

Issue No.: Issue 1
Issue Date: January 2023
Project No.: 1616



EcoPark Operation

Annual Environmental Monitoring & Audit Report 2022

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This report has been prepared by Allied Environmental Consultants Limited with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

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EXECUTIVE SUMMARY

General

EcoPark is a key element in the Government's waste management policy that aims at promoting the local recycling industry by providing long-term land at affordable rents, thereby encouraging investment in advanced technology and value-added recycling processes. EcoPark is being developed in two phases at site in Tuen Mun Area 38 as shown in **Figure I-1**. The contract for the management of EcoPark – Contract No. *EP/SP/102/17 Provision of Management Services for EcoPark 2018* was awarded to Urban Property Management Limited (UPML) by Environmental Protection Department (EPD) effective from 30th October 2018. The contract for the management of EcoPark – Contract No. *EP/SP/218/21 Provision of Management Services for EcoPark 2022* was awarded to Urban Property Management Limited (UPML) by Environmental Protection Department (EPD) effective from 30th October 2022.

UPML, the “Operator” of EcoPark, have appointed Allied Environmental Consultants Ltd. (AEC) as the Environmental Team (ET) to carry out the Environmental Monitoring and Audit (EM&A) works for the operation of EcoPark as required by the EM&A Manual and in accordance with the conditions of the Environmental Permit (EP) (EP-226/2005/G).

This is the sixteenth (16th) annual EM&A report prepared for the operation phase of EcoPark and covers the calendar year of 2022.

In the reporting year, there were ten tenants and four operators in EcoPark Phase 1 and Phase 2. One operator (Jardine Engineering Corporation Ltd.) at biochar production plant in Lots T8-T11 of EcoPark Phase 1, one operator (ALBA Integrated Waste Solutions (Hong Kong) Ltd.) located at WEEE.PARK in Lots P2-P4 of EcoPark Phase 2, one operator (Organic Tech Ltd.) at bioconversion of organic waste plant in Lot P12b of EcoPark Phase 2 and one operator (The Hong Kong Polytechnic University) of biochar-enhanced construction materials plant at Lot P12a of EcoPark Phase 2.

Baguio carried out the waste plastics recycling operation in the reporting year and the PRC - 018 (Supplementary) was also approved on July 2022. The tenant of Lots P1, P5-P7 (Zhou Ji), the operators of Lots P12a (PolyU) and Lots T8-T11 (Jardine Engineering) were under preparation work. The operator of Lot P12b (Organic Tech) was under machinery installation work without any site operation in the reporting year.

In the reporting year, the PRC and DA for Organic Tech's bioconversion of organic waste process was approved in June 2022. The PRC – 018 (Supplementary) for Baguio's plastic recycling process was approved in July 2022. Full set of the completed PRCs and DAs are submitted separately to relevant authorities in EPD.

Throughout the reporting year, monthly site inspections and monthly random site inspections were conducted by the ET and the IEC respectively, while quarterly joint site inspection was carried out by the Operator, the IEC and the ET. Observations and recommendations were made during site inspections.

Throughput of Materials / Waste Generated

The throughputs of WEEE.PARK and the nine active tenants in the reporting year are summarised below. Please note that product output plus waste disposal does not necessarily equal the waste input, due to material losses during processing and material retained within the lots.

Material Type	Waste Input (tonnes)	Product Output ⁽⁴⁾ (tonnes)	Waste Disposed ⁽⁴⁾ (tonnes)
Waste Organic Food	29,447	10,450	10,004
Waste Ferrous Metals	87,918	89,919	604
Waste Wood	2,104	1,462	-
Waste Electronics	23,111	20,076	3,120
Waste Plastics	7,385	6,324	438
Construction Waste	53,767	102,149	212
Waste Glass	7,644		
Waste Rubber Tyres	1,783	1,830	-
Waste Battery	625	-	-

Notes:

- 1) The throughput data presented above is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
- 2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
- 3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
- 4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
- 5) “-” in the column of waste disposal denotes zero quantity; while “n/a” denotes unavailable information.

Exceedances of Any Measured Action / Limit Levels

The northern part of EcoPark is located within the 250m Landfill Gas (LFG) Consultation Zone of Siu Lang Shui Landfill. LFG monitoring was carried out quarterly at five locations (three in Phase 1 and two in Phase 2) in the reporting year. The LFG monitoring in Phase 2 (EP2-1 and EP2-2) was commenced in January 2011.

In the reporting year, LFG monitoring was undertaken on 21st February 2022, 16th May 2022, 17th August 2022, 21st November 2022 at five locations (three in Phase 1 and two in Phase 2). No exceedance of any parameter was recorded.

Summary of Complaints, Summons and Prosecutions

No complaints related to recycling activities was received in the reporting year. One notification of summons for Champway was received was laid in June 2022. One successful prosecution for Champway was received in October 2022.

Reporting Changes

There is no change in the reporting year.

Future Key Issues

No key issues are anticipated in the next reporting year.

Conclusions of Annual Review

In terms of interpretation of EM&A data, the outcome of quarterly monitoring is considered as sufficient and effective according to *Section 8.7.11* of the EIA Report and *Section 6.4.4* of the EM&A Manual.

In terms of the environmental acceptability of EcoPark, no critical environmental deficiencies were identified at various tenants' lots in EcoPark in the reporting year. Therefore, the operation of EcoPark in environmental terms is considered as acceptable in general.

In terms of the practicality and effectiveness of the EIA process and the EM&A programme, the mitigation measures proposed in the EIA Study are effective and efficient. The use of the Process Review mechanism to assess incoming processes, processes not assessed in the EIA, or processes with greater throughputs than EIA assumption, is considered to work well and is fully in accordance with the EP conditions, the recommendations of EIA and the requirements of the EM&A programme.

1 PROJECT BACKGROUND

1.1 Project Overview

- 1.1.1 In the document "A Policy Framework for the Management of Municipal Solid Waste (2005 –2014)", the government set out a comprehensive policy to support the recycling industry. This included allocating suitable land, encouraging research and development, introducing environmental legislation and providing effective support measures. In May 2013, the Environment Bureau launched "Hong Kong Blueprint for Sustainable Use of Resources 2013 – 2022", which promised continuing support for the recycling industry.
- 1.1.2 EcoPark was developed to support the local recycling industry by providing long-term land at affordable rents, thereby encouraging investment in advanced technology and value-added recycling processes.
- 1.1.3 EcoPark, as shown in *Figure 1-1*, has been developed in Tuen Mun Area 38 in two phases (Phase 1 and Phase 2) under Contract *EP/SP/52/06 Development of EcoPark in Tuen Mun Area 38*, which was awarded to Kaden Construction Ltd by the Environmental Protection Department (EPD) in June 2006. Phase 1 construction was completed in July 2009 and Phase 2 construction was completed in November 2010.
- 1.1.4 The contract for the management of EcoPark – Contract No. *EP/SP/102/17 Provision of Management Services for EcoPark 2018* was awarded to Urban Property Management Limited (UPML) by Environmental Protection Department (EPD) effective from 30th October 2018.
- 1.1.5 The contract for the management of EcoPark – Contract No. *EP/SP/218/21 Provision of Management Services for Eco Park 2022* was awarded to Urban Property Management Limited (UPML) by EPD effective from 30th October 2022.
- 1.1.6 UPML, the "Operator" of EcoPark, has appointed Allied Environmental Consultants Ltd. (AEC) as the Environmental Team (ET) to carry out the Environmental Monitoring and Audit (EM&A) works for the operation of EcoPark as required by the EM&A Manual and in accordance with the conditions of the Environmental Permit.
- 1.1.7 Ove Arup & Partners Hong Kong Ltd. (Arup) was appointed by the EPD as the Independent Environmental Checker (IEC) for the Project and ended on 29th October 2022. AECOM Asia Company Limited (AECOM) has been appointed by the EPD as the Independent Environmental Checker (IEC) starting on 30th October 2022.
- 1.1.8 The ET and the IEC carry out the EM&A works for EcoPark as required by the EM&A Manual and in accordance with the conditions of the Environmental Permit (EP).

1.2 Operation Programme

- 1.2.1 By the end of the reporting year, there were ten tenants in EcoPark and four operators were active in EcoPark Phase 1 and Phase 2. There was one operator of WEEE.PARK, one

operator of bioconversion of organic waste plant, one operator of biochar production plant and one operator of biochar-enhanced construction materials plant comprising:

- ALBA Integrated Waste Solutions (Hong Kong) Ltd. (ALBA IWS) for WEEE.PARK, and nine active tenants (Champway, HK Biomass, HP Telford, Chung Yue, K.Wah, E. Tech, On Fat Lung, HKBRC and Baguio) who have carried out full recycling operations;
- Biochar production plant operated by Jardine Engineering Corporation Ltd. (Jardine Engineering) for the waste wood recycling was under site preparation during the reporting year.
- Organic Tech Ltd. (Organic Tech) for bioconversion of organic waste plant was under machinery plant installation during the reporting year;
- Biochar-enhanced construction materials plant operated by The Hong Kong Polytechnic University (PolyU) was under site preparation during the reporting year.

1.3 Project Organization and Contact Personnel

1.3.1 Key personnel and contact particulars are summarised in *Table 1.1*.

Table 1.1 EM&A Personnel Contact Details

Position	Name	Email Address	Phone No.
<i>Project Proponent – EPD</i>			
Food Waste Facilities Development Manager	Mr. K. F. TANG	kinfaitang@epd.gov.hk	3741 1799
<i>Operator – UPML</i>			
Project Manager	Ms. Raindy YIP	raindy.py.yip@urban.com.hk	2212 5900
Park Manager	Ms. Y. H. WONG	eunice.yh.wong@emo.urban.com.hk	2212 5920
<i>IEC – Ove Arup / AECOM</i>			
Former IEC	Mr. Franki C. K. CHIU	franki.chiu@arup.com	2268 3207
IEC	Mr. Y.T. TANG	yt.tang@aecom.com	3922 9393
<i>ET – AEC</i>			
ET Leader	Ms. Grace KWOK	gk@aechk.com	2815 7028

1.3.2 The organisational structure and lines of communication for the operation of EcoPark with respect to environmental management is given in *Figure 1-2* and *Figure 1-3*, respectively.

Figure 1-1 Location of EcoPark in Tuen Mun Area 38



Site Boundary



Phase 1 Tenants



Phase 2 Tenants

Figure 1-2 Organisation Chart of UPML

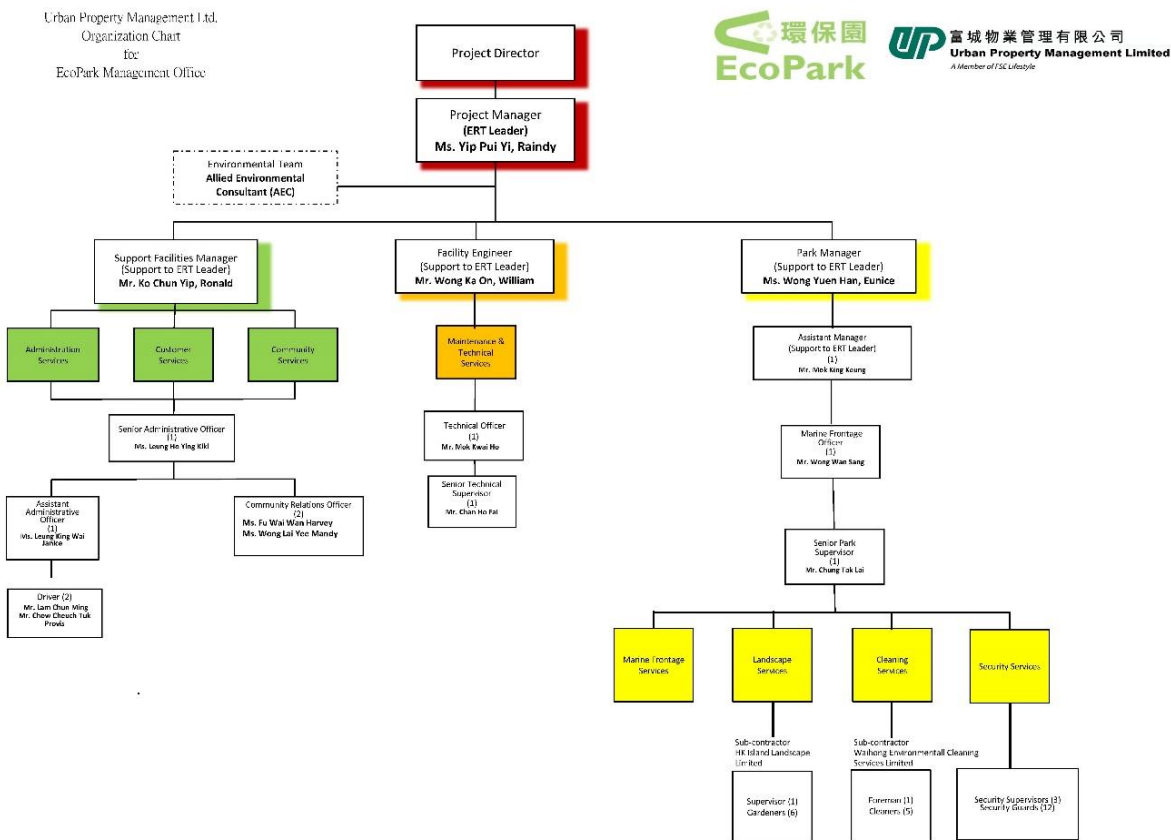
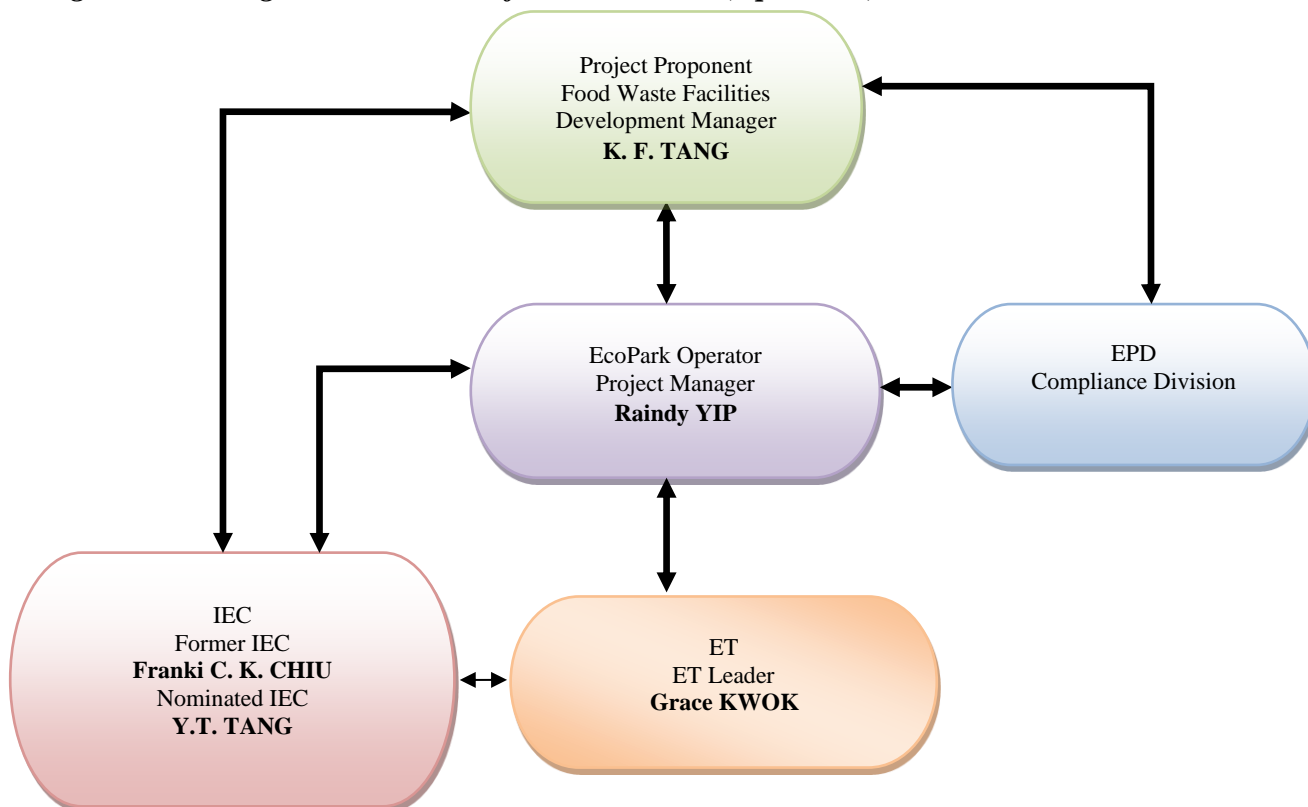


Figure 1-3 Organisation Chart of EM&A Works (Operation)



2 SUMMARY OF EM&A REQUIREMENT

2.1 Monitoring Parameters

- 2.1.1 Landfill Gas (LFG) is required to be monitored quarterly at service voids and utility boxes within EcoPark because the northern part of EcoPark lies within the 250m LFG Consultation Zone for Siu Lang Shui Landfill, which is located to the north of EcoPark.
- 2.1.2 Operational LFG monitoring has been carried out in Phase 1 after completion of construction in July 2009, commencing in the August to October 2009 quarter. In Phase 2, monitoring has been carried out after completion of construction in November 2010, commencing in the November 2010 to January 2011 quarter.
- 2.1.3 The location for LFG monitoring was not specified in the EM&A Manual since the final design of EcoPark was not available when the EM&A Manual was approved. Therefore, during a joint site inspection on 27th July 2009, three monitoring locations were identified and agreed as suitable monitoring locations by the former ET (SMEC Asia Ltd.), IEC (Atkins China Ltd.) and the Operator (Serco Guardian Joint Venture). Subsequently, two more monitoring locations in Phase 2 were proposed by the former ET Leader and agreed by the IEC and Operator via email in January 2011. These five monitoring locations are listed in *Table 2.1* and shown in *Figure 2-1*.

Table 2.1 Operation Phase LFG Monitoring Locations in EcoPark

Monitoring Station ID	Type	Locations
EP1-1	LFG vent pipe	Inside the landscaping area of Administration Building
EP1-2	Service void	PCCW below-ground chamber outside Lot T1
EP1-3	Service void	HGC Broadband below-ground chamber outside Lot T3
EP2-1	Service void	HGC Broadband below-ground chamber outside Lot P1
EP2-2	Service void	HGC Broadband below-ground chamber outside Lot P3

- 2.1.4 Routine LFG monitoring has been carried out on a quarterly basis. Should EPD alert the Operator that high LFG levels have been detected during monthly monitoring under the Siu Lang Shui Landfill restoration contract, the Operator may be required to increase LFG monitoring to monthly until such time EPD informs the Operator that quarterly monitoring can be resumed. To-date, no detection of high LFG levels under Siu Lang Shui Landfill restoration contract was received from EPD.

2.2 Environmental Quality Performance Limits and EAP

- 2.2.1 The Action/Limit Levels and Event Action Plan (EAP) for LFG are shown in *Table 2.2* below. These refer to LFG detected in excavations, utilities and any enclosed on-site areas. No other A/L Levels or EAPs are specified in the EM&A Manual for the operation phase EM&A.

Table 2.2 Action Levels, Limit Levels and Event and Action Plan for LFG

Parameter	Level	Action
Oxygen (O ₂)	Action Level <19% O ₂	<ul style="list-style-type: none"> Ventilate trench/void to restore O₂ to >19%
	Limit Level <18% O ₂	<ul style="list-style-type: none"> Stop works Evacuate personnel/prohibit entry Increase ventilation to restore O₂ to >19%
Methane (CH ₄)	Action Level >10% LEL	<ul style="list-style-type: none"> Post "No Smoking" signs Prohibit hot works Increase ventilation to restore CH₄ to <10% LEL
	Limit Level >20% LEL	<ul style="list-style-type: none"> Stop works Evacuate personnel/prohibit entry Increase ventilation to restore CH₄ to <10% LEL
Carbon Dioxide (CO ₂)	Action Level >0.5% CO ₂	<ul style="list-style-type: none"> Ventilate to restore CO₂ to <0.5%
	Limit Level >1.5% CO ₂	<ul style="list-style-type: none"> Stop works Evacuate personnel/prohibit entry Increase ventilation to restore CO₂ to <0.5%

2.3 Environmental Audit of Non-Monitored Parameters

2.3.1 Site inspections provide a direct means to trigger and enforce the environmental protection and pollution control measures specified in the Environmental Impact Assessment (EIA) Report. To examine operational practice, site inspections are to be undertaken by the ET once per month. The monthly inspection shall join with the random site inspection by the IEC where possible. A joint inspection by ET and IEC will be carried out at least once per quarter. Ad hoc site inspections are also carried out if significant environmental problems are identified. In addition, inspections may be required subsequent to receipt of environmental complaint, or as part of the investigation work, as specified in the EAP.

2.3.2 The following parameters are required to be audited as part of the operation phase EM&A program:

- Air Quality
- Water Quality
- Waste Management
- Land Contamination

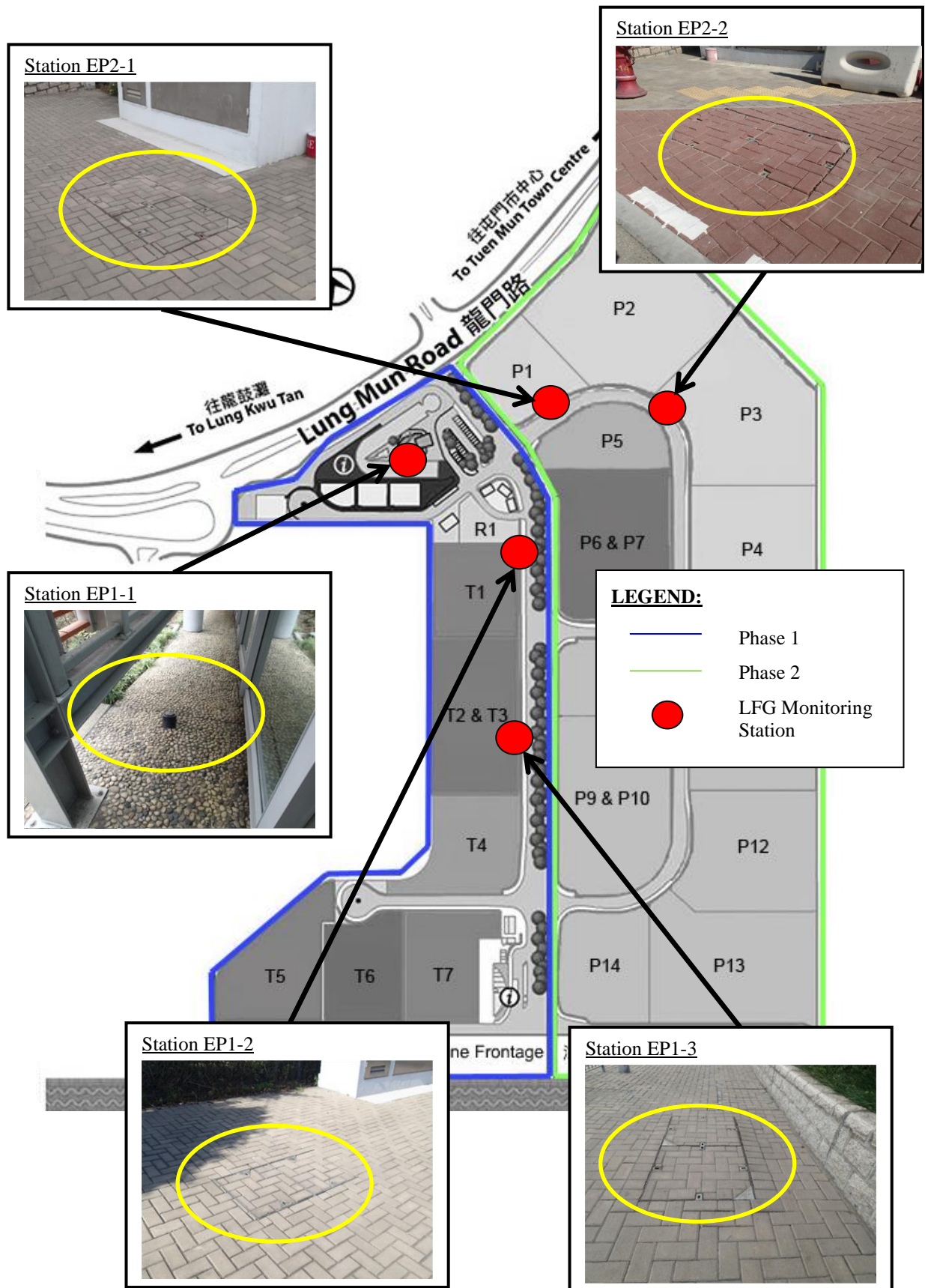
2.4 Environmental Mitigation Measures

2.4.1 Environmental mitigation measures applicable to the operation phase EM&A as stated in the Implementation Schedule are summarised in *Appendix 1*.

2.5 Environmental Requirements in Tenancy Agreements

2.5.1 Environmental requirements specified in tenancy agreements are provided in *Appendix 2*.

Figure 2-1 LFG Monitoring Locations within EcoPark



3 OPERATION STATUS

3.1 General

3.1.1 The location of lots within EcoPark, the tenancy numbers and tenant names are shown in *Figure 3-1*. A summary of waste throughputs is provided in *Section 3.12*. Brief descriptions of the active tenants are provided from *Section 3.2* to *3.11*.

3.1.2 In the reporting year:

- Operator of Lots T8-T11 (Jardine Engineering), tenant of Lots P1, P5-P7 (Zhou Ji) and operator of Lot 12a (PolyU) were under preparatory works without any site operation.
- Operator of Lot P12b (Organic Tech) was under machinery plant installation.

3.2 Champway Technology Limited

- **Lot No.:** T5 (Phase 1)
- **Lot Size:** Approx. 6,000m²
- **Activity:** Recycling of Organic Waste (Waste Cooking Oil)
- **Recycling Process:** Turn waste cooking oil into biodiesel by extraction, neutralisation, separation and distillation

3.2.1 In this reporting year, waste cooking oil was recycled. Bi-monthly samplings for effluent arising from producing biodiesel have been conducted to comply with the requirement of effluent discharge licence.

3.3 Hong Kong Biomass (Wood) Collect and Recycle Company Limited

- **Lot No.:** T4 (Phase 1)
- **Lot Size:** Approx. 5,000m²
- **Activity:** Recycling of Waste Woods
- **Recycling Process:** Recycle waste woods to wood fuel pellets. Ferrous metals will be separated by magnets.

3.3.1 In this reporting year, fallen trees, pallet and wooden board were recycled.

3.4 HP Telford Envirotech Group Limited

- **Lot No.:** T1 (Phase 1)
- **Lot Size:** Approx. 5,000m²
- **Activity:** Recycling of Waste Plastics
- **Recycling Process:** Produce PET packing strap and PE wax.

3.4.1 Sorting, shredding and baling of waste plastic was carried out in the reporting year.

3.5 Chung Yue Steel Group Company Limited

- **Lot No. :** P13 (Phase 2)
- **Lot Size:** Approx. 10,000m²
- **Activity:** Recycling of Waste Metals
- **Recycling Process:** Turn waste metals into non-ferrous scrap, light ferrous scrap and heavy ferrous scrap by sorting, baling and shearing.

3.5.1 Recycling of waste metals was carried out in the reporting year.

3.6 K. Wah Construction Products Ltd.

- **Lot No. :** P11 (Phase 2)
- **Lot Size:** Approx. 10,000m²
- **Activity:** Recycling of Waste Construction Materials/Waste Glass
- **Recycling Process:** Waste construction materials and waste glass will be crushed and delivered to the concrete mixing plant for blending and poured into block machine for casting. The blocks will then be cured, washed and packaged

3.6.1 Recycling of waste construction materials and waste glasses were carried out in the reporting year.

3.7 WEEE.PARK

- **Lot No.:** P2, P3, P4 (Phase 2)
- **Lot Size:** Approx. 30,000 m²
- **Activity:** Recycling of WEEE
- **Recycling Process:** Four major types of WEEE (i.e. refrigerator and freezers, air conditioners, e-scrap, TV and computer screens) will be recycled. The recycling processes include separation of insulation/backlighting/plastics/various metals, recovery of screen/monitor stand/refrigerant/oil/hazardous materials, and shredding of casing.

3.7.1 WEEE recycling was carried out in the reporting year.

3.8 On Fat Lung Innovative Resources Ltd.

- **Lot No.:** P8 (Phase 2)
- **Lot Size:** Approx. 4,400 m²
- **Activity:** Recycling of Waste Rubber Tyres and WEEE

- **Recycling Process:** Waste rubber tyres will be shredded into rubber powder and processed to form rubber bricks. WEEE will be dismantled/shredded and recovered for reusable components.

3.8.1 Recycling of waste rubber tyres and WEEE were carried out in the reporting year.

3.9 E. Tech Management (HK) Limited

- **Lot No.:** P14 (Phase 2)
- **Lot Size:** Approx. 5,000 m²
- **Activity:** Recycling of WEEE
- **Recycling Process:** CRT, computer/electronics, white goods and florescent lamps will be recycled. The recycling processes include testing and dismantling of components, repair of refurbished equipment, sorting for reusable components and shredding for scrap.

3.9.1 Recycling of WEEE was carried out in this reporting year.

3.10 Hong Kong Battery Recycling Centre (HKBRC) Limited

- **Lot No.:** P9 & P10 (Phase 2)
- **Lot Size:** Approx. 10,000m²
- **Activity:** Waste Lead Acid Batteries
- **Recycling Process:** The recycling process involves extraction of lead from spent batteries, secondary lead smelting and refining to produce lead ingots as the end product.

3.10.1 Waste Lead Acid Batteries were shredded and separated into different components, the lead grid was melted to produce lead paste in this reporting year.

3.11 Baguio Waste Management & Recycling Limited

- **Lot No.:** T6 (Phase 1)
- **Lot Size:** Approx. 6,500m²
- **Activity:** Recycling of Waste Plastics
- **Recycling Process:** Sorting, shredding, washing and extrusion

3.11.1 Recycling of waste plastics was carried out in this reporting year.

3.12 Throughput Statistics

3.12.1 For the active recyclers, most of the incoming waste materials and outgoing products were delivered by land transportation, except for the metals from Chung Yue and biodiesel from Champway were delivered by both marine and land transportation.

3.12.2 The throughputs of WEEE.PARK and the nine active tenants in the reporting year are summarised in **Table 3.1**. Please note that product output plus waste disposal does not necessarily equal the waste input, due to material losses during processing and material retained within the lot.

Table 3.1 Throughput Statistics for the Reporting Year

Material Type	Waste Input (tonne)	Product Output ⁽⁴⁾ (tonne)	Waste Disposed ⁽⁴⁾ (tonne)
Waste Organic Food	29,447	10,450	10,004
Waste Ferrous Metals	87,918	89,919	604
Waste Wood	2,104	1,462	-
Waste Electronics	23,111	20,076	3,120
Waste Plastics	7,385	6,324	438
Construction Waste	53,767	102,149	212
Waste Glass	7,644		
Waste Rubber Tyres	1,783	1,830	-
Waste Battery	625	-	-

Notes:

- 1) The throughput data presented above is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
- 2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
- 3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
- 4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
- 5) “-” in the column of waste disposal denotes zero quantity; while “n/a” denotes unavailable information.

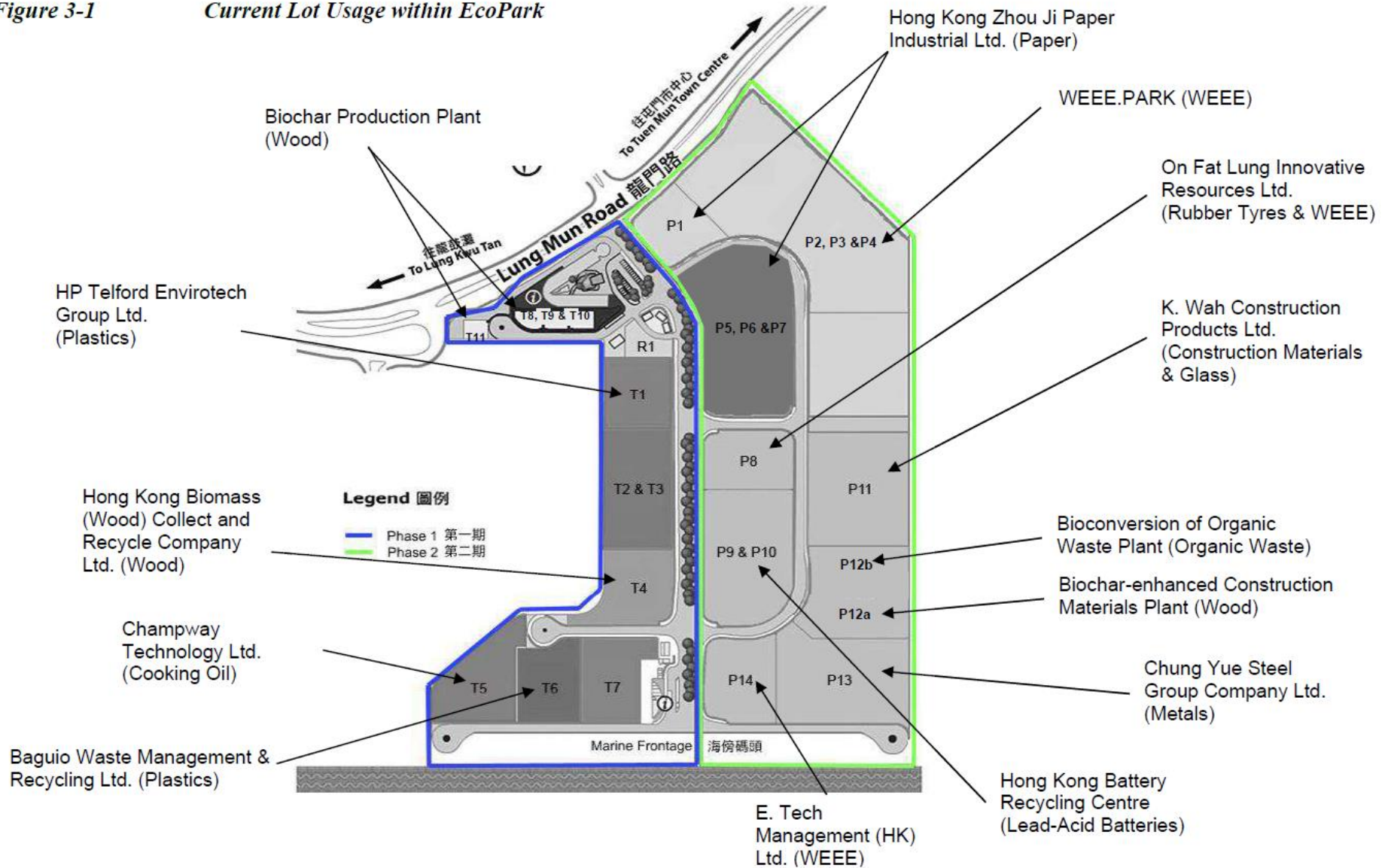
Detailed throughput figures of the reporting year are provided in **Appendix 3.1**. Updated throughput figures of the previous year are provided in **Appendix 3.2**.

3.13 Process Review

3.13.1 Process Review, and maybe Design Audit (DA) where required, had been conducted for each recycling process to be operated within EcoPark to confirm its compliance with the findings and recommendations of the EIA report and the conditions of the EP.

3.13.2 Since 2008, twenty-eight process reviews and four DAs had been approved. Among those, fifteen process reviews and three DAs are related to the current recycling processes in EcoPark as of December 2022. In the reporting year, the PRC and DA for Organic Tech’s bioconversion of the organic waste process were approved in June 2022. In addition, the PRC for Baguio’s plastic recycling operation was reviewed and the PRC – 018 (Supplementary) was approved in July 2022.

Figure 3-1 Current Lot Usage within EcoPark



4 IMPLEMENTATION STATUS OF ENVIRONMENTAL PROTECTION MEASURES

- 4.1.1 Environmental mitigation measures applicable to the operation phase EM&A as stated in the implementation schedule are summarised in *Appendix 1*. Environmental requirements specified in tenancy agreements are summarised in *Appendix 2*.
- 4.1.2 By the end of the reporting year, WEEE.PARK and nine active tenants (Champway, HK Biomass, HP Telford, K. Wah, E. Tech, Chung Yue, On Fat Lung, HKBRC and Baguio) are under full operation.
- 4.1.3 Appropriate environmental protection measures are in place at all lots.

5 MONITORING RESULTS

5.1 Monitoring Date, Time, Frequency and Duration

As described in *Section 2.1*, operational LFG monitoring is conducted quarterly at five monitoring locations, three in Phase 1 and two in Phase 2. LFG monitoring was carried out on 21st February 2022, 16th May 2022, 17th August 2022, 21st November 2022 in this reporting year. Monitoring details are shown *Table 5.1*.

Table 5.1 Sampling Schedule for LFG Monitoring

Station ID	Sampling Date	Time	Duration	Ambient Air Temp. (°C)	Weather
EP1-1	21 st February 2022	09:55 – 09:57	2 minutes	8°C	Raining
EP1-2		10:23 – 10:25	2 minutes	8°C	Raining
EP1-3		10:16 – 10:18	2 minutes	8°C	Raining
EP2-1		10:07 – 10:09	2 minutes	8°C	Raining
EP2-2		10:11 – 10:13	2 minutes	8°C	Raining
EP1-1	16 th May 2022	09:43 – 09:45	2 minutes	24°C	Raining
EP1-2		10:14 – 10:16	2 minutes	24°C	Raining
EP1-3		10:04 – 10:06	2 minutes	24°C	Raining
EP2-1		09:49 – 09:51	2 minutes	24°C	Raining
EP2-2		09:56 – 09:58	2 minutes	24°C	Raining
EP1-1	17 th August 2022	09:43 – 09:45	2 minutes	29°C	Sunny
EP1-2		10:04 – 10:06	2 minutes	29°C	Sunny
EP1-3		09:59 – 10:02	2 minutes	29°C	Sunny
EP2-1		09:47 – 09:50	2 minutes	29°C	Sunny
EP2-2		09:54 – 09:57	2 minutes	29°C	Sunny
EP1-1	21 st November 2022	09:55 – 09:57	2 minutes	24°C	Sunny
EP1-2		10:20 – 10:22	2 minutes	24°C	Sunny
EP1-3		10:15 – 10:17	2 minutes	24°C	Sunny
EP2-1		10:00 – 10:02	2 minutes	24°C	Sunny
EP2-2		10:08 – 10:10	2 minutes	24°C	Sunny

5.2 Monitoring Methodology, Parameters and Equipment

5.2.1 The LFG monitoring requirement and methodology are stipulated in *Section 6* of the EM&A Manual. The LFG monitoring parameters and their measurement ranges are detailed in *Table 5.2* below.

Table 5.2 Parameters and Measurement Ranges for LFG Monitoring

Parameters	Measurement Ranges
Methane (CH ₄)	0 – 100% LEL & 0-100% v/v
Oxygen (O ₂)	0 – 25% v/v
Carbon Dioxide (CO ₂)	0 – 100% v/v
Barometric Pressure	mBar (absolute)

5.2.2 LFG monitoring shall be carried out using intrinsically-safe, portable multi-gas monitoring instruments. The gas monitoring equipment shall:

1. Where possible, comply with BS 6020 and be approved by BASEEFA as intrinsically safe, suitable for use in a Zone 2 area to BS 5345;
2. Be capable of continuous monitoring of methane, oxygen and carbon dioxide;
3. Be capable of continuous barometric pressure and gas pressure measurements;
4. Normally operate in diffusion mode unless required for spot sampling, when it should be capable of operating by means of an aspirator or pump;
5. Have low battery, fault and over range indication incorporated;
6. Store monitoring data, and shall be capable of being down-loaded directly to a PC; and
7. Measure in the following ranges:
 - Methane 0 – 100% LEL & 0 - 100% v/v
 - Oxygen 0 – 25% v/v
 - Carbon dioxide 0 – 100% v/v
 - Barometric pressure mBar (absolute)

5.2.3 The monitoring equipment shall alarm (both audibly and visually) in the event that the concentrations of the following are exceeded:

1. Methane: rise to 10% LEL;
2. Oxygen: fall to 18% by volume; and
3. Carbon monoxide: maximum short term (1-hour) exposure of 300ppm with long term average (8-hours) not to exceed 50ppm.

5.3 Results and Graphical Plots of Monitoring Parameters

- 5.3.1 The EAGLE 2 Multi Gas Detector (serial number E2F694) was used for LFG measurements. The gas analyser is calibrated every 6 months. The calibration records of the monitoring equipment are provided in *Appendix 4*.
- 5.3.2 LFG monitoring results are summarized in *Table 5.3* and compared with the Action and Limit Levels tabulated in *Table 2.2*. Graphical plots of the monitoring results are also provided in *Appendix 5*.
- 5.3.3 No exceedances of Action level were recorded in the reporting year at any of the stations.

Table 5.3 LFG Monitoring Results

Station ID	Sampling Date	Monitoring Results				
		CH ₄ (% v/v)	CH ₄ (% LEL)	O ₂ (% v/v)	CO ₂ (% v/v)	Barometric Pressure (mBar)
EP1-1	21 st February 2022	0.0	1.0	20.9	<0.1	1022
EP1-2		0.0	1.0	20.9	<0.1	1022
EP1-3		0.0	1.0	20.9	<0.1	1022
EP2-1		0.0	1.0	20.9	<0.1	1022
EP2-2		0.0	1.0	20.9	<0.1	1022
EP1-1	16 th May 2022	0.0	0.0	19.2	<0.1	1012
EP1-2		0.0	0.0	19.0	<0.1	1012
EP1-3		0.0	0.0	19.0	<0.1	1012
EP2-1		0.0	0.0	19.0	<0.1	1012
EP2-2		0.0	0.0	19.0	<0.1	1012
EP1-1	17 th August 2022	0.0	0.0	20.9	<0.1	1012
EP1-2		0.0	0.0	20.9	<0.1	1012
EP1-3		0.0	0.0	20.9	<0.1	1012
EP2-1		0.0	0.0	20.9	<0.1	1012
EP2-2		0.0	0.0	20.9	<0.1	1012
EP1-1	21 st November 2022	0.0	1.0	20.9	<0.1	1014
EP1-2		0.0	0.0	20.9	<0.1	1014
EP1-3		0.0	0.0	20.5	<0.1	1014
EP2-1		0.0	0.0	20.9	<0.1	1014
EP2-2		0.0	0.0	20.6	<0.1	1014

6 SUMMARY OF ENVIRONMENTAL AUDIT

6.1 General

- 6.1.1 In the reporting year, WEEE.PARK and nine active tenants were under full operation.
- 6.1.2 Environmental audits were conducted on a monthly basis based on the approved site inspection checklist. The completed audit checklists were provided in the quarterly EM&A Reports.
- 6.1.3 In the “status” column of the following tables, an observation will be indicated as “Closed” if it was resolved during the reporting period and no further follow-up is needed. If the observation is not resolved in the reporting period and would be followed-up in the next reporting period, it will be indicated as “Outstanding”.

6.2 Outstanding Observations recorded in 2021

- 6.2.1 Outstanding audit observations are summarized in *Table 6.1*.

Table 6.1 Environmental Audit Findings in 2021

Date	Tenant	Item	Status
15 th Dec 2021	Champway	The surface channel near the filter press is observed to have oil sheen.	As observed on 17 th January 2022, oil residue in the surface channel near the oil filter press is observed to have been cleared up. (CLOSED)
15 th Dec 2021	Hong Kong Biomass (Wood) Collect and Recycle Company Limited	Dusty materials have been observed to be stockpiled in an open area without any dust mitigation measures.	As observed on 17 th January 2022, dusty materials have been observed to be stockpiled away in bags covered by tarpaulin to prevent dust emissions. The tenant has been reminded to continue to cover dusty stockpiles with tarpaulin. (CLOSED)

Date	Tenant	Item	Status
15 th Dec 2021	Hong Kong Biomass (Wood) Collect and Recycle Company Limited	Non-road mobile machinery ("NRMM") is observed to be without NRMM labels as required by the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation (Cap. 311Z).	As observed on 17 th January 2022, no non-road mobile machinery (NRMM) was observed during inspection. The tenant has been reminded that should there be any NRMM operation in the future, appropriate mitigation measures should be provided for NRMMs to mitigate possible fugitive emission. (CLOSED)
15 th Dec 2021	HP Telford	Non-road mobile machinery ("NRMM") is observed to be without NRMM labels as required by the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation (Cap. 311Z).	As observed on 17 th January 2022, no non-road mobile machinery (NRMM) was observed during inspection. The tenant has been reminded that should there be any NRMM operation in the future, appropriate mitigation measures should be provided for NRMMs to mitigate possible fugitive emission. (CLOSED)

Date	Tenant	Item	Status
15 th Dec 2021	K.Wah	24-hour RSP levels reached 116 µg/m ³ on 20 November 2021 which exceeds the action level of 100 µg/m ³ , as stipulated in the SP license. The latest RSP monitoring record on 2 nd December 2021 have shown that there have been no further exceedances. It is noted that the Tuen Mun fill bank remains at a high level which may have contributed to the exceedance event on 20 th November 2021. The tenant has been requested to continue to strengthen mitigation measures such as increasing the frequency of water spraying.	As observed on 20 April 2022, after the exceedance events recorded on 2 March and 8 March 2022, it was observed that the 24-hour RSP levels in 14 March, 20 March, 26 March, 1 April and 7 April 2022 are below the action level of 100 µg/m ³ , as stipulated in the SP license. (CLOSED)

6.3 January 2022

- 6.3.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 17th of January 2022. IEC random site audit was also carried out on 17th of January 2022. Audit observations are summarised in **Table 6.2**.

Table 6.2 Environmental Audit Findings in January 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.4 February 2022

- 6.4.1 Joint environmental audits of WEEE.PARK, the active tenants and general EcoPark condition were carried out by the ET, the Operator and the IEC on 21st of February 2022. Audit observations are summarised in **Table 6.3**.

Table 6.3 Environmental Audit Findings in February 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.5 March 2022

- 6.5.1 Environmental audits of WEEE.PARK, the active tenants and general EcoPark condition were carried out by the ET and the Operator on 21st March 2022. IEC random site audit was also carried out on 21st March 2022. Audit observation is summarised in **Table 6.4**.

Table 6.4 Environmental Audit Findings in March 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.6 April 2022

- 6.6.1 Environmental audits of WEEE.PARK, the active tenants and general EcoPark condition were carried out by the ET and the Operator on 20th April 2022. IEC random site audit was also carried out on 20th April 2022. Audit observations are summarised in **Table 6.5**.

Table 6.5 Environmental Audit Findings in April 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.7 May 2022

- 6.7.1 Joint environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET, Operator and IEC on 16th May 2022. Audit observations are summarised in **Table 6.6**.

Table 6.6 Environmental Audit Findings in May 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.8 June 2022

- 6.8.1 Environmental audits of WEEE.PARK, the active tenants and general EcoPark condition were carried out by the ET and the Operator on 13th June 2022. IEC random site audit was also carried out on 13th June 2022. Audit observations are summarised in **Table 6.7**.

Table 6.7 Environmental Audit Findings in June 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.9 July 2022

- 6.9.1 Environmental audits of WEEE.PARK, the active tenants and general EcoPark condition were carried out by the ET and the Operator on 25th July 2022. IEC random site audit was also carried out on 25th July 2022. Audit observations are summarised in **Table 6.8**.

Table 6.8 Environmental Audit Findings in July 2022

Tenant	Item	Status
Champway	Oil residue and oil sheen was observed at surface channel near the activated carbon storage area	As observed on 17 th August 2022 monthly inspection, the oil residue and oil sheen in the surface channel near the activated carbon storage area is observed to have been cleaned up. (CLOSED)
Champway	Oil spillage was observed at surface channel near the sludge filter press area. It was observed that the barrier between the surface channel and the sludge filter press had fallen into the surface channel which caused oil to spill into the surface channel.	As observed on 17 th August 2022 monthly inspection, oil spillage at surface channel near the sludge filter press area is observed to have been cleaned up. It was also observed that the tenant is currently reinstating the barrier between the sludge filter press and the surface channel. Further observation on 19 th September 2022 monthly inspection was observed the tenant reinstated the barrier

		between the sludge filter press and the surface channel. It is also observed that the surface channel near the sludge filter press area has been cleaned up. (CLOSED)
Hong Kong Biomass (Wood) Collect and Recycle Company Limited	Significant amount of dusty stockpiles were observed out in the open.	As observed on 17 th August 2022 monthly inspection, the dusty stockpiles were observed to have been cleaned up. The tenant has been reminded to cover any and all dusty stockpiles in the future in order to prevent dust impact. Further observation on 19 th September 2022 monthly inspection was observed the tenant has covered all dusty stockpiles. (CLOSED)

6.10 August 2022

- 6.10.1 Joint environmental audits of WEEE.PARK, the active tenants and general EcoPark condition were carried out by the ET, Operator and IEC on 17th August 2022. Audit observations are summarised in **Table 6.9**.

Table 6.9 Environmental Audit Findings in August 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.11 September 2022

- 6.11.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 19th September 2022. IEC random site audit was also carried out on 19th September 2022. Audit observations are summarised in **Table 6.10**.

Table 6.10 Environmental Audit Findings in September 2022

Tenant	Item	Status
<i>No new critical issue was identified.</i>		

6.12 October 2022

- 6.12.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were

carried out by the ET and Operator on 19th October 2022. IEC random site audit was also carried out on 19th October 2022. Audit observations are summarised in **Table 6.11**.

Table 6.11 Environmental Audit Findings in October 2022

Tenant	Item	Status
K.Wah	During the monthly site walk inspection, it is noted that 24-hour RSP level was observed to have reached 102 $\mu\text{g}/\text{m}^3$ on 16 th September 2022, 208 $\mu\text{g}/\text{m}^3$ on 22 th September 2022 and 334 $\mu\text{g}/\text{m}^3$ on 28 th September 2022, which exceeds the action level for 24-hour RSP monitoring, as stipulated in the SP license (i.e. 100 $\mu\text{g}/\text{m}^3$).	It is noted that on 24 th November 2022, there are no further exceedances of 24-hour RSP level in October 2022. The Tuen Mun fill bank is observed to remain at a high level which may have contributed to the high 24-hour RSP level. This item will be reviewed in the next inspection. (OUTSTANDING)

6.13 November 2022

- 6.13.1 Joint environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET, Operator and IEC on 21st November 2022. Audit observations are summarised in **Table 6.12**.

Table 6.12 Environmental Audit Findings in November 2022

Tenant	Item	Status
K. Wah	During the monthly site walk inspection, it is noted that there are no further exceedances of the 24-hour RSP level recorded in October 2022. However, the 24-hour RSP level was observed to have reached 103 $\mu\text{g}/\text{m}^3$ on 15 th November 2022, which exceeds the action level for 24-hour RSP monitoring, as stipulated in the SP license (i.e. 100 $\mu\text{g}/\text{m}^3$).	It is also observed that the tenant installed an additional set of dust suppression systems for the storage area. Besides that, the tenant has also been requested to strengthen further mitigation measures such as increasing the frequency of water spraying to minimize dust emissions. This item will be reviewed in the next inspection. (OUTSTANDING)

6.14 December 2022

- 6.14.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and Operator on 20th December 2022. IEC random site audit was also carried out on 20th December 2022. Audit observations are summarised in **Table 6.13**.

Table 6.13 Environmental Audit Findings in December 2022

Tenant	Item	Status
Champway	<p>During the monthly site inspection on 20th December 2022, it is observed that the grease trap is under maintenance and temporary mitigation measure has been adopted, e.g. pumping the wastewater to the oil interceptor treatment facility.</p> <p>It is observed the submersible slurry pump was broken and the wastewater treatment facility overflowed.</p>	<p>The tenant has been required to review the maintenance process and maintain the temporary treatment facility in operation.</p> <p>This item will be reviewed in the next inspection in January 2023. (OUTSTANDING)</p>
K.Wah	<p>During the monthly site walk inspection, It is noted that there the 24-hour RSP level was observed to have reached 103 µg/m³ on 15th November 2022, which exceeds the action level for 24-hour RSP monitoring, as stipulated in the SP license (i.e. 100 µg/m³).</p>	<p>It is also observed that the tenant installed an additional set of dust suppression systems for the storage area. Besides that, the tenant has also been requested to strengthen further mitigation measures such as increasing the frequency of water spraying to minimize dust emissions.</p> <p>This item will be reviewed in the next inspection in January 2023. (OUTSTANDING)</p>

7 ENVIRONMENTAL COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTION

7.1 Summary of Complaints, Summons and Prosecutions

- 7.1.1 No complaints related to recycling activities was received in the reporting year.
- 7.1.2 One notification of summons for Champway was received was laid in June 2022.
- 7.1.3 A successful prosecution record was referred by the Project Proponent on 10th October 2022 regarding the exceedance of discharge limit at Champway. One of the determinants in the water sample collected on 17th December 2021, BOD₅, exceed the limit as allowed under its WPCO licence.
- 7.1.4 A joint site inspection with Eco Park Operator, IEC and ET was conducted on 19th October 2022 at Champway Technology Ltd. (Lot T5). During the joint site inspection, no environmental defiance on wastewater handling was recorded. After checking the bi-monthly sampling reports provided by the tenant, all testing parameters complied with the limit specified in the discharge license under the WPCO, no exceedance record was observed since the successful prosecution in December 2021. Meanwhile, the tenant was reminded to review the wastewater treatment procedures and the performance of the wastewater treatment facility. The tenant also has been recommended to increase the cleaning frequency of the grease traps.

8 ANNUAL REVIEW

8.1 Interpretation of EM&A Data

8.1.1 Landfill gas (LFG) is the only parameter that is required to be monitored in the operation phase EM&A programme. Quarterly LFG monitoring has been carried out by the ET since 2009 following the completion of Phase 1 construction of EcoPark. No exceedance of CO₂ and methane was recorded at any monitoring location and there was no indication of the migration of LFG from SLSL. Therefore, the EM&A data is consistent with the assessment result in the EIA Report that the potential risk associated with LFG hazard remains low.

8.2 Environmental Acceptability of EcoPark

8.2.1 In the reporting year, WEEE.PARK, and nine active tenants (Champway, HK Biomass, HP Telford, Chung Yue, K.Wah, E. Tech, On Fat Lung, HKBRC and Baguio) have carried out recycling activities. With reference to *Section 6*, no critical environmental impacts were continuously identified at tenants' lots in EcoPark in the reporting year. The operation of EcoPark in environmental terms is therefore considered as acceptable in general.

8.3 Monitoring Methodology

8.3.1 Quarterly LFG monitoring has been carried out since October 2009. Exceedance of action level was not recorded in the reporting year. The monitoring methodology is considered as effective to detect the change of potential LFG hazard and trigger associated actions. The frequency of LFG monitoring may increase upon detection of high LFG levels under the Siu Lang Shui Landfill restoration contract in accordance with *Section 8.7.11* of the EIA Report and *Section 6.4.4* of the EM&A Manual.

8.4 Practicality and Effectiveness of EIA Process and EM&A Programme

8.4.1 The use of Process Review mechanism to assess incoming processes, processes not assessed in the EIA, or processes with greater throughputs than assumed in the EIA, is considered to work well and is in accordance with the recommendations of the EIA, the requirements of the EM&A programme and the EP conditions.

8.4.2 The EM&A programme has been fully utilised throughout the reporting year and is practical and effective to monitor the operation status of tenants. The mitigation measures proposed in the EIA Study are effective and efficient.

9 CONCLUSIONS

- 9.1.1 This is the sixteenth (16th) annual EM&A report prepared for the operation phase of EcoPark and covers the calendar year of 2022. The tenants' recycling activities are audited on a monthly basis and the results are summarised in this report.
- 9.1.2 In the reporting year, there were ten tenants and four operators in EcoPark Phase 1 and Phase 2. One operator (Jardine Engineering Corporation Ltd.) at biochar production plant in Lots T8-T11 of EcoPark Phase 1, one operator (ALBA Integrated Waste Solutions (Hong Kong) Ltd.) located at WEEE.PARK in Lots P2-P4 of EcoPark Phase 2, one operator (Organic Tech Ltd.) at bioconversion of organic waste plant in Lot P12b of EcoPark Phase 2 and one operator (The Hong Kong Polytechnic University) of biochar-enhanced construction materials plant at Lot P12a of EcoPark Phase 2.
- 9.1.3 Baguio carried out the waste plastics recycling operation in the reporting year and the PRC - 018 (Supplementary) was also approved in July 2022. The tenant of Lots P1, P5-P7 (Zhou Ji), the operators of Lots P12a (PolyU) and Lots T8-T11 (Jardine Engineering) were under preparation work. The operator of Lot P12b (Organic Tech) was under machinery installation work without any site operation in the reporting year.
- 9.1.4 In the reporting year, the PRC and DA for Organic Tech's bioconversion of organic waste process was approved in June 2022. The PRC – 018 (Supplementary) for Baguio's plastic recycling process was approved in July 2022. Full set of the completed PRCs and DAs are submitted separately to relevant authorities in EPD.
- 9.1.5 The throughputs of WEEE.PARK and the nine active tenants in the reporting year are summarised in **Table 9.1**. Please note that product output plus waste disposal do not necessarily equal the waste input, due to material losses during processing and material retained within the lots.

Table 9.1 Throughput Statistics for the Reporting Year

Material Type	Waste Input (tonnes)	Product Output ⁽⁴⁾ (tonnes)	Waste Disposed ⁽⁴⁾ (tonnes)
Waste Organic Food	29,447	10,450	10,004
Waste Ferrous Metals	87,918	89,919	604
Waste Wood	2,104	1,462	-
Waste Electronics	23,111	20,076	3,120
Waste Plastics	7,385	6,324	438
Construction Waste	53,767	102,149	212
Waste Glass	7,644		
Waste Rubber Tyres	1,783	1,830	-
Waste Battery	625	-	-

Notes:

- 1) The throughput data presented above is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
- 2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
- 3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
- 4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
- 5) “-” in the column of waste disposal denotes zero quantity; while “n/a” denotes unavailable information.

- 9.1.6 In the reporting year, LFG monitoring was undertaken on 21st February 2022, 16th May 2022, 17th August 2022, 21st November 2022 at five locations (three in Phase 1 and two in Phase 2). No exceedance of any parameter was recorded.
- 9.1.7 The quarterly monitoring of LFG is considered as sufficient and effective in accordance with *Section 6.4.4* of the EM&A Manual.
- 9.1.8 No complaints related to recycling activities was received in the reporting year.
- 9.1.9 One notification of summons for Champway was received was laid in June 2022.
- 9.1.10 One successful prosecution record was referred by the Project Proponent on 10th October 2022 regarding the exceedance of discharge limit at Champway. One of the determinants in the water sample collected on 17th December 2021, BOD₅, exceed the limit as allowed under its WPCO licence.
- 9.1.11 No critical environmental impacts were continuously identified at tenants' lots in EcoPark in the reporting year. The operation of EcoPark in environmental terms is considered as acceptable in general.
- 9.1.12 The EM&A programme has been fully utilised throughout the reporting year and is practical and effective to monitor the operation status of tenants. The mitigation measures proposed in the EIA Study are effective and efficient.

Appendix 1

Environmental Mitigation Measures (from the Implementation Schedule)

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines	Implementation Status (✓ – Implemented; X – Not Implemented; / - To Be Implemented)
<i>General</i>						
5.5.23 to 5.5.25, 10.2.24 & 10.2.37	4.2.5 to 4.2.8	The Operator shall develop and implement an Emergency Response Plan (ERP) that lists the procedures to be followed in case of fire, fuel or chemical spillage or other emergency within the EcoPark.	Throughout the duration of the operation.	Operator		✓
12.2	7.2	No process shall be allowed to operate within EcoPark without approval from WFBU. Approval will be based on the ten-step Process Review, which may include a Design Audit if deemed to be necessary.	Throughout the duration of the operation.	ET IEC Project Proponent		✓
	8.1.2	All reports (including Process Review Checklists and any Design Audits) shall be prepared and certified by the ET, verified by the IEC and approved by the Project Proponent.	Throughout the duration of construction works until construction is substantially completed. Throughout the duration of the operation.	ET IEC Project Proponent		✓
12.3	7.3	The Operator shall prepare and implement an Environmental Management Plan (EMP) to define mechanisms for achieving the environmental requirements specified in the EIA, EP and in statutory regulations.	Throughout the duration of the operation.	Operator		✓

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines	Implementation Status (✓ – Implemented; X – Not Implemented; / - To Be Implemented)
<i>Air Quality</i>						
13.2		The Operator shall ensure that EcoPark “base case” assumptions for air quality shown in Table 13.1 of the Final EIA Report are met by tenants, as a whole.	Throughout the duration of the operation.	Operator	Table 13.1 of the Final EIA Report	✓
<i>Water Quality</i>						
5.4.11 & 5.6.7		To minimise the chance of accidental spillage during loading and unloading, and thereby reduce marine water quality impacts, well established cargo handling guidelines should be followed.	Adjacent to EcoPark marine frontage when loading or unloading goods.	Operator Operators of bulk carriers	Sections 5 & 6 of IMO Code of Practice for the Safe Loading/ Unloading of Bulk Carriers	✓
5.5.19		Contaminated water collected in the surface drainage systems shall be treated at the WTF or other appropriate treatment facility.	Within EcoPark throughout the life of the facility.	Operator		✓
5.5.23 to 5.5.25	4.2.5 to 4.2.7	An Emergency Response Plan (ERP) will be formulated to address various accident scenarios. The ERP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) under the operation EM&A programme.	Within EcoPark throughout the life of the facility.	Operator		✓
5.6.4		For uncovered areas where recovery process identified as causing potentially high level of contamination are located, stop-logs will be installed in the perimeter drainage system to isolate contamination.	Within EcoPark throughout the life of the facility.	Operator		✓

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines	Implementation Status (✓ – Implemented; X – Not Implemented; / - To Be Implemented)
	4.2.2	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC		✓
<i>Waste Management</i>						
6.8.7	5.2.4	The Operator should register with EPD as a chemical waste producer.	Within EcoPark throughout the life of the facility.	Operator	Waste Disposal (Chemical Waste) (General) Regulation	✓
6.8.16		The dust collected by any air pollution control equipment installed by tenants must be tested to ensure compliance for landfill disposal.	Within EcoPark throughout the life of the facility.	Operator	Practice Note for disposal of dusty waste at landfills & Admission Ticket System	✓
6.8.18 & 6.8.22	5.2.4	Sludge will be disposed of at WENT landfill, or at any future dedicated sludge treatment facility. Sludge will be collected by a Licensed collector at regular intervals, as determined by the operation of the WTF.	Within EcoPark throughout the life of the facility.	Operator		✓
6.8.21	5.2.4	Chemical wastes shall be stored in appropriate containers in a covered area. “No Smoking” signs will be clearly displayed to prevent accidental ignition of flammable materials. Drip trays capable of storing 110% of the volume of the largest container will be used to mitigate possible leakage.	Within EcoPark throughout the life of the facility.	Operator	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	✓

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines	Implementation Status (✓ – Implemented; X – Not Implemented; / - To Be Implemented)
	5.2.3 & 5.2.5	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC		✓
6.8.7	5.2.4	The Operator should register with EPD as a chemical waste producer.	Within EcoPark throughout the life of the facility.	Operator	Waste Disposal (Chemical Waste) (General) Regulation	✓
<i>Prevention of Contaminated Land</i>						
7.3.1	5.3.2	Any spillages of contaminating material shall be cleaned up immediately through the use of an absorbent. Any such used material should then be considered chemical waste and disposed of appropriately.	Within EcoPark throughout the life of the facility.	Operator		/
7.3.3		Any areas within the lot to be used for recycling processes shall be concrete paved before recycling activities commence.	Within EcoPark throughout the life of the facility.	Operator		✓

7.3.5	5.3.2	<p>During operation, the greatest risk of land contamination will come from storage of chemical wastes, therefore the measures should be followed :</p> <ul style="list-style-type: none"> • All chemical storage areas shall be provided with locks and be sited on sealed areas. The storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil and chemicals from contaminating the ground. • Chemical wastes will be collected, stored and disposed of in accordance with the Regulation. Disposal of other construction waste will be undertaken by licensed contractors in accordance with applicable statutory requirements in the WDO. • Chemical wastes shall be handled according to the relevant code of practice. Spent chemicals shall be stored and collected by an approved operator for disposal at a licensed facility in accordance with the relevant regulation. 	Within EcoPark throughout the life of the facility.	Operator		<p>✓</p> <p>✓</p> <p>✓</p>
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EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines	Implementation Status (✓ – Implemented; X – Not Implemented; / - To Be Implemented)
<i>Landfill Gas</i>						
8.7.10 & 8.7.11	6.1.2	<ul style="list-style-type: none"> Alert workers and visitors of possible LFG hazards Prohibit smoking and open fires on site Conduct regular (quarterly) LFG monitoring at mobile offices, equipment stores, etc. 	Within EcoPark throughout the life of the facility.	Operator		✓
	6.4.3	Following construction, routine monthly monitoring may be required at service voids and utility boxes. The monitoring requirement and specific locations of monitoring points shall be established based on the findings of the monitoring carried out during construction (i.e. if no LFG is detected during construction then no routine monitoring is required). The need for continued monitoring shall, however, be reviewed through discussion with EPD.	Within EcoPark throughout the life of the facility.	Operator		✓
<i>Hazard to Life</i>						
10.4.3		Building height limit within EcoPark shall be applied to structures within which people may work at elevated levels.	Within EcoPark throughout the life of the facility.	Operator	EIA Report Table 10.2	✓
<i>Landscape and Visual</i>						
9.4.4		It recommended that this commonality be promoted throughout EcoPark by the Operator and adopted by tenants, if practicable.	Within EcoPark throughout the life of the facility.	Operator		✓

Appendix 2

Environmental Requirements in Tenancy Agreements

Compliance of Environmental Legislation

5. The Tenant shall comply with and observe all Ordinances, by-laws, regulations and rules for the time being in force in Hong Kong governing the control of any form of pollution, including air, noise, water and waste pollution, and for the protection of the environment.

Air Pollution

6. Save with an appropriate exemption under the Air Pollution Control Ordinance (Cap. 311) any regulations made thereunder and any amending legislation, the Tenant shall not install or permit or suffer to be installed upon the Premises or any part thereof or any building(s) or structure(s) or part of any building(s) or structure(s) erected or to be erected thereon any furnace, oven, chimney or flue or any other combustion equipment or use or permit or suffer to be used any fuel or any method or process of manufacture or treatment that might in any circumstance result in, cause or contribute to the discharge or emission of any pollutant or any noxious, harmful or corrosive matter, whether it be in the form of gas, smoke, liquid, solid or otherwise (including but not limited to air pollutant as defined in Section 2 of the Air Pollution Control Ordinance

(Cap. 311), which exists or which is imminent, without the prior written approval of the Director.

Water Pollution

7. (a) In the event that the Tenant produces, generates, permits, causes, allows or suffers any discharge which is subject to control under the Water Pollution Control Ordinance (Cap. 358) any regulations made thereunder and any amending legislation, the Tenant shall apply to the Director for a licence and comply with the terms and conditions stipulated in the licence at the Tenant's own cost(s). Otherwise, the Tenant is not allowed to discharge directly or indirectly or to produce, generate, permit, cause, allow or suffer any discharge into any public sewer, storm-water drain, channel, stream-course, sea or any area inside or outside the Premises any trade effluent or foul or contaminated water or cooling or hot water. Subject to the said licence from the Director, the Tenant shall at its own cost(s) separate, collect, and discharge all process or industrial wastewater which comply with the standard required for discharge into a sewer leading to the sewage treatment works at Pillar Point or other treatment works specified in the licence.
- (b) Subject to obtaining advance written approval of the Director, the Tenant shall at its own cost(s) provide, install, operate and maintain its own waste water pre-treatment plants within the Premises if such process or industrial wastewater could not meet the standard required for discharge into a sewer leading to the sewage treatment works at Pillar Point or other treatment works specified in the licence. The Tenant shall at its own cost(s) separate, collect, discharge and send all domestic wastewater (i.e. other than process or industrial wastewater) to the Pillar Point Sewage Treatment Works directly for treatment or other treatment works specified in the licence.
- (c) In any event, the Tenant shall prevent any spilled materials from entering the surface water drainage system and prevent contamination of the sea at its own cost(s) by, inter alia, providing, installing, operating and maintaining stop-logs or interceptors in the surface water drainage system and at the marine frontage area, respectively, or as required by the licence. The Tenant shall at its own cost comply with relevant provisions of the Dumping at Sea Ordinance (Cap. 466) good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Waste Management

8. (a) The Tenant shall at its own cost(s) comply with relevant provisions of the Waste Disposal Ordinance (Cap. 354).
- (b) The Tenant shall not permit, allow or suffer any fuel or chemical and any sewage, waste water or effluent containing sand, cement, silt or any suspended or dissolved material to flow, escape or run from the Premises onto any adjoining land or allow any waste matter which does not form part of the recovery and/or recycling and/or reprocessing operation or is not part of the final product of such operation to be deposited, kept, held or stored anywhere within the Premises and other areas of EcoPark. The Tenant shall at its own cost(s) have all such matters and all materials arising from recycling activities, chemical materials arising from maintenance of plant and equipment, sewage sludge (from wastewater treatment facilities, if any) and general daily waste from the operation removed from the Premises or any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon in a proper manner to the satisfaction of the Landlord and/or the Director.

Noise Pollution

9. (a) The Tenant shall take all necessary measures as may be required by and to the satisfaction of the Landlord and/or the Director to ensure that the operation of all plant and equipment, installed or used on the Premises or in any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon, will not result, not cause and/or will not contribute any noise (which exists or which is imminent) which disturbs or annoys the residents or occupiers of any adjoining or neighbouring lot or lots or premises, or causes and/or contributes to disturbance to the general public under the Noise Control Ordinance (Cap. 400) any regulations made thereunder and any amending legislation.
- (b) The decision of the Landlord or the Director as to whether any such plant and equipment are causing disturbance or annoyance as aforesaid shall be final and binding on the Tenant.

Landfill Gas Hazard

10. To mitigate landfill gas hazard, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.13 of the Environmental Permit No. EP-226/2005/A regarding raising clear of the ground all buildings and enclosed structures as specified in inter alia

Condition 3.7 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact).

EcoPark Being Within the 250m Consultation Zone of Siu Lang Shui Landfill

11. (a) The Tenant acknowledges that the EcoPark is within the 250m Consultation Zone of the Siu Lang Shui Landfill and that the Premises may be affected by problems associated with migrating landfill gas and undertakes to provide suitable precautionary or protection measures at his own expense to control these potential hazards.
- (b) The Tenant shall ensure all personnel entering the Premises and all visitors to the Premises are aware of the potential hazards of the landfill gas by posting suitable warning notices of the potential hazards at his own expense.
- (c) All buildings and enclosed structures, including temporary offices, temporary stores and the administration building, within the 250m Consultation Zone of the Siu Lang Shui Landfill shall be provided with the following measure(s):
 - (i) buildings shall be raised clear of the ground with a clear separation distance (as measured from the highest point on the ground surface to the underside of the lowest floor joist) of at least 500mm; or
 - (ii) a low-gas permeability membrane shall be applied to the surface of any wall or floor slab that rests on or is below ground. A gravel-fill vent system shall be provided such that passive venting is achieved around the perimeter of the structure. In addition, other building materials, such as dense well-compacted concrete or steel shuttering which provide a measure of resistance to gas permeation, shall be used to achieve gas protection.
- (d) The Tenant shall ensure that the electrical equipment used on the Premises shall be intrinsically safe. Welding, flame-cutting or other hot works shall be confined to the open areas of the Premises and shall be at least 15m away from any ground-level confined space.
- (e) No drilling, trenching and excavation shall be allowed on the Premises. During any construction work, the Tenant shall observe the guidelines recommended in Chapter 8 of the "Landfill Gas Hazard Assessment Guidance Note" published by the Department of Environmental Protection. In particular, no smoking, naked

flames and all other sources of ignition shall be allowed within 15m of any ground-level confined space.

Hazard to Life Impact

12. To mitigate hazard to life impact, the Tenant shall comply with, inter alia, Conditions 4.8 to 4.10 of the Environmental Permit No. EP-226/2005/A (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact) and shall not:-
- (a) bring, keep, store or transport chlorine within the Premises and other areas of EcoPark;
 - (b) bring, keep, store, locate or transport dangerous goods, substances and fuels supporting combustion including oxygen, acetylene, hydrogen peroxide, rubber tyres and diesel within 10 metres from the boundary of the site of EcoPark; and
 - (c) exceed the building height restrictions for buildings on the Premises which are on/near the western boundary of the site of EcoPark as mentioned in Annex B to the Environmental Permit No. EP-226/2005/A (including any updated Permit, amended permit and further permit).

Landscape and Visual Impacts

13. To mitigate landscape and visual impacts, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.14 of the Environmental Permit No. EP-226/2005/A regarding maintaining landscape, planting, treatment and mitigation measures as specified in inter alia Condition 3.8 and Figure 3 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate landscape and visual impacts).

Environmental Permits Relating to EcoPark

14. The Tenant hereby declares, confirms and acknowledges that it is fully aware that, pursuant to the Environmental Impact Assessment Ordinance (Cap.499), the Director has the right to grant, amend or revoke environmental permit(s) or to grant further or amended environmental permit(s) relating to the lots comprising the EcoPark and any other lots but that such right may be challenged by third parties on justifiable grounds. The Tenant hereby undertakes to waive all its rights and remedies for any loss, damages, cost and expenses whatsoever which it may sustain and/or incur directly or

indirectly as a result of the grant, amendment or revocation of the environmental permit(s) or the consequential grant of further or amended environmental permit(s), including but not limited to any right to terminate this Lease and/or to make any claim against the Landlord and/or the Director for any compensation whatsoever.

Appendix 3

Material and Waste Throughputs

Appendix 3.1

Material and Waste Throughputs of the Reporting Year

Table A3.1-1 Recycling of Waste Organic Food

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	3,412	1,008	1,230
February 2022	2,376	878	850
March 2022	1,902	585	660
April 2022	2,052	756	708
May 2022	2,562	1,133	894
June 2022	2,546	1,017	883*
July 2022	2,655	1,022	924
August 2022	2,822	1,077	873
September 2022	2,747	1,205	846
October 2022	2,893	905	955
November 2022	3,482	864	1,182
December 2022	n/a	n/a	n/a
Total	29,447	10,450	10,004

Table A3.1-2 Recycling of Waste Ferrous Metal

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	13,471	13,008	91
February 2022	7,507	6,255	68
March 2022	10,015	9,840	68
April 2022	9,269	9,490	64
May 2022	8,022	4,733	59
June 2022	6,701	9,680	50
July 2022	6,568	7,060	52
August 2022	7,061	9,476	55
September 2022	7,054	5,860	37
October 2022	6,090	3,075	30
November 2022	6,159	11,443	30
December 2022	n/a	n/a	n/a
Total	87,918	89,919	604

Table A3.1-3 Recycling of Waste Wood

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	52	50	-
February 2022	27	15	-
March 2022	60	18	-
April 2022	211	208	-
May 2022	276	168	-
June 2022	302	159	-
July 2022	324	252	-
August 2022	268	231	-
September 2022	345	226	-
October 2022	158	94	-
November 2022	81	41	-
December 2022	n/a	n/a	n/a
Total	2,104	1,462	-

Table A3.1-4 Recycling of Waste Electronics

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	2,445	2,044	311
February 2022	1,159	979	158
March 2022	2,034	1,856	307
April 2022	2,175	1,768	259
May 2022	2,357	2,054	307
June 2022	2,323	1,985	341
July 2022	2,211	1,931	293
August 2022	2,226	2,025	310
September 2022	2,134	1,866	269
October 2022	2,068	1,805	306
November 2022	1,978	1,764	260
December 2022	n/a	n/a	n/a
Total	23,111	20,076	3,120

Table A3.1-5 Recycling of Waste Plastic

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	741	505	-
February 2022	383	338	9
March 2022	843	791	14
April 2022	816	804	7
May 2022	411	342	15
June 2022	705	636	45
July 2022	759	638	43
August 2022	1,027	863	63
September 2022	775	677	68
October 2022	626	553	82
November 2022	299	177	92
December 2022	n/a	n/a	n/a
Total	7,385	6,324	438

Table A3.1-6 Recycling of Waste Glass and Construction Waste

Date	Waste Input (tonnes)		Product Output (tonnes)	Waste Disposal (tonnes)
	Construction Waste	Glass		
January 2022	3,979	888	9,856	6
February 2022	3,674	783	8,149	6
March 2022	5,577	741	11,071	19
April 2022	5,004	522	9,594	6
May 2022	4,985	560	8,245	18
June 2022	5,294	666	10,797	12
July 2022	4,917	622	7,788	16
August 2022	4,188	746	9,095	18
September 2022	4,607	669	7,577	39
October 2022	6,234	798	10,695	42
November 2022	5,308	650	9,282	31
December 2022	n/a	n/a	n/a	n/a
Total	53,767	7,644	102,149	212

Table A3.1-7 Recycling of Waste Rubber Tyres

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	241	241	-
February 2022	59	59	-
March 2022	104	104	-
April 2022	220	220	-
May 2022	297	297	-
June 2022	207	207	-
July 2022	188	188	-
August 2022	105	105	-
September 2022	119	119	-
October 2022	129	129	-
November 2022	114	160	-
December 2022	n/a	n/a	n/a
Total	1,783	1,830	-

Table A3.1-8 Recycling of Waste Battery

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2022	127	-	-
February 2022	21	-	-
March 2022	82	-	-
April 2022	40	-	-
May 2022	39	-	-
June 2022	41	-	-
July 2022	52	-	-
August 2022	43	-	-
September 2022	111	-	-
October 2022	70	-	-
November 2022	n/a	n/a	n/a
December 2022	n/a	n/a	n/a
Total	625	-	-

Notes:

- 1) The throughput data presented in *Tables A3.1-1 to A3.1-8* has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
- 2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
- 3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
- 4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined in *Table A3.1-6*.
- 5) “-” in the column of waste disposal denotes zero quantity; while “n/a” denotes unavailable information.

Appendix 3.2

Updates of Material and Waste Throughputs of the Previous Reporting Year

Table A3.2-1 Recycling of Waste Organic Food

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	2,987	825	797
February 2021	2,504	839	674
March 2021	2,953	1,220	766
April 2021	2,420	1,007	626
May 2021	2,396	994	621
June 2021	2,336	957	602
July 2021	2,639	1,115	666
August 2021	2,645	1,244	686
September 2021	2,692	1,413	664
October 2021	2,595	1,070	673
November 2021	2,829	1,125	726
December 2021	3,393	1,075	1,183

Table A3.2-2 Recycling of Waste Ferrous Metal

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	12,041	13,550	81
February 2021	10,812	7,987	88
March 2021	14,845	15,981	92
April 2021	14,638	17,269	91
May 2021	11,264	10,444	90
June 2021	11,458	11,023	89
July 2021	13,503	11,214	92
August 2021	13,557	13,713	90
September 2021	12,797	12,760	85
October 2021	8,813	8,813	76
November 2021	13,561	13,112	90
December 2021	10,646	11,402	83

Table A3.2-3 Recycling of Waste Wood

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	93	70	-
February 2021	86	71	-
March 2021	125	90	-
April 2021	201	151	-
May 2021	211	124	-
June 2021	209	148	-
July 2021	186	105	-
August 2021	201	40	-
September 2021	222	147	-
October 2021	259	53	-
November 2021	231	82	-
December 2021	216	80	-

Table A3.2-4 Recycling of Waste Electronics

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	2,458	2,188	341
February 2021	2,033	1,722	247
March 2021	2,329	2,002	256
April 2021	2,139	1,932	228
May 2021	2,248	1,924	217
June 2021	2,237	2,036	241
July 2021	2,285	2,085	261
August 2021	2,558	2,108	278
September 2021	2,453	2,203	318
October 2021	2,269	1,988	246
November 2021	2,492	2,269	347
December 2021	2,310	2,096	313

Table A3.2-5 Recycling of Waste Plastic

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	220	124	-
February 2021	196	187	-
March 2021	267	238	-
April 2021	162	183	-
May 2021	305	274	-
June 2021	293	306	-
July 2021	231	226	-
August 2021	292	300	-
September 2021	517	285	-
October 2021	512	306	-
November 2021	541	498	-
December 2021	678	661	-

Table A3.2-6 Recycling of Waste Glass & Construction Waste

Date	Waste Input (tonnes)		Product Output (tonnes)	Waste Disposal (tonnes)
	Construction Waste	Glass		
January 2021	1,873	770	7,995	9
February 2021	774	347	4,727	5
March 2021	2,828	468	7,553	6
April 2021	2,710	402	7,352	26
May 2021	3,127	492	6,660	24
June 2021	2,679	504	6,838	12
July 2021	2,253	568	7,022	29
August 2021	2,429	874	7,034	20
September 2021	2,829	1,006	7,399	12
October 2021	2,487	873	7,470	6
November 2021	4,161	943	8,842	22
December 2021	4,600	1,010	9,569	13

Table A3.2-7 Recycling of Waste Rubber Tyres

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	195	195	-
February 2021	190	190	-
March 2021	74	74	-
April 2021	185	100	-
May 2021	197	197	-
June 2021	200	200	-
July 2021	194	173	-
August 2021	78	3	-
September 2021	293	48	-
October 2021	369	205	-
November 2021	242	180	-
December 2021	258	250	-

Table A3.2-8 Recycling of Waste Battery

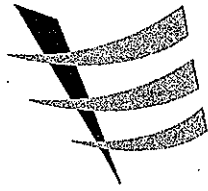
Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2021	-	-	-
February 2021	-	-	-
March 2021	-	-	-
April 2021	-	-	-
May 2021	-	-	-
June 2021	-	-	-
July 2021	87	-	-
August 2021	125	-	-
September 2021	157	14	-
October 2021	30	24	-
November 2021	119	-	-
December 2021	126	-	46

Notes:

- 1) The throughput data in **Tables A3.2-1 to A3.2-3** supersede the same batch of the throughput data in previous Annual Environmental Monitoring & Audit Report. The presented data is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
- 2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting quarter and were stored within the lots.
- 3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
- 4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
- 5) “-” in the column of waste disposal denotes zero quantity; while “n/a” denotes unavailable information.

Appendix 4

Calibration Certificate of Infrared Gas Analyser



東業德勤測試顧問有限公司
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Calibration Certificate

Information Provided by Customer

Customer : ETS – TESTCONSULT LIMITED
Address : 8/F, Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fo Tan, Hong Kong

Information of Unit-under test (UUT)

Description : Gas Detector Equipment I.D. No : ET/EA/005/01
Manufacturer : RKI Instruments EAGLE 2 Serial No. : E2F694
Type of gas : CO₂, O₂, CH₄

Laboratory Information

Procedure : In-house method Data of Receipt : 18-Jun-2021
Date of Calibration : 22-Jun-2021 Calibration Location : Environmental Laboratory
Date of Issue : 22-Jun-2021

Calibration Condition

Ambient Temperature : (20 ± 3) °C Relative Humidity : (50 ± 20)%
Stabilizing Time : 30 minutes Warm-up Time : 30 minutes

Reference Equipment

- Reference Gas Detector, ET/EA/005/02

Calibration Specification

- To perform the calibration of gas below:
- CO₂ at 0, 3000 and 5000ppm
- O₂ at 10, 20 & 30vol%
- CH₄ at 0, 5 & 10%LEL

Calibration Result (CO₂)

Calibration Range (ppm)	Reference Equipment Reading (ppm)	*Corrected Value (ppm)	UUT Reading (ppm)	Deviation (ppm)
0	0.0	0.0	0.0	0.0
3000	3102.6	3040.5	3056.2	15.7
5000	5108.4	5006.2	5048.3	42.1

Remark: 1. 2% indicator error of reference equipment is applied.

Measurement Result (CO₂)

Items	Results
Indication Error (%)	0.7
Repeatability (%)	0.8



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Calibration Result (O₂)

Calibration Range (%vol)	Reference Equipment Reading (%vol)	*Corrected Value (%vol)	UUT Reading (%vol)	Deviation (%vol)
10	10.6	10.5	10.5	0.0
20	21.2	21.0	20.8	-0.2
30	31.1	30.8	30.5	-0.3

Remark: 1. 1.0% Indicator error of reference equipment is applied.

Measurement Result (O₂)

Items	Results
Indication Error (%)	-0.8
Repeatability (%)	0.4

Calibration Result (CH₄)

Calibration Range (%LEL)	Reference Equipment Reading (%LEL)	*Corrected Value (%LEL)	UUT Reading (%LEL)	Deviation (%LEL)
0	0	0	0	0
5	5	5	5	0
10	11	11	11	0

Remark: 1. 0% Indicator error of reference equipment is applied.

Measurement Result (CH₄)

Items	Results
Indication Error (%)	0
Repeatability (%)	2.1

Note: (*) Corrected Value = Reference Equipment Reading x Indicator Error of Reference Equipment

Remarks:

- The calibration results apply to the particular unit-under-test only.

Calibrated By: Maik
(Technician)

Approved Signatory: Geung King



TEST REPORT

Calibration Certificate

Information Provided by Customer

Customer : ETS – TESTCONSULT LIMITED
Address : 8/F, Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fo Tan, Hong Kong

Information of Unit-under test (UUT)

Description : Gas Detector Equipment I.D. No : ET/EA/005/01
Manufacturer : RKI Instruments EAGLE 2 Serial No. : E2F694
Type of gas : CO₂, O₂, CH₄

Laboratory Information

Procedure : In-house method Data of Receipt : 20-Jun-2022
Data of Calibration : 23-Jun-2022 Calibration Location : Environmental Laboratory
Data of issue : 23-Jun-2022

Calibration Condition

Ambient Temperature : (20 ± 3) °C Relative Humidity : (50 ± 20)%
Stabilizing Time : 30 minutes Warm-up Time : 30 minutes

Reference Equipment

- Reference Gas Detector, ET/EA/005/02

Calibration Specification

- To perform the calibration of gas below:
- CO₂ at 0, 3000 and 5000ppm
- O₂ at 10, 20 & 30vol%
- CH₄ at 0, 5 & 10%LEL

Calibration Result (CO₂)

Calibration Range (ppm)	Reference Equipment Reading (ppm)	*Corrected Value (ppm)	UUT Reading (ppm)	Deviation (ppm)
0	0.0	0.0	0.0	0.0
3000	3158.0	3094.8	3053.7	-41.2
5000	4987.0	4887.3	4831.6	-55.7

Remark: 1. 2% indicator error of reference equipment is applied.

Measurement Result (CO₂)

Items	Results
Indication Error (%)	-1
Repeatability (%)	0.9



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TEST REPORT

Calibration Result (O₂)

Calibration Range (%vol)	Reference Equipment Reading (%vol)	*Corrected Value (%vol)	UUT Reading (%vol)	Deviation (%vol)
10	10.4	10.3	10.3	0.0
20	19.8	19.6	19.3	-0.3
30	32.6	32.3	31.2	-1.1

Remark: 1. 1.0% indicator error of reference equipment is applied.

Measurement Result (O₂)

Items	Results
Indication Error (%)	-1.6
Repeatability (%)	1.0

Calibration Result (CH₄)

Calibration Range (%LEL)	Reference Equipment Reading (%LEL)	*Corrected Value (%LEL)	UUT Reading (%LEL)	Deviation (%LEL)
0	0.0	0	0.0	0
5	5.0	5.1	5.0	-0.1
10	10.0	10.2	10.1	-0.1

Remark: 1. -2% indicator error of reference equipment is applied.

Measurement Result (CH₄)

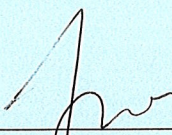
Items	Results
Indication Error (%)	-1
Repeatability (%)	3.7

Note: (*) Corrected Value = Reference Equipment Reading x Indicator Error of Reference Equipment

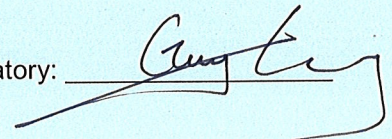
Remarks:

- The calibration results apply to the particular unit-under-test only.

Calibrated By: _____


(Technician)

Approved Signatory: _____



Appendix 5

Graphical Plots of LFG Monitoring

Landfill Gas Monitoring Results

Monitoring Station ID	Monitoring Locations	Weather Conditions	Temperature (°C)	Start Time	End Time	Measurement Results				Action Level			Limit Level			Remarks	
						Methane		Oxygen	Carbon Dioxide	Barometric Pressure	Methane	Oxygen	Carbon Dioxide	Methane	Oxygen		Carbon Dioxide
						% v/v	% LEL	% v/v	% v/v	mBar (absolute)	% LEL	% v/v	% v/v	% LEL	% v/v		% v/v
<i>21/2/2022</i>																	
EP1-1	Inside the landscaping area of Administration Building	Raining	8	09:55	09:57	0.0	1.0	20.9	0.0	1022	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		8	10:23	10:25	0.0	1.0	20.9	0.0	1022							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		8	10:16	10:18	0.0	1.0	20.9	0.0	1022							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		8	10:07	10:09	0.0	1.0	20.9	0.0	1022							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		8	10:11	10:13	0.0	1.0	20.9	0.0	1022							Nil
<i>16/5/2022</i>																	
EP1-1	Inside the landscaping area of Administration Building	Raining	24	09:43	09:45	0.0	0.0	19.2	0.0	1012	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		24	10:14	10:16	0.0	0.0	19.0	0.0	1012							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		24	10:04	10:06	0.0	0.0	19.0	0.0	1012							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		24	09:49	09:51	0.0	0.0	19.0	0.0	1012							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		24	09:56	09:58	0.0	0.0	19.0	0.0	1012							Nil
<i>17/8/2022</i>																	
EP1-1	Inside the landscaping area of Administration Building	Sunny	29	09:43	09:45	0.0	0.0	20.9	0.0	1012	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		29	10:04	10:06	0.0	0.0	20.9	0.0	1012							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		29	09:59	10:02	0.0	0.0	20.9	0.0	1012							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		29	09:47	09:50	0.0	0.0	20.9	0.0	1012							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		29	09:54	09:57	0.0	0.0	20.9	0.0	1012							Nil
<i>21/11/2022</i>																	
EP1-1	Inside the landscaping area of Administration Building	Sunny	24	09:55	09:57	0.0	1.0	20.9	0.0	1014	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		24	10:20	10:22	0.0	0.0	20.9	0.0	1014							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		24	10:15	10:17	0.0	0.0	20.5	0.0	1014							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		24	10:00	10:02	0.0	0.0	20.9	0.0	1014							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		24	10:08	10:10	0.0	0.0	20.6	0.0	1014							Nil

Notes:

- (1) Underlined figure indicates an exceedance of Action Level
- (2) Shaded area indicates an exceedance of Limit Level

EPI-1

Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
21/2/2022	1	10	20	20.9	19	18	0.0	0.5	1.5	1022
16/5/2022	0	10	20	19.2	19	18	0.0	0.5	1.5	1012
17/8/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1012
21/11/2022	1	10	20	20.9	19	18	0.0	0.5	1.5	1014

EPI-2

Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
21/2/2022	1	10	20	20.9	19	18	0.0	0.5	1.5	1022
16/5/2022	0	10	20	19.0	19	18	0.0	0.5	1.5	1012
17/8/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1012
21/11/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1014

EPI-3

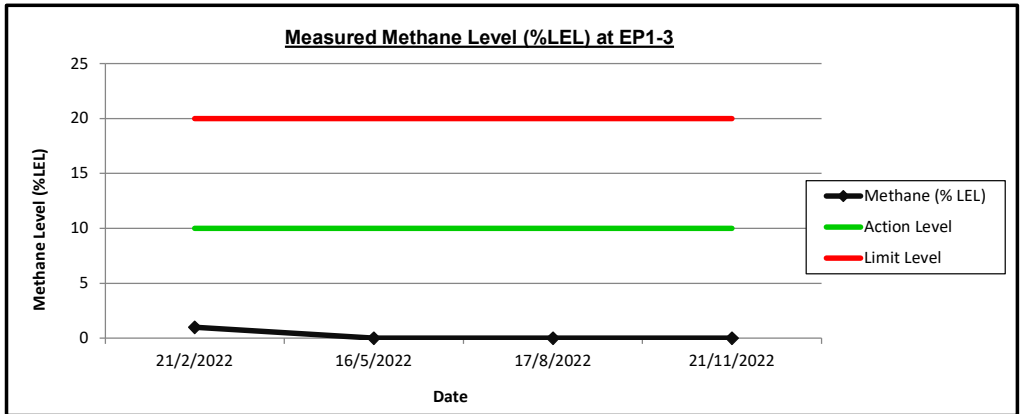
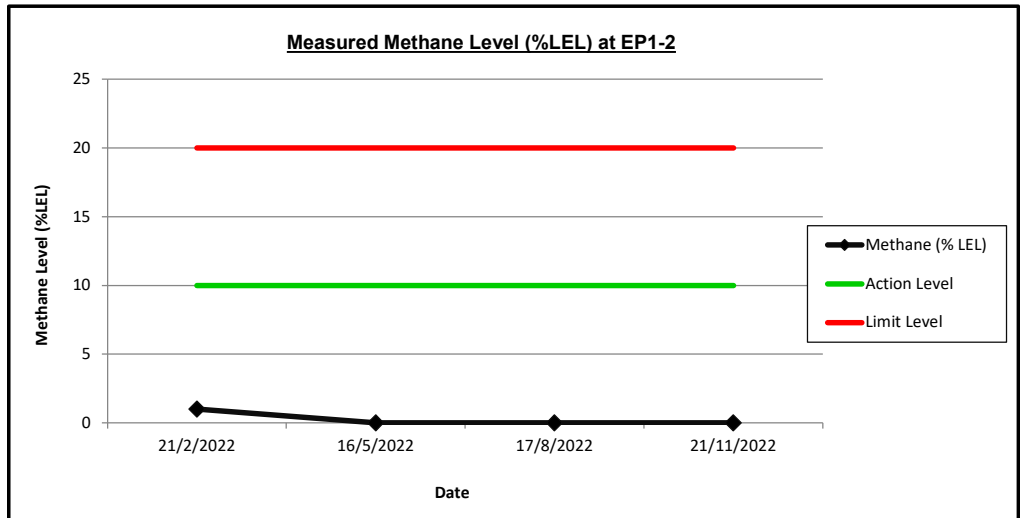
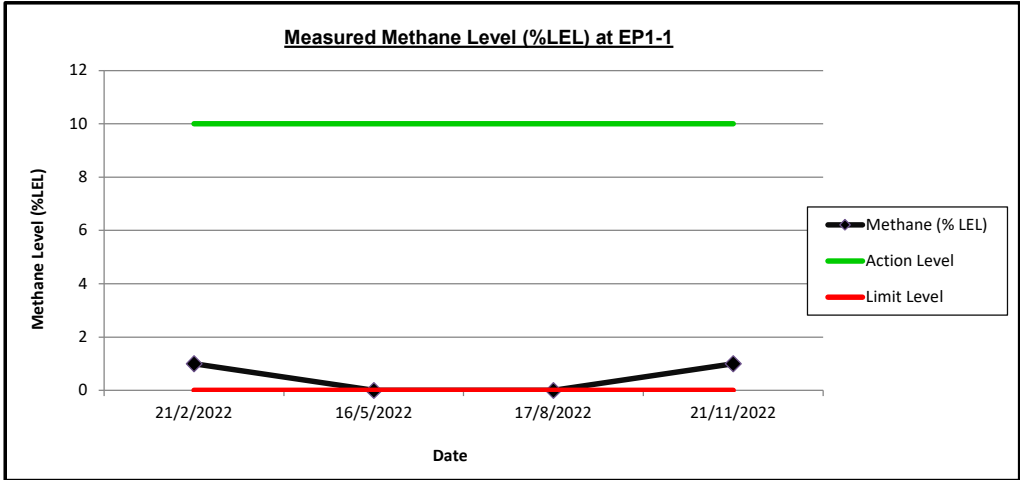
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
21/2/2022	1	10	20	20.9	19	18	0.0	0.5	1.5	1022
16/5/2022	0	10	20	19.0	19	18	0.0	0.5	1.5	1012
17/8/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1012
21/11/2022	0	10	20	20.5	19	18	0.0	0.5	1.5	1014

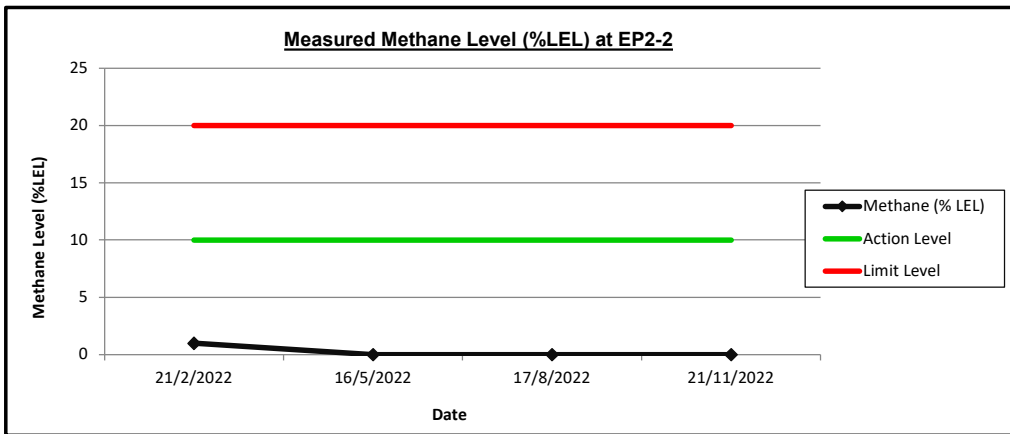
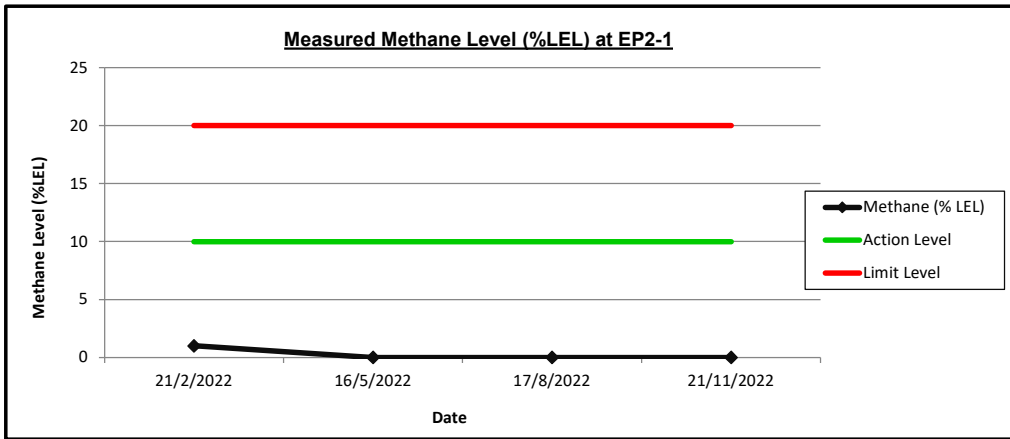
EP2-1

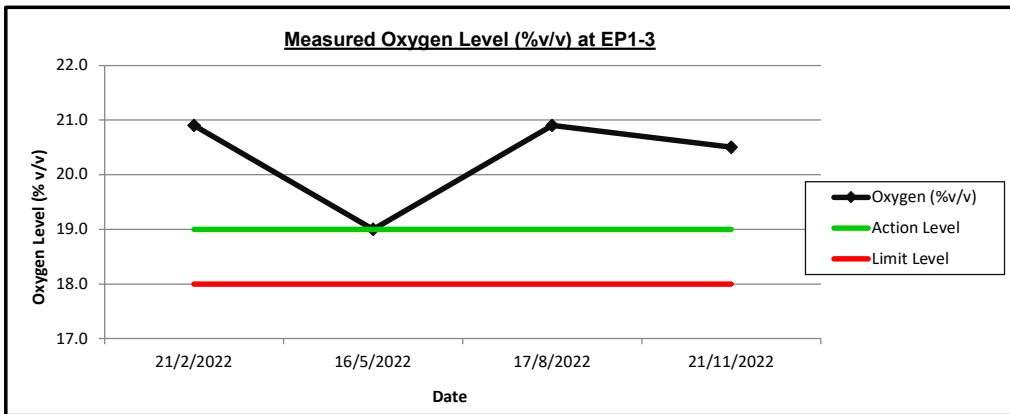
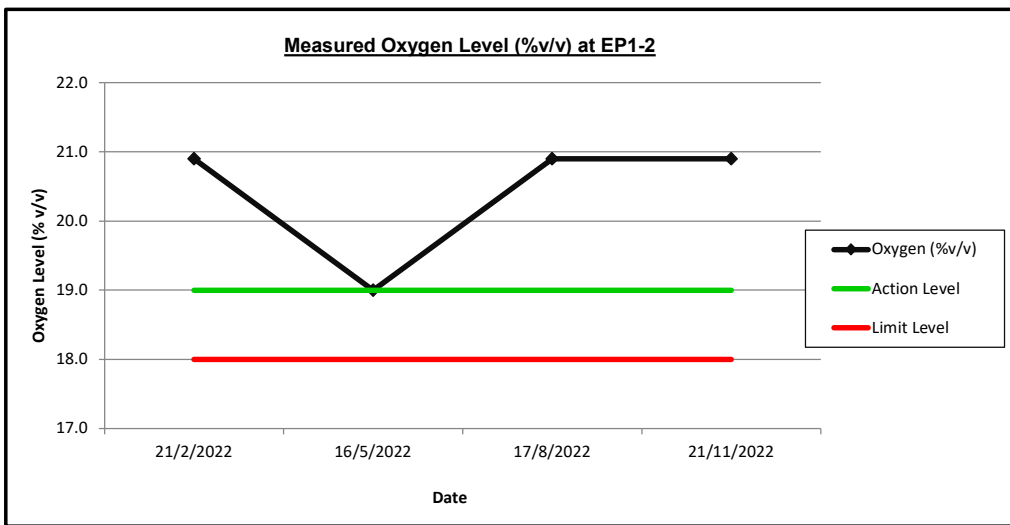
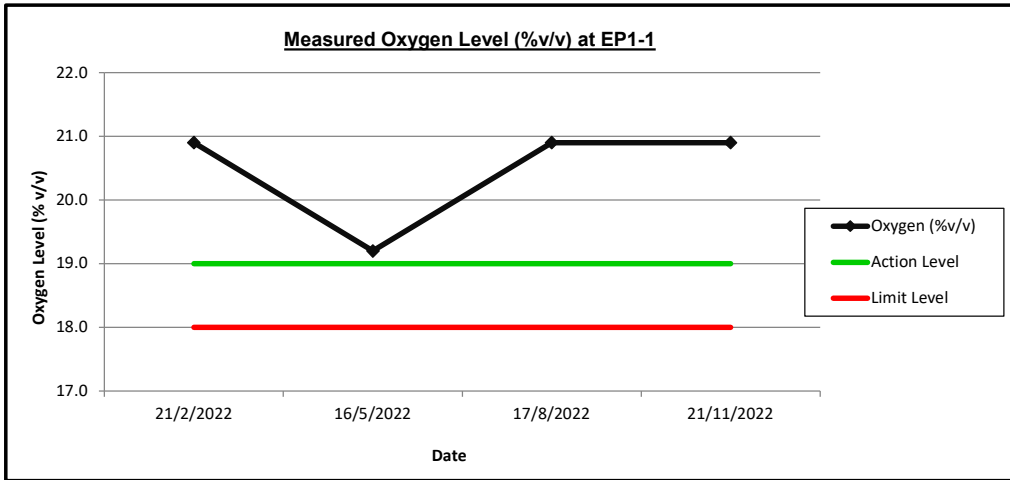
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
21/2/2022	1	10	20	20.9	19	18	0.0	0.5	1.5	1022
16/5/2022	0	10	20	19.0	19	18	0.0	0.5	1.5	1012
17/8/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1012
21/11/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1014

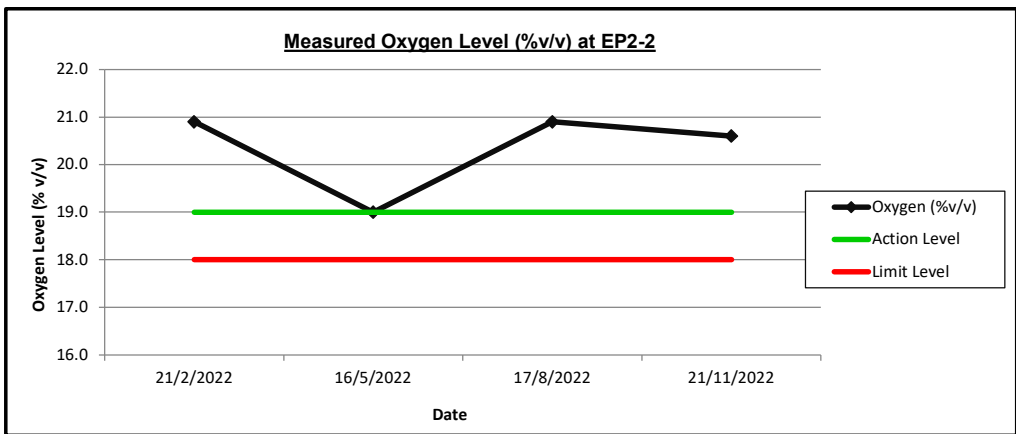
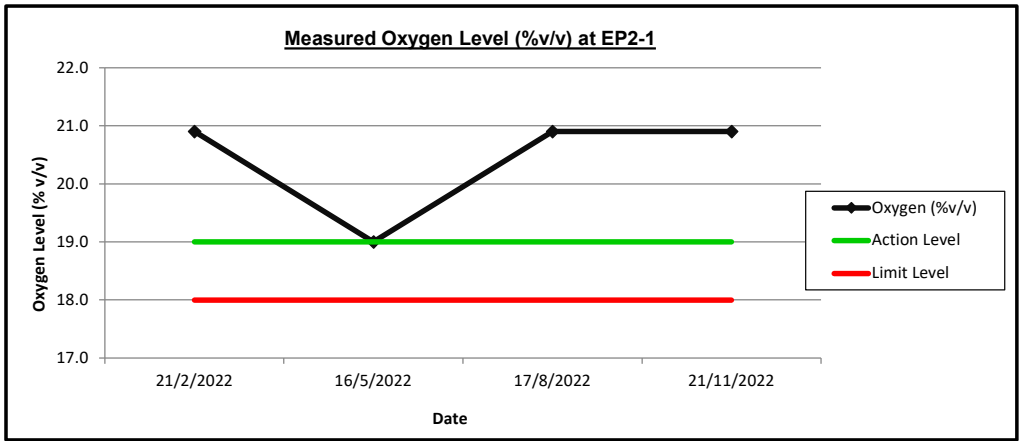
EP2-2

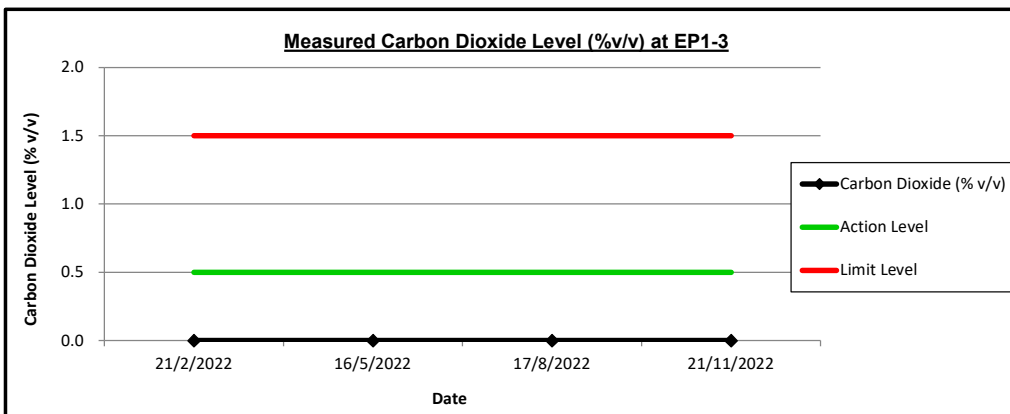
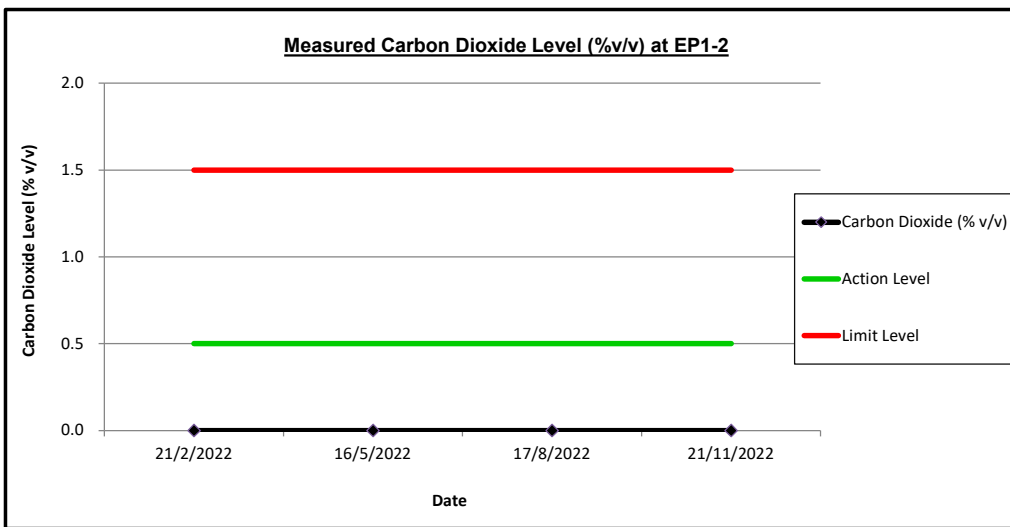
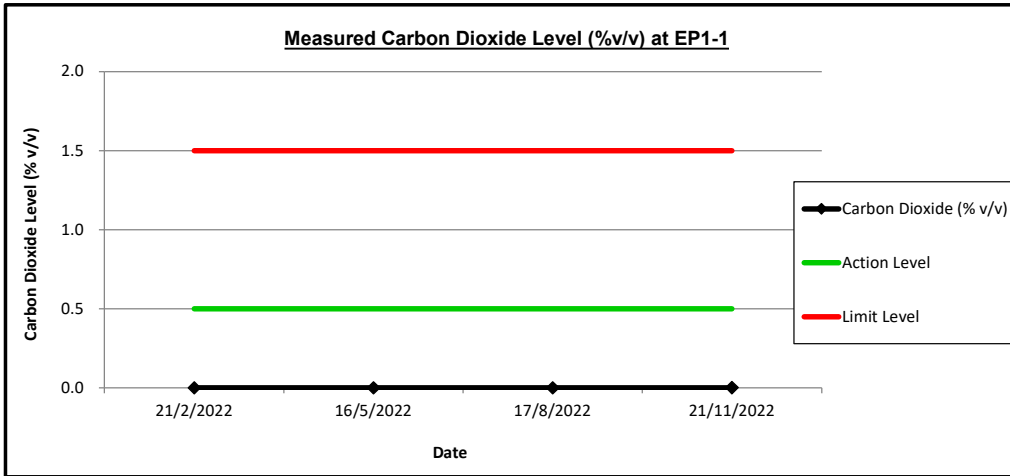
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
21/2/2022	1	10	20	20.9	19	18	0.0	0.5	1.5	1022
16/5/2022	0	10	20	19.0	19	18	0.0	0.5	1.5	1012
17/8/2022	0	10	20	20.9	19	18	0.0	0.5	1.5	1012
21/11/2022	0	10	20	20.6	19	18	0.0	0.5	1.5	1014

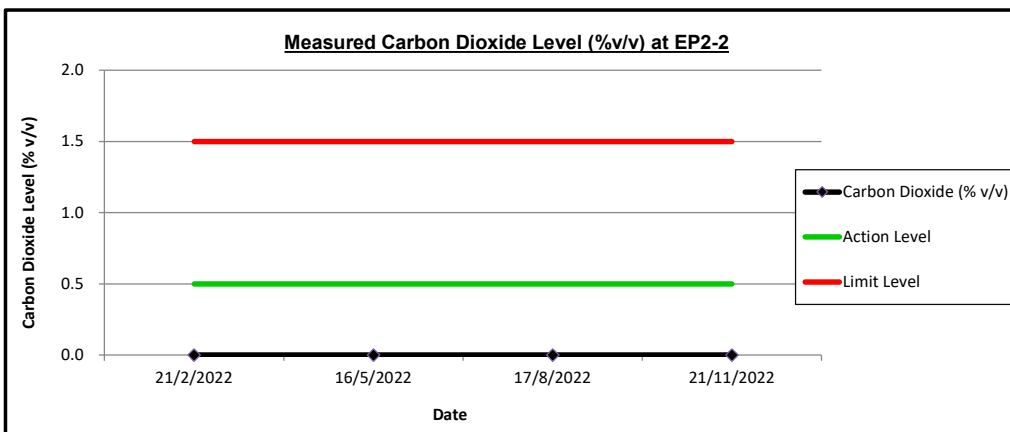
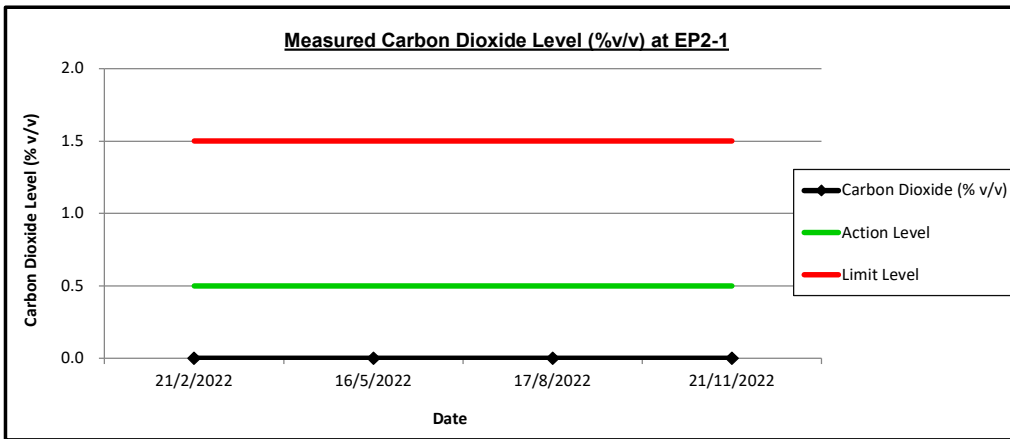












Remark: All <0.1%v/v for carbon dioxide is regarded as 0.0%v/v in graphical presentation

