Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1)

Thirty-seventh Quarterly EM&A Summary Report

PREPARED FOR
OSCAR Bioenergy Joint Venture

DATE
27 November 2025

REFERENCE
0279222

Meinhardt Infrastructure and Environment Limited

Organic Resources Recovery Centre, Phase I

37th Quarterly EM&A Report

(1 Jun 2024 – 31 Aug 2024)

Verified by:	Claudine Lee 
Position:	Independent Environmental Checker
Date:	27th November 2025

DOCUMENT DETAILS

DOCUMENT TITLE	Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1)
DOCUMENT SUBTITLE	Thirty-seventh Quarterly EM&A Summary Report
PROJECT NUMBER	0279222
Date	27 November 2025
Version	1
Author	MY
Client name	OSCAR Bioenergy Joint Venture

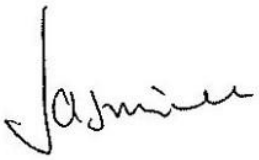
DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
	VERSION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
	1	MY	MT	JN	27.11.2025	

SIGNATURE PAGE

Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1)

Thirty-seventh Quarterly EM&A Summary Report
0279222



Dr Jasmine Ng
Managing Partner

Mandy To
Environmental Team Leader

ERM-Hong Kong, Limited
2507 One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
T +852 2271 3000

CONTENTS

LIST OF TABLES

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 37th Quarterly Environmental Monitoring and Audit (EM&A) report presenting the EM&A works carried out during the period from 1 June 2024 to 31 August 2024 in accordance with the EM&A Manual.

ENVIRONMENTAL MONITORING AND AUDIT PROGRESS

AIR QUALITY MONITORING

Non-compliance of emission limits of NO_x and SO_2, from CHP1; NO_x from CHP2; NO_x from CHP3; and NO_x, SO_2, and NH_3, from the ASP were recorded during June 2024.

Non-compliance of emission limits of NO_x and HCl from CHP1; NO_x from CHP2; NO_x from CHP3; NO_x, SO_2, and NH_3 from the ASP; and Dust, CO, VOCs, and HF from the Standby Gas Flaring Unit were recorded during July 2024.

Non-compliance of emission limits of Total Odour from CAPCS; NO_x and SO_2 from CHP1; NO_x from CHP2; NO_x, SO_2, NH_3, and HCl from the ASP; and VOCs and HF from the Standby Gas Flaring Unit were recorded during August 2024.

Exceedances occurred due to sensor issues, system instability, emergency condition and unstable operation.

ENVIRONMENTAL EXCEEDANCE/ NON-CONFORMANCE/ COMPLIANT/ SUMMONS AND PROSECUTION

Exceedances for the air emission limits for the CAPCS, CHP, and ASP stacks were recorded during the reporting period.

No complaint was received during the reporting period.

1. PROJECT INFORMATION

1.1 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.

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.

1.2 GENERAL SITE DESCRIPTION

The Project Site is located at Siu Ho Wan in North Lantau with an area of about 2 hectares. The facility received an average of 165.26 to 181.95 tonnes and treated an average of 127.83 to 137.07 tonnes of source separated organic waste per day during the reporting period.

1.2.1 MAJOR ACTIVITIES UNDERTAKEN

A summary of the major activities undertaken in the reporting period is shown in *Table 1.1.*

TABLE 1.1 SUMMARY OF ACTIVITIES UNDERTAKEN IN THE REPORTING PERIOD

Activities Undertaken in the Reporting Period

- 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;
- CHP fine-tuning ongoing (will continue into next month);
- PT Line 1 overhaul ongoing (will continue into next month);
- ASP overhaul;
- 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;
- CHP fine-tuning (began in June 2024, will continue into next month);
- Overhaul of PT Line 1 completed
- 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;
- Ongoing repair works for front roller shutter for Receiving Bay 2 & 3; and
- ASP column 1 Cleaning

2. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS AND RESULTS

2.1 ENVIRONMENTAL MONITORING

2.1.1 AIR QUALITY

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). The number of exceedances of the concerned air emissions monitored for the CAPCS, CHP and ASP during this reporting period are presented in *Tables 2.1* to *2.6*.

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 2.1 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 – 579	680	Nil	Nil
Dust (or TSP)	0 – 0	6	Nil	Nil
Odour (including NH_3 & H_2S) [(b)]	0 – 964.56	220	Identified [(c)]	Sensor issues

Notes:
(a) The VOCs emission limit includes methane as biogas is adopted, as fuel in the combustion process.
(b) The odour unit is OU/Nm^3.
(c) Dates with Odour exceedances (number of exceedances on that day) were identified on 26(13), 27(6), 28(12), 29(21), 30(9), and 31(6) August 2024.

TABLE 2.2 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 - 7	15	Nil	Nil
Carbon Monoxide	0 - 136	650	Nil	Nil
NO_x	0 – 666	300	Identified [(c)]	System unstable (e.g., low efficiency)
SO_2	0 – 74	50	Identified [(d)]	System unstable (e.g., low efficiency)

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [a]	Max. Emission Limit (mg/Nm^3)	Exceedance Identified	Remarks
VOCs (including methane) [b]	0 – 882	1,500	Nil	Nil
HCl	0 - 12	10	Identified [e]	System unstable (e.g., low efficiency)
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 NOx exceedances (number of exceedances on that day) were identified on 1(24), 2(24), 3(13), 4(14), 5(20), 6(14), 7(18), 8(24), 9(24), 10(24), 11(24), 12(24), 13(24), 14(12), 15(12), 16(24), 17(2), 18(8), 19(21), 20(24), 21(24), 22(24), 23(24), 24(15), 25(24), 26(24), 27(23), 28(23), 29(24), and 30(23) June 2024; 1(24), 2(24), 3(24), 4(24), 5(23), 6(24), 7(24), 8(9), 9(8), 10(24), 11(24), 12(18), 13(24), 14(24), 15(21), 16(18), 17(13), 18(24), 19(21), 20(18), 21(14), 22(9), 23(21), 24(18), 25(21), 26(14), 27(24), 28(24), 29(24), 30(24), and 31(23) July 2024; and 1(21), 2(23), 3(24), 4(24), 5(23), 6(24), 7(24), 8(24), 9(24), 10(24), 11(18), 12(24), 13(24), 14(24), 15(24), 16(24), 17(24), 18(24), 19(24), 20(24), 21(21), 22(24), 23(24), 24(24), 25(24), 26(24), 27(24), 28(24), 29(24), 30(24), and 31(23) August 2024.
(d) Dates with SO2 exceedances (number of exceedances on that day) was identified on 28(11) June 2024 and 8(6), 9(21), 10(24), 11(10), 12(13), 13(14), 14(20), 16(11), 17(8), 18(13), 19(15), 28(6), 29(10), and 30(4) August 2024.
(e) Date with HCl exceedance (number of exceedances on that day) was identified on 23(1) July 2024.

TABLE 2.3 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 – 8	15	Nil	Nil
Carbon Monoxide	0 – 490	650	Nil	Nil
NO_x	0 – 461	300	Identified [c]	System unstable (e.g., low efficiency)
SO_2	0 – 48	50	Nil	Nil
VOCs (including methane) [b]	0 – 569	1,500	Nil	Nil
HCl	0 – 10	10	Nil	Nil
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 the day) were identified on 1(9), 2(3), 3(10), 4(11), 5(10), 6(10), 7(9), 8(15), 9(8), 10(5), 11(4), 12(3), 13(11), 14(1), 15(4), 16(2), 17(1), 18(8), 19(1), 20(5), 21(3), 22(6), 23(7), 24(9), 25(12), 26(6), and 27(12) June 2024; 9(7), 10(24), 11(9), 12(7), 13(24), 14(24), 15(24), 16(18), 17(2), 18(1), 19(1), 20(2), 22(1), 23(3), 24(1), 28(1), 29(1), and 31(1) July 2024; and 1(8), 2(21), 3(18), 4(23), 5(15), 6(9), 8(17), 9(24), 10(18), 11(2), 12(7), 13(6), 14(10), 15(1), 20(2), 21(5), 22(13), 23(12), 24(2), 25(1), 27(2), and 28(4) August 2024.

TABLE 2.4 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 – 13	15	Nil	Nil
Carbon Monoxide	0 – 245	650	Nil	Nil
NO_x	0 – 556	300	Identified [c]	System unstable (e.g., low efficiency)
SO_2	0 – 50	50	Nil	Nil
VOCs (including methane) [b]	0 – 604	1,500	Nil	Nil
HCl	0 – 1	10	Nil	Nil
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 the day) were identified on 20(1), 21(4), 22(14), 24(3), 25(2), 27(4), 28(14), 29(16), and 30(24) June 2024; and 1(24), 2(24), 3(24), 4(24), 5(24), 6(22), 7(18), 8(7), 9(24), 10(24), 11(23), 12(23), 13(24), 14(24), 15(24), 16(24), and 17(9) July 2024.

TABLE 2.5 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 – 5	5	Nil	Nil

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [a]	Max. Emission Limit (mg/Nm^3)	Exceedances Identified	Remarks
Carbon Monoxide	0 – 96	100	Nil	Nil
NO_x	0 – 970	200	Identified [c]	System unstable (e.g., low efficiency, unstable column temperature)
SO_2	0 – 210	50	Identified [d]	System unstable (e.g., low efficiency, unstable column temperature)
VOCs (including methane) [b]	0 – 20	20	Nil	Nil
NH_3	0 – 318	35	Identified [e]	System unstable (e.g., low efficiency, unstable column temperature)
HCl	0 – 26	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 the day) were identified on 1(5), 2(7), 3(8), 4(4), 5(5), 6(18), 7(12), 8(13), 9(22), 10(8), 11(22), 12(12), 13(3), 14(9), 15(15), 16(14), 17(7), 19(5), 21(3), 22(2), 23(1), 24(3), 25(1), 26(11), 27(3), 28(12), 29(7), and 30(6) June 2024; 1(20), 2(17), 3(11), 4(11), 5(11), 6(15), 7(16), 8(18), 9(24), 10(18), 11(21), 12(22), 13(17), 14(24), 15(22), 16(18), 17(6), 18(6), 19(20), 20(17), 21(9), 22(10), 24(13), 25(12), 26(12), 27(14), 28(4), 29(5), 30(7), and 31(7) July 2024; and 1(23), 2(19), 3(5), 4(4), 6(8), 7(21), 8(17), 9(3), 10(12), 11(1), 12(8), 13(13), 14(10), 15(5), 16(9), 17(10), 18(7), 19(11), 20(11), 21(5), 22(8), 23(14), 24(13), 25(1), 26(2), 27(15), 28(15), 29(11), 30(23), and 31(23) August 2024.
(d) Dates with SO_2 exceedances (number of exceedances on the day) were identified on 1(1), 3(2), 4(1), 5(1), 7(1), 8(3), 15(9), 23(1), 28(14), 29(13), and 30(16) June 2024; 1(3), 14(1), 15(9), 17(2), 19(2), 28(7), 29(1), 30(3), and 31(12) July 2024; and 6(9), 7(24), 8(18), 9(3), 10(24), 11(24), 12(21), 13(19), 14(24), 15(12), 16(18), 17(23), 18(24), 19(20), 20(21), 21(15), 22(23), 23(8), 28(14), 29(24), and 30(21) August 2024.
(e) Dates with NH_3 exceedances (number of exceedances on the day) were identified on 1(11), 3(3), 4(12), 5(6), 6(1), 7(2), 8(3), 10(7), 11(2), 14(3), 15(2), 18(14), 19(1), 20(1), 23(4), 24(5), 25(22), 26(11), 27(12), 28(8), 29(4), and 30(8) June 2024; 1(10), 2(15), 3(10), 4(7), 5(4), 6(6), 7(1), 11(1), 17(9), 18(7), 20(2), 23(1), 24(5), 25(5), 26(8), 27(3), 29(1), and 30(3) July 2024; and 1(1), 2(5), 3(2), 4(5), 5(22), 6(20), 7(16), 8(18), 10(2), 11(8), 12(13), 13(6), 14(4), 15(8), 16(7), 17(9), 18(10), 19(9), 20(8), 21(7), 22(2), 23(7), 24(6), 25(1), 26(2), 27(15), 28(7), 29(16), 30(1), and 31(1) August 2024.
(f) Dates with HCl exceedances (number of exceedances on the day) were identified on 6(2), 7(1), 8(1), 11(1), and 13(1) August 2024.

TABLE 2.6 HOURLY AVERAGE OF PARAMETERS RECORDED FOR THE STANDBY FLARING GAS UNIT

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [a]	Max. Emission Limit (mg/Nm^3)	Exceedances Identified	Remarks
Dust (or TSP)	0 – 8	5	Identified [c]	Emergency condition required the use of flare
Carbon Monoxide	0 – 821	100	Identified [d]	Emergency condition required the use of flare
NOx	0 – 73	200	Nil	Nil
SO_2	0 – 5	50	Nil	Nil
VOCs (including methane) [b]	0 – 1,300	20	Identified [e]	Emergency condition required the use of flare, unstable operation (low temperature)
HCl	0 – 4	10	Nil	Nil
HF	0 – 5	1	Identified [f]	Emergency condition required the use of flare, unstable operation (low temperature)

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) Date with Dust exceedance (number of exceedance on that day) was identified on 11(1) July 2024.
(d) Date with CO exceedance (number of exceedance on that day) was identified on 5(1) July 2024.
(e) Dates with VOCs exceedances (number of exceedances on that day) was identified on 5(1) July 2024 and 23(1) August 2024.
(f) Dates with HF exceedances (number of exceedances on that day) were identified on 5(2), 6(4), 7(3), 8(5), 11(1), 22(1), 23(1), and 26(2) July 2024 and 23(1) August 2024.

2.1.2 ODOUR

Odour patrol was conducted by the independent odour patrol team of ALS Technichem (HK) Pty Ltd on 5 July 2024, 8 July 2024, 9 July 2024; and 9 August 2024, 15 August 2024 respectively.

No complaint was received during the reporting period.

2.2 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. Monthly site audits for June 2024 to August 2024 have been carried out to check the implementation of these mitigation measures. Follow-up actions resulting from the site audits 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.

2.3 LANDSCAPE AND VISUAL

The monthly inspections of the landscape and visual mitigation measures for the operation phase of the Project were performed on 28 June 2024, 25 July 2024 and 19 August 2024, and no non-compliance in relation to the landscape and visual mitigation measures were identified.

2.4 WASTE MANAGEMENT

Wastes generated from the operation of the Project include chemical waste, wastes generated from pre-treatment process and general refuse. The quantities of different types of waste generated from the operation of the Project in the reporting period are summarised in *Table 2.7.*

TABLE 2.7 QUANTITIES OF WASTE GENERATED FROM THE OPERATION OF THE PROJECT

Month / Year	Chemical Waste	Waste Generated from Pre-treatment Process		General Refuse	
	Disposal of at CWTC	Disposed of at Landfill [a]	Recycled [b]	Disposed of at Landfill [a] [e]	Recycled [c]
June 2024	1,200 L [d]	1,199.51 tonnes	0 tonnes	4.080 tonnes [e]	0.052 tonnes
July 2024	18.496 L [d]	1,391.16 tonnes	0 tonnes	2.995 tonnes [e]	0.085 tonnes
August 2024	1,200 L [d]	1,160.32 tonnes	0 tonnes	3.110 tonnes [e]	0.038 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.

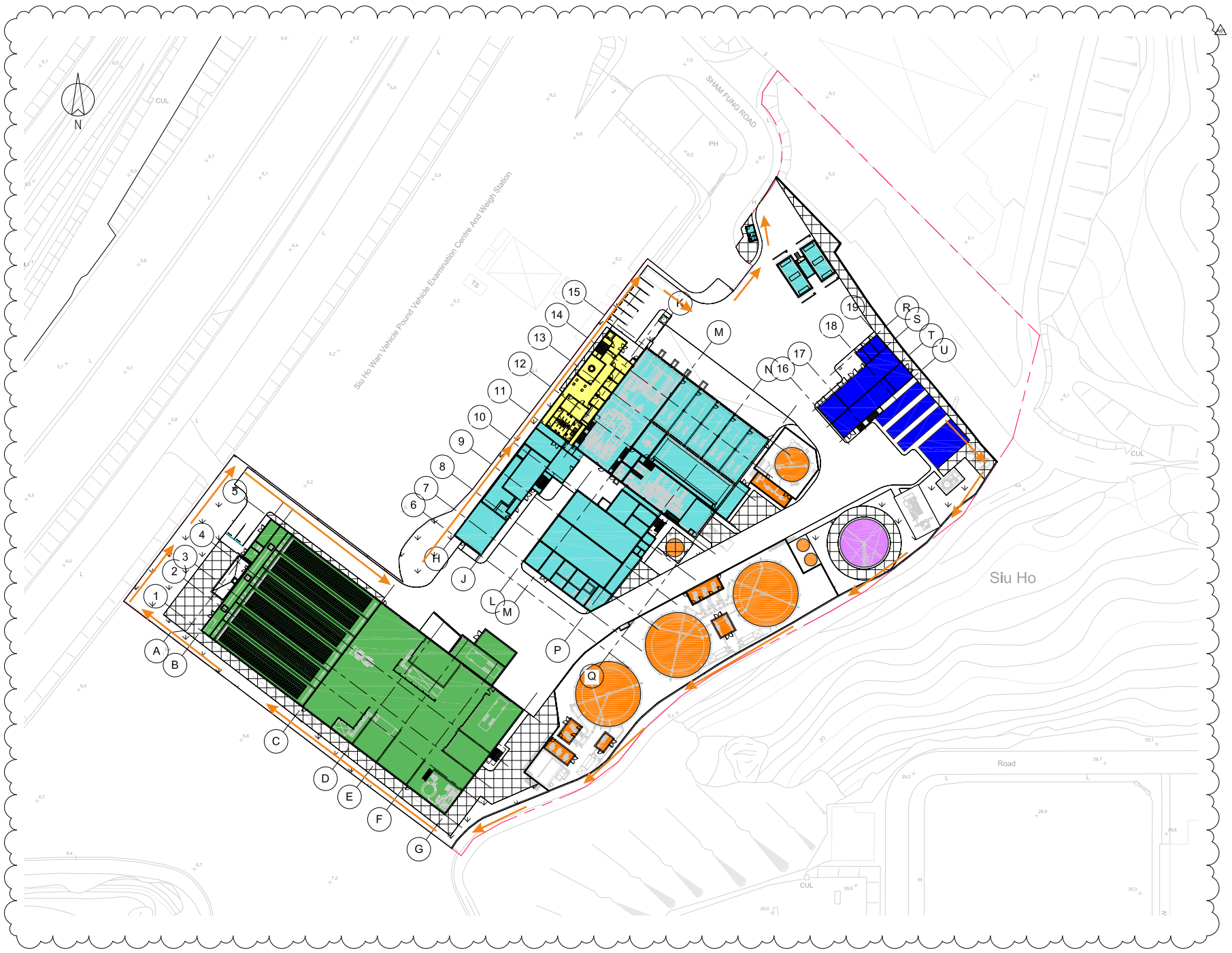
(b) Among waste generated from pre-treatment process, no metals, papers/ cardboard packing or plastics were sent to recyclers for recycling during the reporting period.

(c) Among general refuse, 0.003 tonnes of metals, 0.125 tonnes of papers/ cardboard packing and 0.047 tonnes of plastics were sent to recyclers for recycling during the reporting period.

(d) 1,200L of chemical waste (spent lube oil) was disposed of at CWTC in June 2024; 16,000L of chemical waste (unwanted flocculant agent) was disposed of at CWTC in July 2024. 4,560kg of chemical waste (waste lead-acid battery) was also disposed of at CWTC in July 2024; for unit consistency this figure has been converted to 2,496L, assuming a density of 1.827 kg/L; and 1,200L of chemical waste (spent lube oil) was disposed of at CWTC in August 2024.

(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.

ANNEX A PROJECT LAYOUT



Key

→ Patrol Route

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

CLIENT

ENVIRONMENTAL PROTECTION DEPARTMENT
GOVERNMENT OF THE HKSAR

CLIENT'S CONSULTANT

AECOM ASIA CO. LTD.

CONTRACTOR

OSCAR BIOENERGY JV

LEAD DESIGNER

ARUP
Ove Arup & Partners Hong Kong Limited

ENVIRONMENTAL TEAM

ERM HONG KONG LIMITED

INDEPENDENT CONSULTANTS

Meinhardt Infrastructure and Environment Limited
滙techn基建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	CHECKED	APPROVED
CW	RS	DP

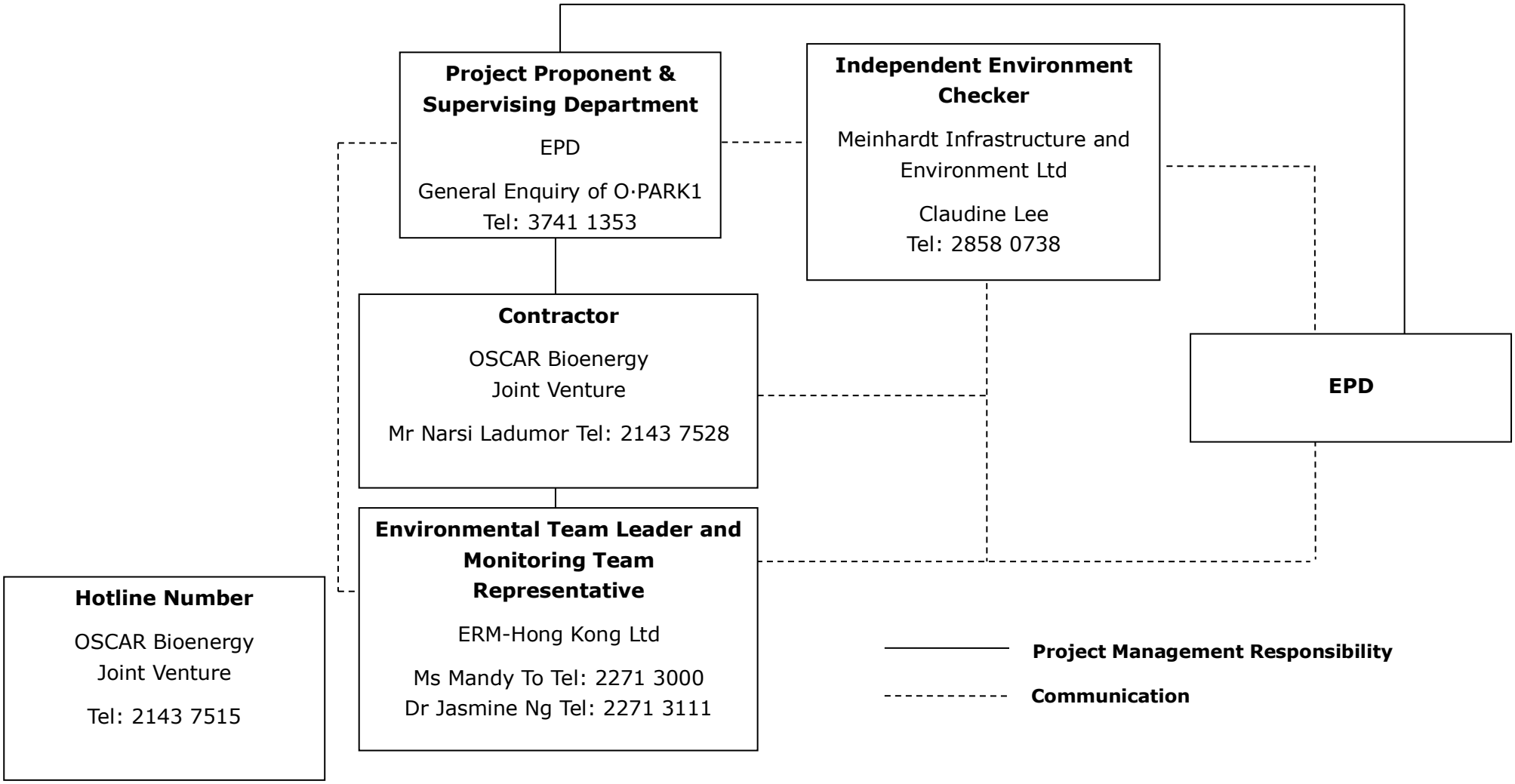
SCALE 1:500@A1 / 1:1000@A3

DATE 12/02/15

JOB NO.	DRAWING NO.	REV.
239956	DR-OAP-20-0-CA-1001	A01

ANNEX B PROJECT ORGANISATION CHART AND CONTACT DETAIL

PROJECT ORGANISATION (WITH CONTACT DETAILS)



ERM HAS OVER 160 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

Argentina
Australia
Belgium
Brazil
Canada
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
The Netherlands
New Zealand
Peru
Poland
Portugal
Puerto Rico
Romania
Senegal
Singapore
South Africa
South Korea
Spain
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM-Hong Kong, Limited
2507, 25/F, One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong

T: +852 22713000
F: +852 3015 8052

www.erm.com