	0	0
August 2021	0	0
September 2021	0	0
October 2021	0	0
November 2021	0	0
December 2021	0	0
January 2022	0	0
February 2022	0	0
March 2022	0	0
April 2022	0	0
May 2022	0	0
June 2022	0	0
July 2022	0	0
August 2022	0	0
September 2022	0	0
October 2022	0	0
November 2022	0	0
December 2022	0	0
January 2023	0	0
February 2023	0	0

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
March 2023	0	0
April 2023	0	0
May 2023	0	0
June 2023	0	0
July 2023	0	0
August 2023	0	0
September 2023	0	0
October 2023	0	0
November 2023	0	0
Overall Total	1	0

Annex F

Investigation Reports

Annex F-1

Investigation Report for September 2023

Investigation Report of CEMS Exceedances

Date	1 - 30 September 2023
Time	Continuous monitoring throughout September 2023
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of Cogeneration Units (CHPs) and Ammonia Stripping Plant (ASP)
Exceedance Description	<p>1. Continuous monitoring was carried out at the CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHPs and ASP respectively. The concentrations of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including:</p> <ul style="list-style-type: none"> • NO_x and SO₂ from CHP1; • NO_x, SO₂, and HCl from CHP2; • NO_x and SO₂ from CHP3; and • NO_x, SO₂, NH₃, and HCl from ASP. <p>2. The Contractor has investigated the cause of the exceedance and identified that:</p> <ul style="list-style-type: none"> • The exceedances of NO_x, SO₂, and HCl from the CHPs, as well as the exceedances of NO_x, SO₂, NH₃, and HCl from ASP occurred due to system instability.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedances and arranged Remedial Works and Follow-up Actions (see below).
Remedial Works and Follow-up Actions	<ul style="list-style-type: none"> • The Contractor had arranged the CHP supplier to inspect, analyse and improve CHP performance in September 2023 based on final reports of the quality assurance level 2 test (QAL) for the CEMS calibration. This QAL2 evaluation is still ongoing, and improvement recommendation will be provided once the final report is received. • The Contractor has also arranged cleaning of the ASP in October 2023 to restore the treatment efficiency of the ASP.

Prepared by: Alex Khawaja Waheed, MT Representative

Date: 16 October 2023

Annex F-2

Investigation Report for October 2023

Investigation Report of CEMS Exceedances

Date	1 - 31 October 2023
Time	Continuous monitoring throughout October 2023
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of Cogeneration Units (CHPs) and Ammonia Stripping Plant (ASP)
Exceedance Description	<p>1. Continuous monitoring was carried out at the CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHPs and ASP respectively. The concentrations of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including:</p> <ul style="list-style-type: none"> • NO_x, SO₂ and HCl from CHP1; • NO_x and SO₂ from CHP2; • NO_x and SO₂ from CHP3; and • NO_x, SO₂ and NH₃ from ASP. <p>2. The Contractor has investigated the cause of the exceedances and identified that:</p> <ul style="list-style-type: none"> • The exceedances of NO_x, SO₂, and HCl from the CHPs, as well as the exceedances of NO_x, SO₂ and NH₃, from ASP occurred due to system instability.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedances and arranged Remedial Works and Follow-up Actions (see below).
Remedial Works and Follow-up Actions	The Contractor had arranged the CHP supplier to inspect, analyse and improve CHP and ASP performance in November 2023 based on final reports of the quality assurance level 2 test (QAL) for the CEMS calibration. This QAL2 evaluation is still ongoing, and improvement recommendation will be provided once the final report is received.

Prepared by: Alex Khawaja Waheed, MT Representative

Date: 10 November 2023

Investigation Report of Discharged Sample Exceedances

Date	12 October 2023
Monitoring Location	Petrol Interceptor 2
Parameter	Suspended Solids, Chemical Oxygen Demand, Oil & Grease
Exceedance Description	<p>1. According to EM&A Manual, the monitoring of the effluent discharge from the outlet chamber of the Effluent Storage Tank and Petrol Interceptors shall be carried out monthly and bi-monthly, respectively, under Section 21 of the Water Pollution Control Ordinance (WPCO) license. Exceedance is considered if the concentration of discharged effluent sample from the Effluent Storage Tank and Interceptors is higher than the discharge limits stated in Part B2 of the WPCO. Exceedances of discharge parameter were recorded during the monitoring of effluent discharge from the Petrol Interceptor 2 (Suspended Solids, Chemical Oxygen Demand, Oil & Grease).</p> <p>2. The Contractor has investigated the cause of the exceedances and found that:</p> <ul style="list-style-type: none"> • The exceedances of Suspended Solids, Chemical Oxygen Demand and Oil & Grease from the effluent discharge from Petrol Interceptor 2 occurred due to the increasing road cleaning frequency, leading to Suspended Solids, Chemical Oxygen Demand and Oil & Grease in the sample taken on 12 October 2023.
Action Taken / Action to be Taken	Proper cleaning of the petrol interceptor was arranged to maintain a better effluent water quality. Additionally, after measures implemented by the Contractor, a second Discharge Sample from the Petrol Interceptor 2 was collected on 31 October 2023 as a follow-up, with all parameters recorded to be in compliance with discharge limits.
Remedial Works and Follow-up Actions	The Contractors will review the efficiency of the Petrol Interceptor, to ensure the discharge effluents comply with the discharge limits.

Prepared by: Alex Khawaja Waheed, MT Representative

Date 3 January 2024

Annex F-3

Investigation Report for November 2023

Investigation Report of CEMS Exceedances

Date	1 - 30 November 2023
Time	Continuous monitoring throughout November 2023
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of Cogeneration Units (CHPs) and Ammonia Stripping Plant (ASP)
Exceedance Description	<p>1. Continuous monitoring was carried out at the CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHPs and ASP respectively. The concentrations of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including:</p> <ul style="list-style-type: none"> • NO_x, SO₂, and HCl from CHP1; • NO_x, SO₂, and HCl from CHP2; • NO_x and SO₂ from CHP3; and • NO_x, SO₂, NH₃, and HCl from ASP. <p>2. The Contractor has investigated the cause of the exceedances and identified that:</p> <ul style="list-style-type: none"> • The exceedances of NO_x, SO₂, and HCl from the CHPs, as well as the exceedances of NO_x, SO₂, NH₃, and HCl from ASP occurred due to system instability.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedances and arranged Remedial Works and Follow-up Actions (see below).
Remedial Works and Follow-up Actions	The Contractor had arranged the CHP supplier to inspect, analyse and improve CHP and ASP performance in December 2023 based on final reports of the quality assurance level 2 test (QAL) for the CEMS calibration. This QAL2 evaluation is still ongoing, and improvement recommendation will be provided once the final report is received.

Prepared by: Alex Khawaja Waheed, MT Representative

Date: 8 December 2023

Annex G

Odour Patrol Result



CERTIFICATE OF ANALYSIS

CLIENT:	OSCAR BIOENERGY JOINT VENTURE	WORK ORDER:	HK2337148
CONTACT:	MS HASSAN KA SIN		
ADDRESS:	NO. 5, SHAM FUNG ROAD, SIU HO WAN, NORTH LANTAU ISLAND, NT, HONG KONG	LABORATORY:	HONG KONG
		SUB-BATCH:	0
		DATE OF PATROL:	14 SEPTEMBER 2023
		DATE OF ISSUE:	25 SEPTEMBER 2023
PROJECT:	ODOUR PATROL FOR THE ORGANIC RESOURCES RECOVERY CENTRE PHASE 1 IN SIU HO WAN	SAMPLE TYPE:	ODOUR PATROL
SITE:	ORGANIC RESOURCES RECOVERY CENTRE PHASE 1 (O-PARK 1)	NO. OF LOCATIONS:	8
PO:	23040085		

COMMENTS

Odour Patrol was conducted by the staff of ALS Technichem during 10:16 - 10:17 and 15:35 - 15:54. Due to raining when conducting the first round of patrol at Location 7, all the remaining patrol points in the morning time were cancelled.

Sampling information (Project name, Sample ID) is provided by client.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

The results related only to the items tested. All pages of this report have been checked and approved for release.



Fung Lim Chee, Richard
Managing Director - Hong Kong



1. Summary of Work

The odour patrol was conducted during daytime and evening time.

2. Odour Patrol

Odour patrolling is a process to make use of the calibrated olfactory senses (i.e. the nasal sense) of the patrol members to evaluate the odour and its intensity during a patrol exercise at the site.

The patrol work was conducted by two odour patrol team members from ALS Technichem (HK) Pty Ltd during each time session. All members are free from any respiratory diseases during patrol day. None of the members has been working or living in the area of the vicinity of the inspection zone.

The patrol team was required to move slowly from one to the other monitoring locations and use their olfactory senses to detect odour at each location.

The location of odour sources and the areas to be affected by the odour nuisance were identified as much as possible.

During the patrolling, the meteorological and surrounding information were recorded:

- the prevailing weather condition;
- the wind direction;
- the wind speed;
- location where odour is spotted;
- possible source of odour;
- perceived intensity of the odour;
- duration of odour; and
- characteristics of the odour detected.

The perceived intensity is to be divided into 5 levels which are ranked in an ascending order as follows:

0	Not detected	No odour perceives or an odour so weak that it cannot be easily characterised or described
1	Slight	Identifiable odour, slight
2	Moderate	Identifiable odour, moderate
3	Strong	Identifiable odour, strong
4	Extreme	Severe odour

The odour patrol location was shown in Appendix 1.



3. Odour Patrol Result

3.1 Daytime:

Location	Panellist	Weather	Time	T (°C)	RH (%)	WS (m/s)	WD (Degree)	Odour Intensity	Duration of Odour	Direction from Source	On-Site Observation	
											Odour Characteristics	Potential Odour Source
8	1	Cloudy	10:16	27.6	96.4	0.0	--	0	NA	NA	NA	NA
	2							0				
7	1	Cloudy	10:17	27.3	96.6	0.0	--	1	Continuous	NA	Garbage	Tipping Hall
	2							1				

Remark:

T: Air Temperature
 RH: Relative Humidity
 WS: Wind Speed
 WD: Wind Direction

NA: Not Applicable

Due to the raining when conducting the patrol at Location 7, all the remaining patrol points in the morning time were cancelled.



3.2 Evening time:

Location	Panellist	Weather	Time	T (°C)	RH (%)	WS (m/s)	WD (Degree)	Odour Intensity	Duration of Odour	Direction from Source	On-Site Observation	
											Odour Characteristics	Potential Odour Source
8	1	Cloudy	15:35	28.9	87.1	0.6	280	0	NA	NA	NA	NA
	2							0				
7	1	Cloudy	15:36	29.0	86.0	0.6	353	1	Continuous	Upwind	Garbage	Tipping Hall
	2							1				
2	1	Cloudy	15:39	29.0	87.4	0.0	--	1	Intermittent	NA	Grassy	Vegetation
	2							1				
3	1	Cloudy	15:40	28.6	94.3	0.0	--	1	Intermittent	NA	Grassy	Vegetation
	2							1				
5	1	Cloudy	15:44	29.1	91.1	0.0	--	1	Intermittent	NA	Compost	Composting Hall
	2							1				



Location	Panellist	Weather	Time	T (°C)	RH (%)	WS (m/s)	WD (Degree)	Odour Intensity	Duration of Odour	Direction from Source	On-Site Observation	
											Odour Characteristics	Potential Odour Source
6	1	Cloudy	15:48	29.0	90.5	0.4	173	0	NA	NA	NA	NA
	2							0				
9	1	Cloudy	15:51	29.0	91.7	0.5	159	1	Continuous	Downwind	Compost	Composting Hall
	2							1				
10	1	Cloudy	15:54	22.4	79.3	NA	NA	1	Continuous	NA	Musty	Air Conditioning System
	2							1				

Remark:

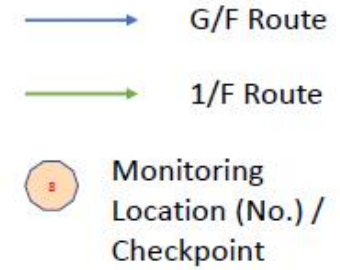
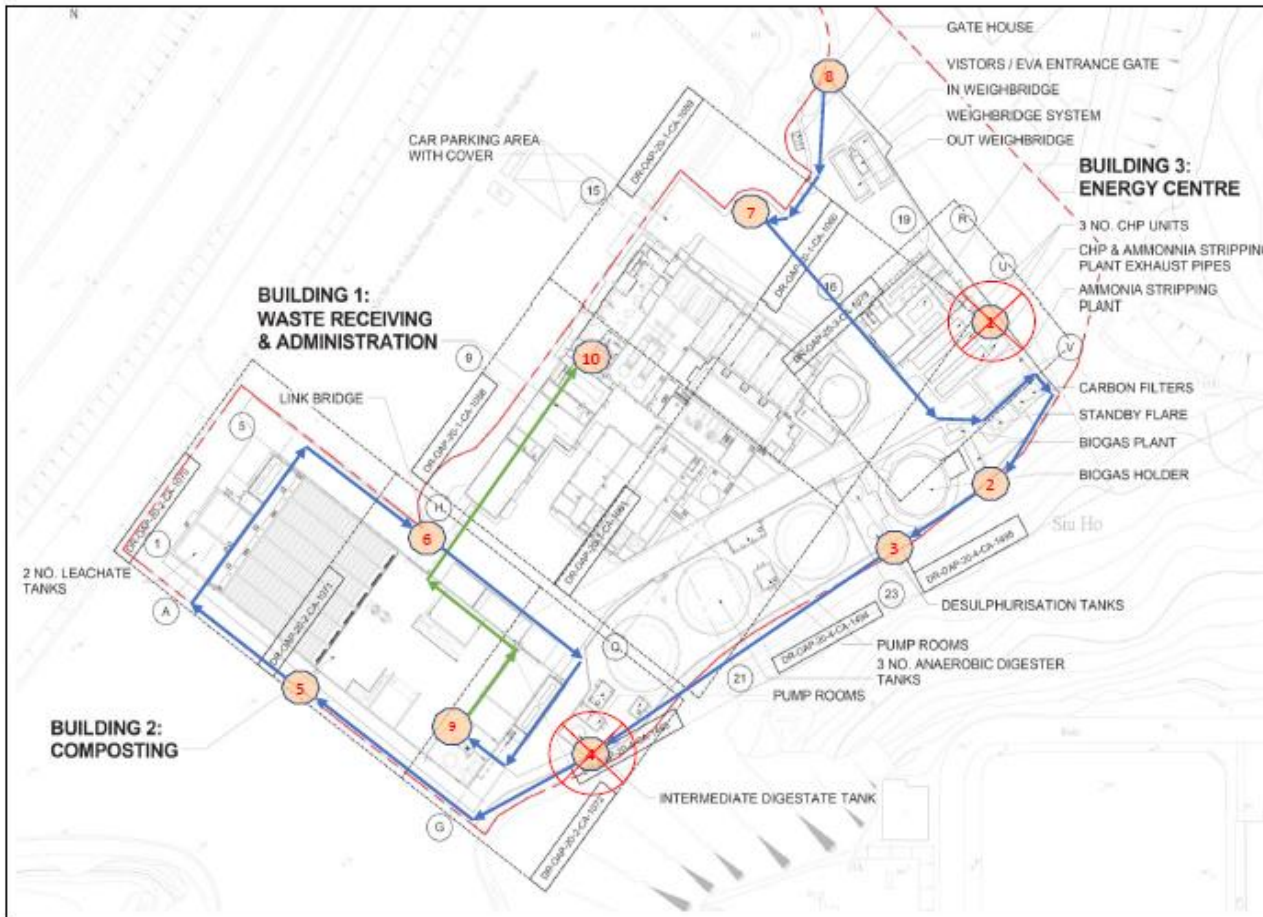
T: Air Temperature
 RH: Relative Humidity
 WS: Wind Speed
 WD: Wind Direction

NA: Not Applicable



APPENDIX 1

Odour Patrol Route





APPENDIX 2

A2.1 Odour Patrol at Different Locations - Morning time



Location: 8



Location: 7



A2.1 Odour Patrol at Different Locations - Evening time



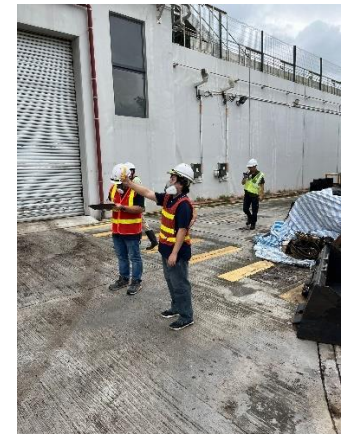
Location: 2



Location: 3



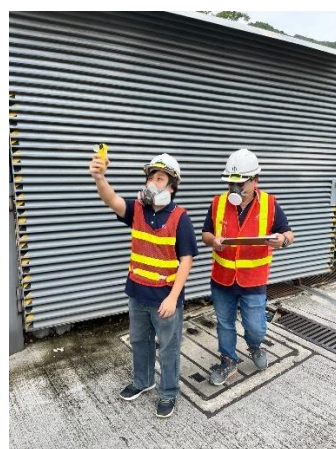
Location: 5



Location: 6



Location: 7



Location: 8



Location: 9



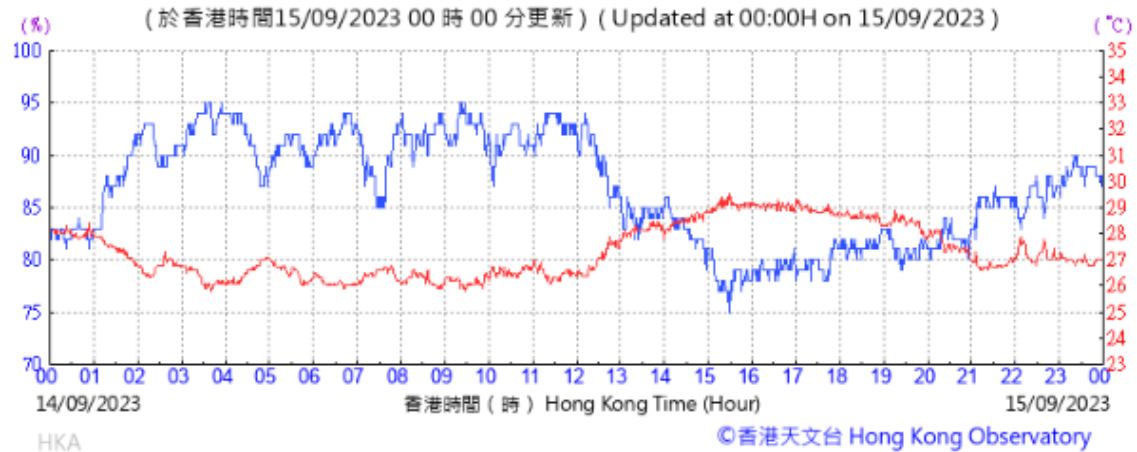
Location: 10



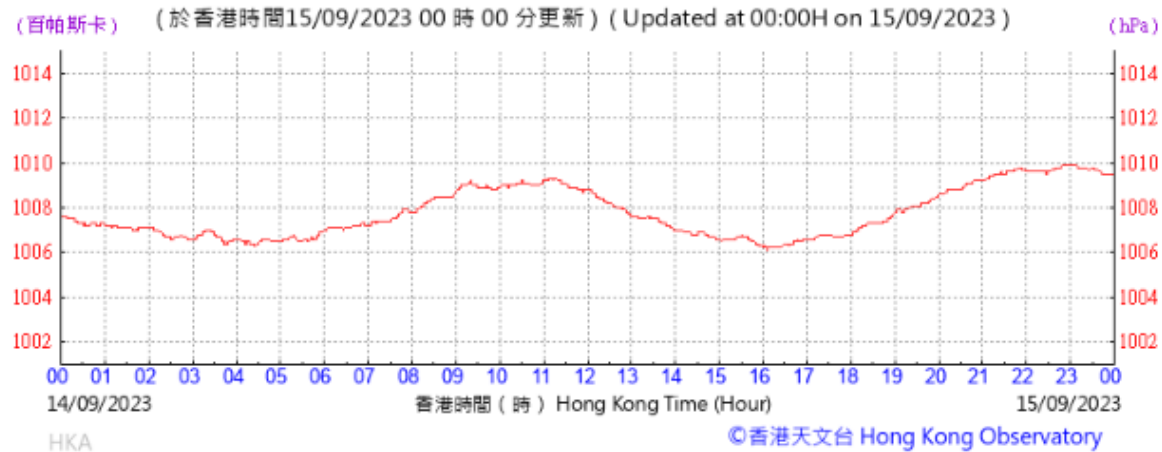
APPENDIX 3

Extract of Meteorological Observations from Hong Kong Airport Observatory Station

Temperature/Humidity:



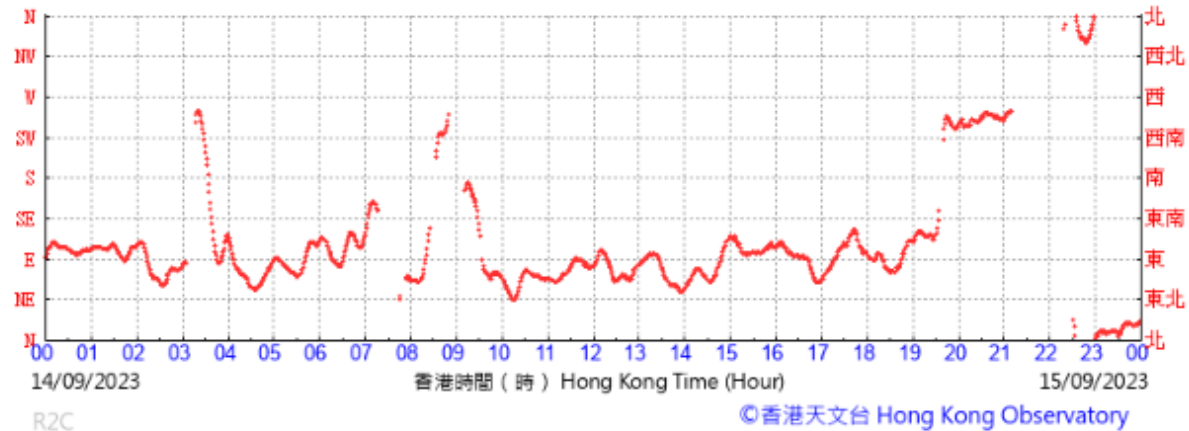
Pressure:





Wind Direction:

(於香港時間15/09/2023 00 時 00 分更新) (Updated at 00:00H on 15/09/2023)



R2C
Wind Speed:

(公里/小時) (於香港時間15/09/2023 00 時 00 分更新) (Updated at 00:00H on 15/09/2023) (km/h)

