Capco 青山發電有限公司 Castle Peak Power Co. Ltd.

Installation of One Additional Gas-fired Generation Unit (CCGT Unit No. 1) at the Black Point Power Station

Annual EM&A Report No.3

3 March 2020

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Client:	Project No:
Castle Peak Power Company Limited (CAPCO)	0368878

Summary:

This document presents the Annual EM&A Report No.3 for the Installation of One Additional Gas-fired Generation Unit (CCGT Unit No. 1) at the Black Point Power Station (EP-507/2016/B; FEP-02/507/2016/B)

Date: 3 March 2020

Approved by:

Jasmine Ng
Partner

Revision	Description	By	Checked	Approved	Date
0	Annual EM&A Report No.3	JH	JNG	JNG	3 Mar 20

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Capco 青山發電有限公司 Castle Peak Power Co. Ltd.

Installation of One Additional Gas-fired Generation Unit (CCGT Unit No. 1) at the Black Point Power Station

Environmental Certification Sheet

EP-507/2016/B and FEP-02/507/2016/B

Reference Document/Plan

Document/~~Plan~~ to be Certified/ ~~Verified~~:	Annual EM&A Report No.3
Date of Report:	3 March 2020
Date prepared by ET:	3 March 2020
Date received by IEC:	

Reference EM&A Manual/ EP Requirement

EM&A Manual (AEIAR-197/2016): Sections 15.1 & 15.6

Content: *Annual EM&A Reports*

In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly, annual and final review EM&A reports will be made available to the Director of Environmental Protection.

An annual EM&A report will be prepared by the ET at the end of each construction year during the course of the Project.

ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced requirement of EM&A Manual (AEIAR-197/2016).

Dr Jasmine Ng,
Environmental Team Leader:  Date: 3 March 2020

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced requirement of EM&A Manual (AEIAR-197/2016).

Mr Thomas Chan,
Independent Environmental Checker:  Date: 3 March 2020

CONTENTS

LIST OF ANNEXES

EXECUTIVE SUMMARY

The construction works of CCGT Unit No. 1 of the **Additional Gas-fired Generation Units Project at the Black Point Power Station** commenced on 5 December 2016. This is the third Annual Environmental Monitoring and Audit (EM&A) report presenting the EM&A works carried out during the period from 1 January to 31 December 2019 in accordance with the EM&A Manual and the requirements of EP-507/2016/B and FEP-02/507/2016/B.

Summary of the Construction Works undertaken during the Reporting Period

The major construction works undertaken during the reporting period include site establishment and land-based civil works within the BPPS. Details of the construction activities within the reporting period are presented in *Section 2*.

Environmental Site Inspection

During the reporting period, weekly joint environmental site inspections/ audits were carried out by the representatives of the Contractors, the Environmental Team (ET), CLP and the Independent Environmental Checker (IEC). Environmental performance complied with the environmental requirements and all necessary mitigation measures were properly implemented.

Waste Management

CAPCO and the Contractors (Leighton Contractors (Asia) Limited and Chun Wo) have followed the Waste Management Plan (WMP) for the handling and disposal of construction and demolition (C&D) materials (inert public fill and non-inert construction wastes), chemical wastes, recyclable materials, sewage and dredged marine sediment.

Environmental Complains, Non-compliance & Summons

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of the Project was recorded in this reporting period. No environmental complaint or environmental summons was received in this reporting period.

The EM&A requirements have been reviewed and were considered as adequate and effective. No change to the requirements was considered to be necessary. The recommended environmental mitigation measures are also considered to be effective and efficient in reducing the potential environmental impacts associated with the construction of the Project. No change was thus considered necessary.

Overall, the EM&A results indicated that the Project has not caused unacceptable environmental impacts. This is in agreement with the assessment presented in the EIA Report.

1 INTRODUCTION

The Castle Peak Power Company Limited (CAPCO) is a joint venture between CLP Power Hong Kong Limited (CLP) and China Southern Power Grid Company Limited with CLP as the operator. ERM-Hong Kong, Limited (ERM) and Mott MacDonald Hong Kong Limited were appointed by CAPCO as the Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertake the Environmental Monitoring and Audit (EM&A) activities for the installation of CCGT Unit No. 1 of the **Additional Gas-fired Generation Units Project at the Black Point Power Station (BPPS)** ("the Project").

1.1 PURPOSE OF THE REPORT

This is the third Annual EM&A report which summarises the audit findings during the reporting period from 1 January 2019 to 31 December 2019.

1.2 STRUCTURE OF THE REPORT

Section 1 : **Introduction**
It details the purpose and structure of the report.

Section 2 : **Project Information**
It summarises the background and scope of the project, site description, project organisation and contact details, construction programme, construction works undertaken and status of the Environmental Permits/Licenses during the reporting period.

Section 3 : **EM&A Requirements**
It summarises the EM&A requirements for the Project.

Section 4 : **Implementation Status of the Environmental Protection Requirements**
It summarises the implementation of environmental protection measures during the reporting period.

Section 5 : **EM&A Results**
It summarises the EM&A results obtained in the reporting period.

Section 6 : **Environmental Non-conformance**
It summarises any exceedances of environmental performance standard, and environmental complaints and environmental summons received within the reporting period.

Section 7 : **Review of EM&A Programme**
It reviews the success of the EM&A programme, including the effectiveness and efficiency of the mitigation measures and recommendations for any improvements in the EM&A Programme.

Section 8 : **Conclusions**

2 PROJECT INFORMATION

2.1 BACKGROUND

The scope of the Project involves the phased construction and operation of up to two additional combined cycle gas turbine (CCGT) units (with an installed capacity of up to 600 MW each) at the BPPS. The additional generation units will be of CCGT configuration using natural gas as the primary fuel. It is a Designated Project under the *Environmental Impact Assessment Ordinance* (Cap. 499) (EIAO). The current EM&A Programme only includes the CCGT Unit No. 1.

An EIA of the Additional Gas-fired Generation Units Project was prepared in accordance with the *EIA Study Brief* (No. ESB-286/2015) and the *Technical Memorandum of the Environmental Impact Assessment Process* (*EIAO-TM*) and submitted under the EIAO in February 2016. Subsequent to the approval of the EIA (*EIAO Register Number AEIAR-197/2016*), an Environmental Permit (EP-507/2016) (EP) for CCGT Unit No. 1 was granted by the Director of Environmental Protection (DEP) on 14 June 2016.

A Further Environmental Permit (FEP-01/507/2016) (FEP) was granted to the Contractor, Chun Wo Foundations Limited, of the CCGT Unit No. 1 on 9 December 2016. The application for surrender of the FEP (FEP-01/507/2016) was submitted by Chun Wo on 15 June 2018 and approved by EPD on 18 July 2018.

An Application for Variation of an Environmental Permit (No. VEP-531/2017) was submitted to EPD on 28 July 2017 and the Variation of Environmental Permit (No. EP-507/2016/A) was granted on 21 August 2017. A FEP (FEP-02/507/2016/A) was granted to the Contractor, Leighton Contractors (Asia) Limited, of the CCGT Unit No. 1 on 13 September 2017.

Applications for variation of Environmental Permit (EP-507/2016/A) and variation of Further Environmental Permit (FEP-02/507/2016/A) were submitted to EPD on 29 October 2018. The variation of Environmental Permit (No. EP-507/2016/B) and variation of Further Environmental Permit (No. FEP-02/507/2016/B) were granted on 22 November 2018.

2.2 GENERAL SITE DESCRIPTION

The proposed location for the Project is within the existing boundaries of the BPPS site. The size of the land reserved for the additional generation units and the associated facilities (the Project Site) is about 40,000 m^2. Construction works for CCGT Unit No. 1 is currently ongoing at the Project Site.

The location plan of key Project components for CCGT Unit No.1 is shown in ***Annex A***.

2.3 CONSTRUCTION PROGRAMME AND ACTIVITIES

A summary of the major construction activities undertaken in this reporting period is shown in ***Table 2.1***. The construction programme is presented in ***Annex B***.

Table 2.1 Summary of the Construction Activities Undertaken during the Reporting Period

Month	Construction Activities undertaken
January 2019	• Installation of secondary steel structure at Heat Recovery Steam Generator (HRSG) and Turbine Hall; • Balance of Plant (BoP) piping prefabrication, natural gas pipeline installation and fuel oil pipe installation; • Pipe welding to HRSG High, Intermediate and Low Pressure drums; • HRSG Inlet duct roof panel installation; • Scaffolding inside HRSG; • Foundation works (Intake, Diversion Culvert, Discharge Culvert, Pumping Station, Generator Transformer & Shafts); • Substructure & Superstructure works (Turbine Hall, Generator Transformer, Rainwater Collection Pump Room & Cooling Water Pipes Installation); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
February 2019	• Stack scaffolding erection; • Installation of secondary steel structure at Heat Recovery Steam Generator (HRSG) and Turbine Hall; • Cable tray installation; • Main pipe rack installation; • Balance of Plant (BoP) piping prefabrication, natural gas pipeline installation and fuel oil pipe installation; • Pipe welding to HRSG High, Intermediate and Low Pressure drums; • Scaffolding inside HRSG; • Foundation works (Intake, Diversion Culvert, Discharge Culvert & Shafts); • Substructure & Superstructure works (Turbine Hall, Generator Transformer, Rainwater Collection Pump Room, Pumping Station, Outfall Modifications & Cooling Water Pipes Installation); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
March 2019	• Stack scaffolding erection; • Installation of secondary steel structure at Heat Recovery Steam Generator (HRSG) and Turbine Hall; • Cable tray installation; • Main pipe rack installation; • Balance of Plant (BoP) piping prefabrication, natural gas pipeline installation and fuel oil pipe installation; • Pipe welding to HRSG High, Intermediate and Low Pressure drums; • Scaffolding inside HRSG; • Positioning of transformer; • Foundation works (Intake, Diversion Culvert, Discharge Culvert & Shafts); • Substructure & Superstructure works (Turbine Hall, Generator Transformer, Rainwater Collection Pump Room, Pumping Station, Outfall & Cooling Water Pipes Installation); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
April 2019	• Stack scaffolding erection;

Month	Construction Activities undertaken
	• Installation of secondary steel structure at Heat Recovery Steam Generator (HRSG) and Turbine Hall; • Cable tray installation; • Balance of Plant (BoP) piping prefabrication, natural gas pipeline installation and fuel oil pipe installation; • Pipe welding to HRSG High, Intermediate and Low Pressure drums; • Scaffolding inside HRSG; • Oil filling work for transformer; • Foundation works (Intake, Diversion Culvert, Discharge Culvert & Shafts); • Substructure & Superstructure works (Turbine Hall, Generator Transformer, Rainwater Collection Pump Room, Pumping Station, Outfall & Cooling Water Pipes Installation); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
May 2019	• Stack scaffolding erection; • Installation of secondary steel structure at Heat Recovery Steam Generator (HRSG) and Turbine Hall; • Cable tray installation and cable laying work; • Balance of Plant (BoP) piping, natural gas pipeline installation and fuel oil pipe installation; • Pipe welding to HRSG; • Scaffolding inside HRSG; • Oil filling work for transformer; • Substructure & Superstructure works (Intake, Discharge Culvert, Shafts, Turbine Hall, Rainwater Collection Pump Room, Pumping Station, Outfall & Cooling Water Pipes Installation); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
June 2019	• Selective Catalyst Reduction (SCR) base structure beam welding and Non-destructive Test (NDT); • HRSG top grating platform installation; • Install Air Intake Duct; • Balance of Plant (BOP) piping, natural gas pipeline installation and fuel oil pipe installation; • Install diffuser; • Installation of Inlet Air Filter House; • Pipe installation in Annex Building, CEP & CPP, D16; • Substructure & Superstructure works (Intake, Discharge Culvert, Shafts, Turbine Hall, Pumping Station, Outfall & Cooling Water Pipes); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
July 2019	• HRSG top grating platform installation; • Stack insulation and scaffolding; • Installation of Air Intake Duct; • Balance of Plant (BOP) piping, natural gas pipeline installation and fuel oil pipe installation; • Installation of diffuser; • Installation of Inlet Air Filter House; • Pipe installation in Annex Building, CEP & CPP, D16; • Substructure & Superstructure works (Intake, Diversion, Culvert, Discharge Culvert, Shafts, Turbine Hall, Pumping Station, Outfall & Installation of Cooling Water Pipes by Pipe Jacking); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works & Electrical and Mechanical (E&M) Installations).
August 2019	• Stack installation and cladding; • Outlet duct erection; • Urea Tank associated pump skid and ladder;

Month	Construction Activities undertaken
	• Roof canopy erection; • Steam Turbine (ST) install LP top half outer casing; • ST instrument installation; • Cable support system erection; • Substructure and Superstructure works (Intake, Diversion Culvert, Discharge Culvert, Shafts, Turbine Hall, Pumping Station, Outfall and Installation of Cooling Water Pipes by Pipe Jacking); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works and Electrical and Mechanical (E&M) Installations).
September 2019	• Stack installation and cladding; • Outlet duct erection and welding; • Urea Tank associated pump skid and ladder; • Roof canopy erection; • Steam Turbine (ST) install Low Pressure (LP) top half outer casing; • ST instrument installation; • Cable support system erection; • Substructure and Superstructure works (Intake, Diversion Culvert, Discharge Culvert, Shafts, Turbine Hall, Pumping Station, Outfall and Installation of Cooling Water Pipes by Pipe Jacking); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works and Electrical and Mechanical (E&M) Installations).
October 2019	• Outlet duct welding; • HRSG Roof canopy erection; • Steam Turbine (ST) install Low Pressure (LP) top half outer casing; • ST instrument installation; • Cable support system erection; • Piping and High Pressure (HP) drum insulation; • Substructure and Superstructure works (Intake, Diversion Culvert, Discharge Culvert, Shafts, Turbine Hall, Pumping Station, Outfall and Installation of Cooling Water Pipes by Pipe Jacking); and • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works and Electrical and Mechanical (E&M) Installations).
November 2019	• Outlet duct welding; • HRSG Roof canopy erection; • Steam Turbine (ST) install Low Pressure (LP) top half outer casing; • ST instrument installation; • Cable support system erection; • Substructure and Superstructure works (Intake, Diversion Culvert, Shafts, and Outfall); • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works and Electrical and Mechanical (E&M) Installations); and • Reinstatement Works (Road re-pavement and reinstatement of existing station facilities).
December 2019	• Stack punch rectification; • HRSG piping insulation and cladding; • HRSG roof canopy cladding; • Scaffolding dismantling; • Cable support system erection; • Substructure and Superstructure works (Intake, Diversion Culvert, Discharge Culvert, Shafts and Outfall); • Building Services Works (Architectural Builder's Work and Finishes (ABWF) works and Electrical and Mechanical (E&M) Installations); and • Reinstatement Works (Road re-pavement and reinstatement of existing station facilities).

2.4 PROJECT ORGANISATION

The project organizational chart and contact details are shown in ***Annex C***.

2.5 STATUS OF ENVIRONMENTAL LICENCES, NOTIFICATION AND PERMITS

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

Table 2.2 Summary of the Status of Valid Environmental Licence, Notification, Permit and Documentations

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Environmental Permit	EP-507/2016	Throughout the Contract	Permit granted on 14 Jun 2016
Variation of Environmental Permit	EP-507/2016/A	Throughout the Contract	Permit granted on 21 Aug 2017
	EP-507/2016/B	Throughout the Contract	Permit granted on 22 Nov 2018
Further Environmental Permit	FEP-02/507/2016	Throughout the Contract	Permit granted on 9 Dec 2016; application for surrender of the FEP was submitted on 15 Jun 2018 and approved by EPD on 18 Jul 2018
	FEP-02/507/2016/A	Throughout the Contract	Permit granted on 13 Sep 2017 2018
	FEP-02/507/2016/B	Throughout the Contract	Permit granted on 22 Nov 2018
Notification Pursuant to Section 3(1) of the *Air Pollution Control (Construction Dust) Regulation*	417935	Throughout the Contract	Notification received on 14 Jun 2017
	417676	Throughout the Contract	Notification received on 8 Jun 2017
Wastewater Discharge Licence	WT00028829-2017	To 31 Oct 2022	Licence granted on 25 Oct 2017
Chemical Waste Producer Registration	5211-432-L2954-02	Throughout the Contract	Registration approved on 4 Jul 2017
	5214-421-K3324-01	Throughout the Contract	Registration approved on 6 Jul 2018
Billing Account for Disposal of Construction Waste	7028380	Throughout the contract	Approved on 26 Jul 2017
	7029093	Throughout the contract	Approved on 19 Oct 2017
Application for Installation of Furnace, Chimney and Flue Premises	-	Throughout the contract	Approved on 3 Jun 2019 for steam cleaning of boiler
Construction Noise Permit	GW-RW0470-18	14 Nov 2018 – 30 Apr 2019	Approved on 9 Nov 2018
	GW-RW0483-18	23 Nov 2018 – 22	Approved on 22 Nov

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
		May 2019	2018
	GW-RW0168-19	1 May 2019 – 30 Sep 2019	Approved on 24 Apr 2019; voluntarily cancelled and superseded by GW-RW0256-19
	GW-RW0182-19	23 May 2019 – 22 Nov 2019	Approved on 29 Apr 2019
	GW-RW0256-19	14 Jun 2019 – 31 Oct 2019	Approved on 11 Jun 2019
	GW-RW0515-19	2 Nov 2019 – 30 Apr 2020	Approved on 1 Nov 2019
	GW-RW0522-19	5 Nov 2019 – 15 Dec 2019	Approved on 2 Nov 2019
	GW-RW0517-19	23 Nov 2019 – 22 May 2020	Approved on 29 Oct 2019
	GW-RW0589-19	17 Dec 2019 – 15 Jun 2020	Approved on 16 Dec 2019

3 EM&A REQUIREMENTS

3.1 GENERAL

Potential environmental impacts, which were identified during the EIA process and are associated with the construction phase of the Project, will be addressed through the monitoring and controls specified in the EM&A Manual and in the construction contracts.

During the construction phase of the Project, air quality, hazard to life, noise, water quality, waste, land contamination, ecology, fisheries, landscape and visual and cultural heritage will be subjected to EM&A. Monitoring of the effectiveness of the mitigation measures will be achieved through site inspections.

3.2 SITE INSPECTIONS & AUDITS

The ET will undertake site inspections of on-site practices and procedures each week. The primary objective of the inspection programme will be to assess the effectiveness of the environmental controls established by the Contractor(s) and the implementation of the environmental mitigation measures recommended in the EIA Report. The IEC will undertake monthly site audits to assess the performance of the Contractor(s) and the effectiveness of the ET.

3.3 WATER QUALITY MONITORING

In accordance with the EM&A Manual, monitoring works is required at a frequency of once per week on first year of commissioning of the CCGT Unit No.1. The monitoring details including monitoring requirement, locations of monitoring stations will be confirmed and approved by EPD before commissioning of the CCGT Unit No.1.

4 IMPLEMENTATION STATUS OF THE ENVIRONMENTAL PROTECTION REQUIREMENTS

4.1 SUBMISSIONS UNDER THE PROJECT

The Contractors have implemented all the environmental mitigation measures and requirements as stated in the EIA Report, Environmental Permit (EP) and EM&A Manual for the installation of CCGT Unit No.1. The implementation status of the environmental mitigation measures for this Project during the reporting period is summarised in ***Annex D***. The status of the required submissions under the EP and EM&A Manual for the Project in the reporting period is presented in ***Table 4.1***.

Table 4.1 Status of Required Submission under the Project

EP Condition	Submission	Submission Date
Sections 15.1 & 15.5 of EM&A Manual	9th Quarterly EM&A Report (December 2018 – February 2019)	12 April 2019
	10th Quarterly EM&A Report (March – May 2019)	30 June 2019
	11th Quarterly EM&A Report (June – August 2019)	10 October 2019
	12th Quarterly EM&A Report (September – November 2019)	14 February 2020
Condition 3.2 under Environmental Permit No. EP-507/2016/B and FEP-02/507/2016/B.	25th Monthly EM&A Report (December 2018)	14 January 2019
	26th Monthly EM&A Report (January-2019)	14 February 2019
	27th Monthly EM&A Report (February-2019)	14 March 2019
	28th Monthly EM&A Report (March-2019)	12 April 2019
	29th Monthly EM&A Report (April-2019)	14 May 2019
	30th Monthly EM&A Report (May-2019)	14 June 2019
	31st Monthly EM&A Report (June-2019)	12 July 2019
	32nd Monthly EM&A Report (July-2019)	14 August 2019
	33rd Monthly EM&A Report (August-2019)	13 September 2019
	34th Monthly EM&A Report (September-2019)	14 October 2019
	35th Monthly EM&A Report (October-2019)	14 November 2019
	36th Monthly EM&A Report (November-2019)	12 December 2019
	37th Monthly EM&A Report (December 2019)	14 January 2020

4.2 MARINE VESSEL OPERATION

Table 4.1 presents the summary of vessels for transport of equipment and materials during the reporting period.

Table 4.2 Summary of Vessels for Transport of Equipment and Materials during the Reporting Period under the Project

Month	Contractor	Number of vessels	Date of Vessel Arrival
January 2019	N/A	N/A	N/A
February 2019	N/A	N/A	N/A
March 2019	N/A	N/A	N/A
April 2019	N/A	N/A	N/A
May 2019	Leighton	1	21 May 2019
June 2019	N/A	N/A	N/A
July 2019	N/A	N/A	N/A
August 2019	N/A	N/A	N/A
September 2019	Leighton	2	5 and 30 September 2019
October 2019	Leighton	2	1 and 29 October 2019
November 2019	N/A	N/A	N/A
December 2019	N/A	N/A	N/A

In accordance with the Vessel Control Plan prepared for the Project under Condition 2.4 of the EP, an environmental briefing to the vessel operators has been conducted before each vessel operation. The environmental briefing has included the following content:

- Requirements under the EP and *Vessel Control Plan*;
- General education on local cetaceans;
- Predefined and regular marine travel routes for this Project;
- Vessel speed limit within designated areas and areas identified as high presence of Indo-Pacific humpback dolphin;
- Guidelines for safe vessel operation in the presence of cetaceans;
- Guidelines on effluent /wastewater handling from vessels to prevent avoidable water quality impacts; and
- Policy of no dumping of rubbish, food, oil, or chemicals from vessels.

Details of the monitoring method and procedures have been agreed with the IEC before implementation and communicated with the vessel operators. The record of marine travel routes of the works vessels was provided by the vessel operators for inspection and monitoring purposes.

During the reporting period, no warning was issued to vessel operators given that the vessel operators followed the predefined and regular marine travel routes.

No major observation and non-compliance were recorded during the reporting period.

5.1 SITE INSPECTIONS & AUDITS

Joint site inspections were conducted by representatives of the Contractors, CAPCO Project Team and ET every week throughout the reporting period. The representative of the IEC joined the site inspections on a monthly basis in the reporting period. No non-compliance was recorded during the site inspections.

Environmental performance complied with environmental requirements and all necessary mitigation measures were properly implemented. The implementation status of the environmental mitigation measures for this Project during the reporting period is summarised in ***Annex D***. The ET will keep track of the construction activities to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

5.2 WASTE MANAGEMENT

The waste generated from this Project includes inert construction and demolition (C&D) materials, and non-inert C&D materials. Non-inert C&D materials are made up of general refuse and recyclable wastes such as plastics and paper/cardboard packaging waste. Steel materials generated from the project are also grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials. With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are summarised in ***Table 5.1***. Details of waste management data are presented in ***Annex E.***

Table 5.1 Quantities of Waste Generated from the Project

Reporting Month	Quantity					
	Inert C&D Materials [a] [b]	Chemical Waste [d]	Non-inert C&D Materials			
			General Refuse [c]	Recycled materials		
				Paper/card board	Plastics	Metals
	(in '000m^3)	(in'000 kg)	(in '000m^3)	(in'000 kg)	(in'000 kg)	(in'000 kg)
January 2019	7.770	0.180	0.164	0	0	42.500
February 2019	9.854	0.200	0.142	0	0	23.960
March 2019	10.845	0	0.185	0	0	18.820
April 2019	4.090	0	0.101	0	0	95.520
May 2019	4.329	0	0.169	0	0	62.110
June 2019	3.753	0	0.220	0	0	73.210
July 2019	4.113	0.020	0.168	0	0	22.990
August 2019	9.329	0	0.162	0	0	35.130
September 2019	8.113	0	0.186	0	0	227.710
October 2019	5.571	0	0.149	0	0	83.410

Reporting	Quantity					
November 2019	3.448	0	0.182	0	0	44.900
December 2019	1.507	0	0.311	0	0	0
Total	**72.722**	**0.400**	**2.137**	**0**	**0**	**730.260**

Notes:

(a) Inert C&D materials include bricks, concrete, building debris, rubble and excavated spoil.

(b) The inert C&D materials generated from the Project were sent to Tuen Mun Area 38 Fill Bank during the reporting month.

(c) The general refuse generated from the Project was sent to WENT landfill during the reporting month.

(d) Chemical waste includes waste oil. It is assumed density of waste oil to be 0.8 kg/L.

(e) The cut-off data for waste management data is 31 December 2019.

The estimated amount of waste generated from the Project predicted by EIA Report and the actual cumulative quantities of waste generated from the construction phase of the Project during the reporting period are presented in *Table 5.2*. These wastes were also disposed of in accordance with the recommendations of the EIA. Mitigation measures recommended in EIA Report were implemented by the Contractor as far as practicable and were considered effective in reducing the total quantity of wastes generated during the reporting period.

Table 5.2 ***Comparison of Estimated Amount of Waste Generated for Construction of CCGT Unit No.1 and Actual Amount Generated during the Reporting Period***

Type of Material	Estimated Amount for Project	Actual Amount during Reporting Period	Cumulative Amount since Project's Commencement (December 2016)
Total Amount of Inert C&D Materials disposed as Public Fill [(a)] (in '000m^3)	80.96	67.878	128.668
Amount of Inert C&D Materials Reused in the Contract (in '000m^3)	8.89	4.844	6.892
Amount of Inert C&D Materials Reused in Other Projects (in '000m^3)	-	0	0.119
Total Amount of Non-Inert C&D Materials and General Refuse disposed at WENT Landfill [(b)] (in '000m^3)	1.717	2.137	3.433
Chemical Waste [(c)] (in ''000kg)	40.8	0.400	0.580

Notes:

(a) Inert C&D materials include site clearance waste, excavated materials, building works generated from construction of CCGT Unit No.1 for the entire project.

(b) Non-inert C&D materials include site clearance waste, excavated materials, building works generated from construction period of CCGT Unit No.1 for the entire project. The amount of general refuse was estimated 780 kg per day for construction of CCGT Unit No.1. There are 296 working days in the reporting period.

(c) The total amount of chemical waste was estimated 3,400 kg per month. There are 12 months in the reporting period.

6 ENVIRONMENTAL NON-CONFORMANCE

6.1 SUMMARY OF MONITORING EXCEEDANCE

No environmental monitoring is required during construction of CCGT Unit No. 1.

6.2 SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

No non-compliance event was recorded during the reporting period.

6.3 SUMMARY OF ENVIRONMENTAL COMPLAINT

No environmental complaint was received during the reporting period.

6.4 SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION

No summon or prosecution was received during the reporting period.

7 REVIEW OF EM&A PROGRAMME

7.1 SITE INSPECTIONS & AUDITS

Weekly joint environmental site inspections by ET and monthly joint environmental site inspections with IEC have been conducted in the reporting period to assess the effectiveness of the environmental controls established by the Contractor(s) and the implementation of the environmental mitigation measures recommended in the EIA Report. Findings of the site inspections confirmed that the predictions in EIA Report are valid and environmental mitigation measures recommended in the EIA Report were properly implemented by the Contractor, and the recommended mitigation measures have been working effectively. There was no non-compliance recorded during the site inspections and environmental performance complied with environmental requirements.

The requirements for site inspections and audits have been reviewed and were considered as adequate. No change to the requirements was considered to be necessary.

The recommended environmental mitigation measures are also considered to be effective and efficient in reducing the potential environmental impacts associated with the construction of Project. No change was thus considered necessary.

7.2 WASTE MANAGEMENT

The waste inspection and audit programme has been implemented during this reporting period. Wastes generated from construction activities have been managed in accordance with the recommendations in the EIA Report, the EM&A Manual, the WMP and other relevant legislative requirements.

The requirements for construction waste management have been reviewed and were considered as adequate. No change to the requirements was considered to be necessary.

7.3 SUMMARY OF RECOMMENDATIONS

Findings of the EM&A programme indicate that the recommended mitigation measures have been properly implemented and working effectively. The EM&A programme has been reviewed and was considered as adequate and effective. No change to the EM&A programme was considered to be necessary.

The EM&A programme will be evaluated as appropriate in the next reporting period and improvements in the EM&A programme will be recommended if deemed necessary.

8 CONCLUSIONS

This third Annual Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from 1 January to 31 December 2019 in accordance with the EM&A Manual and the requirements of EP-507/2016/B and FEP-02/507/2016/B.

Weekly joint environmental site inspections by ET and monthly joint environmental site inspections with IEC were conducted in the reporting period. It confirmed that the environmental mitigation measures recommended in the EIA Report were properly implemented by the Contractor and were working effectively.

The Contractors have followed the Waste Management Plan (WMP) for handling and disposal of construction and demolition (C&D) materials (inert public fill and non-inert construction wastes), chemical wastes, recyclable materials, and sewage generated from the Project. No non-compliance event was recorded during the reporting period.

No environmental complaint, summon or prosecution was received during the reporting period.

The EM&A programme was considered effective in reflecting the environmental conditions at the site. The site inspection results also indicated that the Project has not caused unacceptable environmental impacts and the mitigation measure were effectively implemented. The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

The EM&A programme has been reviewed and was considered as adequate and effective. No change to the EM&A programme was considered to be necessary. The EM&A programme will be evaluated as appropriate in the next reporting period.

Annex A

Indicative Location Plan of Key Project Components for CCGT Unit No.1

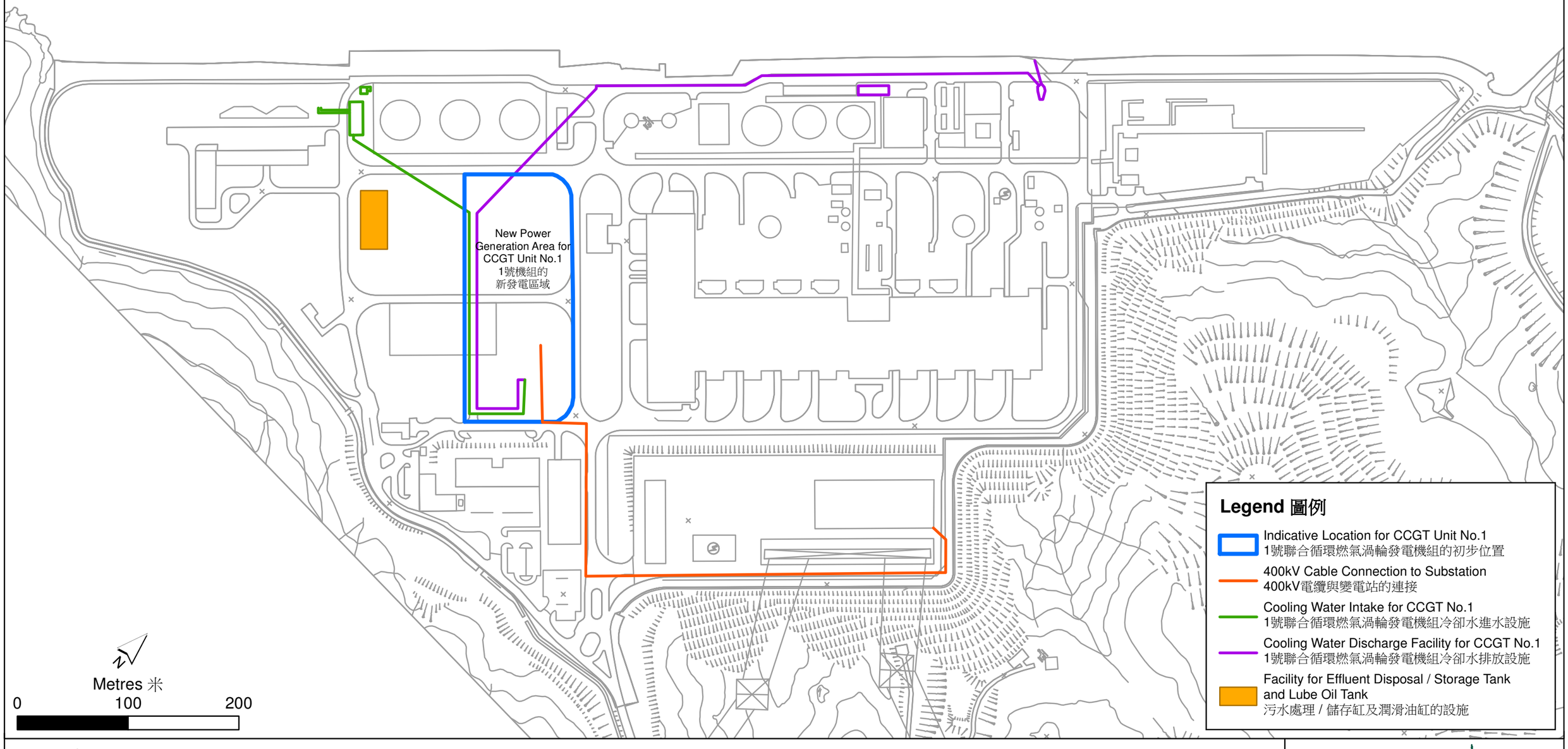


Figure 1
圖 1

Additional Gas-fired Generation Units Project - Indicative Location Plan of Key Project Components for CCGT Unit No.1
新增燃氣發電機組工程 - 1號聯合循環燃氣渦輪發電機組主要工程項目組成部份的初步位置圖

File: T:\GIS\CONTRACT\0367751\Mxd\0367751_Indicative_Location_of_Key_Project_Components_bil.mxd
Date: 13/9/2018

Environmental
Resources
Management

ERM

Annex B

Construction Programme for the Reporting Period and Coming Months

	Year 2019												Year 2020											
CCGT Unit No.1	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Civil Works																								
Equipment Supply & Installation, Commissioning																								

Annex B

Preliminary Construction Programme for CCGT Unit No. 1

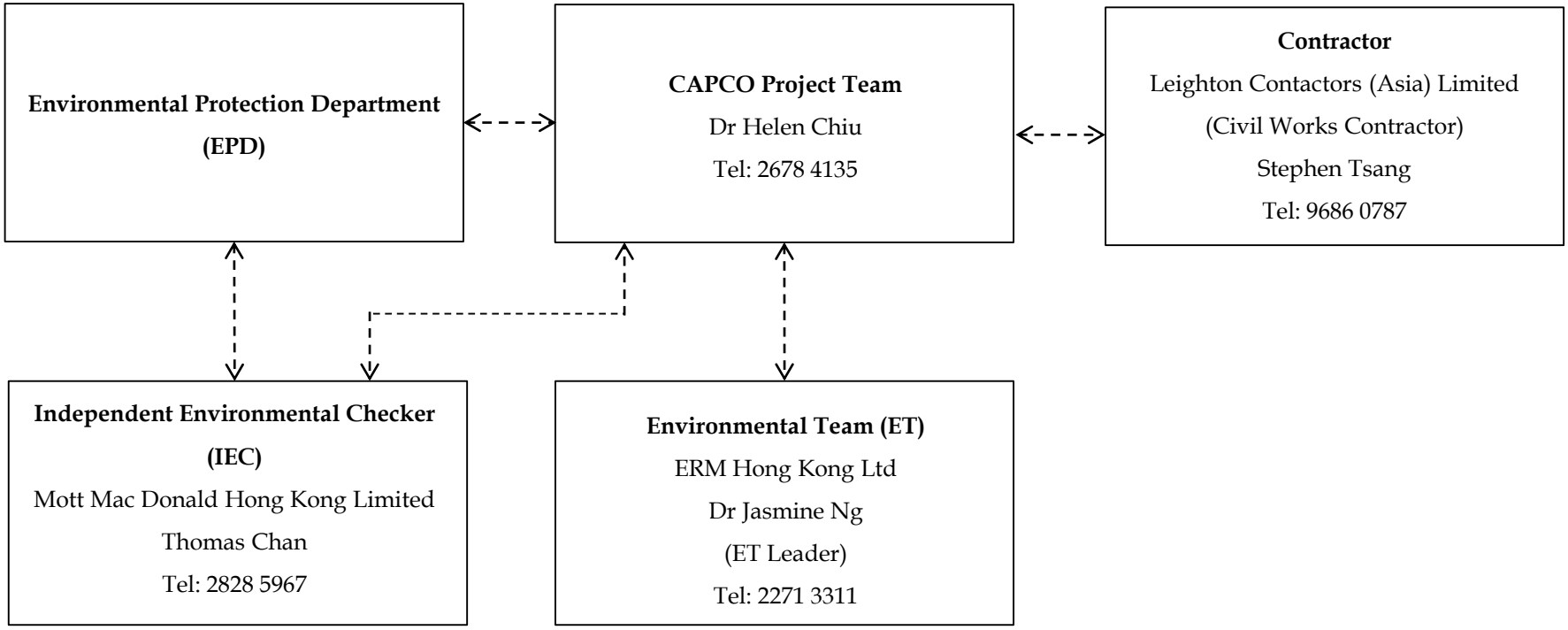
DATE: 23/1/2020

Environmental Resources Management

ERM

Annex C

Project Organization for EM&A Implementation



Key

------- Line of Communication

Annex C

Project Organization for EM&A Implementation

DATE: 9/1/2020

Environmental Resources Management

ERM

Annex D

Summary of Implementation Status of Environmental Mitigation

Annex D - Environmental Mitigation Implementation Status for Additional CCGT Units Project at BPPS

Note:

✓ Compliance of Mitigation Measures

<> Compliance of Mitigation but need improvement

x Non-compliance of Mitigation Measures

▲ Non-compliance of Mitigation Measures but rectified by the Contractor

Δ Deficiency of Mitigation Measures but rectified by the Contractor

N/A Not Applicable in Reporting Period

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
Air Quality								
S4.10.1	S3.1	Impervious dust screen or sheeting will be provided to enclose scaffolding from the ground floor level of building for construction of superstructure of the new buildings.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	Impervious sheet will be provided for skip hoist for material transport.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	The area where dusty work takes place should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after dusty activities as far as practicable.	Contractor	Construction Stage	<>	✓	✓	<>
S4.10.1	S3.1	All dusty materials should be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	Dropping heights for excavated materials should be controlled to a practical height to minimise the fugitive dust arising from unloading.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	During transportation by truck, materials should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	Wheel washing device should be provided at the exits of the work sites. Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty material from its body and wheels as far as practicable.	Contractor	Construction Stage	<>	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S4.10.1	S3.1	Road sections between vehicle-wash areas and vehicular entrance will be paved.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	Hoarding of not less than 2.4m high from ground level will be provided along the length of the Project Site boundary.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	Haul roads will be kept clear of dusty materials and will be sprayed with water so as to maintain the entire road surface wet at all times.	Contractor	Construction Stage	<>	<>	✓	✓
S4.10.1	S3.1	Temporary stockpiles of dusty materials will be either covered entirely by impervious sheets or sprayed with water to maintain the entire surface wet all the time.	Contractor	Construction Stage	<>	<>	<>	<>
S4.10.1	S3.1	Stockpiles of more than 20 bags of cement, dry pulverised fuel ash and dusty construction materials will be covered entirely by impervious sheeting sheltered on top and 3-sides.	Contractor	Construction Stage	<>	✓	<>	✓
S4.10.1	S3.1	All exposed areas will be kept wet always to minimise dust emission.	Contractor	Construction Stage	<>	<>	✓	✓
S4.10.1	S3.1	Ultra-low-sulphur diesel (ULSD) will be used for all construction plant on-site, as defined as diesel fuel containing not more than 0.005% sulphur by weight) as stipulated in *Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No 19/2005* on Environmental Management on Construction Sites.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	The engine of the construction equipment during idling will be switched off.	Contractor	Construction Stage	✓	✓	✓	✓
S4.10.1	S3.1	Regular maintenance of construction equipment deployed on-site will be conducted to prevent black smoke emission.	Contractor	Construction Stage	✓	✓	✓	✓
S4.11.2	S3.2	It is recommended to continuously monitor and record the levels of air pollutants of the exhaust gas streams emitted from the stacks of the additional CCGT units by means of CEMS per the licence requirements. Continuous monitoring of ambient concentrations of SO_2, NO and NO_2 will be continued at the current CLP's AQMSs.	CAPCO	Operational Stage	N/A	N/A	N/A	N/A
Hazard to Life								
S5.6	S4	All construction workers shall comply with CLP's safety policy and requirements.	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S5.6	S4	Method statements and risk assessments shall be prepared and safety control measures shall be in place before commencement of work.	Contractor	Construction Stage	✓	✓	✓	✓
S5.6	S4	All work procedures shall be complied with the operating plant procedures or guidelines and regulatory requirements.	Contractor	Construction Stage	✓	✓	✓	✓
S5.6	S4	Work permit system, on-site pre-work risk assessment and emergency response procedure shall be in place before commencement of work.	Contractor	Construction Stage	✓	✓	✓	✓
S5.6	S4	All construction workers shall equip with appropriate PPE when working at the Project Site.	Contractor	Construction Stage	✓	✓	✓	✓
S5.6	S4	Safety training and briefings shall be provided to all construction workers.	Contractor	Construction Stage	✓	✓	✓	✓
S5.6	S4	All construction workers shall be under close site supervision.	Contractor	Construction Stage	✓	✓	✓	✓
S5.6	S4	Regular site safety inspections shall be conducted during the construction phase of the Project.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Ensure speed limit enforcement is specified in the contractor's method statement to limit the speed of construction vehicles on-site.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Conduct speed checks to ensure enforcement of speed limits and to ensure adequate site access control.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Provide escort for hydrogen and CO_2 delivery vehicle drivers to ensure the right access route is used during the construction phases of the Project.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	A lifting plan, with detailed risk assessment, should be prepared and endorsed for heavy lifting of large equipment.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Vehicle crash barrier, designed for the specific speed limit at the BPPS, should be provided between the construction site and the distillate oil storage facilities during 1st CCGT unit construction phase. Also, a vehicle crash barrier is to be provided between the construction site and the 1st CCGT unit during 2nd CCGT unit construction phase.	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S5.13	S4	Any lifting operation near or over live equipment should be strictly minimised. If such operation cannot be avoided, lifting activities should be assessed, controlled and supervised. Adequate protection covers should also be provided on the existing BPPS facilities in case the operation of lifting equipment has a potential to impact live equipment at BPPS. Process isolation should be achieved in case that live equipment protection becomes impractical.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	The hydrogen road trailer and carbon dioxide road tanker delivery should follow alternative route, which is further from the construction site, during crane operation and movement of construction vehicles in the vicinity.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Ensure that a hazardous area classification study is conducted and hazardous area maps are updated before the start of the construction activities to ensure ignition sources are controlled during both construction and operation phases.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Ensure work permit system for hot work activities within the Project Site is specified in the contractor's method statement to minimise/ control ignition sources during construction phase.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Ensure effective communication system/ protocol is in place between the construction contractors and operation staff.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Ensure the Project Construction Emergency Response Plan is integrated with the Emergency Response Plan for the BPPS during construction phases. The plan should address stop work instructions to be promptly communicated to all construction workers performing hot works in case a confirmed flammable gas (natural gas and hydrogen) detection at the BPPS.	Contractor	Construction Stage	✓	✓	✓	✓
S5.13	S4	Ensure that construction activities do not impede the functions of fire and gas detection system, fire protection system, muster areas, fire-fighting vehicle access and escape routes.	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S5.13	S4	Ensure a Job Safety Analysis is conducted for construction activities of the Project during the construction phases, to identify and analyse hazards associated with the construction activities (e.g. lifting operations by cranes) onto the existing plant facilities and operations. Potential risks of the construction activities shall be assessed, and risk precautionary measures shall be implemented in Contractor's works procedures.	Contractor	Construction Stage	✓	✓	✓	✓
Water Quality								
S 7.9	S6.5	Reduction of dredging rate from 4,000 m^3 per day to 740 m^3 per day for dredging at the seawater intake and discharge outfall	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	Deploy floating type silt curtain around grab dredger	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	Deploy single layer of floating type silt curtain surrounding coral colonies identify at dive survey Transect C (SR18). The silt curtain surrounding SR18 should provide sufficient clearance to the coral colonies such that no direct impact from the installation and anchoring of silt curtain would be inflicted on the coral colonies.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	The contractor shall regularly inspect the silt curtains and check that they are moored and marked to avoid danger to marine traffic. Regular inspection on the integrity of the silt curtain should be carried out by the contractor and any damage to the silt curtain shall be repaired by the contractor promptly. Relevant marine works shall only be undertaken when the repair is fixed to the satisfaction of the engineer.	Contractor	Construction Stage	<>	<>	<>	<>
S 7.9	S6.5	Construction of intake and outfall structure shall be conducted behind drained cofferdam.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	All vessels should be well maintained and inspected before use to limit any potential discharges to the marine environment.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	All vessels must have a clean ballast system.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	No discharge of sewage/grey wastewater should be allowed. Wastewater from potentially contaminated area on working vessels should be minimised and collected. These kinds of wastewater should be brought back to port and discharged at appropriate collection and treatment system.	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S 7.9	S6.5	No soil waste is allowed to be disposed overboard.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	Silt removal facilities such as silt traps or sedimentation facilities will be provided to remove silt particles from runoff to meet the requirements of the TM standard under the WPCO. The design of silt removal facilities will be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly.	Contractor	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	Appropriate surface drainage will be designed and provided where necessary.	Contractor	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	The precautions to be taken at any time of year when rainstorms are likely together with the actions to be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94.	Contractor	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	Oil interceptors will be provided in the drainage system where necessary and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.	Contractor	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	Temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge, if any, will be adequately designed for the controlled release of storm flows.	Contractor	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	The temporary diverted drainage, if any, will be reinstated to the original condition when the construction work has finished or when the temporary diversion is no longer required.	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S 7.9	S6.5	Appropriate infiltration control, such as cofferdam wall, should be adopted to limit groundwater inflow to the excavation works areas in the Project site. Groundwater pumped out from excavation area should be discharged into the storm system via silt removal facilities.	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S 7.9	S6.5	Appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers over the construction site to prevent direct disposal of sewage into the water environment.	Contractor	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	The contingency plan for the existing operation of the BPPS is considered sufficient for directing immediate response to any accidental spillage event.	CAPCO	Construction Stage	✓	✓	✓	✓
S 7.9	S6.5	Mitigation measures required for maintenance dredging at seawater intake and discharge outfall would be the same as that recommended for construction phase dredging operation	Contractor	Construction Stage	N/A	N/A	N/A	N/A
S7.9 and S7.12	S6.2-S6.5	A water quality monitoring programme shall be implemented for the construction phase.	ET	Construction Stage	N/A	N/A	N/A	N/A
S7.9 and S7.12	S6.2-S6.5	To ensure compliance to the effluent standard, regular monitoring of effluent quality is recommended during normal operation. Furthermore, marine water monitoring at selected nearby WSRs during the first year of project commission are recommended to ensure compliance to WQO or other water quality criteria.	ET/ CAPCO	Operational Stage	N/A	N/A	N/A	N/A
Waste Management								
S8.5.1	Table 7.1	The Contractor must ensure that all the necessary waste disposal and marine dumping permits or licences are obtained prior to the commencement of the construction works.	Contractor	Construction Stage	✓	✓	✓	✓
S8.5.1	S7.2	The contractor will open a billing account with EPD in accordance with the Waste Disposal (Charges for Disposal of Construction Waste) Regulation for the payment of disposal charges.	Contractor	Construction Stage	✓	✓	✓	✓
S8.5.1	S7.2	A trip-ticket system will be established in accordance with *DEVB TC(W) No. 6/2010* to monitor the reuse of surplus excavated materials off-site and disposal of construction waste and general refuse at transfer facilities/ landfills, and to control fly-tipping.	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S8.5.1	S7.2	A WMP as stated in the *PNAP ADV-19* for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established and implemented during the construction phase as part of the Environmental Management Plan (EMP). The Contractor will be required to prepare the EMP and submits it to the Architect/ Engineer under the Contract for approval prior to implementation.	Contractor	Construction Stage	✓	✓	✓	✓
S8.5.1	Table 7.1	The management of dredged/ excavated sediment management requirement from *PNAP ADV-21* will be incorporated in the Specification of the Contract Documents.	CAPCO/ Contractor	Construction Stage	✓	<>	✓	✓
S8.5.1	S7.2	C&D materials will be segregated on-site into public fill and construction waste and stored in different containers or skips to facilitate reuse of the public fill and proper disposal of the construction waste. Specific areas of the Site will be designated for such segregation and storage if immediate use is not practicable. Prefabrication will be adopted as far as practicable to reduce the construction waste arisings.	Contractor	Construction Stage	✓	✓	✓	✓
S8.5.1	S7.2	The Contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.	Contractor	Construction Stage	✓	✓	✓	<>
S8.5.1	S7.2	Containers used for storage of chemical wastes will: • Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; • Have a capacity of less than 450 L unless the specifications have been approved by the EPD; and • Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.	Contractor	Construction Stage	✓	✓	✓	<>
S8.5.1	S7.2	The storage area for chemical wastes will: • Be clearly labelled and used solely for the storage of chemical waste; • Be enclosed on at least 3 sides; • Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area,	Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
		whichever is the greatest; • Have adequate ventilation; • Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and • Be arranged so that incompatible materials are appropriately separated. Chemical waste will be disposed of: • Via a licensed waste collector; and • To a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers.						
S8.5.1	S7.2	General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to the WENT Landfill, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts.	Contractor	Construction Stage	✓	<>	<>	<>
S8.5.1	S7.2	Recycling bins will be provided at strategic locations within the Project Site to facilitate recovery of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Project Site. Materials recovered will be sold for recycling.	Contractor	Construction Stage	✓	✓	✓	✓
S8.5.1	S7.2	To avoid any odour and litter impact, appropriate number of portable toilets will be provided for workers on-site.	Contractor	Construction Stage	✓	✓	✓	✓
S8.5.1	S7.2	At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.	Contractor	Construction Stage	✓	✓	✓	✓
Land Contamination								
S9.8	S8	During construction stage, good house-keeping practices shall be maintained by the Contractor to minimise the risk of land contamination due to construction activities, including but not limited to the followings:	Contractor	Construction Stage	<>	<>	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
		• Minimise the chemical stock within Project Site, only store the amount of chemicals needed; • Designated chemical/ chemical waste storage shall be established on concrete paved ground, as far as practicable. Secondary containments shall be provided for storage of chemicals/ chemical wastes; • Conduct regular maintenance and inspection on plants and equipment, particularly those involve the use of fuel, hydraulic oil or any sort of chemicals; and • Divert rainfall and surface run-off around construction areas.						
Ecology								
S10.9.2	S9.1	The vessel operators will be required to control and manage all effluent from vessels to prevent avoidable water quality impacts.	Contractor	Construction Stage	✓	✓	✓	✓
S10.9.2	S9.1	A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced. This will also be covered in the contractor briefings.	Contractor	Construction Stage	✓	✓	✓	✓
S10.9.2	S9.1	The effects of construction of the Project on the water quality of the area will be reduced with the implementation of mitigation measures as described in the Water Quality Impact Assessment.	Contractor	Construction Stage	✓	✓	✓	✓
S10.9.3	S9.1	All vessel operators working on the Project construction will be given a briefing, alerting them to the possible presence of dolphins in the marine works areas, and the guidelines for safe vessel operation in the presence of cetaceans. The use of high-speed vessels will be avoided as far as possible. All vessels used in this Project will be required to slow to 10 knots around the Project's marine works areas and area with high dolphin usage.	Contractor	Construction Stage	✓	✓	✓	✓
S10.9.3	S9.1	The vessel operators of this Project will be required to use predefined and regular routes.	Contractor	Construction Stage	✓	✓	✓	✓
S10.9.3	S9.2.1	A marine mammal exclusion zone within a radius of 250 m from dredger will be implemented during the construction phase. Qualified observer(s) will scan an exclusion zone of 250 m radius around the work area for at least 30 minutes prior to the start of dredging. If cetaceans are observed in the exclusion zone, dredging will be delayed until they have left the area.	Contractor	Construction Stage	N/A	N/A	N/A	N/A

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S10.9.4	S9.1	Structures will utilise appropriate design to complement the surrounding landscape wherever possible. Materials and finishes will be considered during detailed design.	CAPCO	Construction Stage	✓	✓	✓	✓
S10.9.4	S9.1	All of the major lighting sources will be pointed inward and downwards to avoid disturbances to wildlife.	CAPCO	Construction Stage	✓	✓	✓	✓
S10.9.4	S9.1	Good site practices and precautionary measures are recommended to be implemented to avoid encroachment onto the nearby natural habitats, minimise disturbance to wildlife, and ensure air and water quality is maintained. Mitigations measures as mentioned in the air quality (Section 4 in Approved EIA Report ref. no. AEIAR-197/2016) and water quality (Section 7 in Approved EIA Report ref. no. AEIAR-197/2016) assessments will be consequently instigated to minimise dust and surface runoff to adjacent wildlife and natural habitats during construction activities.	CAPCO/ Contractor	Construction Stage	✓	✓	✓	✓
S10.9.4	S9.1	Erect fences or demarcate along the boundary of the works area before the commencement of works to prevent vehicle movements, and encroachment of staffs, onto adjacent areas.	CAPCO/ Contractor	Construction Stage	✓	✓	✓	✓
S10.9.4	S9.1	Avoid any damage and unnecessary disturbance to the surrounding natural habitats.	CAPCO/ Contractor	Construction Stage	✓	✓	✓	✓
Landscape & Visual								
S12.8	S11	Sensitive architectural design of the new facilities. This should take into account material texture, colour, finished to structure and the context of the site.	CAPCO/ Design Contractor	Construction Stage	N/A	N/A	N/A	N/A
S12.8	S11	Reinstatement. Following construction, areas temporarily affected by the construction works, will be reinstated to their former state. This will include the artificial shoreline as well as parts of some roads.	CAPCO/ Contractor	Construction Stage	N/A	N/A	N/A	N/A
S12.8	S11	Preservation of vegetation. Plants affected by the proposed Project are all within movable planters. Prior to construction, these affected moveable planters should be re-located to a suitable area, still within the BPPS, taking care to ensure the existing health status of the vegetation is maintained or enhanced at the new location. Once construction is complete the final location of the moveable planters should be integrated into the LMP.	CAPCO/ Contractor	Construction Stage	✓	✓	✓	✓

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Who to implement the measures?	When to implement the measures?	Implementation Status (Year 2019)			
					Jan to Mar 2019	Apr to Jun 2019	Jul to Sept 2019	Oct to Dec 2019
S12.8	S11	Update Landscape Master Plan (LMP) to take account of the changes brought about by the Project and explore suitable areas where soft landscaping may be installed amongst the new facilities. The LMP should give due consideration to the possibility of re-provisioning of disturbed lands and provision of screen planting within the facility boundaries as far as practicable.	Qualified Landscape Professional employed by Project Proponent	Construction Stage	N/A	N/A	N/A	N/A

Annex E

Waste Flow Table

Annex E - Waste Flow Table for Additional CCGT Units Project at BPPS

Monthly Summary Waste Flow Table for 2019

Month	Actual Quantities of Inert C&D Materials Generated Monthly [1]					Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete [5]	Reused in the Contract	Reused in other Projects	Disposed as Public Fill [3]	Metals	Paper/ cardboard packaging	Plastics [2]	Chemical Waste [4]	Others, e.g. general refuse [3]
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000kg)	(in '000kg)	(in '000kg)	(in'000 kg)	(in '000m^3)
Jan-19	7.770	0.000	1.800	0.000	5.970	42.500	0.000	0.000	0.180	0.164
Feb-19	9.854	0.000	1.600	0.000	8.254	23.960	0.000	0.000	0.200	0.142
Mar-19	10.845	0.000	0.800	0.000	10.045	18.820	0.000	0.000	0.000	0.185
Apr-19	4.090	0.000	0.400	0.000	3.690	95.520	0.000	0.000	0.000	0.101
May-19	4.329	0.000	0.000	0.000	4.329	62.110	0.000	0.000	0.000	0.169
Jun-19	3.753	0.000	0.200	0.000	3.553	73.210	0.000	0.000	0.000	0.220
Sub-total	40.640	0.000	4.800	0.000	35.840	316.120	0.000	0.000	0.380	0.980
Jul-19	4.113	0.000	0.044	0.000	4.070	22.990	0.000	0.000	0.020	0.168
Aug-19	9.329	0.000	0.000	0.000	9.329	35.130	0.000	0.000	0.000	0.162
Sep-19	8.113	0.000	0.000	0.000	8.113	227.710	0.000	0.000	0.000	0.186
Oct-19	5.571	0.000	0.000	0.000	5.571	83.410	0.000	0.000	0.000	0.149
Nov-19	3.448	0.000	0.000	0.000	3.448	44.900	0.000	0.000	0.000	0.182
Dec-19	1.507	0.000	0.000	0.000	1.507	0.000	0.000	0.000	0.000	0.311
Total (2019)	72.722	0.000	4.844	0.000	67.878	730.260	0.000	0.000	0.400	2.137
2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2017	29.871	0.554	0.048	0.000	29.269	200.162	0.004	0.750	0.180	0.303
2018	33.640	0.000	2.000	0.119	31.522	316.251	0.000	0.000	0.000	0.992
Cumulative	136.233	0.554	6.892	0.119	128.668	1246.673	0.004	0.750	0.580	3.433

Notes:

(1) Inert C&D materials include bricks, concrete, building debris, rubble and excavated spoil.

(2) Plastics refer to plastic bottles/containers, plastic sheets/foam form packaging material.

(3) Density Assumption: 1.6(kg/l) for Public Fill and 0.9(kg/l) for General Refuse.

(4) Chemical waste includes waste oil and spent pipes with lubricating oil. Density of waste oil is assumed to be 0.8 kg/L.

(5) Density of broken concrete is assumed to be 2.5 ton/m^3.

(6) The cut-off data for waste management data during the reporting period is 31 December 2019.