

Issue No.: Issue 1
Issue Date: January 2022
Project No.: 1616



EcoPark Operation

Annual Environmental Monitoring & Audit Report 2021

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Allied Environmental Consultants Limited

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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.

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 fifteenth (15th) annual EM&A report prepared for the operation phase of EcoPark and covers the calendar year of 2021.

In 2021, there were ten tenants (3R, Champway, HK Biomass, HP Telford, Chung Yue, K.Wah, E. Tech, On Fat Lung, HKBRC and Baguio) in EcoPark Phase 1 and Phase 2, and four operators located at WEEE. PARK, Lot T7, biochar production plant and bioconversion of organic waste plant in EcoPark.

The lease of 3R at Lots T2 & T3 were terminated and returned to EPD in February 2021. Operator of Lot T7 (FWMG of EPD) returned the lot to EPD in June 2021. After testing and commission, HKBRC commenced full operations in July 2021. Baguio carried out construction works and then machinery installation works in 2021 but without any site operation. Operator of Lot P12 (Organic Tech) and Lots T8-T11 (Jardine Engineering) had taken possession of their lots during Q4 of the reporting year but without any site operation.

In the reporting year, the PRC for Baguio's plastic recycling process was approved in December 2021. No DA was approved in this reporting year. The completed PRC has been 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, the operator of Lot T7, and the eight 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	28,998	11,809	7,502
Waste Ferrous Metals	137,287	135,865	966
Waste Wood	2,024	1,081	-
Waste Electronics	25,501	22,383	2,980
Waste Plastics	2,995	2,427	-
Construction Waste	28,148	78,892	171
Waste Glass	7,247		
Waste Rubber Tyres	2,221	1,565	-

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 23rd February 2021, 26th May 2021, 24th August 2021, 15th November 2021 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 complaint, notifications of summons and successful prosecutions related to recycling activities was received in the reporting year.

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/71/13 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 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. Ove Arup & Partners Hong Kong Ltd. (Arup) was appointed by the EPD as the Independent Environmental Checker (IEC). 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 nine tenants in EcoPark and one operator of WEEE.PARK, one operator of bioconversion of organic waste plant and one operator of biochar production plant comprising:
- Alba Integrated Waste Solutions (Hong Kong) Ltd. (Alba IWS) for WEEE.PARK, and eight active tenants (Champway, HK Biomass, HP Telford, Chung Yue, K.Wah, E. Tech, On Fat Lung and HKBRC) who have carried out full recycling operations;
 - Baguio (i.e. Lot T6) carried out construction works and then machinery installation works in 2021 but without any site operation; and
 - Organic Tech Ltd. (Organic Tech) for bioconversion of organic waste plant and Jardine Engineering Corporation Ltd. (Jardine Engineering) for biochar production plant were under preparatory works but without any operation

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

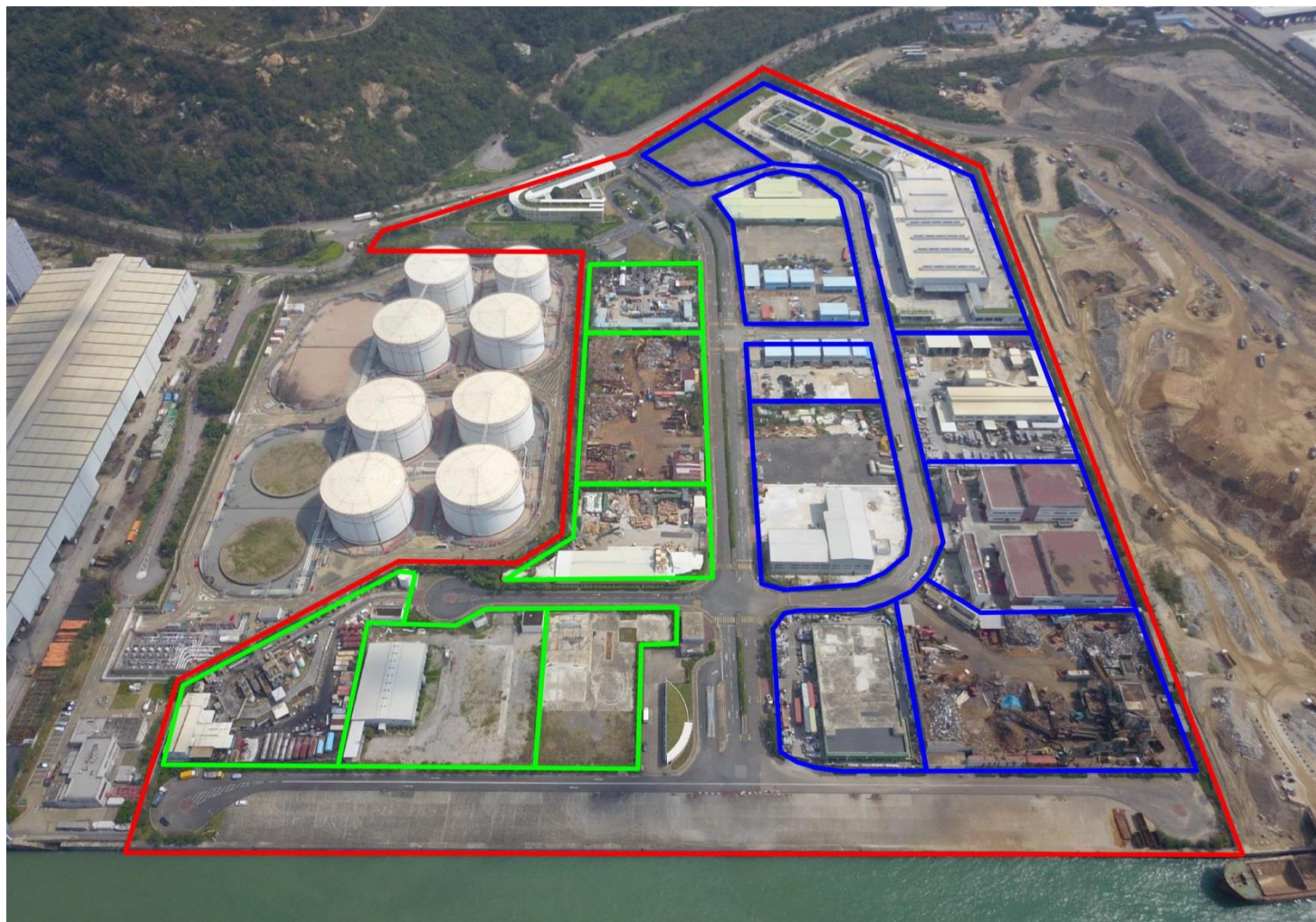
Position	Name	Email Address	Phone No.
<i>Project Proponent – EPD</i>			
Principal EPO	Mr. Gary C. W. Tam	garytam@epd.gov.hk	3690 7860
<i>Operator – UPML</i>			
Project Manager	Ms. Raindy YIP	raindy.py.yip@urban.com.hk	2212 5900
Park Manager*	Ms. May WU	may.sm.wu@urban.com.hk	2212 5920
	Ms. Susan LEUNG	susanleung@urban.com.hk	2212 5920
<i>IEC – Ove Arup</i>			
IEC*	Mr. Sam TSOI	sam.tsoi@arup.com	2268 3208
	Mr. Franki C. K. CHIU	franki.chiu@arup.com	2268 3207
<i>ET – AEC</i>			
ET Leader	Ms. Grace KWOK	gk@aechk.com	2815 7028

*Ms. May WU was replaced by Ms. Susan LEUNG with effective from 8 December 2021

Mr. Sam TSOI was replaced by Mr. Franki C. K. CHIU with effective from October 2021

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

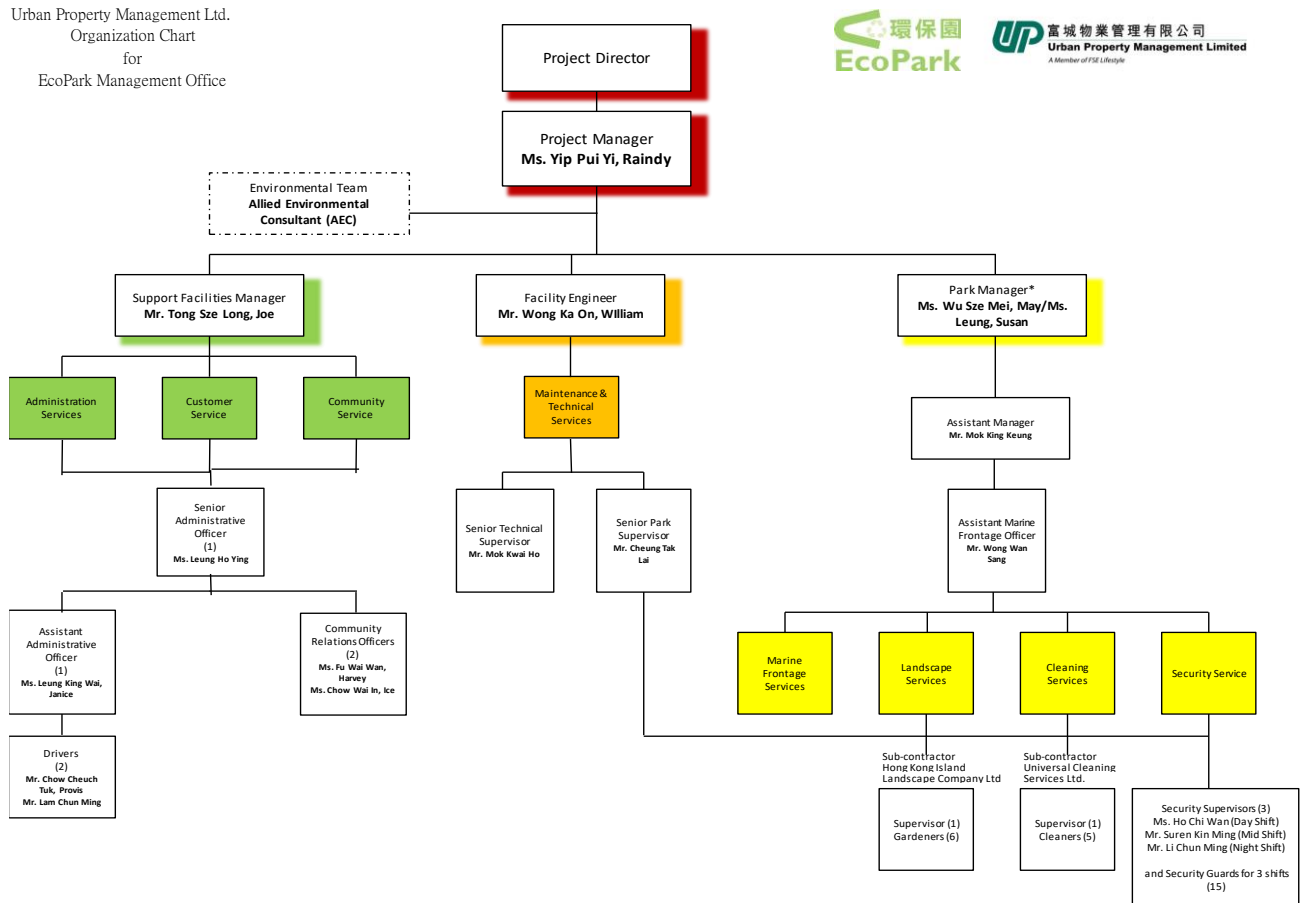


Phase 1 Tenants



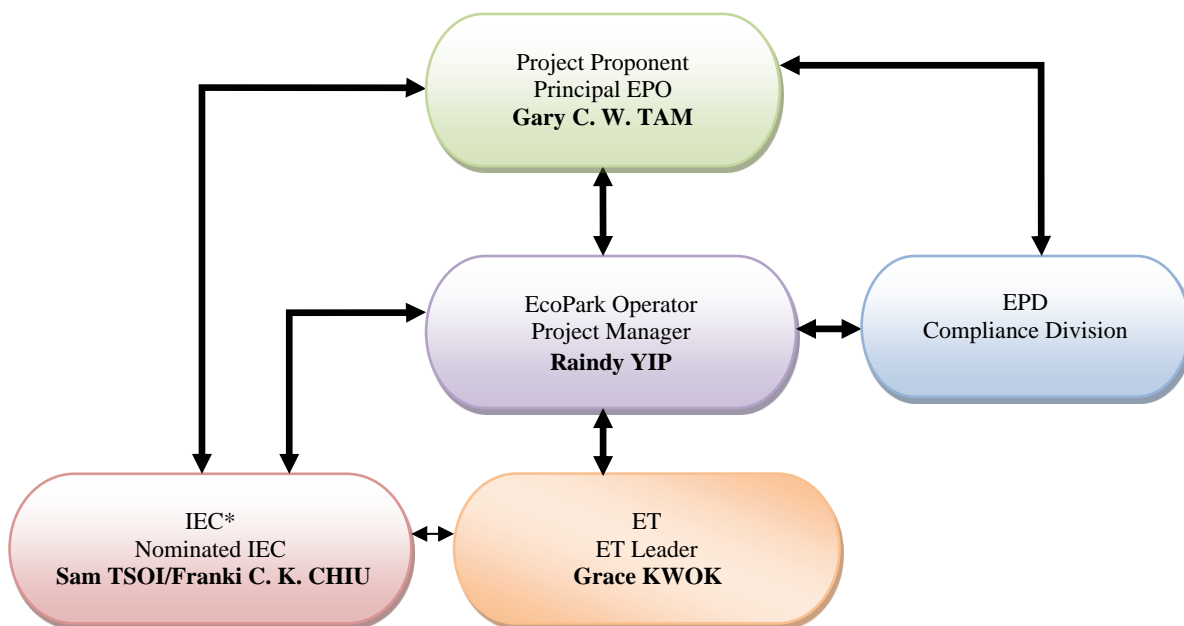
Phase 2 Tenants

Figure 1-2 Organisation Chart of UPML



*Ms. May WU was replaced by Ms. Susan LEUNG with effective from 8 December 2021

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



* Mr. Sam TSOI was replaced by Mr. Franki C. K. CHIU with effective from October 2021

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

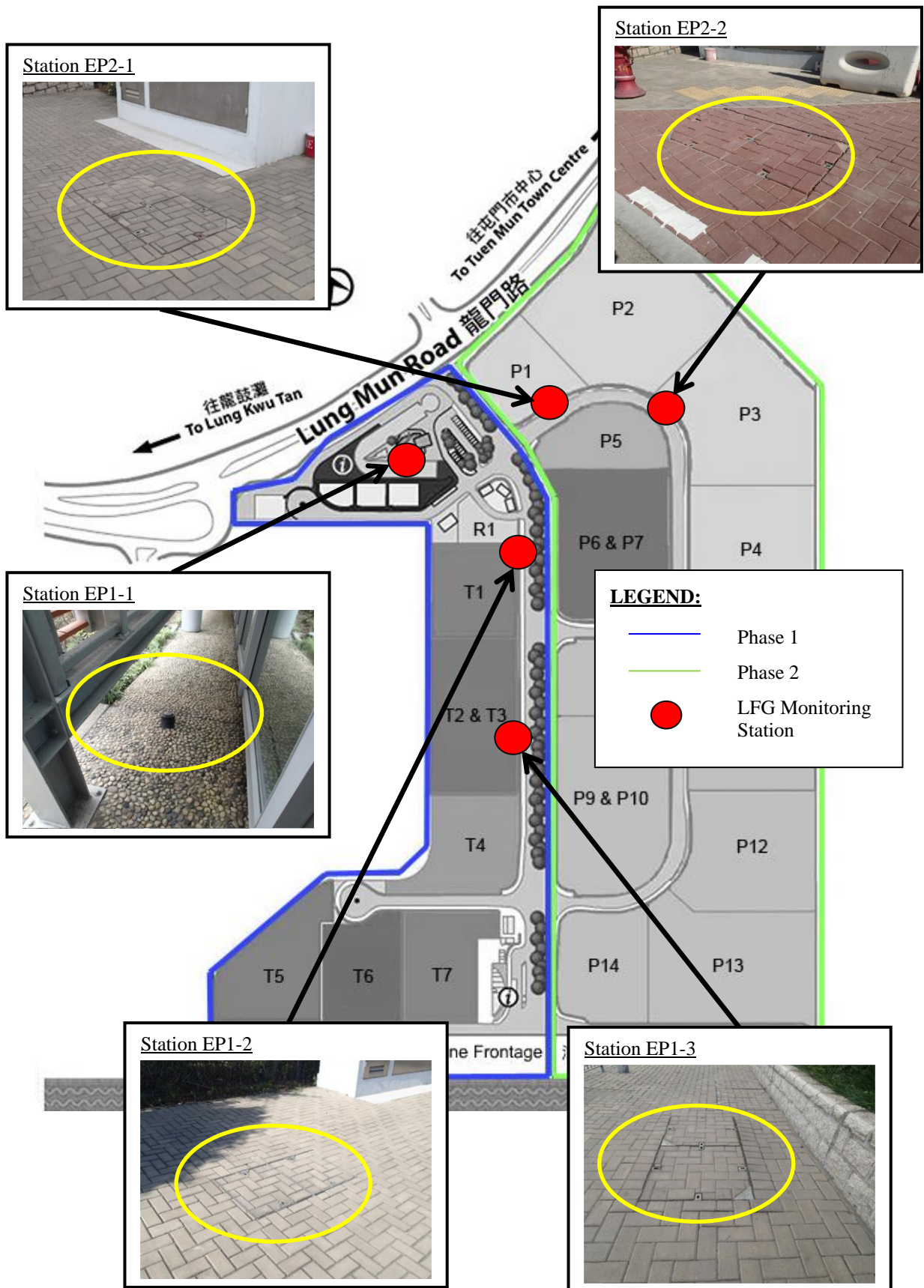
2.4 Environmental Mitigation Measures

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 3.14*. Brief descriptions of the active tenants are provided from *Section 3.2* to *3.10*.

3.1.2 In the reporting year:

- The lease of 3R at Lots T2 & T3 were terminated and returned to EPD in February 2021 and no recycling activities were conducted;
- Operator of Lot T7 (FWMG of EPD) returned the lot to EPD in June 2021;
- After testing and commission, HKBRC commenced full operations in July 2021;
- Baguio carried out construction works and then machinery installation works in 2021 but without any site operation; and
- Operator of Lot P12 (Organic Tech) and Operator of Lots T8-T11 (Jardine Engineering) took possession of their lots in Q4 of the reporting year and were under preparatory works but without any site operation

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, waste wood was 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:** Sorting, shredding and baling of waste plastic

3.4.1 Recycling of waste plastics 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 was carried out in the reporting year.

3.9 Food Waste Management Group (FWMG) of EPD

- **Lot No.:** T7 (Phase 1)
- **Lot Size:** Approx. 4,000 m²
- **Activity:** Temporary storage of wood chip and waste trees handling
- **Recycling Process:** Bulk reduction of waste tree by mechanical shearing and chipping.

3.9.1 Recycling of food waste was carried out in this reporting year.

3.10 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.

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

3.11 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.

3.11.1 Recycling of Waste Lead Acid Batteries 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 were delivered by both marine and land transportation.

3.12.2 The throughputs of WEEE.PARK and the eight 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	28,998	11,809	7,502
Waste Ferrous Metals	137,287	135,865	966
Waste Wood	2,024	1,081	-
Waste Electronics	25,501	22,383	2,980
Waste Plastics	2,995	2,427	-
Construction Waste	28,148	78,892	171
Waste Glass	7,247		
Waste Rubber Tyres	2,221	1,565	-

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.

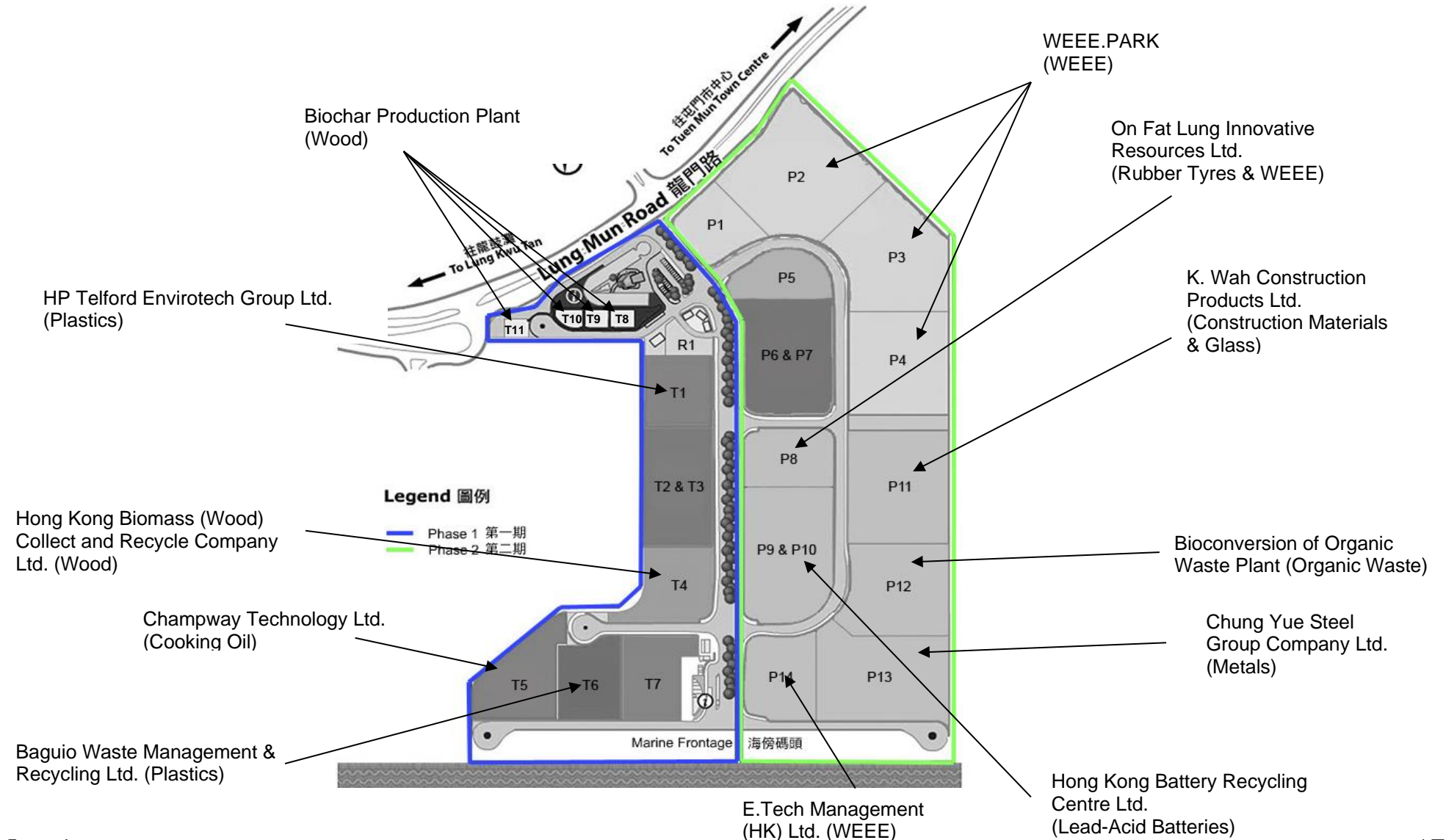
Detailed throughput figures of the reporting year are provided in **Appendix 3.1**. Updated throughput figures of the previous year are provided in **Appendix 3.2**.

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-five process reviews and three DAs had been approved. Among those, seventeen process reviews and three DAs are related to the current recycling processes in EcoPark as of December 2021. In the reporting year, the process review for Baguio’s proposed plastic recycling process was approved in December 2021.

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 eight active tenants (Champway, HK Biomass, HP Telford, K. Wah, E. Tech, Chung Yue, On Fat Lung and HKBRC) 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 23rd February 2021, 26th May 2021, 24th August 2021, 15th November 2021 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	23 rd February 2021	09:53 – 09:55	2 minutes	24°C	Sunny
EP1-2		09:48 – 09:50	2 minutes	24°C	Sunny
EP1-3		09:44 – 09:46	2 minutes	24°C	Sunny
EP2-1		09:38 – 09:40	2 minutes	24°C	Sunny
EP2-2		09:40 – 09:42	2 minutes	24°C	Sunny
EP1-1	26 th May 2021	10:10 – 10:12	2 minutes	31°C	Drizzle
EP1-2		10:35 – 10:40	2 minutes	31°C	Drizzle
EP1-3		10:31 – 10:33	2 minutes	31°C	Drizzle
EP2-1		10:15 – 10:17	2 minutes	31°C	Drizzle
EP2-2		10:26 – 10:28	2 minutes	31°C	Drizzle
EP1-1	24 th August 2021	10:00 – 10:02	2 minutes	28°C	Sunny
EP1-2		10:26 – 10:28	2 minutes	28°C	Sunny
EP1-3		10:25 – 10:27	2 minutes	28°C	Sunny
EP2-1		10:05 – 10:07	2 minutes	28°C	Sunny
EP2-2		10:15 – 10:17	2 minutes	28°C	Sunny
EP1-1	15 th November 2021	09:46 – 09:48	2 minutes	22°C	Sunny
EP1-2		10:02 – 10:04	2 minutes	22°C	Sunny
EP1-3		09:59 – 10:01	2 minutes	22°C	Sunny
EP2-1		09:50 – 9:52	2 minutes	22°C	Sunny
EP2-2		09:53 – 9:55	2 minutes	22°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	23 rd February 2021	0.0	0.0	20.9	<0.1	1015
EP1-2		0.0	0.0	20.9	<0.1	1015
EP1-3		0.0	0.0	20.9	<0.1	1015
EP2-1		0.0	0.0	20.9	<0.1	1015
EP2-2		0.0	0.0	20.9	<0.1	1015
EP1-1	26 th May 2021	0.0	0.0	20.9	<0.1	1009
EP1-2		0.0	0.0	20.9	<0.1	1009
EP1-3		0.0	0.0	20.9	<0.1	1009
EP2-1		0.0	0.0	20.9	<0.1	1009
EP2-2		0.0	0.0	20.9	<0.1	1009
EP1-1	24 th August 2021	0.0	0.0	20.9	<0.1	1008
EP1-2		0.0	0.0	20.9	<0.1	1008
EP1-3		0.0	0.0	20.9	<0.1	1008
EP2-1		0.0	0.0	20.9	<0.1	1008
EP2-2		0.0	0.0	20.9	<0.1	1008
EP1-1	15 th November 2021	0.0	0.0	20.9	<0.1	1013
EP1-2		0.0	0.0	20.9	<0.1	1013
EP1-3		0.0	0.0	20.9	<0.1	1013
EP2-1		0.0	0.0	20.9	<0.1	1013
EP2-2		0.0	0.0	20.9	0.4	1013

6 SUMMARY OF ENVIROMENTAL AUDIT

6.1 General

- 6.1.1 In the reporting year, WEEE.PARK, the operator of the Lot T7, and eight active tenants were under full operation. Specific site inspections were only carried out at the lot of WEEE.PARK, FWMG of Lot T7 and the eight active tenants. As FWMG of EPD of Lot T7 was no longer in operation since June 2021, general site inspection was conducted at Lot T7 beginning from June 2021 of the reporting year. For the lots of those tenants that were not in operation, general site inspections were conducted.
- 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 2020

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

Table 6.1 *Environmental Audit Findings in 2020*

Date	Tenant	Item	Status
25 Nov 2020	Champway	Oil stain was observed near the bins in the refuse area at the front of the processing plant.	As observed on 21 January 2021, oil stain was still observed near the bins in the refuse area at the front of the processing plant. As observed on 23 February 2021, oil stain near the bins in the refuse area at the front of the processing plant has been cleared up. (CLOSED)

Date	Tenant	Item	Status
25 Nov 2020	Champway	Oil stain was observed near the tanks in the stockpile area near the site office.	As observed on 21 January 2021, oil stain near the tanks in the stockpile area near the site office has been cleared up. (CLOSED)
25 Nov 2020	Champway	The perimeter drainage was observed to have been blocked.	As observed on 21 January 2021, the perimeter drainage was still observed to have been blocked. In addition, oil and oil sludge were still also observed in the drainage. As observed on 23 February 2021, the perimeter drainage was still observed to have been blocked. In addition, oil and oil sludge were still also observed in the drainage. As observed on 24 March 2021, the perimeter drainage was observed to have been cleared up. Oil and sludge in the drainage was also observed to have been removed. (CLOSED)

Date	Tenant	Item	Status
17 Dec 2020	Champway	Activated carbon was still observed to have been spilled all over the floor.	As observed on 21 January 2021, activated carbon was still observed to have been spilled all over the floor, and yet to be cleaned up. As observed on 23 February 2021, scattered activated carbon on the ground has been cleared up. (CLOSED)
17 Dec 2020	Chung Yue	Loads levels of trucks were observed to exceed the levels of the sides and the tailboard during the inspection.	As observed on 21 January 2021, no truck operation was observed during the inspection. As observed on 23 Feb 2021, no truck operation was observed during the inspection. As observed on 24 Mar 2021, load level of the truck has been reduced. (CLOSED)

Date	Tenant	Item	Status
17 Dec 2020	K. Wah	C&D materials were observed to have blocked the perimeter drain.	As observed on 21 January 2021, C&D materials in the parameter drain has been cleared. As observed on 23 February 2021, while no debris was observed in the perimeter drain, the tenant was requested to provide adequate mitigation measures (e.g. tarpaulin cover, temporary wall) to prevent debris and effluent from entering the perimeter drain. As observed on 24 Mar 2021, workers were clearing the debris in the perimeter drain during the site inspection. The stockpile of C&D materials was also observed to have been re-located to area away from the perimeter drain. (CLOSED)
23 Sept 2020	Baguio (General Inspection)	Mud debris was observed to have been flushed into the stormwater gully on the road outside the site entrance.	As observed on 21 January 2021, the existing surface channel was still blocked. It is also noted that the drainage system has been operating, with mud debris was still observed in the surface channel. As observed on 23 February 2021, the surface channel is no longer blocked. It is also noted that the drainage system has been

Date	Tenant	Item	Status
			operating, with mud debris observed in the surface channel. As observed on 24 March 2021, the surface channel is no longer blocked, with mud debris being cleared up. (CLOSED)
23 Sept 2020	Baguio (General Inspection)	Stockpile was observed to not be covered or watered	As observed on 21 January 2021, the temporary stockpile of C&D materials has been covered. (CLOSED)

6.3 January 2021

- 6.3.1 Environmental audits of WEEE.PARK, operator of Lot T7, active tenants and general EcoPark condition were carried out by the ET and the Operator on 21st of January 2021. IEC random site audit was also carried out on 21st of January 2021. Audit observations are summarised in **Table 6.2**.

Table 6.2 Environmental Audit Findings in January 2021

Tenant	Item	Status
Champway	Oil leakage was observed near the containers near the old oil filter press.	As observed on 23 February 2021, oil leakage near the containers near the old oil filter press has been cleaned up. (CLOSED)
	Oily sludge was observed to be at the vicinity of the oil container area.	As observed on 23 February 2021, oily sludge was still observed to be at the vicinity of the oil container area near the new filter press. As observed on 24 March 2021, oily sludge at the vicinity of the oil container area has been cleared up. (CLOSED)

6.4 February 2021

- 6.4.1 Joint environmental audits of WEEE.PARK, operator of Lot T7, active tenants and general EcoPark condition were carried out by the ET, the Operator and the IEC on 23rd of February 2021. Audit observations are summarised in **Table 6.3**.

Table 6.3 Environmental Audit Findings in February 2021

Tenant	Item	Status
Champway	Oil stain was observed in the oil storage tank area opposite the biodiesel processing plant.	As observed on 24 March 2021, oil stain in the oil storage tank area opposite the biodiesel processing plant was cleared up. (CLOSED)
	Oil leakage was observed near the tanks opposite the new oil filter press.	As observed on 24 March 2021, oil leakage near the tanks opposite the new oil filter press has been cleared up. (CLOSED)
WEEE.PARK	The sieve on the stormwater drain opposite the chemical waste stores	As observed on 24 March 2021, the debris in the sieve on the

Tenant	Item	Status
	was observed to be filled by debris.	stormwater drain opposite the chemical waste stores was observed to be cleaned up. (CLOSED)
On Fat Lung	Oil was observed to dripping from oil containers in an alleyway between tire processing facilities.	As observed on 20 April 2021, drip tray was observed to have been placed under the oil containers. The oil containers were also observed to have been re-located away from the drainage. (CLOSED)
Baguio (General Inspection)	General refuse is observed to be overfilling the skip.	As observed on 24 March 2021, general refuse level has been reduced. (CLOSED)

6.5 March 2021

- 6.5.1 Environmental audits of WEEE.PARK, operator of Lot T7, active tenants and general EcoPark condition were carried out by the ET and the Operator on 24th March 2021. IEC random site audit was also carried out on 24th March 2021. Audit observation is summarised in **Table 6.4**.

Table 6.4 Environmental Audit Findings in March 2021

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

6.6 April 2021

- 6.6.1 Environmental audits of WEEE.PARK, operator of Lot T7, active tenants and general EcoPark condition were carried out by the ET and the Operator on 20th April 2021. IEC random site audit was also carried out on 20th April 2021. Audit observations are summarised in Table 6.5.

Table 6.5 Environmental Audit Findings in April 2021

Tenant	Item	Status
Champway	Sludge and oil spillage were observed at both the foulwater and stormwater drainage manhole near the main gate of the Lot.	As observed on 26 May 2021, sludge and oil spillage at both the foulwater and stormwater drainage manhole near the main gate of the Lot have been cleaned up. (CLOSED)

6.7 May 2021

- 6.7.1 Joint environmental audits of WEEE.PARK, operator of Lot T7, active tenants and general EcoPark condition were carried out by the ET, Operator and IEC on 26th May 2021. Audit observations are summarised in *Table 6.6*.

Table 6.6 Environmental Audit Findings in May 2021

Tenant	Item	Status
K.Wah	The emission concentration of 24-hr RSP on 6, 12, 18, 24 April 2021 were found to have exceedance of action level of 24-hour averaged RSP in the SP licence.	As observed in 24 August 2021, the 24-hour RSP levels from 24-hour RSP monitoring events are observed to have returned to below the action level. The tenant is reminded to continue provide sufficient mitigation measures, e.g increase watering intervals, to reduce RSP emission. (CLOSED)

6.8 June 2021

- 6.8.1 Environmental audits of WEEE.PARK, operator of Lot T7, active tenants and general EcoPark condition were carried out by the ET and the Operator on 23rd June 2021. IEC random site audit was also carried out on 23rd June 2021. Audit observations are summarised in *Table 6.7*.

Table 6.7 Environmental Audit Findings in June 2021

Tenant	Item	Status
Champway	Oil spillage was observed at the stormwater drainage manhole near the main gate of the Lot.	As observed on 27 July 2021, oil spillage at the stormwater drainage manhole near the main gate of the Lot has been cleared. (CLOSED)
On Fat Lung	Oil containers were observed to be storing without drip tray in the workplace area.	As observed on 27 July 2021, drip tray has been provided for the oil containers in the workplace area. (CLOSED)

6.9 July 2021

6.9.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 27th July 2021. IEC random site audit was also carried out on 27th July 2021. Audit observations are summarised in **Table 6.8**.

Table 6.8 Environmental Audit Findings in July 2021

Tenant	Item	Status
Chung Yue	Load level of the truck was observed to have exceeded the level of the side and tailboard during inspection.	As observed on 24 August 2021, the load level of the trucks was observed to have been reduced. (CLOSED)

6.10 August 2021

6.10.1 Joint environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET, Operator and IEC on 24th August 2021. Audit observations are summarised in **Table 6.9**.

Table 6.9 Environmental Audit Findings in August 2021

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

6.11 September 2021

6.11.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 16th September 2021. IEC random site audit was also carried out on 16th September 2021. Audit observations are summarised in **Table 6.10**.

Table 6.10 Environmental Audit Findings in September 2021

Tenant	Item	Status
Champway	Oil sheen was observed in the stormwater manhole near the entrance of the facility.	On 25 October 2021, the oil residue in the stormwater manhole near the entrance of the facility was observed to have been cleaned up. (CLOSED)
	Oil Sheen was observed in the stormwater surface channel near the activated carbon storage area.	On 25 October 2021, the oil residue in the stormwater surface channel near the activated carbon storage area was observed to have been cleaned up. (CLOSED)

6.12 October 2021

- 6.12.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and Operator on 25th October 2021. IEC random site audit was also carried out on 25th October 2021. Audit observations are summarised in **Table 6.11**.

Table 6.11 Environmental Audit Findings in October 2021

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

6.13 November 2021

- 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 15th November 2021. Audit observations are summarised in **Table 6.12**.

Table 6.12 Environmental Audit Findings in November 2021

Tenant	Item	Status
K. Wah	24-hour RSP level was observed to have reached 162 mg/m ³ on 27 October 2021 which exceeds action level for 24-hour RSP monitoring, as stipulated in the SP license (i.e. 100 mg/m ³). It is noted that there are no further exceedances of 24-hour RSP level in November 2021. The Tuen Mun fill bank is observed to remain at a high level which may have contributed to the high 24-hour RSP level.	As observed on 15 December 2021, 24-hour RSP levels reached 116 mg/m ³ on 20 November 2021 which exceeds the action level of 100 mg/m ³ , as stipulated in the SP license. The latest RSP monitoring record on 2 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 November 2021. The tenant has been requested to continue to strengthen mitigation measures such as increasing the frequency of water spraying. This item will be reviewed in the next inspection in January 2022. (OUTSTANDING)

6.14 December 2021

6.14.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and Operator on 15th December 2021. IEC random site audit was also carried out on 15th December 2021. Audit observations are summarised in **Table 6.13**.

Table 6.13 Environmental Audit Findings in December 2021

Tenant	Item	Status
Champway	The surface channel near the filter press is observed to have oil sheen.	This item will be reviewed in the next inspection in January 2022. (OUTSTANDING)
HK Biomass	Dusty materials have been observed to be stockpiled in an open area without any dust mitigation measures.	This item will be reviewed in the next inspection in January 2022. (OUTSTANDING)
	Non-road mobile machinery (“NRMM”) are observed to be without NRMM labels as required by the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation (Cap. 311Z).	This item will be reviewed in the next inspection in January 2022. (OUTSTANDING)
HP Telford	Non-road mobile machinery (“NRMM”) are observed to be without NRMM labels as required by the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation (Cap. 311Z).	This item will be reviewed in the next inspection in January 2022. (OUTSTANDING)

7 ENVIRONMENTAL COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTION

7.1 Summary of Summons and Prosecutions

- 7.1.1 No complaint, notifications of summons or successful prosecutions related to recycling activities was received in the reporting year.

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, the operator of the Lot T7, and eight active tenants (Champway, HP Telford, Hong Kong Biomass, Chung Yue, K.Wah, E.Tech, On Fat Lung and HKBRC) 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 fifteenth (15th) annual EM&A report prepared for the operation phase of EcoPark and covers the calendar year of 2021. 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. By the end of the reporting year, Alba Integrated Waste Solutions (Hong Kong) Ltd. (Alba IWS) for WEEE,PARK and eight active tenants (Champway, HK Biomass, HP Telford, Chung Yue, K.Wah, E.Tech, On Fat Lung and HKBRC) are carrying full recycling activities within their lots.
- 9.1.3 The lease of 3R at Lots T2 & T3 were terminated and returned to EPD in February 2021. Operator of Lot T7 (FWMG of EPD) returned the lot to EPD in June 2021. After testing and commission, HKBRC commenced full operations in July 2021. Baguio carried out construction works and machinery installation works in 2021 but without any site operation. Operator of Lot P12 (Organic Tech) and Lots T8-T11 (Jardine Engineering) had taken possession of their lots during Q4 of the reporting year but without any site operation.
- 9.1.4 The throughputs of WEEE.PARK, the operator of the Lot T7 and the eight 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	28,998	11,809	7,502
Waste Ferrous Metals	137,287	135,865	966
Waste Wood	2,024	1,081	-
Waste Electronics	25,501	22,383	2,980
Waste Plastics	2,995	2,427	-
Construction Waste	28,148	78,892	171
Waste Glass	7,247		
Waste Rubber Tyres	2,221	1,565	-

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.

- 9.1.5 LFG monitoring was undertaken on 23rd February 2021, 26th May 2021, 24th August 2021, 15th November 2021 and at five locations (three in Phase 1 and two in Phase 2). Exceedance of Action Level was not recorded.
- 9.1.6 The quarterly monitoring of LFG is considered as sufficient and effective in accordance with *Section 6.4.4* of the EM&A Manual.
- 9.1.7 No complaint, notifications of summons or prosecutions related to recycling activities was received in the reporting year.
- 9.1.8 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.
- 9.1.9 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 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	2,833	1,125	726
December 2021	n/a	n/a	n/a
Total	28,998	11,809	7,502

Table A3.1-2 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	n/a	n/a	n/a
Total	137,287	135,865	966

Table A3.1-3 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	n/a	n/a	n/a
Total	2,024	1,081	-

Table A3.1-4 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	2,196	346
December 2021	n/a	n/a	n/a
Total	25,501	22,383	2,980

Table A3.1-5 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	n/a	n/a	n/a
December 2021	n/a	n/a	n/a
Total	2,995	2,427	-

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 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	n/a	n/a	n/a	n/a
Total	28,148	7,247	78,892	171

Table A3.1-7 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	373	205	-
November 2021	242	180	-
December 2021	n/a	n/a	n/a
Total	2,221	1,565	-

Notes:

- 1) The throughput data presented in **Tables A3.1-1 to A3.1-7** 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.
- 6) The throughput data marked with “*” have been revised with updated data since submission of corresponding quarterly EM&A reports.

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)
June 2020	948	647	236
July 2020	891	768	162
August 2020	1114	640	249
September 2020	1598	640	395
October 2020	2296	986	592
November 2020	2404	932	623
December 2020	2830	1021	746

Table A3.2-2 Recycling of Waste Ferrous Metal

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
December 2020	13,320	11,085	81

Table A3.2-3 Recycling of Waste Wood

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
December 2020	93	70	-

Table A3.2-4 Recycling of Waste Electronics

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
October 2020	2,227	1,943	249
November 2020	2,219	1,986	260
December 2020	2,156	1,822	273

Table A3.2-5 Recycling of Waste Plastic

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
December 2020	200	124	-

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

Date	Waste Input (tonnes)		Product Output (tonnes)	Waste Disposal (tonnes)
	Construction Waste	Glass		
December 2020	2,974	583	7,426	4

Table A3.2-7 Recycling of Waste Rubber Tyres

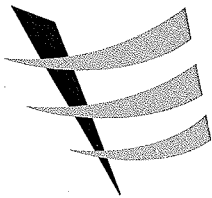
Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2020	51	40	-
February 2020	65	50	-
March 2020	56	21	-
April 2020	91	50	-
May 2020	83	42	-
June 2020	69	50	-
July 2020	149	60	-
August 2020	211	70	-
September 2020	205	120	-
October 2020	192	65	-
November 2020	201	80	-
December 2020	193	160	-

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



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

Laboratory Information

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

Calibration Condition

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

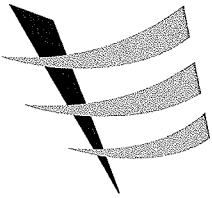
Calibration Result (CO₂)

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: Mark
(Technician)

Approved Signatory: Geung Lung

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>23 February 2021</i>																	
EP1-1	Inside the landscaping area of Administration Building	Sunny	24	9:53	9:55	0.0	0.0	20.9	< 0.1	1015	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		24	9:48	9:50	0.0	0.0	20.9	< 0.1	1015							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		24	9:44	9:46	0.0	0.0	20.9	< 0.1	1015							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		24	9:38	9:40	0.0	0.0	20.9	< 0.1	1015							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		24	9:40	9:42	0.0	0.0	20.9	< 0.1	1015							Nil
<i>26 May 2021</i>																	
EP1-1	Inside the landscaping area of Administration Building	Drizzle	31	10:10	10:12	0.0	0.0	20.9	< 0.1	1009	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		31	10:35	10:37	0.0	0.0	20.9	< 0.1	1009							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		31	10:31	10:33	0.0	0.0	20.9	< 0.1	1009							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		31	10:15	10:17	0.0	0.0	20.9	< 0.1	1009							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		31	10:26	10:28	0.0	0.0	20.9	< 0.1	1009							Nil
<i>24 August 2021</i>																	
EP1-1	Inside the landscaping area of Administration Building	Sunny	28	10:00	10:02	0.0	0.0	20.9	< 0.1	1008	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		28	10:26	10:28	0.0	0.0	20.9	< 0.1	1008							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		28	10:25	10:27	0.0	0.0	20.9	< 0.1	1008							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		28	10:05	10:07	0.0	0.0	20.9	< 0.1	1008							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		28	10:15	10:17	0.0	0.0	20.9	< 0.1	1008							Nil
<i>15 November 2021</i>																	
EP1-1	Inside the landscaping area of Administration Building	Sunny	22	9:46	9:48	0.0	0.0	20.9	< 0.1	1013	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		22	10:02	10:04	0.0	0.0	20.9	< 0.1	1013							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		22	9:59	10:01	0.0	0.0	20.9	< 0.1	1013							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		22	9:50	9:52	0.0	0.0	20.9	< 0.1	1013							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		22	9:53	9:55	0.0	0.0	20.9	0.4	1013							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
23 Feb 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1015
26 May 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1009
24 Aug 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1008
15 Nov 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1013

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
23 Feb 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1015
26 May 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1009
24 Aug 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1008
15 Nov 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1013

EPI-3

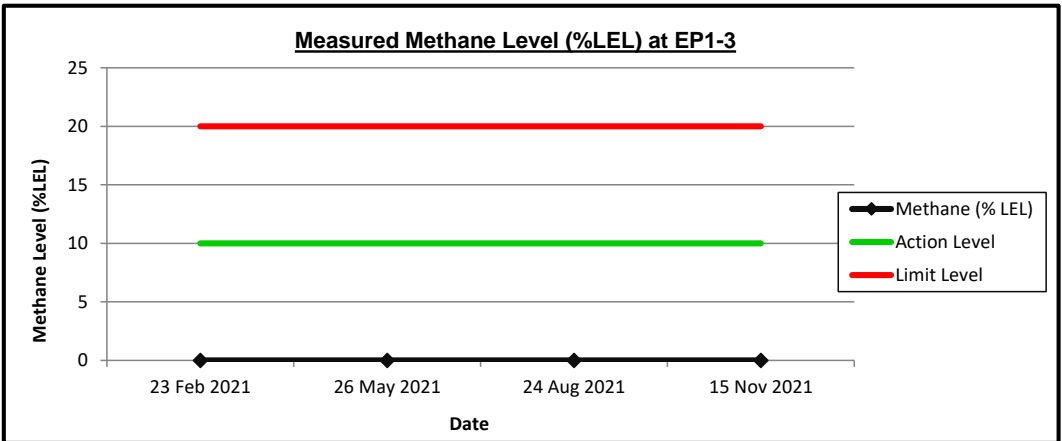
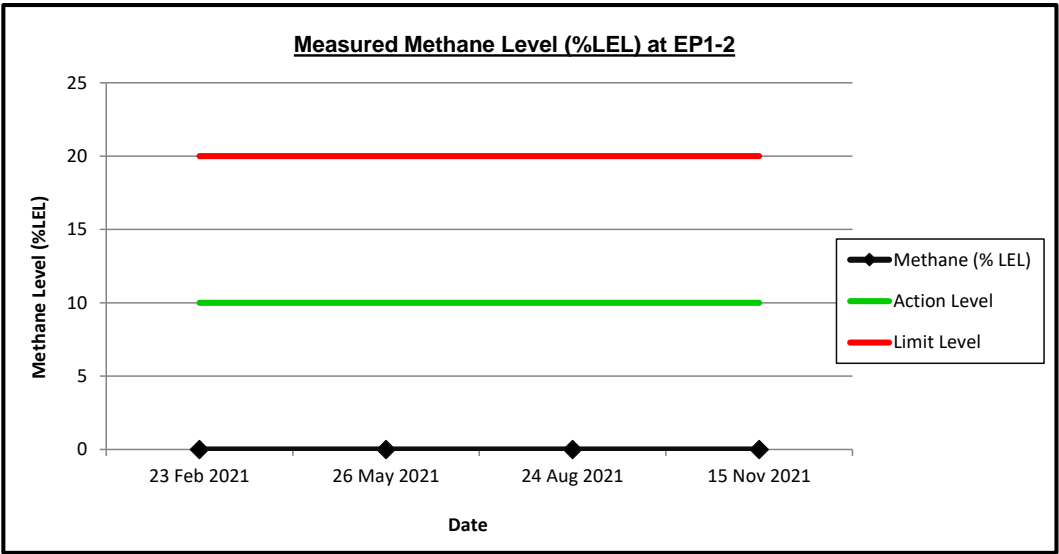
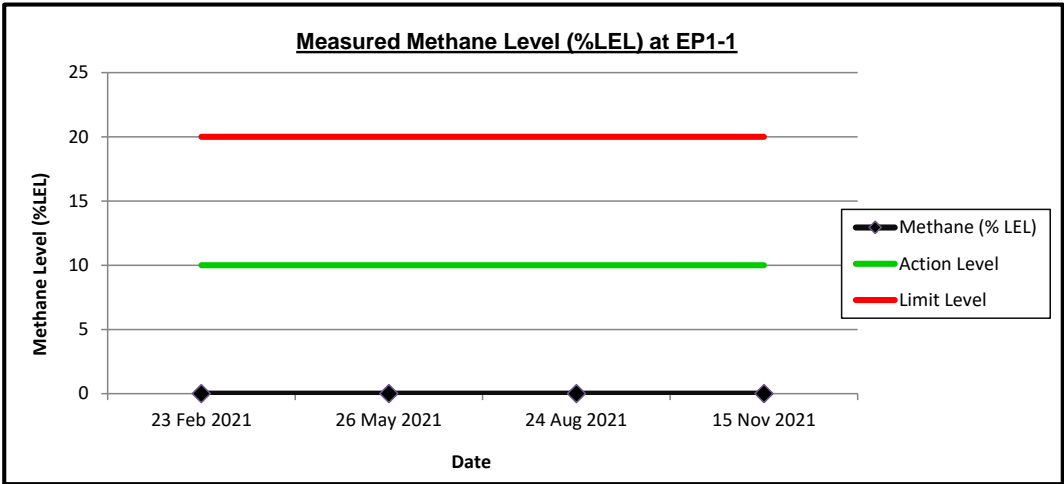
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
23 Feb 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1015
26 May 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1009
24 Aug 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1008
15 Nov 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1013

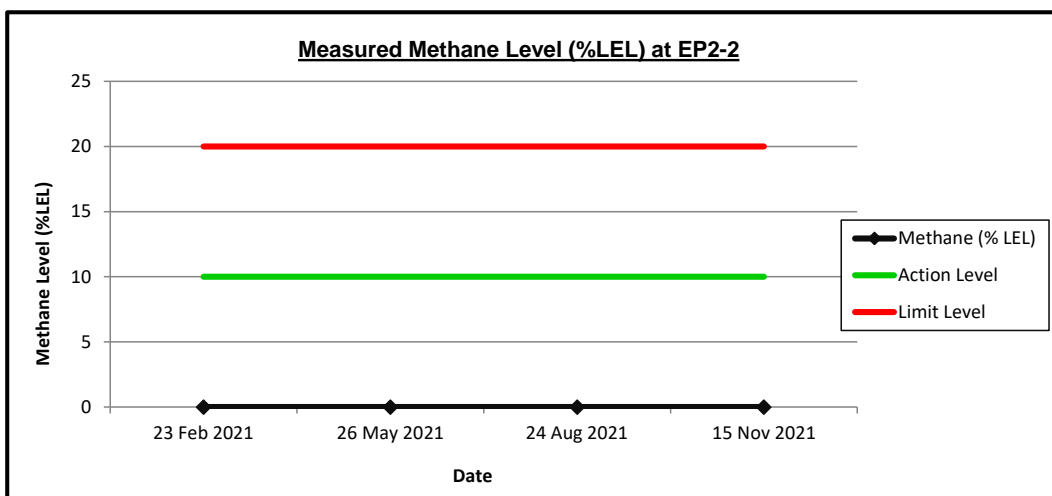
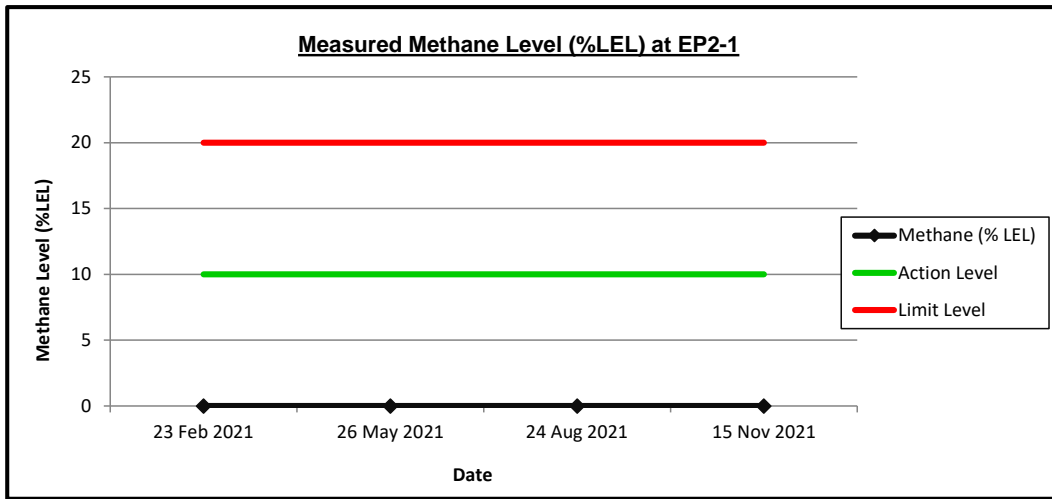
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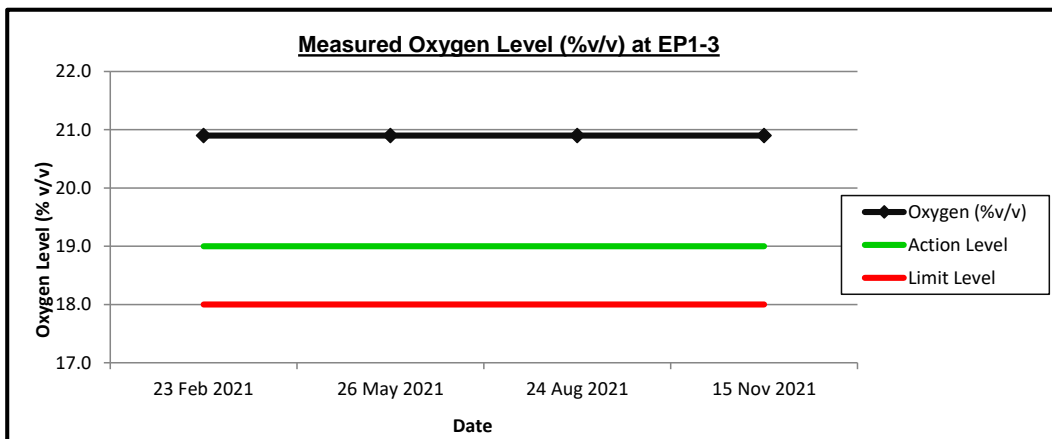
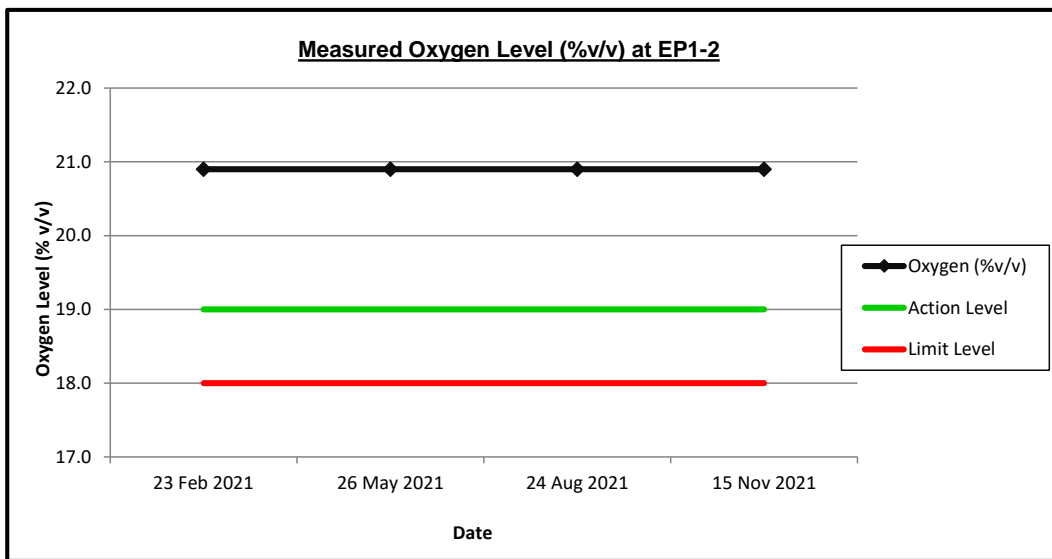
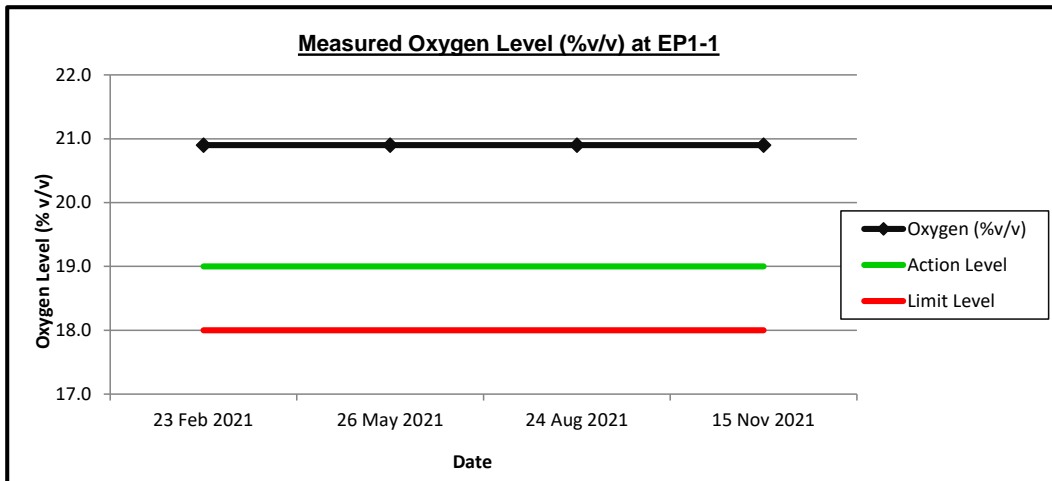
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
23 Feb 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1015
26 May 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1009
24 Aug 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1008
15 Nov 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1013

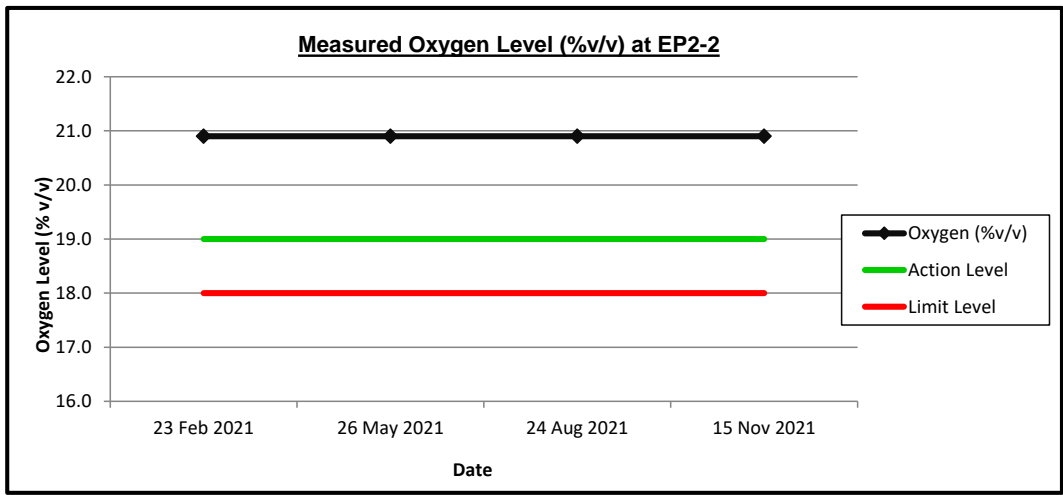
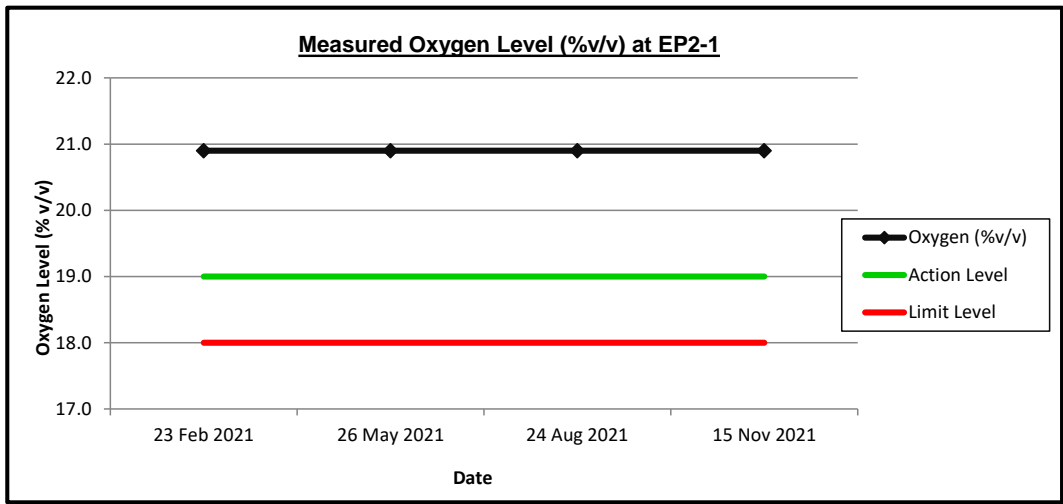
EP2-2

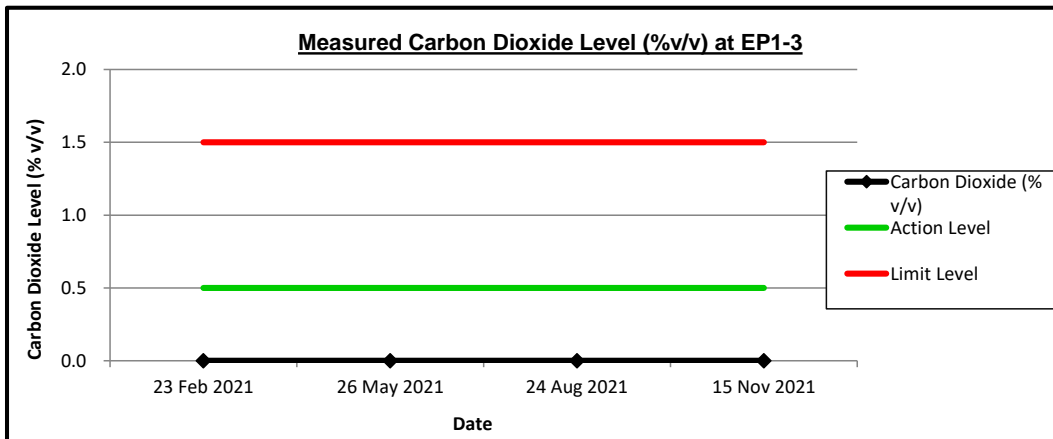
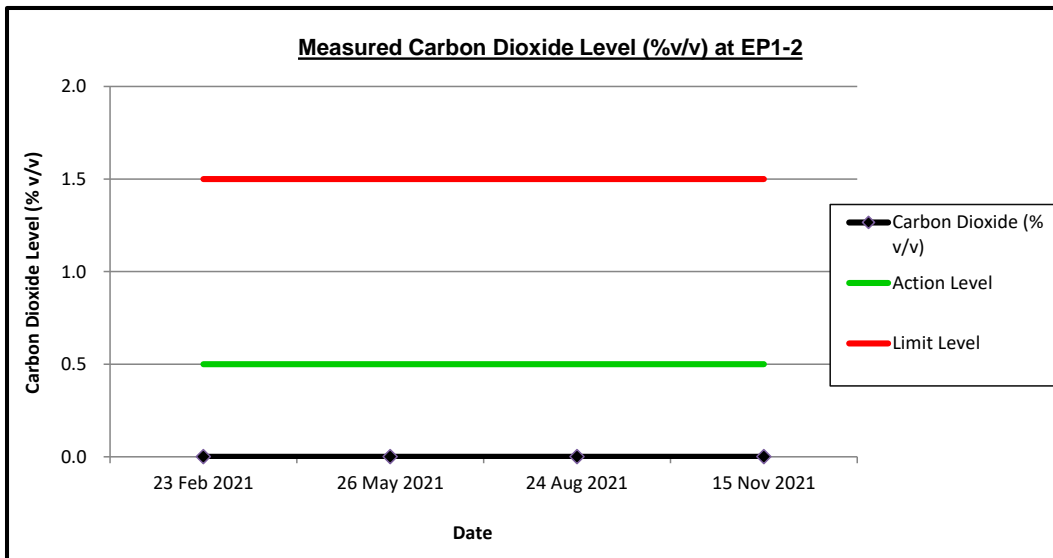
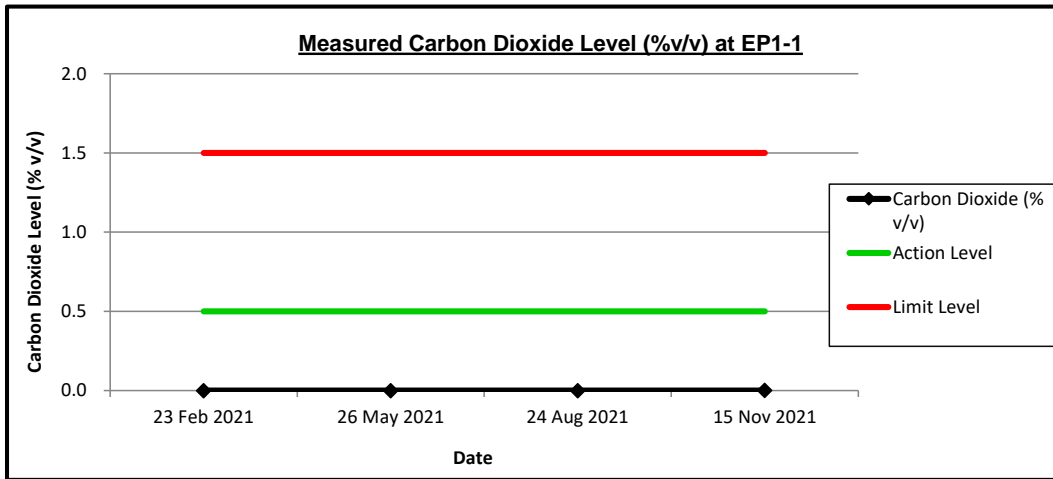
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
23 Feb 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1015
26 May 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1009
24 Aug 2021	0	10	20	20.9	19	18	< 0.1	0.5	1.5	1008
15 Nov 2021	0	10	20	20.9	19	18	0.4	0.5	1.5	1013

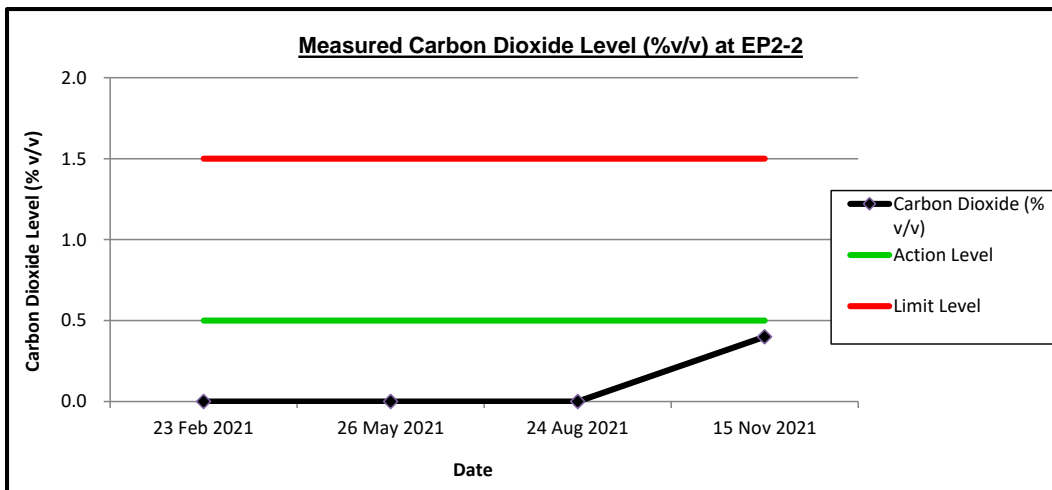
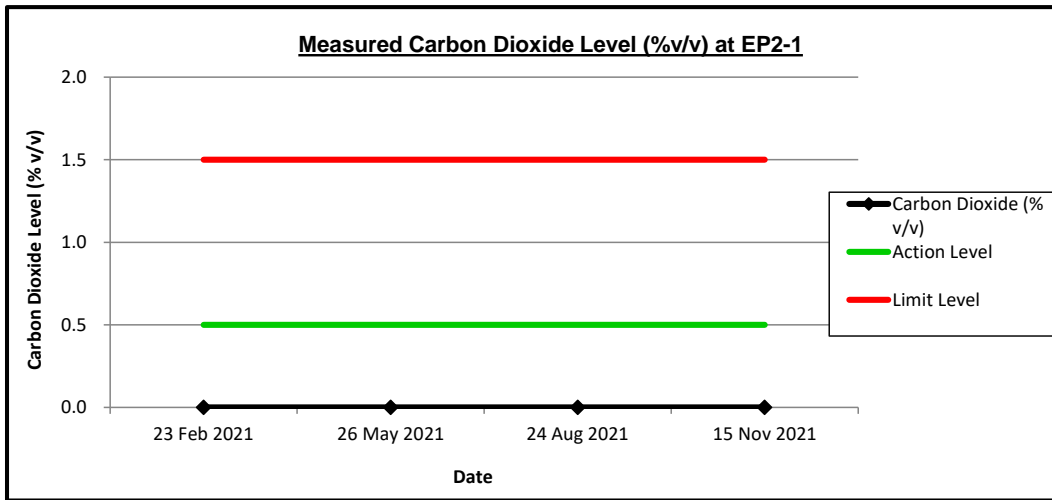












Remark: All <0.1%v/v for carbon dioxide is regarded as 0.0%v/v in graphical presentation

