

ALBA Integrated Waste Solutions (Hong Kong) Limited


Contract No. EP/SP/69/12

**Technical Note for Extension of Boiler Operation Hours
at Lot P4 at Eco Park from 1 Jan 2022 to 31 Dec 2023**

Issue No. 1

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1. INTRODUCTION

1.1. Background and Purpose

- 1.1.1. EcoPark has been developed in Tuen Mun Area 38 (see *Figure 1.1*) in two phases (Phase 1 and Phase 2) with a total area of around 20 hectares, of which 14 hectares of land can be rented to tenants to carry out recycling and related activities. EcoPark aims 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.
- 1.1.2. EcoPark has been in operation since 2007 with tenants recycling waste cooking oil, waste metals, waste wood, Waste Electrical and Electronic Equipment (WEEE), waste plastics, waste lead-acid batteries, Construction and Demolition (C&D) waste, waste glass, waste rubber tyres, and etc.
- 1.1.3. EcoPark is a Designated Project (DP) under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) and an Environmental Impact Assessment (EIA) Report together with an Environmental Monitoring and Audit (EM&A) Manual were prepared for EcoPark in 2005. EcoPark is governed under Environmental Permit (EP) No. EP-226/2005/G, which was issued to the Director of Environmental Protection (the Director, or the Permit Holder). Therefore, all recycling facilities in EcoPark are subject to this EcoPark EP.
- 1.1.4. A diesel fuel boiler was installed by the operator at Lot P4 of EcoPark in 2017 to provide process steam for one of the recycling processes being carried out at the premises. In order to increase the handling capacity of the processing line, the operator of the Lot P4 of EcoPark proposed to extend the operation hours of the boiler and associated treatment lines in 2018 from the 0700 hrs to 1900 hrs stated in the EP to 24 hours per day operation, 7 days a week. As stipulated in EP-226/2005/G, Part C, Condition 4.4, a detailed proposal should be submitted for approval by the Director of the Environmental Protection for any chimney emissions outside the 0700 hrs to 1900 hrs period. EPD's approval were given to operate the boiler with night-time emissions (1900 hrs to 0700 hrs) at Lot P4 of EcoPark for the period from 20 September 2018 to 30 June 2019, and the approval was further extended to 31 May 2020 and 31 May 2022 respectively. EPD's approval letters are appended to *Appendix A* for reference.
- 1.1.5. In order to continue the operation of the boiler at Lot P4 for 24 hours per day beyond

31 May 2022, this new Technical Note is prepared, which will be submitted under Condition 4.4 of the above EP, and shall be taken into consideration for the approval by the Director.

1.2. Proposed Boiler Installation

- 1.2.1. The location of the Lot P4 of EcoPark and its environs is shown on **Figure 1.1**. The plant has a nominal capacity of 30,000 tonnes/year (i.e. 2,500 tonnes/month). The existing boiler in Lot P4 is located indoors, and its location is shown on **Figure 1.2** with the photograph showing its condition.
- 1.2.2. Specifications of the existing boiler are provided in **Appendix B** and summarised in **Table 1-1**.

Table 1-1 Diesel Fuel Boiler Parameters

Parameter	Description
Manufacturer	CERTUSS Dampfautomaten GmbH, Model Junior 500 SC
Fuel	Ultra-Low Sulphur Diesel (ULSD) $\leq 0.005\%$ sulphur by weight
Fuel Storage	Underground ULSD Storage Tank to the south of the Lot P4 building
Fuel Consumption	37L/h
Steam Capacity	500kg/h
Existing Operating Hours Approved by EPD	19:00 to 07:00 approved until 31 May 2022
Proposed Operating Hours	19:00 to 07:00 from 1 Jan 2022 – 31 Dec 2023

- 1.2.3. The boiler, shown on **Figure 1.2**, is located outside the “Chimney Restricted Area” as shown on **Figure 1.3**, within which no chimney could be installed as per the approved EIA report. Hence, the existing chimney of the boiler is in compliance with EP Condition 4.3. In addition, the underground storage tank for ULSD with a maximum capacity of 10,000 litres is located around 47m from the EcoPark site boundary and therefore complies with EP Condition 4.9, which prohibits dangerous goods, including diesel, to be stored within 10m from the EcoPark boundary. The underground storage tank for

ULSD is also located >15m from the nearest adjacent tenant lot and therefore complies with paragraph 10.3.4 of the EIA.

1.2.4. The parameters of fuel combustion are restricted by the approved EIA of EcoPark and those of the existing boiler are summarised in **Table 1-2**, below, and the detailed calculations of the maximum emission rates of different pollutants according to AP-42 of USEPA (i.e. Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition by the United States Environmental Protection Agency (USEPA) are shown in **Appendix C**.

Table 1-2 Parameters Restricted by the Approved EIA and Those of the Existing Boiler in Lot P4 of EcoPark

Physical Parameter	Values Restricted by Approved EIA	Boiler in Lot P4
Stack height (metre above ground)	≥30	13.2
Stack diameter (mm)	≥1,000	150
Efflux velocity (m/s)	≥9	7.19
Exit temperature (°C)	≥80	190
Sulphur content (% w/w)	<0.005	<0.005
ULSD (l/hr)	≤7,500	≤37
Pollutant Identified in the EIA	Emissions	
	Limited in EIA (g/s)	Boiler in Lot P4 (g/s) ^[Note]
PM	0.5000	0.0025
SO ₂	0.1963	0.0009
NO _x	6.0000	0.0296
CO	1.2500	0.0062
Note:		
1. Boiler emission data is made reference to <i>Supporting Information for Design Audit for Proposed Boiler for WEEE Treatment Facility at EcoPark (October 2017)</i>		
2. PM (particulate matter) is assumed to be equivalent to TSP – Total Suspended Particulates as a conservative approach in terms of emission		

3. As a conservative approach, respirable Suspended Particulates (RSP) and fine Suspended Particulates (FSP) are both assumed to = TSP as a worst-case scenario, with emission factor of TSP = 0.0025g/s

1.3. Fuel Combustion Emission Identified in EIA

- 1.3.1. The exhaust vent and the fuel combustion of the boiler has, by strict interpretation of the EP conditions, deviated to some extent from the base case listed in Table 13.1 of the EIA Report and Annex A of the EP. Nevertheless, a PRC/DA mechanism certified by the EcoPark ET Leader and verified by the EcoPark Independent Environmental Checker (IEC) was carried out to review the exhaust vent of the boiler prior to the trial operation at Lot P4 of EcoPark in October 2017.
- 1.3.2. Owing to the further proposed extension of boiler operation from 0700 hrs to 1900 hrs to 24 hours per day operation, 7 days a week, further air quality impact assessments were carried out in September 2018, June 2019 and May 2020, and the relevant results were mentioned in Technical Note 2018, 2019 and 2020. The result of the quantitatively air quality assessment revealed that the proposed changes would not cause any adverse impacts to the surrounding environment.

1.4. Review of Environmental Impacts

- 1.4.1. A number of environmental impacts were assessed in the approved EIA Report in 2005 (EIA Register No. AEIAR-086/2005), including air quality impact, noise impact, water quality impact, waste management, land contamination impact, landfill gas hazard assessment, landscape and visual issues and hazard to life assessment. For the continued extension of boiler operation hours during night time (i.e. 1900 hrs to 0700 hrs), air quality is the only concern and this is examined in detail in the remainder of this Technical Note. As the applicable change is for chimney emissions only, it is necessary for its air quality impact to be assessed to meet the following requirements:
- (a) There has been no material change to the environmental impact of the project with mitigation measures in place as approved under the EIA report; and
 - (b) The project complies with the requirements described in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).
- 1.4.2. The boiler at Lot P4 of EcoPark is located indoors in a roofed building sitting on a concrete slab as shown on **Figure 1.2**. There are also no noise sensitive receivers

identified in proximity. There is no wastewater discharge during the operation of the boiler. Therefore, it could be concluded that the extended operation hours of the boiler would not cause additional adverse impacts in terms of noise pollution, water quality, land contamination, landfill gas and landscape and visual and hazard to life.

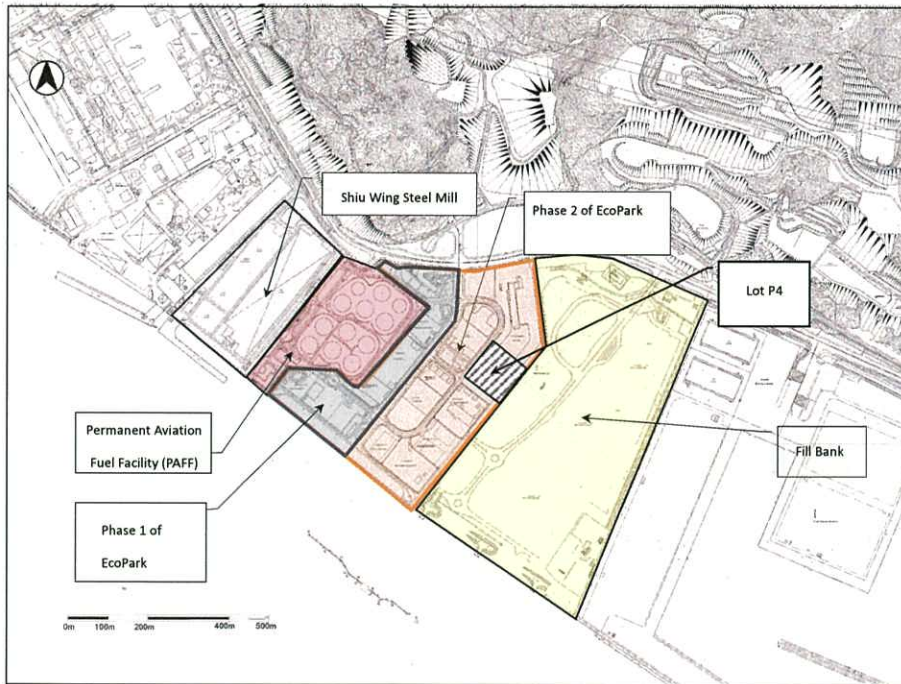
- 1.4.3. In order to evaluate the air quality impacts due to the proposed extension operation hours of the existing boiler of Lot P4 of EcoPark, the latest assessment results in the *Environment Review for Operation of Fill Bank at Tuen Mun Area 38* (the “ERFB 2021”) dated 3 Dec 2021, prepared for the Civil Engineering and Development Department (CEDD), has been referred to.
- 1.4.4. Other environmental impacts, including noise, water quality, waste management, land contamination, landfill gas hazard, landscape and visual issues and hazard to life will not be affected by the proposed extension of boiler operation hours. Therefore, such impacts are not required to be reviewed in this Technical Note.

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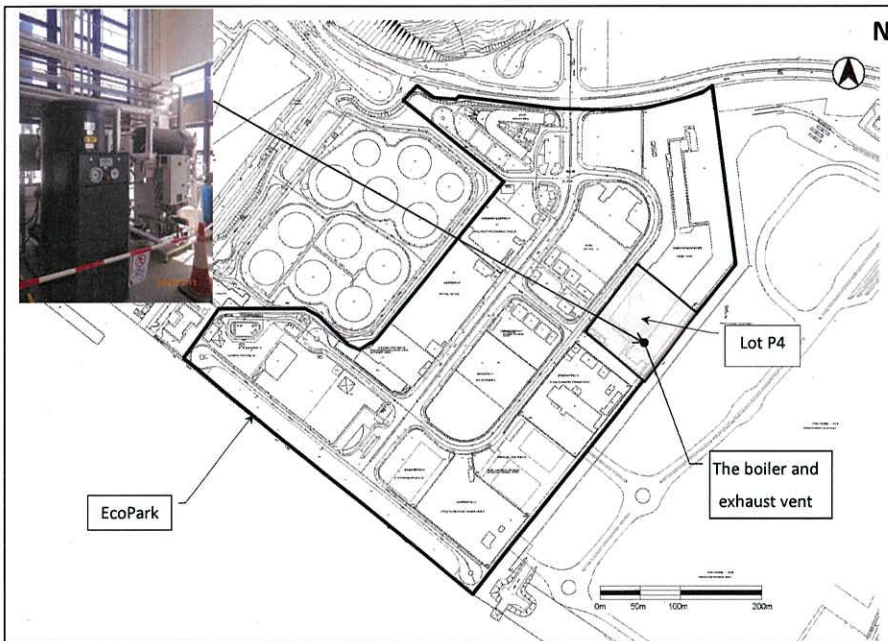
Figure 1.1 Site Location and Its Environs

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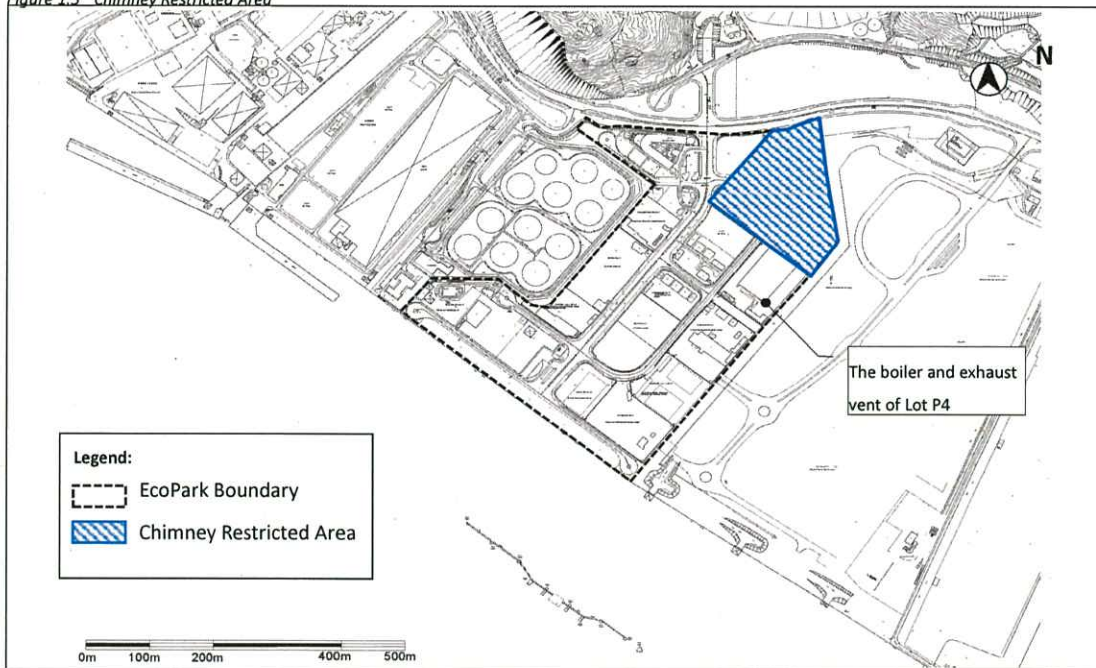
Figure 1.2 Location of the Existing Boiler of Lot P4



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Figure 1.3 Chimney Restricted Area



Source: Re-provided in accordance with Figure 4 of EP-226/2005/G.

2. ASSESSMENT CRITERIA

2.1. Environmental Legislation and Standards

Air Pollution Control Ordinance

2.1.1. The Air Pollution Control Ordinance (APCO, Cap. 311) provides the statutory controls of air pollutants from a variety of stationary and mobile sources. It encompasses the Air Quality Objectives (AQOs) for seven air pollutants. The AQOs criteria applicable are shown in **Table 2-1**.

Table 2-1 Hong Kong Air Quality Objectives

Pollutant	Averaging Time	Concentration Limit, $\mu\text{g}/\text{m}^3$	No. of Exceedance Allowed
Sulphur Dioxide (SO_2)	10-minutes	500	3
	24-hour	125	3
Respirable Suspended Particulates (RSP)(PM10) [Note 2]	24-hour	100	9
	Annual	50	Not Applicable
Fine Suspended Particulates (FSP)(PM2.5) ^[Note 3]	24-hour	75	9
	Annual	35	Not Applicable
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual	40	Not Applicable
Ozone (O_3)	8-hour	160	9
Carbon Monoxide (CO) ^[Note 4]	1-hour	30,000	0
	8-hour	10,000	0
Lead (Pb)	Annual	0.5	Not Applicable

Notes:

- All measurements of the concentration of gaseous air pollutants, i.e., sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.
- RSP means suspended particles in air with a nominal aerodynamic diameter of 10 μm or less.
- FSP means suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less.

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4. The 8-hour mean of CO concentration is calculated based on Item 9 of Schedule 5 of APCO. The maximum daily 8- hour mean concentration of CO in air is selected by examining 8-hour running averages, calculated from CO hourly data and updated each hour, that is:
- (a) the first calculation period for a day is the period from 5pm on previous day to 1 a.m. on that day.
 - (b) the last calculation period for a day is the period from 4pm to 12 midnight on that day.

3. AIR QUALITY ASSESSMENT

3.1. Assessment Methodology & Emission Inventory

3.1.1. Tuen Mun Fill Bank (TMFB) serves as a temporary stockpiling area for public fill generated from construction works and is one of the Designated Waste Disposal Facilities under the Waste Disposal Ordinance (WDO). In accordance with the requirements in Condition 3.28 of the Environmental Permit (EP-210/2005/D) of the Fill Bank at Tuen Mun Area 38 (TMFB), an Air Quality Impact Assessment (AQIA) review is carried out annually during the TMFB extended operation from 2019 to 2023. Therefore, reference is made to the latest cumulative pollutants results associated with the extended operation (i.e. 2019 to 2023) of TMFB from 1 January 2022 to 31 December 2023 extracted from the ERFB 2021.

3.1.2. The assumptions made in Sections 3.5 and 3.6 of the ERFB 2021 for estimating the cumulative air quality impacts arising from the emission sources includes the followings:

Within TMFB:

- Dust emissions from the TMFB operational activities.
- Vehicular emissions from internal roads within TMFB.
- Emission from site crusher and marine vessels during berthing and maneuvering for exporting and importing fill materials.

In the Vicinity of TMFB:

- Stack emissions from nearby industrial sites including Green Island Cement (GIC), Castle Peak Power Station (CPPS) and Shiu Wing Steel Mill (SWSM).
- Existing emissions from the plants in EcoPark including Lot P4, SSK Metal Ltd., K.Wah Recycled Block Manufacturing Plant, as well as other planned tenants including a pilot biochar facility within EcoPark as shown on **Figure 3.2**.
- Vehicular emissions from external roads within 500m Study Area of TMFB.
- Emissions from the existing Construction and Demolition Materials Sorting Facility (C&DMSF) and marine vessels during berthing and maneuvering for material transport at the berth next to C&DMSF.

3.1.3. **Figure 3.1** and **Figure 3.2** show the locations of emission sources associated with TMFB Operation were included in the cumulative air quality assessment, and those in the vicinity of TMFB, respectively as extracted from the ERFB 2021.

- 3.1.4. The air quality cumulative results assessed from 1 January 2022 to 31 December 2023 in the ERFB 2021 was considered as the best available information that could make reference to during the time of assessment. The relevant results were extracted and summarised in **Table 3-3**.
- 3.1.5. The air quality impact arising from the extension of operation hours of the boiler at Lot P4 and potential emissions from EcoPark from 1 January 2022 to 31 December 2023 were assessed in the ERFB 2021. According to Chapter 3.6.4.2 and Annex B of the ERFB 2021 (Appendix C of this technical note), Waste Reduction Group (WRG) of EPD has been consulted with regard to the tenant conditions and potential emissions with EcoPark during the Review Period.
- 3.1.6. For the background air quality, the following are key approaches adopted in the ERFB 2021:
1. For the assessment of NO₂ impact avoiding double counting of NO_x emissions, the PATH-2016 model in 2020 was re-run to exclude NO_x emissions from road traffic and industrial emissions (i.e. GIC) within the Study Area and marine emissions off the coast of EcoPark and TMFB (Grid 15,38). The rerun hourly average NO₂ concentrations were adopted as the background NO₂ levels.
 2. The hourly RSP and SO₂ concentrations in 2020 extracted from the EPD's PATH-2016 model (i.e., unmodified PATH-2016) were adopted as the background levels.
 3. In accordance with EPD's *Guidelines on Choice of Models and Model Parameters*, the 24- hour average RSP background concentrations were adjusted by added with 26.5 µg/m³. Similarly, the annual average RSP background levels were adjusted by added with 15.6 µg/m³.
 4. The 24-hour average FSP background concentrations were estimated by multiplying the 24- hour average RSP background concentrations with 0.75 and the annual average FSP background concentrations were estimated by multiplying the annual average RSP background concentrations with 0.71. This approach was referred to EPD's *Guidelines on the Estimation of PM_{2.5} for Air Quality Assessment in Hong Kong*.
- 3.1.7. The other modelling assumptions in details can be referred to Section 3.6 of the TMFB ERFB 2021.

3.2. Representative Air Sensitive Receivers

3.2.1. There were totally twelve existing and/or planned ASRs identified within the 500m Study Area of TMFB. The ASRs being assessed are listed in **Table 3-1**, and the locations of these ASRs are shown on **Figure 3.3**.

Table 3-1 Identified Representative ASRs

ASR ID	Description	Type of Use	Approx. Distance from Site Boundary (m)	Approx. Base Elevation (m)	Height Above Ground (m)
A1	Eco Park Tenant: HP Telford	Industrial	224	6	7.5
A2	Eco Park Tenant: Baguio	Industrial	368	5	7.5
A3	Eco Park Tenant: Lot P4	Industrial	50	5	10
A4	Eco Park Tenant: South China	Industrial	85	5	10
A5	Eco Park Tenant: Chung Yue	Industrial	103	5	4.5
A6	Eco Park K.Wah	Industrial	75	5	4.5
A7	Eco Park Tenant: HK Battery Recycling Centre	Industrial	131	5	10
A8	Eco Park Tenant: E-Tech	Industrial	163	5	10
A9	Eco Park Administration Building	Industrial	267	6	10
A10	PAFF Office	Industrial	474	5	10
A11	Proposed Modern Logistics Development at Tuen Mun Area 49 [Note1]	Industrial	81	10	10

A12	Eco Park Tenant: On Fat Lung	Industrial	116	5	7.5
Note:					
1) ASR A11 is a planned development that may become operative within the Review Period, i.e. between Jan 2022 – Dec 2023.					

3.3. Evaluation of Impacts

3.3.1. With reference to the latest ERFB 2021, the predicted cumulative TSP, RSP, FSP, SO₂ and NO₂ concentrations at the ASRs would comply with the relevant AQO criteria. Although the Carbon Monoxide (CO) levels were not assessed in the ERFB 2021 Report, the air quality impact due to CO is relatively minor because of the following reasons:

- 1) the ambient CO levels measured in Hong Kong are generally very low compared with the AQO criteria in accordance with EPD's air quality monitoring stations. **Table 3-2** shows the highest 1-hour and 8-hour average CO concentrations extracted from the EPD's *Annual Air Quality in Hong Kong Reports* from 2016 to 2020. It indicated that the highest 1-hour and 8-hour average CO concentrations across all air quality monitoring stations are all far below their corresponding AQO limits.

Table 3-2 Highest 1-hour and 8-hour Average Carbon Monoxide Records in Hong Kong from 2016 – 2020

Year ^[Note 1]	Highest 1-hour Average CO (µg/m ³)	Highest 8-hour Average CO (µg/m ³)
2016	3,130	2,339
2017	2,420	2,156
2018	2,610	2,047
2019	2,620	2,309
2020	2,850	1,685
AQO Limits	30,000	10,000

Note:

1. Data were extracted EPD's *Air Quality Annual Reports* from 2016 – 2020, source: <https://www.aqhi.gov.hk/en/download/air-quality-reports77ba.html?start=1>

- 2) the CO emission from the Lot P4 ULSD boiler would be minimal. Therefore, adverse impact due to CO is not anticipated and CO is not assessed in this Technical Note.

- 3.3.2. The detailed emission inventory within the TMFB, as well as those located at its vicinity including the emissions within EcoPark are summarised in **Appendix C**.
- 3.3.3. The assessment results are summarised in **Table 3-3 and 3-4**, below, which indicated that the cumulative impacts of all pollutants at ASRs between 1 January 2022 to 31 December 2023 are in compliance with their corresponding AQO criteria.

3.4. Assessment Results

- 3.4.1. The cumulative air quality assessment has demonstrated that all ASRs within 500m of the project are able to meet the AQOs considering the actual emission inventory in place, thereby meeting the requirements described in the EIAO-TM. The assessment was conducted based on the best available information for the worst-case scenario. In addition, the total emission rates of EcoPark are still within the limits of Annex A of the EP-226/2005/G, i.e. no material change to the environmental impact of EcoPark as assessed in the EIA Report approved under the EIAO.
- 3.4.2. In addition, as advised by Waste Reduction Group (WRG) of EPD, the emission inventories of EcoPark adopted in this cumulative air quality assessment would remain valid up to December 2023. Should the operation condition and emissions associated with TMFB, adjacent industrial emissions outside EcoPark, ASR locations and etc remain unchanged, the current assessment results conducted should also be valid through to December 2023.

3.5. Conclusion

- 3.5.1. All air quality impacts associated with chimney emissions from the existing diesel fuel boiler at Lot P4 due to the proposed extension of operation hours of the boiler have been assessed based on the best available information for the worst-case scenario. As such, the air quality impacts between 1 January 2022 to 31 December 2023 will be within the relevant environmental standards set out in the approved EIA report and the EIAO-TM.
- 3.5.2. As discussed in Section 3.4.2, the emission inventories in EcoPark adopted in this assessment would remain valid to December 2023. Should operation condition and emissions outside of EcoPark remain unchanged, there will be no adverse air quality impact due to the proposed 24 hours per day, seven days per week operation of the existing boiler at Lot P4 between 1 January 2022 and 31 December 2023.

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Table 3-3 Cumulative Impacts of NO₂, TSP, RSP and FSP at Worst Affected Heights of ASRs in 2022 and 2023

ASR ID	Description	Year	19 th Highest Hourly NO ₂ (µg/m ³)	Annual NO ₂ (µg/m ³)	Max 1-hr TSP (µg/m ³)	10 th Highest Daily RSP (µg/m ³)	Annual RSP (µg/m ³)	10 th Highest Daily FSP (µg/m ³)	Annual FSP (µg/m ³)
A1	Eco Park Tenant: HP Telford	2022	135.72	36.19	213.19	84.30	37.97	62.53	26.30
		2023	135.56	35.95	213.25	84.31	37.97	62.53	26.30
A2	Eco Park Tenant: Baguio	2022	134.74	37.35	203.50	89.84	40.17	66.19	28.41
		2023	134.74	37.30	203.50	89.84	40.17	66.19	28.41
A3	Eco Park Tenant: Lot P4	2022	142.08	36.47	331.13	86.05	38.51	63.75	26.55
		2023	141.35	36.09	331.14	86.05	38.50	63.74	26.55
A4	Eco Park Tenant: South China	2022	145.56	38.44	368.52	94.51	43.47	67.72	29.07
		2023	145.26	38.38	368.56	94.53	43.48	67.73	29.07
A5	EcoPark Tenant: Chung Yue	2022	141.00	38.47	449.14	93.53	43.03	65.89	28.45
		2023	140.93	38.43	449.18	93.54	43.04	65.90	28.45
A6	Eco Park K.Wah	2022	139.32	38.25	440.11	96.32	45.12	69.66	30.11
		2023	139.57	38.19	440.09	96.32	45.13	69.67	30.12

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ASR ID	Description	Year	19 th Highest Hourly NO ₂ (µg/m ³)	Annual NO ₂ (µg/m ³)	Max 1-hr TSP (µg/m ³)	10 th Highest Daily RSP (µg/m ³)	Annual RSP (µg/m ³)	10 th Highest Daily FSP (µg/m ³)	Annual FSP (µg/m ³)
A7	Eco Park Tenant: HK Battery	2022	144.46	38.12	348.75	91.96	42.74	67.61	28.82
		2023	144.05	38.06	348.78	91.97	42.74	67.62	28.83
A8	Eco Park Tenant: E-Tech	2022	144.57	38.12	244.81	92.12	41.26	66.30	28.32
		2023	144.57	38.09	245.10	92.13	41.27	66.31	28.33
A9	Eco Park Admin Bldg	2022	132.70	34.95	250.11	84.02	37.28	62.71	26.24
		2023	132.23	34.70	250.11	84.02	37.28	62.71	26.24
A10	PAFF Office	2022	133.60	37.19	260.54	89.63	40.53	68.24	29.06
		2023	133.47	37.14	260.54	89.62	40.53	68.25	29.06
A11	Proposed Modern Logistics Development at Tuen Mun Area 49	2022	147.56	36.78	292.60	84.13	37.16	63.22	26.08
		2023	146.10	36.33	292.54	84.13	37.16	63.20	26.07
A12	Eco Park Tenant: On Fat Lung	2022	136.17	37.81	361.48	90.42	42.79	66.44	29.08
		2023	135.98	37.72	361.57	90.43	42.79	66.45	29.08
AQO Standard / EIAO-TM			200	40	500	100	50	75	35

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Table 3-4 Cumulative Impacts of SO₂ at Worst Affected Heights of ASRs between 2022-2023

ASR ID	Description	4th Highest 10-min SO ₂ (µg/m ³)	4th Highest Daily SO ₂ (µg/m ³)
A1	Eco Park Tenant: HP Telford	171.51	36.06
A2	Eco Park Tenant: HP Baguio	204.34	38.12
A3	Eco Park Tenant: Lot P4	129.18	33.66
A4	Eco Park Tenant: South China	212.78	38.75
A5	EcoPark Tenant: Chung Yue	210.69	38.52
A6	Eco Park K.Wah	212.43	38.83
A7	Eco Park Tenant: HK Battery	211.40	38.65
A8	Eco Park Tenant: E-Tech	207.20	38.21
A9	EcoPark Administration Building	164.61	36.12
A10	PAFF Office	203.88	38.17
A11	Proposed Modern Logistics Development at Tuen Mun Area 49	128.28	33.87
A12	Eco Park Tenant: On Fat Lung	209.85	38.88
AQO Standard / EIAO-TM		500	125

Figure 3.1 Emission Sources Associated with TMFB Operation in the Cumulative Assessment



Source: Extracted from ERFB 2021.

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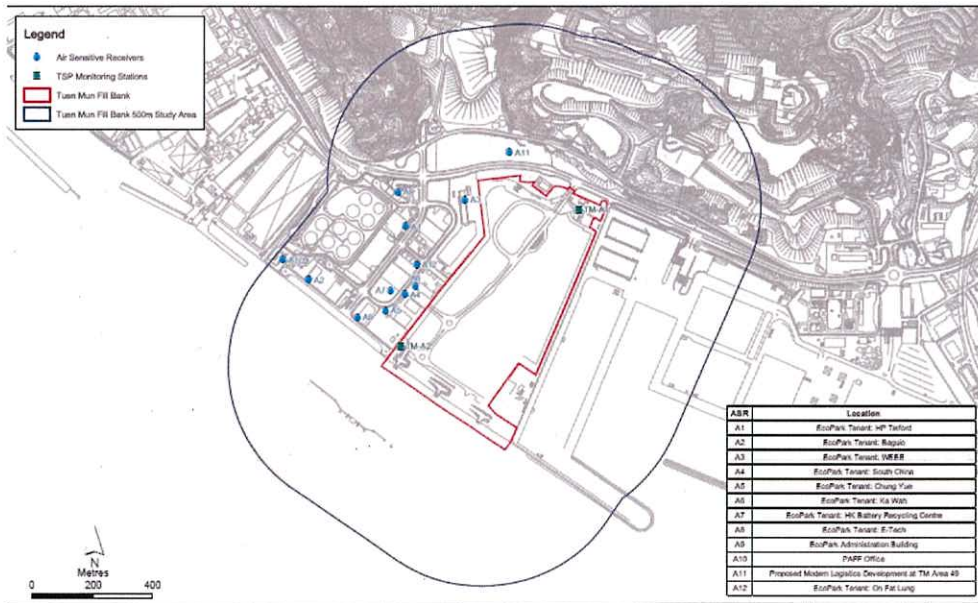
Figure 3.2 Emission Sources in the Vicinity of TMFB in the Cumulative Assessment



Source: Extracted from ERFB 2021. Descriptions of T5 and Lot P4 are mentioned in paragraph 3.1.2.

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Figure 3.3 Locations of Representative Air Sensitive Receivers (ASRs) of ERFB 2021



Source: Extracted from ERFB 2021.

4. OVERALL CONCLUSION

- 4.1.1. Pursuant to Condition 4.4 of EP-226/2005/G for EcoPark, this Technical Note has been prepared to address the potential environmental impacts arising from proposed extension of operation hours, from 0700 hrs to 1900 hrs to 24 hours per day 7 days per week, for an existing diesel fueled boiler in Lot P4 from 1 January 2022 to December 2023.
- 4.1.2. After reviewing the environmental impacts, there is no change of environmental impacts with respect to noise, water quality, landfill gas, land contamination, landscape and visual and hazard to life due to the proposed extension of boiler operation hour, and in particular the key impact relating to air quality. For air quality impact, it has been assessed that the cumulative impacts from 1 January 2022 to 31 December 2023 on all ASRs are in compliance of AQO limits based on the best available information for the worst-case scenario. It has been concluded that there will be no unacceptable environmental impacts or material change to the EcoPark project resulting from the proposed extension of boiler operation hours.
- 4.1.3. As discussed in Section 3.4.2, the emission inventories in EcoPark adopted in this assessment would remain valid to December 2023. With operation condition and emissions outside of EcoPark remain unchanged, there is no adverse air quality impact anticipated due to the proposed boiler operation up to December 2023.
- 4.1.4. Therefore, the technical requirements for the proposed 24 hours per day 7 days per week boiler operation between 1 June 2022 and 31 December 2023 have been satisfied, subject to the approval by the Director under EP Condition 4.4 of EP-226/2005/G.
- 4.1.5. In addition, all the relevant requirements as mentioned in the Environmental Monitoring and Audit (EM&A) manual (e.g. Process Review or Design Audit, if applicable) will be followed and complied with by Lot P4 of EcoPark if there are substantial changes that affect the emission inventory.

Appendix A **EPD'S APPROVAL LETTER IN 2020**

本署編號 () in Ax(14) to EP2/N4/G/34 PL16
OUR REF:
來函編號 () in EP 1201/2-61/1
YOUR REF:
電話 2835 1107
TEL. NO.:
圖文傳真 2591 0558
FAX NO.:
電子郵件
E-MAIL:
網址
HOMEPAGE: <http://www.epd.gov.hk>

**Environmental Protection Department
Branch Office**

28th Floor, Southern Centre,
130 Hennessy Road,
Wan Chai, Hong Kong.



環境保護署分處
青洲灣仔
軒尼詩道
一百三十號
樓頂中心廿八樓

29 May 2020

By Registered Post & Fax 2872 0389

Director of Environmental Protection
Environmental Protection Department
88 Victoria Road
Kennedy Town
Western District, Hong Kong

(Attn: Mr. Duncan CHAN, Senior Environmental Protection (Waste Reduction & Recycling))

Dear Mr. CHAN,

Environmental Impact Assessment (EIA) Ordinance, Cap. 499
Project Title: Development of EcoPark in Tuen Mun Area 38
-Submission under Condition 4.4 of EP-226/2005/F
Extension of Chimney Emissions from 19:00 to 07:00 hours to 24 hours
at Lot P4 at EcoPark from 1.6.2020 to 31.5.2022

I refer to the set of technical proposal enclosed in your letter of 29 May 2020 under reference.

Pursuant to Condition 4.4 of the Environmental Permit (EP) No. EP-226/2005/F, the approval for chimney emissions associated with the operation of the Waste Electrical and Electronic Equipment Recycling Plant located at Lot P4 of EcoPark as shown in Figure 6 of the EP (EP No. EP-226/2005/F) between 19:00 to 07:00 hours daily, for the period from 1 June 2020 to 31 May 2022 inclusive is hereby given.

We shall arrange to place the technical proposal at the EIAO Register Office for public access.

Yours sincerely,

(Tom TH TAM)

Senior Environmental Protection Officer
for Director of Environmental Protection

c.c.

ET (Attn: Grace M. H. KWOK (AEC)) Fax no.: 2815 5399
IEC (Attn: Sam TSOI (Arup)) Fax no.: 2268 3950

Internal: S(RW)1

EIAO Register Office – please place hard copy of the submission on EIAO Register

Appendix B **MANUFACTURER'S DETAILS OF PROPOSED BOILER**

CERTUSS
Steam Generators

CERTUSS
Steam Generators

Junior 80 – 600 SC

Also in product range

Junior SC
with CERTOMAT



Steam generator UNIVERSAL 700 – 1800 SC series

Size	Steam capacity kg/h	Method of combustion
5	700 - 800	Oil, gas or combination
6	1000 - 1300	Oil, gas or combination
7	1500 - 1800	Oil, gas or combination

Steam generator ELEKTRO E 6 – 72 M series

Size	Steam capacity kg/h	Method of heating
One size	6 - 97	Electrical E - 72 kW

Steam generator ELEKTRO E 100 series

Size	Steam capacity kg/h	Method of heating
One size	100 / 100	Electrical 100 / 120 kW



CONTAINER Steam System
Completely equipped and ready to operate



CVE
Supply unit as complete ready-to-operate boiler housing installation
In addition: Water softening equipment, measuring equipment



CERTCON
Exhaust gas heat exchangers for Junior
In addition: Exhaust gas heat exchangers ECD-09 for pressure



DESALINATION HEAT EXCHANGER
Heat exchanger from the desalination condensate to heat feed water
Reduction of the amount of cooling water at steam systems with heating heat exchangers when waste water cooling is required



RECOWAP
Condensate heat recovery



Junior 80 – 600 SC at a glance

Junior 80 – 600 SC in detail

Efficiency

- Extremely high degree of efficiency (with exhaust gas heat exchanger up to 96%) achieved through the 3-fold air insulation with simultaneous preheating of combustion air at very low emission losses
- Short heat-up time. Full steam output is reached after a maximum of 5 minutes
- Immediate output adjustment to the respective steam requirements which saves energy and thus costs
- Low emission burner developed specially to latest European standards for all sizes

User friendliness

- "Thermostat" for fully automatic operation*
 - Optionally "CVT" supply unit as complete boiler housing installation of boiler feed pump, steam dryer, water conditioning and waste-water mixing heat exchanger
- Operation and installation**
- Secure installation without foundation at low space requirements
 - Can be installed in work areas, no boiler housing required
 - No permit required for installation and use in Germany

Safety and quality

- Can be remotely programmed and read out or controlled via Ethernet, CAN bus, PROFIBUS or GOMUMTS modem*
- Customer service standby 24 hours a day, 365 days a year
- Spare parts supply guaranteed for 20 years
- Function and error messages as well as service instructions through clear text display in many languages

Advantages of our technology

- Robust all-steel design with double-shell air cooling without insulation materials
- Air intake from above, trapped heat in boiler house extracted, floor dust remains
- Noise and vibration damping, elastic aggregate fastening
- Flue-gas recycling (NO_x reduction)*
- Vertical tension-free central mounting of the heating system with low-point clarifying filtration
- Recognized exemplary service
- Can optionally be equipped with burners for EL heating oil, natural gas or liquid gas, tested and approved by the TÜV Rheinland-Berlin Brandenburg in accordance with the latest EU regulations for burners

The generation of a proven series

The steam generators CERTUSS Junior SC are characterized by the immediate output adjustment and the simplified operation.

Complete and safe

The Junior 80 – 600 SC series encompasses completely equipped, ready-to-operate, steam generators with all safety devices for burner technology, pressure and temperature.

CERTOMAT-Display

modul with indication of all operation and fault messages in plain text with operator guidance.

Storage module

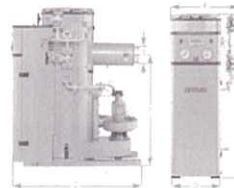
The long-term recording of the boiler and operating states that can be read out per computer via the existing RS 232 interface.

Switch module

Dry contact for central fault indication to connect a signaling device or for further processing by central control technology systems (configurable with the CERTUSS software Konfigurator Basic) extension modules for detailed transmission of operation and fault messages.

External modem*

Transmission of operating and fault messages to the CERTUSS server via phone lines for storage and system queries through phone line assigned to the system and automatic transmission of the due date for service intervals to a central control center.



Automatic desliming and start dewatering
The Junior 80 – 600 SC steam generators can be equipped additionally with an automatic desliming and start dewatering in connection with the "Thermostat" automatic system.

Size	Capacities			Level	Pressure		Consumption				Dimensions (- mm)					Weight	Connections							
	Steam capacity t/h	Heating capacity kW	Normal load kW		Max. operating pressure MPa (bar)	Max. permissible overpressure MPa (bar)	Heating oil (l/h)	Natural gas (m ³ /h)	Liquid gas (m ³ /h)	Height	Width	Depth	Boiler Ø	Flue gas pipe Ø	Flue gas (border) F		Electrical connection load kVA	Oil connection DN	Natural gas DN	Liquid gas DN	Feed water DN	Steam connection DN	Safety valve DN	Start-up line DN
1	80	53	58	1	0.8-1.4-2.2-3.9 (8-14-22-39)	1.0-1.6-2.5-3.2 (10-16-25-32)	4.9	5.8	2.2	1500	650	1210	500	180	1050	320	1.75	1/2"	20	20	1 1/2"	15	1"	1/2"
2	150	99	109	1	0.8-1.4-2.2-3.9 (8-14-22-39)	1.0-1.6-2.5-3.2 (10-16-25-32)	9.2	10.9	4.2	1500	725	1375	560	200	1120	420	1.9	1/2"	32	20	1 1/2"	20	40	1/2"
3	250	164	182	1	0.8-1.4-2.2-3.9 (8-14-22-39)	1.0-1.6-2.5-3.2 (10-16-25-32)	15.3	18.2	7.1	1850	805	1510	640	250	1380	520	2.0	1/2"	40	20	1 1/2"	25	40	1"
4	350	230	255	1	0.8-1.4-2.2-3.9 (8-14-22-39)	1.0-1.6-2.5-3.2 (10-16-25-32)	21.5	25.5	9.9	1980	870	1630	700	250	1460	550	3.6	1/2"	50	25	1 1/2"	32	40	1/2"
5	400	262	291	2	0.8-1.4-2.2-3.9 (8-14-22-39)	1.0-1.6-2.5-3.2 (10-16-25-32)	24.5	29.1	11.3	1980	870	1630	700	250	1460	550	3.6	1/2"	50	25	1 1/2"	32	40	1/2"

Reference values: Natural gas at 10 kWh/m³ · 8600 kcal/m³, liquid gas at 25.9 kWh/m³ · 22200 kcal/m³. Measurements and weights are rounded up or off. MPa and bar are overpressure values. For positioning purposes lateral fittings are detachable. **Delivery complete with water pump**. Output values stated are related to 100°C feed water temperature with 1 MPa (10 bar) steam overpressure. CERTUSS burner with flue-gas return (NO_x reduction)*.

* Supplementary equipment.
We reserve the right to make technical modifications.

1 MPa (10 bar) = 145 psi
10 psi = 0.689 MPa (9.89 bar)

1 MW = 3413 BTU
1000 BTU = 0.293 kW

Appendix C EMISSION SUMMARY TABLE

Emission Summary from Boiler of Lot P4 of EcoPark

Emissions from Fuel Combustion in Boiler

ULSD Consumption Rate	=	37.00	L/hour
Sulphur Content	=	0.005	%
Emission factor of PM	=	2	lb/1000 gallon [Note 1]
	=	0.24	kg/1000 L [Note 2]
	=	0.24	g/L
	=	8.88	g/hour
	=	0.0025	g/s
Emission factor of NO _x	=	24	lb/1000 gallon [Note 1]
	=	2.88	kg/1000 L [Note 2]
	=	2.88	g/L
	=	106.56	g/hour
	=	0.0296	g/s
Emission factor of SO ₂	=	1425	lb/1000 gallon [Note 1]
	=	0.71	lb/1000 gallon
	=	0.0852	kg/1000 L [Note 2]
	=	0.0852	g/L
	=	3.1524	g/hour
	=	0.00088	g/s
Emission factor of CO	=	5	lb/1000 gallon [Note 1]
	=	0.6	kg/1000 L [Note 2]
	=	0.6	g/L
	=	22.2	g/hour
	=	0.0062	g/s

Note

1. Emission factor made reference to Table 1.3-1 of AP-42 of USEPA for No. 2 oil fired.
2. Conversion of lb/1000 gallon by multiplying 0.12 as per AP42

Emission Summary

No.	Plant	Plant Type	Emission Sources	Pollutants during Operation	Operation Hours	ID	X	Y	Ground mPD	Type of Source	Stack Diameter (m)	Stack Height (mAG)	Exit Temperature (C)	Gas Flow Rate (m ³ /hr)	Exhaust Gas Exit Velocity (m/s)	NO _x Emission Rate (g/s)	TSP Emission Rate (g/s)	RSP Emission Rate (g/s)	FSP Emission Rate (g/s)	CO Emission Rate (g/s)	SO ₂ Emission Rate (g/s)
1	Lot P4 of EcoPark	WEEE Treatment Facility	Diesel Fuel Boiler	RSP, SO ₂ , NO _x , CO	24	EP	810983.0	825412.0	5	Point	0.15	13.2	190	-	7.19	0.0296	0.0025	0.0025	0.0025	0.0062	0.0009

Emission Inventory for Stack Emission Sources in EcoPark

Chimney	Lot	NOx Emissions	Operation Period	Operation Hours
WEEE Park	Lot P4	0.0296 g/s	Throughout Review Period	24 hours
SSK Metal Ltd.	Lot 2A-2	0.99 g/s	Throughout Review Period	07:00 to 19:00
EcoPark BioChar	Lot T5	0.17 g/s	May commence within the Review Period	24 hours

Emission Inventory for Stack Emission Sources in the Vicinity of TMFB

Sources	Model Input ID	X	Y	Elevation m	TSP Emission g/s or g/m ² /s	RSP Emission g/s or g/m ² /s	FSP Emission g/s or g/m ² /s	NOx Emission g/s	SO2 Emission g/s	Discharge Height m	Temp K	Exit Velocity m/s	Diameter m	X-length m	Y-length m	Angle degree	Operation Hour
WEEE	WEEE	210923.0	228411.0	5		0.0025	0.0025	0.0294	0.0009	13.2	463	7.19	0.15				24 hours
SSK	SSK	210768.0	228253.0	5		0.034	0.0355	0.99	0.48	30	353	16.9	1.8				0700-1900
ECOPARK_K_WAH	KW1	210000.0	225301.2	5	0.0061	0.0061	0.0061			10	298	12.2	0.25				0700-1900
ECOPARK_K_WAH	KW2	210090.4	225301.0	5	0.0061	0.0061	0.0061			10	298	12.2	0.25				0700-1900
ECOPARK_K_WAH	KW3	210094.8	225297.3	5	0.0061	0.0061	0.0061			10	298	12.2	0.25				0700-1900
ECOPARK_K_WAH	KW4	210919.0	225169.0	5	4.48E-05	2.16E-05	6.68E-06			5.5				4.50	25.00	38.10	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW5	210928.5	225297.1	5	6.76E-06	3.45E-06	1.02E-06			3				2.30	3.60	38.10	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW8	210901.0	225223.0	5	4.72E-05	2.46E-05	6.17E-06			0				4.30	11.30	38.10	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW9	210910.0	225314.7	5	3.58E-05	1.75E-05	5.41E-06			0				13.00	18.30	38.11	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW10_1	210054.0	225319.0	5	4.30E-05	8.04E-06	1.94E-06			0				3.50	26.50	66.70	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW10_2	210077.9	225313.2	5	4.29E-05	8.04E-06	1.94E-06			0				3.50	26.50	66.70	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW11	210023.3	225293.8	5	4.20E-05	4.20E-05	4.20E-05			9.4	298	4.3	0.35	50.00	3.50	37.80	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW12	210026.8	225293.1	5	4.20E-05	4.20E-05	4.20E-05			9.4	298	4.3	0.35				24 hours
ECOPARK_K_WAH	KW13	210927.5	225301.0	5	1.82E-04	1.19E-04	1.80E-05			0				13.30	5.30	38.14	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW14	210933.8	225304.8	5	2.82E-04	1.19E-04	1.80E-05			0				13.30	5.30	38.14	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW15	210926.5	225288.5	5	7.27E-04	3.33E-04	1.09E-04			3				3.00	3.00	38.10	0700-1900 (100%)0900-0700 (50%)
ECOPARK_K_WAH	KW16	210928.4	225284.4	5	0.0113	0.0113	0.0113			1.8	298	12.2	0.30				24 hours
ECOPARK_BIOCHAR	TS-11	210773.7	225990.0	5	0.01417	0.01417	0.01417	0.17		13	433	20.0	0.30				24 hours
Castle Peak Power Station	CPK	209700.0	226240.0	7.4		3.9003	3.9003	146.4517	35.0393	250	353	17.0	15.20				24 hours

- Notes:
- (a) Emissions for Green Island Cement and Shiu Wing Steel Mill are referenced from the Approved Additional Gas-fired Generation Units Project (AEGAR-197/2016)
 - (b) Emissions for WEEE park and the proposed Biochar system are provided by WRG of EPD.
 - (c) Emissions for SSK at EcoPark is referenced from the Air Pollution Control Plan of its Specified Process Licence (L-17-004(1)).
 - (d) Emissions for K WAh at EcoPark is referenced from the Air Pollution Control Plan of its Specified Process Licence (L-3-241(2)). The area sources are fugitive dust sources and thus dry deposition was considered in the model with particle size distributions based on the ratios of the TSP, RSP and FSP emission rates.

Reference: Appendix B1 of ERFB 2021.