



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

Additional Gas-fired Generation Units Project

**Environmental Monitoring and Audit
Manual**

April 2016

Environmental Resources Management

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1 INTRODUCTION

1.1 PURPOSE OF THE MANUAL

This *Environmental Monitoring and Audit (EM&A) Manual* ("the Manual") has been prepared by ERM-Hong Kong, Limited (ERM) on behalf of The Castle Peak Power Company Limited (CAPCO). The Manual is a supplementary document to the Environmental Impact Assessment (EIA) Report of the Additional Gas-fired Generation Units Project at the Black Point Power Station (BPPS) (hereafter referred to as the Project).

The Manual has been prepared in accordance with the *EIA Study Brief (No. ESB-286/2015)* and the *Technical Memorandum of the Environmental Impact Assessment Process (EIAO-TM)*. The purpose of the Manual is to provide information, guidance and instruction to personnel charged with environmental duties and those responsible for undertaking EM&A work during Project construction and operation. It provides systematic procedures for monitoring and auditing the environmental performance of the Project.

This Manual contains the following information:

- Responsibilities of the Contractor(s) for Project construction, Environmental Team (ET), and the Independent Environmental Checker (IEC) with respect to the EM&A requirements during the course of the Project;
- Project organisation;
- Requirements with respect to the construction and operational programme schedule and the necessary EM&A programme to track the environmental impact;
- Details of the methodologies to be adopted including field, laboratory and analytical procedures, and details on quality assurance and quality control programme;
- Preliminary definition of Action and Limit levels;
- Establishment of Event and Action plans;
- Requirements for reviewing pollution sources and working procedures required in the event of exceedances of applicable environmental criteria and/or receipt of complaints;
- Requirements for presentation of EM&A data and appropriate reporting procedures; and
- Requirements for review of EIA predictions and the effectiveness of the mitigation measures/environmental management systems and the EM&A programme.

1.2 PROJECT DESCRIPTION

1.2.1 Site Location

Black Point, where the BPPS is situated, is located in the western-most part of the New Territories. It comprises a headland extending from the east (land) to the west (sea) with granitic soil underneath, typical of the Tuen Mun and Castle Peak areas. The major development at Black Point is the BPPS, which is the first natural gas-fired power plant in Hong Kong. The BPPS is located to the north of the headland on reclaimed land. Reclamation in Black Point was completed in 1993 followed by construction of the BPPS and commencement of operation in 1996. BPPS is surrounded by mountain to the east and south while to the immediate north and west is the mouth of Deep Bay.

The proposed location for the Project is within the existing boundaries of the BPPS site and the location for each of the additional gas-fired generation units is illustrated in *Figure 1.1*. The size of the land reserved for the additional generation units and the associated facilities (the Project Site) is about 40,000 m². The reserved land has been used for material storage in warehouses and temporary structures. The northern half of the reserved land is not occupied by any buildings or facilities, whereas the southern half is occupied by a single storey warehouse. There are no other facilities or utilities within the reserved land except the surrounding chain link fence.

1.2.2 Project Scope

The scope of the Project involves the phased construction and operation of up to two additional CCGT units (with an installed capacity of up to 600 MW each) at the BPPS. The additional generation units will be of combined cycle gas turbine (CCGT) configuration using natural gas as the primary fuel, thereby providing a cleaner source of electricity for Hong Kong. The Project is comprised of the following key components:

- Up to two CCGT units;
- Cooling water intake facility and discharge facility;
- Alternation of temporary warehouse;
- Civil works and electrical / mechanical installation works for the CCGT units; and
- Infrastructure for making connections (fuel gas, fuel oil, electricity supply, water supplies, auxiliary gas supplies, etc.) from existing plant equipment in BPPS and their associated engineering works for enhancement / additions of equipment.

The location of these components is shown in *Figures 1.2a* and *1.2b*.

Legend

 Project Site



Figure 1.1

Indicative Location of Additional CCGT Units

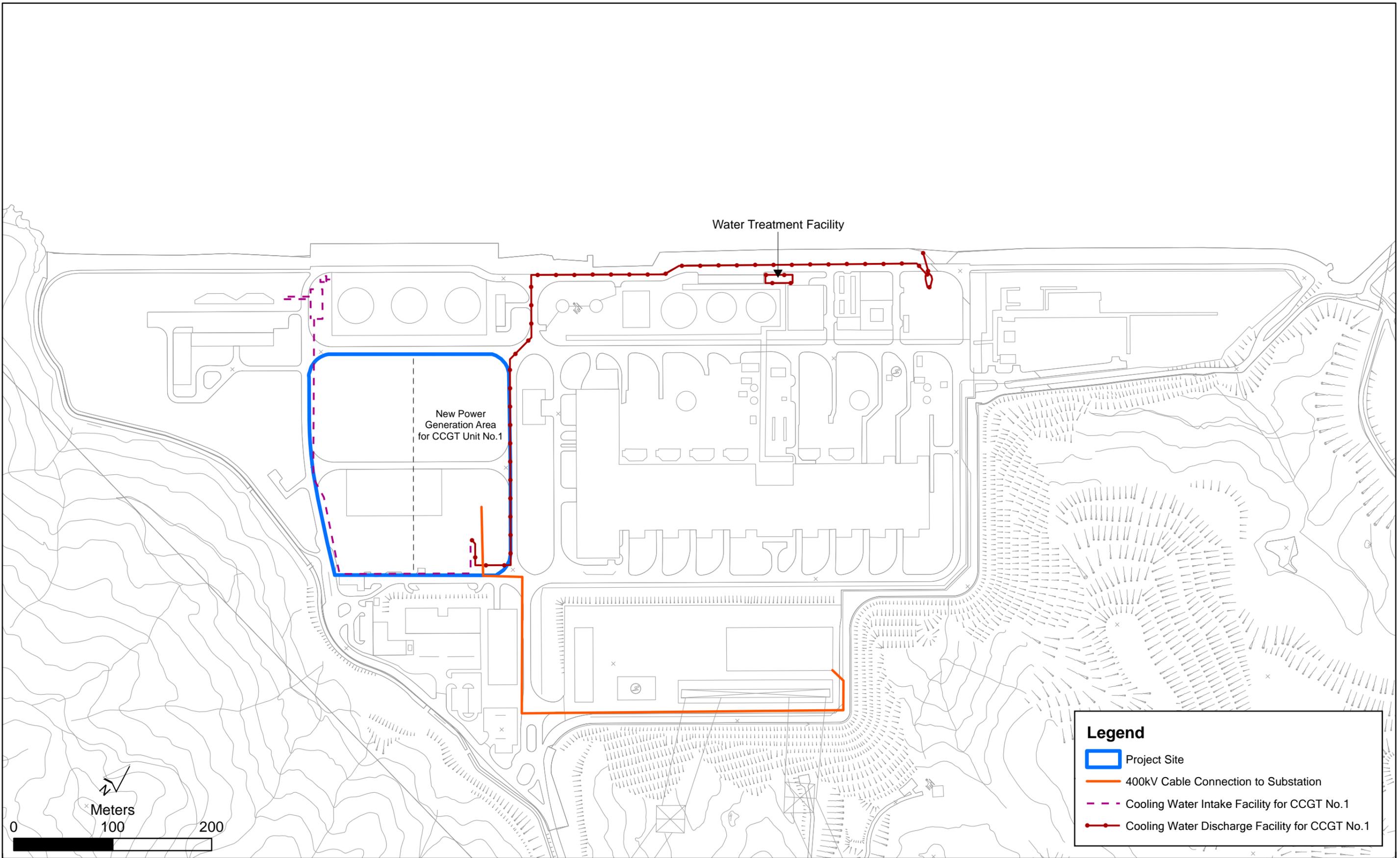


Figure 1.2A

Indicative Location of Key Project Components for CCGT No.1

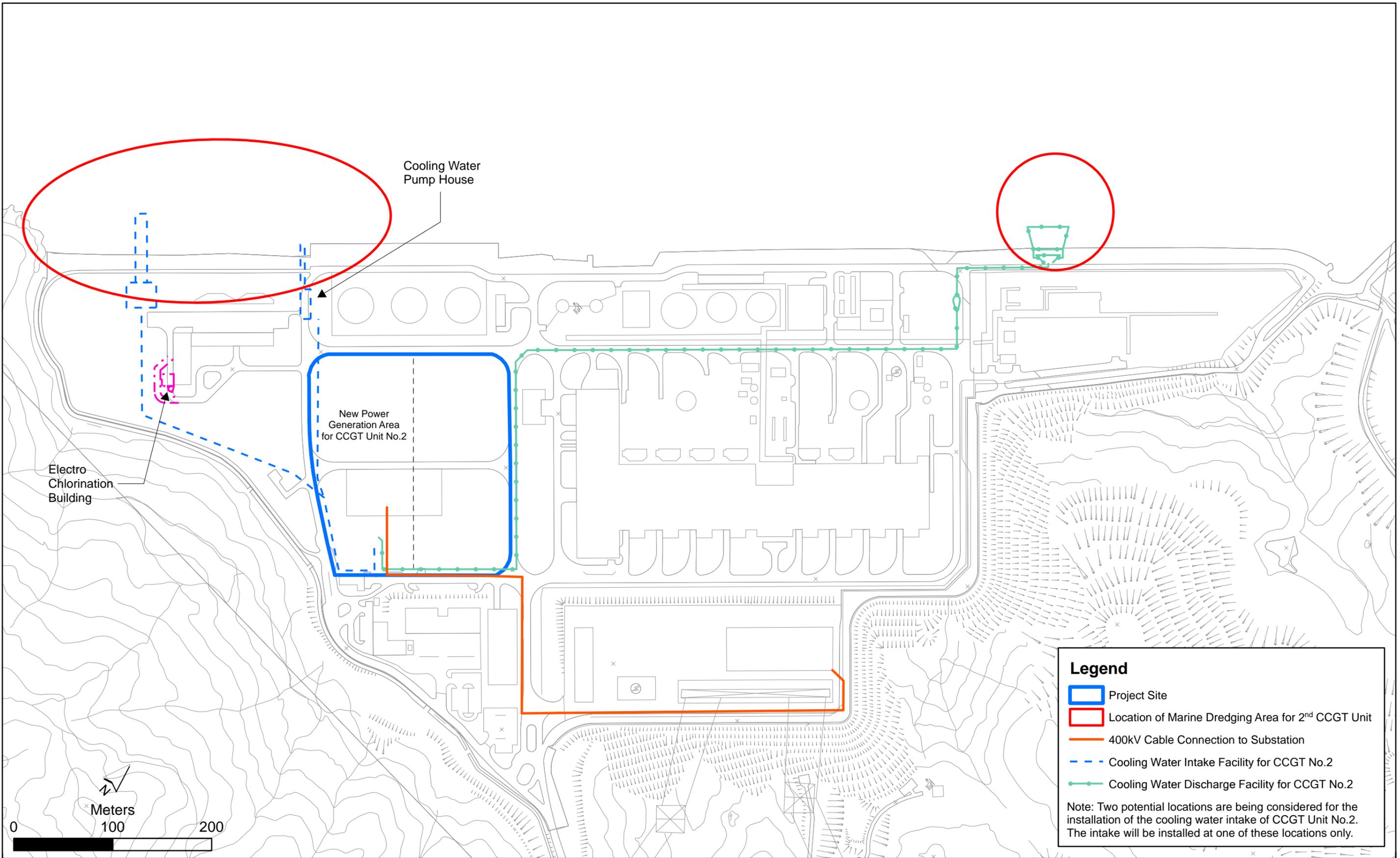


Figure 1.2B

Indicative Location of Key Project Components for CCGT No.2

The following elements of the Project addressed in this EIA Report are classified as Designated Projects under the *Environmental Impact Assessment Ordinance (Cap. 499) (EIAO)*:

- Installation of additional gas-fired generation unit(s) in phases at the BPPS (Schedule 2, Part I, Item D.1 - Public utility electricity power plant); and
- If a second unit is to be installed, a dredging operation less than 100 m from the BPPS seawater intake location would be required (Schedule 2, Part I, Item C.12(b) - A dredging operation which is less than 100 m from a seawater intake point).

1.3

OBJECTIVE OF THE EM&A

The broad objective of this Manual is to define the procedures of the EM&A programme for monitoring the environmental performance of the Project during design, construction and operation. The construction and operational impacts arising from the implementation of the Project are specified in the EIA Report. The EIA Report also specifies mitigation measures and construction practices that may be needed to confirm compliance with the environmental criteria. These mitigation measures and their implementation requirements are presented in the Implementation Schedule of Mitigation Measures (*Annex A*).

The main objectives of the EM&A programme are to:

- provide a database of environmental parameters against which to determine any short term or long term environmental impacts;
- provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
- confirm that the mitigation recommendations of the EIA are included in the design of the Project;
- clarify and identify potential sources of pollution, impact and nuisance arising from the works for the responsible parties;
- confirm compliance with regulatory requirements, contract specifications and EIA study recommendations;
- confirm compliance of environmental designs during the design phase of the Project with the specifications stated in the EIA Report and the Environmental Permit (EP);
- monitor performance of the mitigation measures and to assess their effectiveness;
- take remedial action if unexpected issues or unacceptable impacts arise;

- verify the environmental impacts predicted in the EIA; and
- audit environmental performance.

1.4 SCOPE OF THE EM&A PROGRAMME

The scope of this EM&A programme is to:

For both CCGT Unit No.1 and No.2:

- implement inspection and audit requirements for waste management;
- liaise with, and provide environmental advice (as requested or when otherwise necessary) to construction site staff on the significance and implications of the environmental monitoring data;
- identify and resolve environmental issues and other functions as they may arise from the works;
- check and quantify the Contractor(s)'s overall environmental performance, implementation of Event and Action Plans (EAPs), and remedial actions taken to mitigate adverse environmental effects as they may arise from the works;
- conduct monthly reviews of monitored impact data as the basis for assessing compliance with the defined criteria and to verify that necessary mitigation measures are identified and implemented, and to undertake additional ad hoc monitoring and auditing as required by special circumstances;
- evaluate and interpret environmental monitoring data to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards, and to verify the environmental impacts predicted in the EIA;
- manage and liaise with other individuals or parties concerning other environmental issues deemed to be relevant to the construction process;
- conduct regular site inspections and audits of a formal or informal nature to assess:
 - (i) the level of the Contractor(s)'s general environmental awareness;
 - (ii) the Contractor(s)'s implementation of the recommendations in the EIA and their contractual obligations;
 - (iii) the Contractor(s)'s performance as measured by the EM&A;
 - (iv) the need for specific mitigation measures to be implemented or the continued usage of those previously agreed;

(v) to advise the site staff of any identified potential environmental issues; and

- produce monthly EM&A reports which summarise project monitoring and auditing data, with full interpretation illustrating the acceptability or otherwise of any environmental impacts and identification or assessment of the implementation status of agreed mitigation measures.

For CCGT Unit No.2 only:

- establish baseline water quality levels at specified locations and implement monitoring requirements for water quality monitoring programme; and
- implement monitoring requirements for marine mammal monitoring programme.

1.5 WORKS PROGRAMME & WORKS LOCATIONS

The preliminary construction programme is given in *Figure 1.3*. The locations of works are shown in *Figure 1.1*.

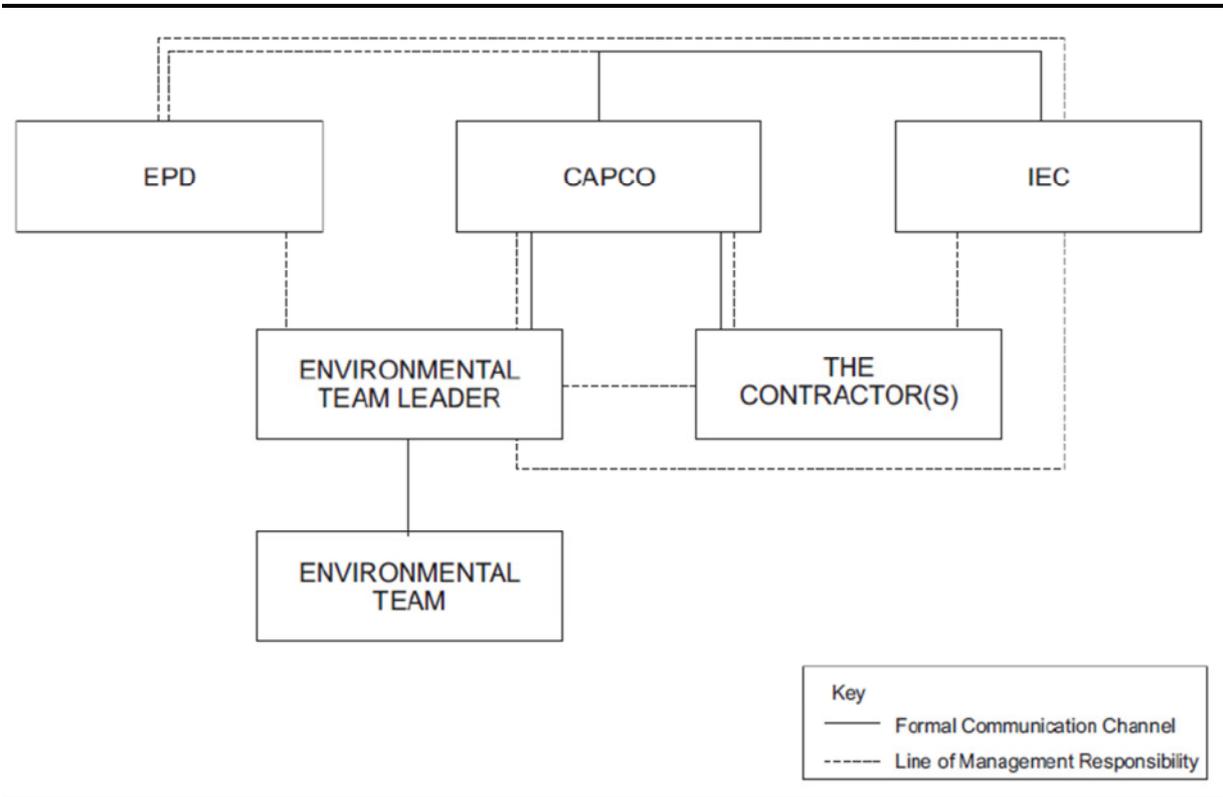
Figure 1.3 Preliminary Construction Programme of the Project

	2016				2017				2018				2019				
	Q1	Q2	Q3	Q4													
CCGT Unit No.1																	
Civil Works			█														
Equipment Supply & Installation			█														

	Year 1				Year 2				Year 3				Year 4	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
CCGT Unit No.2 (Tentative)														
Civil Works	█													
Cooling Water Pumping Station	█													
Equipment Supply & Installation	█													

The EM&A will require the involvement of CAPCO, an ET, an IEC and the Contractor(s). The roles and responsibilities of the various parties involved in the EM&A process are further expanded in the following sections and in Figure 1.4.

Figure 1.4 Indicative Project Organisation Chart



CAPCO will appoint an ET to conduct the site inspection and monitoring and, to provide specialist advice on the undertaking and implementation of environmental responsibilities. The ET will be led and managed by the ET Leader. The ET Leader will have relevant education, training, knowledge, experience and professional qualifications and the appointment will be subject to the approval of the Director of Environmental Protection. Suitably qualified staff will be included in the ET, and the ET should not be in any way an associated body of the Contractor(s) for Project construction. For the purpose of this Manual, the ET Leader, who will be responsible for, and in charge of, the ET, is referred to as the person delegated the role of executing the EM&A requirements.

To maintain strict control of the EM&A process, CAPCO will appoint independent environmental consultants to act as an IEC to verify and validate/ audit the environmental performance of CAPCO's Contractor(s) for Project construction and effectiveness of ET. The IEC will have previous relevant experience with checking and auditing similarly sized EM&A programmes and the IEC will be a recognised environmental professional.

Sufficient and suitably qualified professional and technical staff will be employed by the IEC, as required under the EM&A programme for the duration of the Project.

Roles & Responsibilities

CAPCO will:

- employ an ET as described above;
- employ an IEC as described above;
- supervise the Contractor(s)' activities and confirm that the requirements in the EM&A Manual and the Contract Document are fully complied with;
- develop appropriate contract clauses to confirm that the Contractor(s) will have qualified professionals to interface with the ETL/CAPCO/IEC to fulfil the EIA/EP requirements;
- inform the Contractor(s) when action is required to reduce impacts in accordance with the Event and Action Plans;
- adhere to the procedures for carrying out complaint investigation; and
- participate in joint site inspections undertaken by the ET and IEC.

The Contractor(s) for Project construction will:

- work within the scope of the construction contract and other tender conditions;
- provide assistance to the ET in carrying out monitoring and site inspections;
- submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;
- implement measures to reduce impact where Action and Limit levels are exceeded;
- implement the corrective actions instructed by CAPCO/ET/IEC;
- participate in the site inspections undertaken by the ET and the IEC, as required, and undertake any corrective actions instructed by CAPCO/ETL/IEC; and
- adhere to the procedures for carrying out complaint investigation.

The ET will:

- monitor various environmental parameters as required in this EM&A Manual;
- assess the EM&A data and review the success of the EM&A programme determining the adequacy of the mitigation measures implemented and the validity of the EIA predictions as well as identify any adverse environmental impacts before they arise;
- carry out regular site inspection to investigate the Contractor(s)'s site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt issues;
- review the Contractor(s)'s working programme and methodology, and comment as necessary;
- provide advice (if required) to CAPCO for the development of environmental contract clauses for contractor contract;
- review and prepare reports on the environmental monitoring data and site environmental conditions;
- report on the environmental monitoring results and conditions to the IEC, Contractor(s), EPD and CAPCO;
- recommend suitable mitigation measures to the Contractor(s) in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans; and
- adhere to the procedures for carrying out complaint investigation.

The IEC will:

- review and audit the implementation of the EM&A programme and the overall level of environmental performance being achieved;
- arrange and conduct monthly independent site audits of the works;
- validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring stations, monitoring procedures and locations of sensitive receivers;
- audit the EIA recommendations and requirements against the status of implementation of environmental protection measures on site;
- on an as needed basis, audit the Contractor(s)'s construction methodology and agree the appropriate, reduced impact alternative in consultation with CAPCO, the ET and the Contractor(s);
- adhere to the procedures for carrying out complaint investigation;

- review the effectiveness of environmental mitigation measures and project environmental performance including the proposed corrective measures;
- review EM&A report submitted by the ET leader and feedback audit results to ET by signing off relevant EM&A proformas; and
- report the findings of site audits and other environmental performance reviews to CAPCO, ET, EPD and the Contractor(s).

1.7 *STRUCTURE OF THE EM&A MANUAL*

The remainder of the Manual is set out as follows:

- Section 2 sets out the EM&A general requirements;
- Section 3 sets out the EM&A requirements for air quality;
- Section 4 sets out the EM&A requirements for hazard to human life;
- Section 5 sets out the EM&A requirements for noise;
- Section 6 details the requirements for water quality baseline and impact monitoring, and lists relevant monitoring equipment, compliance and Event and Action Plans (EAPs);
- Section 7 details the requirements for waste management;
- Section 8 details the requirements for land contamination;
- Section 9 details the requirements for ecology;
- Section 10 details the requirements for fisheries;
- Section 11 sets out the EM&A requirements for landscape and visual;
- Section 12 sets out the EM&A requirements for cultural heritage;
- Section 13 sets out the EM&A requirements for health;
- Section 14 describes the scope and frequency of site environmental inspection;
- Section 15 details the reporting requirements for the EM&A;
- Annex A contains the implementation schedule summarising all mitigation measures proposed in the EIA Report; and
- Annex B contains the monitoring and complaint log sheets.

2.1 INTRODUCTION

In this section, the general requirements of the EM&A programme for the Project are presented. The scope of the programme is developed with reference to the findings and recommendations of the EIA Report.

It should be noted that the construction and operation of the two proposed additional CCGT units, namely CCGT Units No.1 and No.2, are phased. The required EM&A exercises stipulated in this Manual are applicable to the construction and operation of both units unless otherwise specified in the corresponding sections. A summary of the requirements for each of the environmental parameters in each stage of the Project is detailed in *Table 2.1*.

Table 2.1 Summary of EM&A Requirements for the Project

Parameters	EM&A Requirement					
	Design (1)	Phase	CCGT Unit No.1		CCGT Unit No.2	
			Construction Phase	Operation Phase	Construction Phase	Operation Phase
Air Quality	-		✓ (SI)	✓	✓ (SI)	✓
Hazard to Human Life	✓		✓ (SI)	-	✓ (SI)	-
Noise	-		✓ (SI)	-	✓ (SI)	-
Water Quality	-		✓ (SI) (2)	✓	✓ (2)	✓
Waste	-		✓ (SI)	-	✓ (SI)	-
Land Contamination	-		✓ (SI)	-	✓ (SI)	-
Ecology	-		✓ (SI)	-	✓ (SI)	-
Fisheries	-		-	-	-	-
Landscape & Visual	✓		✓ (SI)	-	✓ (SI)	-
Cultural Heritage	-		-	-	-	-
Health	-		-	-	-	-

Notes:

" (SI) " = Site Inspection forms the main checking method; "- " = no EM&A required

- (1) EM&A requirements in the design phase shall include confirmation on the compliance for environmental designs which were specified in the EIA Report and the EP for all parameters.
- (2) For the construction phase of the CCGT Unit No.1, no marine construction works would be required. Therefore construction phase marine water quality monitoring exercise is only required for the construction phase of the CCGT Unit No.2.

2.2 CONSTRUCTION PHASE EM&A**2.2.1 General**

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

During the construction phases of the Project (for both CCGT Units No.1 and No.2), air quality, hazard to human life, noise, water quality, waste

management, land contamination, ecology, and landscape and visual will be subject to EM&A, with environmental monitoring being undertaken for water quality for the construction phase of the CCGT Units No.2 as determined in the EIA. Monitoring of the effectiveness of the mitigation measures will be achieved through the environmental monitoring programme as well as through site inspections. The inspections will include within their scope, mechanisms to review and assess the Contractor(s)'s environmental performance, ensuring that the recommended mitigation measures have been properly implemented, and that the timely resolution of received complaints are managed and controlled in a manner consistent with the recommendations of the EIA Report.

2.2.2 *Environmental Monitoring*

The environmental monitoring work throughout the Project will be carried out in accordance with this Manual and reported by the ET. Monitoring works is only required during the construction phase of CCGT Unit No.2 and will cover water quality and marine mammal monitoring.

2.2.3 *Action and Limit Levels*

Action and Limit (A/L) Levels are defined levels of impact recorded by the environmental monitoring activities which represent levels at which a prescribed response is required. Since environmental monitoring is only required for the construction phase of CCGT Unit No.2, details on these Levels are provided in the Water Quality Section (*Section 6*).

2.2.4 *Event and Action Plans*

The purpose of the Event and Action Plans (EAPs) is to provide, in association with the monitoring and audit activities, procedures for ensuring that if any significant environmental incident occurs, the cause will be quickly identified and remediated. This also applies to the exceedances of A/L criteria identified in the EM&A programme.

2.2.5 *Site Inspections*

In addition to monitoring, as a means of assessing the ongoing performance of the Contractor(s) for Project construction, the ET will undertake site inspections of the compliance with stipulated procedures and on-site practices. The primary objective of the inspection and audit 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 site audits on as need basis to assess the performance of the Contractor(s).

Whilst the audit and inspection programme will complement the monitoring activity, the criteria against which the audits will be undertaken will be derived from the Clauses within the Contract Documents which seek to enforce the recommendations of the EIA Report and the EM&A Manual.

The findings of site inspections and audits will be made known to the Contractor(s) at the time of the inspection to enable the rapid resolution of identified non-conformities. Non-conformities, and the corrective actions undertaken, will also be reported in the monthly EM&A Reports.

Section 14 of this Manual presents details of the scope and frequency of on-site inspections and defines the range of issues that the audit protocols will be designed to address.

2.2.6 *Enquiries, Complaints and Requests for Information*

Enquiries, complaints and requests for information may occur from a wide range of individuals and organisations including members of the public, Government departments, the press and community groups.

All enquiries concerning the environmental impacts of the Project, irrespective of how they are received, will be reported to CAPCO and IEC and directed to the ET who should set up procedures for handling, investigation and storage of such information. The following steps should be followed:

- (1) The ET Leader should notify the IEC and CAPCO of the nature of the enquiry.
- (2) An investigation should be initiated to determine the validity of the complaint and to identify the source(s) of the problem.
- (3) The ET Leader should undertake the following steps, as necessary:
 - investigate and identify source(s) of the problem, with assistance from CAPCO and relevant Contractor(s);
 - if considered necessary by CAPCO following consultation with the IEC, undertake additional monitoring to verify the existence and severity of the alleged complaint;
 - identify necessary remedial measures and implement as soon as possible;
 - if the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;
 - repeat the monitoring to verify effectiveness of mitigation measures; and,
 - repeat review procedures to identify further possible areas of improvement if the repeat monitoring results continue to substantiate the complaint.
- (4) The outcome of the investigation and the action taken will be documented on a complaint log (*Annex B*). A formal response to each

complaint received will be prepared by the Contractor(s) within five working days and submitted to CAPCO, in order to notify the concerned person(s) that action has been taken.

- (5) All enquiries/complaints that trigger this process should be reported in the monthly EM&A reports, which should include results of investigations undertaken by the ET Leader, and details of the measures taken, and additional monitoring results (if deemed necessary). It should be noted that the receipt of complaint or enquiry should not be, in itself, a sufficient reason to introduce additional mitigation measures.

The complainant will be notified of the findings, and audit procedures will be put in place to verify that the issue does not recur.

2.2.7 *Reporting*

Baseline, construction phase and post-construction phase monitoring, monthly, and annual/final reports will be prepared and certified by the ET Leader and verified by the IEC. The reports will be submitted to CAPCO and EPD. The monthly reports will be prepared and submitted within two weeks of the end of each calendar month.

2.2.8 *Cessation of EM&A*

The cessation of EM&A programme is subject to the satisfactory completion of the EM&A Final Report, agreement with the IEC and approval from EPD.

2.3 *OPERATION PHASE EM&A*

Based on the findings of the EIA, air and water quality monitoring during operation phase of both CCGT Units is considered necessary. Monitoring of any planting works should also continue over their establishment period, which may extend into the operation phase, and will be covered by regular site inspections. Other operational licences will require specific monitoring or audit conditions or practices, and a non EIA EM&A practice will need to be put in place.

3 *AIR QUALITY*

3.1 *CONSTRUCTION PHASE*

The EIA study concluded that no adverse fugitive dust impact is anticipated during the construction of CCGT Units No.1 and No.2, and dust monitoring is considered not necessary. However, it is recommended to conduct regular environmental site audit, i.e. on weekly basis, to confirm the implementation of the dust control measures and good site practices as recommended in *Section 4.10.1* of the EIA Report throughout the construction of these two units. These measures are also summarised in the Implementation Schedule provided in *Annex A*.

3.2 *OPERATION PHASE*

Based on the prediction of the air quality modelling exercise conducted under this EIA study, no adverse air quality impact is anticipated during the operation of the additional CCGT units. Air pollutants of the exhaust gas streams emitted from the stacks of the CCGT units will be continuously monitored and recorded by means of Continuous Emission Monitoring System (CEMS) per the licence requirements.

Existing continuous monitoring of ambient concentrations of SO₂, NO and NO₂ will be continued at the current CLP's air quality monitoring stations, as required by specific emissions licences.

The EIA study concluded that the individual risk and societal risks posed by the proposed Project and the existing BPPS facilities for both construction and operation phases are acceptable and in compliance with risk criteria in *Section 2 of Annex 4 of EIAO-TM*. No unacceptable risks are foreseen as a result of the operation of the proposed Project. No mitigation measures are thus deemed necessary and no monitoring will be required for the construction and operation phases. Safety management measures are recommended to further manage and minimise the external hazards from constructions activities risk during the construction phase of the two units. They are summarised in the Implementation Schedule provided in *Annex A*.

CAPCO is a registered gas supply company and will periodically review and update the risk assessment associated with the operations of the natural gas facilities under the *Gas Safety Ordinance* to demonstrate that the members of the public are not exposed to undue risks.

Noise monitoring is considered not necessary during both construction and operation phases of the proposed Project. Monthly site inspections and audits are recommended to be carried out during the construction phase of the two units in order to confirm that regulatory requirements are being met.

6 WATER QUALITY

6.1 INTRODUCTION

In accordance with the recommendations of the EIA, water quality EM&A is required during dredging at the cooling water intake and discharge outfall for construction of CCGT Unit No.2 and operation phase maintenance dredging. In addition, baseline water quality monitoring will be required prior to the commencement of marine construction activities of CCGT Unit No.2. The following sections provide details of the water quality monitoring to be undertaken by the ET to verify the distance of sediment and thermal plume dispersion and to identify whether the potential exists for any indirect impacts to occur to ecological sensitive receivers. The water quality monitoring programme will be carried out to allow any deteriorating water quality to be readily detected and timely action taken to rectify the situation. The status and locations of water quality sensitive receivers and the marine works location may change after issuing this Manual. If required, the ET in consultation with IEC will propose updated monitoring locations and seek approval from EPD.

Water quality monitoring for the Project can be divided into the following stages:

- Marine water quality monitoring for dredging activities during construction phase of the CCGT Unit No.2;
- Marine water quality monitoring on first year of commissioning of the CCGT Unit No.1;
- Marine water quality monitoring on first year of commissioning of the CCGT Unit No.2;
- Marine water quality monitoring for maintenance dredging during operation phase of the CCGT Unit No.2 and
- Regular monitoring of effluent quality.

6.2 SAMPLING & TESTING METHODOLOGY

6.2.1 Water Quality Parameters

The parameters that have been selected for measurement in situ and in the laboratory are those that were either determined in the EIA to be those with the most potential to be affected by the construction works or are a standard check on water quality conditions. Parameters to be measured in the construction phase, operation phase and effluent quality monitoring are listed in *Table 6.1*.

Table 6.1 Parameters Measured in the Marine Water Quality Monitoring

Parameters	Unit	Abbr.	Marine Water Quality Monitoring				Effluent Monitoring
			Baseline	Construction and Maintenance Dredging of CCGT Unit No.2	First-year Operation CCGT		
					Unit No.1	Unit No.2	
<i>In situ measurements</i>							
Dissolved oxygen	mg/L	DO	✓	✓	✓	✓	
Temperature	°C	-	✓	✓	✓	✓	✓
pH	-	-	✓	✓	✓	✓	✓
Turbidity	NTU	-	✓	✓			
Salinity	‰	-	✓	✓	✓	✓	
Total Residual Chlorine	mg/L	TRC	✓		✓	✓	✓
<i>Laboratory measurements</i>							
Suspended Solids	mg/L	SS	✓	✓			

In addition to the water quality parameters, other relevant data will also be measured and recorded in Water Quality Monitoring Logs, including the location of the sampling stations, water depth, time, weather conditions, sea conditions, tidal stage, current direction and velocity, special phenomena and work activities undertaken around the monitoring and works area that may influence the monitoring results. A sample data record sheet is shown in *Annex B* for reference.

6.2.2 Monitoring Equipment

For water quality monitoring, the following equipment will be used:

- **Dissolved Oxygen and Temperature Measuring Equipment** - The instrument will be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and will be operable from a DC power source. It will be capable of measuring: dissolved oxygen levels in the range of 0 - 20 mg L-1 and 0 - 200% saturation; and a temperature of 0 - 45 degrees Celsius. It shall have a membrane electrode with automatic temperature compensation complete with a cable of not less than 35 m in length. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary (e.g. YSI model 59 DO meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).
- **Turbidity Measurement Equipment** - The instrument will be a portable, weatherproof turbidity-measuring unit complete with cable, sensor and comprehensive operation manuals. The equipment will be operated from a DC power source, it will have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU and will be complete with a cable with at least 35 m in length (for example Hach 2100P or an approved similar instrument).

- **Salinity Measurement Instrument** - A portable salinometer capable of measuring salinity in the range of 0 - 40 ppt will be provided for measuring salinity of the water at each monitoring location.
- **Water Depth Gauge** – A portable, battery-operated echo sounder (for example Seafarer 700 or a similar approved instrument) will be used for the determination of water depth at each designated monitoring station. This unit will preferably be affixed to the bottom of the work boat if the same vessel is to be used throughout the monitoring programme. The echo sounder should be suitably calibrated. The ET shall seek approval for their proposed equipment with the client prior to deployment.
- **Current Velocity and Direction** – No specific equipment is recommended for measuring the current velocity and direction. The environmental contractor shall seek approval of their proposed equipment with the client prior to deployment.
- **Positioning Device** – A Global Positioning System (GPS) shall be used during monitoring to allow accurate recording of the position of the monitoring vessel before taking measurements. The Differential GPS, or equivalent instrument, should be suitably calibrated at appropriate checkpoint (e.g. Quarry Bay Survey Nail) to verify that the monitoring station is at the correct position before the water quality monitoring commence.
- **Water Sampling Equipment** - A water sampler, consisting of a PVC or glass cylinder of not less than two litres, which can be effectively sealed with cups at both ends, will be used (e.g. Kahlsico Water Sampler 13SWB203 or an approved similar instrument). The water sampler will have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.
- **Total Residual Chlorine** - Total residual chlorine (TRC) shall be measured in-situ using approved test kit.

6.2.3

Sampling / Testing Protocols

All *in situ* monitoring instruments will be checked, calibrated and certified by a laboratory accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) ⁽¹⁾ or any other international accreditation scheme before use, and subsequently re-calibrated at monthly intervals throughout the stages of the water quality monitoring. Responses of sensors and electrodes will be checked with certified standard solutions before each use.

On-site calibration of field equipment shall follow the “*Guide to On-Site Test Methods for the Analysis of Waters*”, BS 1427: 2009. Sufficient stocks of spare

(1) The laboratory will be contracted before commencement of the monitoring programme.

parts shall be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when equipment is under maintenance, calibration etc.

6.2.4 *Laboratory Measurement and Analysis*

All laboratory work shall be carried out in a HOKLAS accredited laboratory. Sufficient volume of each water sample shall be collected at the monitoring stations for carrying out the laboratory analyses. Using chain of custody forms, collected water samples will be transferred to an HOKLAS accredited laboratory for immediate processing. The determination work shall start within the next working day after collection of the water samples. The laboratory measurements shall be provided to the client within 5 working days of the sampling event. Analytical methodology and sample preservation of other parameters will be based on the latest edition of Standard Methods for the Examination of Waste and Wastewater published by American Public Health Association (APHA), American Water Works Association (AWWA) and methods by USEPA, or suitable method in accordance with requirements of HOKLAS or another internationally accredited scheme. The submitted information should include pre-treatment procedures, instrument use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per-batch etc.), detection limits and accuracy. The QA/QC details shall be in accordance with requirements of HOKLAS or another internationally accredited scheme.

Parameters for laboratory measurements, their standard methods and their detection limits are presented in *Table 6.2*.

Table 6.2 *Laboratory measurements, standard methods and corresponding detection limits of marine water quality monitoring*

Parameters	Standard Methods	Detection Limit	Reporting Limit
Construction Phase			
Dissolved oxygen (mg/L)	Instrumental, CTD	0.1	–
Temperature (°C)	Instrumental, CTD	0.1	–
pH	Instrumental, CTD	0.1	–
Turbidity (NTU)	Instrumental, CTD	0.1	–
Salinity (‰)	Instrumental, CTD	0.1	–
Suspended Solids (mg/L)	APHA 2540E	1.0	–
Operation Phase			
Dissolved oxygen (mg/L)	Instrumental, CTD	0.1	–
Temperature (°C)	Instrumental, CTD	0.1	–
pH	Instrumental, CTD	0.1	–
Salinity (‰)	Instrumental, CTD	0.1	–
Suspended Solids (mg/L)	APHA 2540E	1.0	–
Total Residual Chlorine (mg/L)	Test-kit *	*	*

*Note: The testing methods, Quality Assurance/Quality Control (QA/QC) details, detection limits and accuracy shall be submitted to EPD for approval prior to the commencement of monitoring programme.

6.2.5 Monitoring Locations

The water quality monitoring locations for baseline, construction and first-year operation phases are shown in *Figure 6.1* and detailed in *Table 6.3* below. A schedule for water quality monitoring shall be prepared by the ET and approved by IEC and EPD prior to the commencement of the monitoring.

Table 6.3 Location of Water Quality Monitoring Stations

Station	Easting	Northing	Description	Baseline	Construction and Maintenance Dredging	First-year Operation	
						CCGT Unit No.1	CCGT Unit No.2
SR3	812234	832326	Ha Pak Nai	✓	✓	✓	✓
SR5	809170	829218	Lung Kwu Sheung Tan	✓	✓	✓	✓
SR6	804834	827940	Northwestern corner of the Sha Chau and Lung Kwu Chau Marine Park	✓	✓	✓	✓
SR7	806218	827940	Northeastern corner of the Sha Chau and Lung Kwu Chau Marine Park	✓	✓	✓	✓
SR14	812168	833209	Oyster production area	✓	✓	✓	✓
SR16	810349	831706	Seawater intake of the Sludge Treatment Facilities	✓	✓		
SR18	808759	830684	Coral colonies at the existing seawall of BPPS	✓	✓		
CE	811708	834740	Control station for ebb tide	✓	✓	✓	✓
CF	806912	826205	Control station for flood tide	✓	✓	✓	✓

Cooling water effluent from BPPS shall be collected at a suitable location before discharge. The sampling location should be agreed with CAPCO and EPD, and should fulfil the following requirements:

- Effluent collected at the sampling location is representative to the effluent discharged at the outfall diffuser;
- Sampling works at the sampling location would not interfere with the normal operation of the BPPS; and
- Sampling works at the sampling location would not induce safety hazard.

The status and locations of water quality sensitive receivers and the monitoring sites may change after issuing this Manual. If such cases exist, the ET shall propose updated monitoring locations and seek approval from the IEC and EPD.

When alternative monitoring locations are proposed, they shall be chosen based on the following criteria:

- at locations close to and preferably at the boundary of the site activities as indicated in the EIA Report, which are likely to have water quality impacts;

Legend

- Water Quality Monitoring Station
- Control Station
- Oyster Production Area
- Marine Park

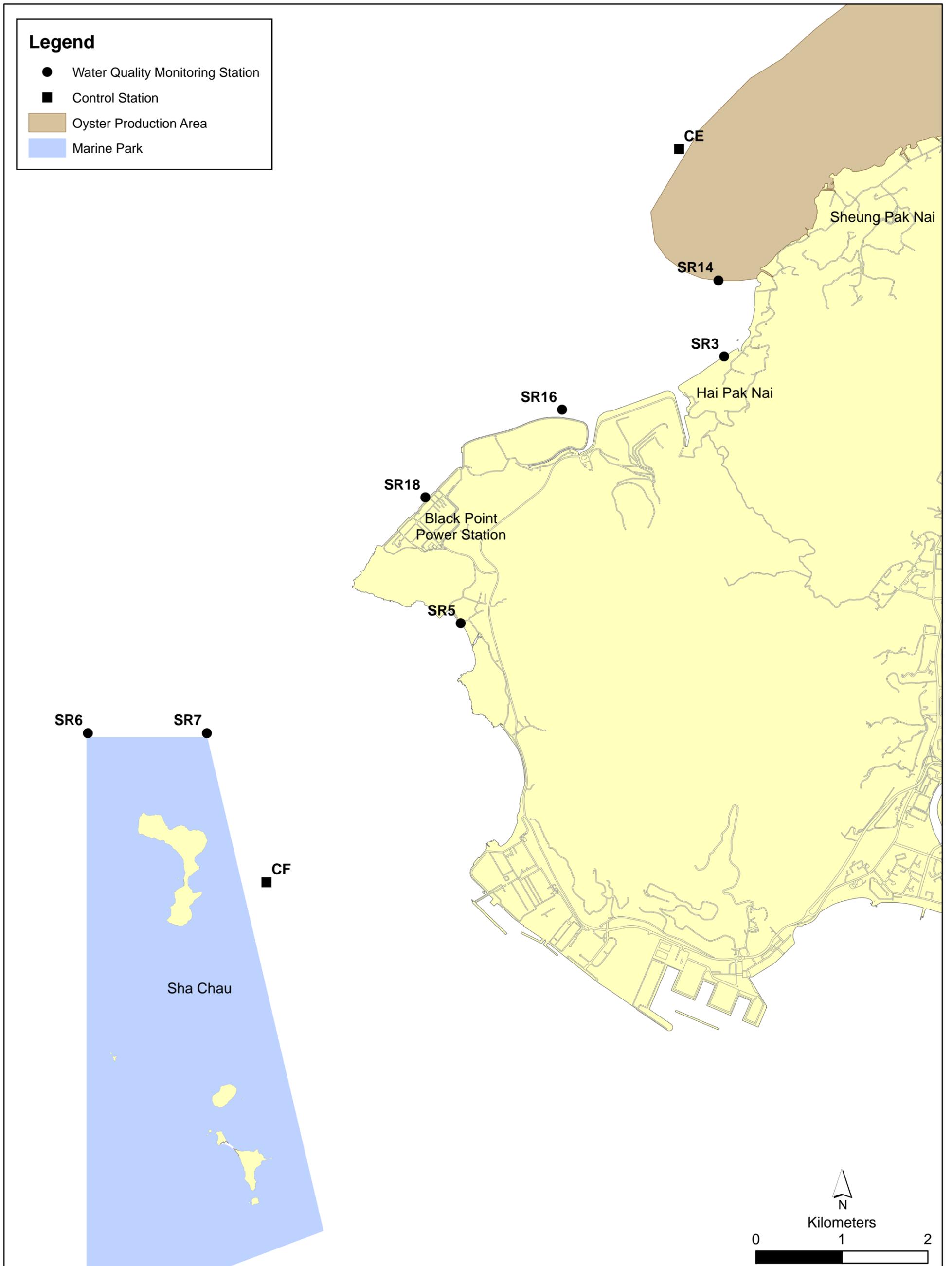


Figure 6.1

Water Quality Monitoring Station

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Date: 15/1/2016

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- close to the sensitive receptors which are directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receptors, care should be taken to cause minimal disturbance during monitoring; and
- control stations which are at locations representative of the project site in its undisturbed condition.

6.3 *SAMPLING FREQUENCY*

6.3.1 *Baseline Monitoring*

Baseline conditions for water quality shall be established and agreed with the IEC and the EPD prior to the commencement of marine dredging works for CCGT Unit No.2. The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the dredging works and to demonstrate the suitability of the proposed control monitoring stations. The baseline conditions shall normally be established by measuring the water quality parameters specified above.

The measurements shall be taken at all designated monitoring stations including control stations, at both mid-ebb and mid-flood tides on the same day for a minimum of 3 days per week for 4 weeks prior to the commencement of the construction works. Measurements shall be taken at each station at any time. The interval between two sets of monitoring shall not be less than 36 hours.

No construction activities shall be on-going in the vicinity of the stations during the baseline monitoring. The ET shall be responsible for undertaking the baseline monitoring and submitting the results within 10 working days from the completion of the baseline monitoring work.

In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, the ET shall seek approval from the IEC and the EPD on an appropriate set of data to be used as baseline reference.

The baseline monitoring schedule shall be issued to the IEC and EPD at least 1 week prior to the commencement of baseline monitoring.

6.3.2 *Construction Phase*

During periods when there are dredging works, impact monitoring shall be undertaken at the monitoring stations as shown in *Figure 6.1* and *Table 6.3* three times a week. Monitoring at each station would be undertaken at both mid-ebb and mid-flood tides on the same day. The tidal range selected for the baseline monitoring will be at least 0.5 m for both flood and ebb tides as far as practicable. The interval between two sets of monitoring would not be less than 36 hours. The monitoring frequency would be increased in the case

of exceedances of Action/Limit Levels if considered necessary by ET. Monitoring frequency would be maintained as far as practicable.

The monitoring location/position, time, water depth, water temperature, salinity, weather conditions, sea conditions, tidal stage, special phenomena and work underway at the marine works site will be recorded.

6.3.3 *Post-Construction Phase*

Upon completion of all marine construction activities, a post-construction water quality monitoring exercise would be carried out for four weeks, in the same manner as the baseline monitoring.

6.3.4 *First-year of Additional CCGT Commissioning*

Upon commencement of CCGT Unit No.1 and No.2, an operation phase water quality monitoring exercise shall be carried out for one year, in the same manner as the baseline monitoring except at a frequency of once per week.

Monitoring of cooling water effluent quality shall be conducted daily for one year at specific location agreed by IEC prior to the commissioning of the CCGT Unit No.1 or No.2. The monitoring exercise shall be conducted in accordance with the effluent parameters and standards stipulated by the WPCO Discharge Licence conditions and therefore would not be further detailed in this Manual. The monitoring requirement for the monitoring of cooling water effluent quality shall be approved by EPD. The effluent results reflect whether the effluent quality is in compliance with the Discharge Licence requirements. In case of non-compliance, suitable actions shall be undertaken to notify the plant operator for the non-compliance and identify the cause for the non-compliance. Corrective and remedial actions shall be implemented to improve the effluent quality. The non-compliance events and preventive measures shall be documented.

6.3.5 *Maintenance Dredging*

In case maintenance dredging at the seawater intake and / or discharge outfall of CCGT Unit No.2 is required, the same water quality monitoring exercise, including baseline monitoring (*Section 6.3.1*), impact monitoring (*Section 6.3.2*) and post-construction monitoring (*Section 6.3.3*) shall be conducted to before, during and after the dredging works.

6.4 *SAMPLING DEPTHS & REPLICATION*

For baseline, construction phase and operation phase monitoring, each station will be sampled and measurements/ water samples will be taken at three depths, 1 m below the sea surface, mid-depth and 1 m above the seabed. For stations that are less than 3 m in depth, only the mid-depth sample shall be taken. For stations that are less than 6 m in depth, only the surface and seabed sample shall be taken. For *in situ* measurements, duplicate readings

shall be made at each water depth at each station. Duplicate water samples shall be collected at each water depth at each station.

The effluent sampling should be planned carefully to ensure appropriate volume of effluent sub-samples is collected to prepare sufficient amount of flow-weighted composite effluent sample for carrying out subsequent chemical analysis and testing.

6.5 WATER QUALITY COMPLIANCE

Water quality monitoring will be evaluated against Action and Limit Levels. The key assessment parameters are dissolved oxygen, temperature, suspended solids and TRC and thus Action and Limit Levels based on the assessment criteria are identified for these. However turbidity can also provide valuable instantaneous information on water quality and thus Action and Limit Levels are also recommended for this parameter to facilitate quick responsive action in the event of any apparent unacceptable deterioration attributable to the works. The proposed Action and Limit Levels are shown in *Table 6.4*.

Action and Limit levels are used to determine whether operational modifications are necessary to mitigate impacts to water quality. In the event that the levels are exceeded, appropriate actions in Event and Action Plan (*Table 6.5*) should be undertaken and a review of works will be carried out by the Contractor(s).

Any noticeable change to water quality will be recorded in the monitoring reports and will be investigated and remedial actions will be undertaken to reduce impacts. Particular attention will be paid to the Contractor(s)'s implementation of the recommended mitigation measures.

Site audit will be conducted throughout the construction phase of CCGT Units No.1 and No.2 to confirm the implementation of the water pollution control measures and good site practices as recommended in *Annex A*.

Table 6.4 Action and Limit Level for Water Quality

Parameter	Action Level	Limit Level
Construction Phase and Maintenance Dredging Marine Water Monitoring		
DO in mgL ⁻¹ ^a	<u>Surface and Middle</u> 5 th %-ile of baseline data for surface and middle layer	<u>Surface and Middle</u> 4 mg L ⁻¹ or 1%ile of baseline for surface and middle layers
	<u>Bottom</u> 5 th %-ile of baseline data for bottom layers	<u>Bottom</u> 2 mg L ⁻¹ or 1%ile of baseline for surface and middle layers
Turbidity in NTU (Depth-averaged) ^{b) c}	95 th %-ile of baseline data, or 20% exceedance of value at any impact station compared with corresponding data from control station	99 th %-ile of baseline data, or 30% exceedance of value at any impact station compared with corresponding data from control station
SS in mgL ⁻¹ (Depth-averaged) ^{b) c}	95 th %-ile of baseline data, or 20% exceedance of value at any impact station compared with corresponding data from control station	99 th %-ile of baseline data, or 30% exceedance of value at any impact station compared with corresponding data from control station
First-year Operation Phase Marine Water Monitoring		
DO in mgL ⁻¹ ^a	<u>Surface and Middle</u> 5 th %-ile of baseline data for surface and middle layer	<u>Surface and Middle</u> 4 mg L ⁻¹ or 1%ile of baseline for surface and middle layers
	<u>Bottom</u> 5 th %-ile of baseline data for bottom layers	<u>Bottom</u> 2 mg L ⁻¹ or 1%ile of baseline for surface and middle layers
Water temperature in °C (Depth-averaged) ^{b) c}	±1.5 °C of baseline data	±2.0 °C of baseline data
Turbidity in NTU (Depth-averaged) ^{b) c}	95 th %-ile of baseline data, or 20% exceedance of value at any impact station compared with corresponding data from control station	99 th %-ile of baseline data, or 30% exceedance of value at any impact station compared with corresponding data from control station
TRC in mgL ⁻¹ (Depth-averaged) ^{b) c}	0.02 mg L ⁻¹	0.02 mg L ⁻¹
Notes:		
a.	For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.	
b.	“Depth-averaged” is calculated by taking the arithmetic means of reading of all three depths.	
c.	For water temperature, SS, turbidity and TRC, salinity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.	

Table 6.5 *Event and Action Plan for Water Quality Monitoring*

Event	Action			
	ET	IEC	Contractor(s)	CAPCO
Action Level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; Check monitoring data, plant, equipment and Contractor(s)'s working methods; Identify source(s) of impact and record in notification of exceedance; Inform IEC, Contractor(s) and CAPCO. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor(s)'s working methods; Inform EPD. 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Check plant and equipment and rectify unacceptable practice 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing.
Action Level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; Check monitoring data, plant, equipment and Contractor(s)'s working methods; Identify source(s) of impact and record in notification of exceedance; Inform IEC, Contractor(s) and CAPCO; Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor(s)'s working methods; Inform EPD; Discuss with ET and Contractor(s) on additional mitigation measures and advise CAPCO accordingly; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Check plant and equipment and rectify unacceptable practice; Consider changes of working methods; Discuss with ET and IEC on additional mitigation measures and propose them to CAPCO within 3 working days; Implement the agreed mitigation measures. 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. Ensure additional mitigation measures are properly implemented.

Event	Action			
	ET	IEC	Contractor(s)	CAPCO
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; 2. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 3. Identify source(s) of impact and record in notification of exceedance; 4. Inform IEC, Contractor(s) and CAPCO; 5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor(s)'s working methods; 2. Inform EPD; 3. Discuss with ET and Contractor(s) on additional mitigation measures and advise CAPCO accordingly; 4. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Check plant and equipment and rectify unacceptable practice; 3. Critically review the need to change working methods; 4. Discuss with ET and IEC on additional mitigation measures and propose them to CAPCO within 3 working days; 5. Implement the agreed mitigation measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. 3. Ensure additional mitigation measures are properly implemented. 4. Request Contractor(s) to critically review the working methods.

Event	Action			
	ET	IEC	Contractor(s)	CAPCO
Limit Level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; 2. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 3. Identify source(s) of impact and record in notification of exceedance; 4. Inform IEC, Contractor(s) and CAPCO; 5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor(s)'s working methods; 2. Inform EPD; 3. Discuss with ET and Contractor(s) on additional mitigation measures and advise CAPCO accordingly; 4. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Check plant and equipment and rectify unacceptable practice; 3. Critically review the need to change working methods; 4. Discuss with ET and IEC on additional mitigation measures and propose them to CAPCO within 3 working days; 5. Implement the agreed mitigation measures. 6. As directed by CAPCO, slow down or stop all or part of the marine construction works until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. 3. Ensure additional mitigation measures are properly implemented. 4. Request Contractor(s) to critically review the working methods; 5. Consider and instruct, if necessary, the Contractor(s) to slow down or to stop all or part of the marine construction works until no exceedance of Limit Level 6. Adjust chlorine dosing of the CCGT units.

7 WASTE MANAGEMENT

7.1 INTRODUCTION

The construction of the proposed additional CCGT units is expected to generate the following types of waste during the construction phase:

- Dredged marine sediment (for CCGT Unit No.2 only);
- Excavated materials;
- Construction & demolition (C&D) materials;
- Chemical waste; and
- General refuse.

Mitigation measures, where appropriate, have been recommended as part of the EIA to avoid or reduce potential adverse environmental impacts associated with handling, collection and disposal of waste arising from the construction of the proposed Project.

Waste management will be the Contractor(s)'s responsibility and wastes produced during the construction phase will be managed in accordance with appropriate waste management practices and EPD's regulations and requirements.

Auditing of waste management practices during regular site inspections will confirm that these solid and liquid wastes generated during construction are not disposed of into the surrounding storm drains. The construction Contractor(s) will be responsible for the implementation of any mitigation measures to reduce waste or redress issues arising from the waste materials.

7.2 WASTE MANAGEMENT PRACTICES

The waste management practices and recommended mitigation measures will be incorporated into a Waste Management Plan (WMP) as stated in the *ETWB TC(W) No. 19/2005, Environmental Management on Construction Sites* and *C&D Material Management Plan (C&DMMP)* for the Project for managing the different types of wastes by the Contractors on site. The WMP will become a part of the Environmental Management Plan (EMP), as required under the quoted *ETWB TCW No. 19/2005*. The contractor is required to prepare the EMP and submit it CAPCO for approval and then implement the EMP accordingly. The WMP will also be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report.

The WMP shall describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment, the estimated rate of construction and

demolition materials generation and disposal, and the recommended mitigation measures on waste management as set out in *Section 8.5* of the EIA Report. The WMP shall indicate the disposal arrangements and locations of C&D materials and other wastes.

A Trip Ticket system will be included in the WMP. Surplus excavated spoil and other wastes will not be disposed at any other designated disposal locations unless otherwise approved in writing by EPD, Secretary of Public Fill Committee and/or other authorities as appropriate.

The Implementation Schedule (*Annex A*) provides details on the appropriate mitigation measures for avoiding and preventing adverse environmental impacts associated with dredged marine mud, C&D materials, chemical wastes, general refuse and sewage from the workforce. The WMP will be refined and updated as more detailed information is generated on the volume of dredged marine mud and the agreed disposal arrangements. Similarly, it will be regularly reviewed, and updated as appropriate, throughout the course of the construction works to confirm that it remains current with the latest detailed information and works practices.

The WMP will also outline the requirements for a waste audit program to verify that the measures outlined in the plan are effectively implemented and adhered to.

7.3

METHODOLOGY AND CRITERIA

The construction Contractor(s) must confirm that the necessary disposal permits or licences are obtained from appropriate authorities in accordance with the various Ordinances. In addition to the monthly joint inspections/audits, each construction Contractor(s) will designate a member of staff as being responsible for routine inspections and audits of on-site waste management practices, with reference to the relevant legislation and guidelines as well as the recommendations given in the Implementation Schedule contained in *Annex A* of this Manual, and defined below:

(1) General Legislation

- *Waste Disposal Ordinance (WDO) (Cap 354);*
- *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C);*
- *Waste Disposal (Charges for Disposal of Construction Waste) Regulation;*
- *Land (Miscellaneous Provisions) Ordinance (Cap 28);*
- *Public Health and Municipal Services Ordinance (Cap 132) – Public Cleansing and Prevention of Nuisances Regulations; and*
- *Dumping at Sea Ordinance (DASO) (Cap. 466).*

(2) Other Relevant Guidelines

- *Waste Disposal Plan for Hong Kong (December 1989), Planning, Environment and Lands Branch Government Secretariat, Hong Kong SAR Government;*
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), EPD, Hong Kong SAR Government;*
- *Hong Kong Planning Standards and Guidelines Planning (2014), Planning Department, Hong Kong SAR Government;*
- *WBTC No. 2/93 - Public Dumps, Works Branch, Hong Kong SAR Government;*
- *WBTC No. 2/93B - Public Filling Facilities, Works Branch, Hong Kong SAR Government;*
- *WBTC No. 16/96 - Wet Soil in Public Dumps, Works Branch, Hong Kong SAR Government;*
- *Waste Reduction Framework Plan, 1998 to 2007, Planning, Environment and Lands Bureau, Government Secretariat, 5 November 1998;*
- *WBTC No. 4/98 and 4/98A - Use of Public Fill in Reclamation and Earth Filling Projects, Works Bureau, Hong Kong SAR Government;*
- *Project Administration Handbook for Civil Engineering Works, Section 3.3(i) of Chapter 2 and Section 4.13 of Chapter 4 - Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers, Hong Kong SAR Government;*
- *WBTC No. 12/2000 - Fill Management, Works Bureau, Hong Kong SAR Government;*
- *WBTC No. 19/2001 - Metallic Site Hoardings and Signboards; Works Bureau, Hong Kong SAR Government;*
- *Project Administration Handbook for Civil Engineering Works, Section 21.25 of Chapter 7 and Section 9.12 of Chapter 5 - Control of Site Crushers, Hong Kong SAR Government;*
- *WBTC No. 12/2002 - Specifications Facilitating the Use of Recycled Aggregates, Works Bureau, Hong Kong SAR Government;*
- *Project Administration Handbook for Civil Engineering Works, Section 4.1.3 of Chapter 4 - Management of Construction and Demolition Material Including Rock, Hong Kong SAR Government;*

- *ETWB TC(W) No. 19/2005 - Environmental Management on Construction Sites, Environment, Transport and Works Bureau, Hong Kong SAR Government; and*
- *DevB TC(W) No. 6/2010 - Trip Ticket System for Disposal of Construction & Demolition Materials, Development Bureau, Hong Kong SAR Government.*

The Contractor(s)'s waste management practices will be audited with reference to the checklist detailed in *Table 7.1* below.

Details of the required mitigation measures are included in the Implementation Schedule of *Annex A* of this EM&A Manual.

Table 7.1 Waste Management Checklist

Activities	Timing	Checking Frequency	If non-compliance noted, Action Required
Necessary waste disposal permits or licences have been obtained	Before commencement of works	the Once of	The ET will inform the Contractor(s), IEC and CAPCO. The Contractor(s) will apply for the necessary permits/ licences prior to disposal of the waste. The ET will verify that corrective action has been taken.
Dredged sediments are managed and disposed in accordance with <i>ETWB TC(W) No. 34/2002: Management Framework for Disposal of Dredged/ Excavated Sediment.</i>	Throughout dredging works.	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to manage and dispose the dredged materials properly. The Contractor(s) will immediately suspend dredging until the dredging materials are properly managed and disposed.
Only licensed waste hauliers are used for waste collection.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to use a licensed waste haulier. The Contractor(s) will temporarily suspend waste collection of that particular waste until a licensed waste haulier is used. Corrective action will be undertaken within 48 hours.
Records of quantities of wastes generated, recycled and disposed are properly kept. For demolition material/waste, the number of loads for each day will be recorded (quantity of waste can then be estimated based on average truck load. For landfill charges, the receipts of the charge could be used for estimating the quantity).	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. The Contractor(s) will estimate the missing data based on previous records and the activities carried out. The ET will review the results and forward to CAPCO for approval.
Sufficient waste disposal points are provided. Wastes are collected and removed from site in a timely manner. General refuse is collected on a regular basis.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to remove waste accordingly.

Activities	Timing	Checking Frequency	If non-compliance noted, Action Required
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance. Appropriate measures to reduce windblown litter and dust nuisance of waste will be adopted, e.g. by either covering trucks or by transporting wastes in enclosed containers.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to clean the storage area and/or cover the waste.
Different types of waste are segregated in different containers or skip to enhance reuse and recycling of material and proper disposal of waste.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to provide separate skips/containers. The Contractor(s) will verify that the workers place the waste in the appropriate containers.
Chemical wastes are stored, handled and disposed of in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> , published by the EPD. Chemical wastes are separated for special handling and appropriate treatment at the Chemical Waste Treatment Centre at Tsing Yi.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to rectify the issues immediately. Warning will be given to the Contractor(s) if corrective actions are not taken within 24 hrs.
Demolition materials are properly covered before leaving the site.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to comply. The Contractor(s) will confirm that the demolition materials are properly covered when transport out of the site.
Wastes are disposed at licensed sites.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will warn the Contractor(s) and instruct the Contractor(s) to confirm that the wastes are disposed of at the licensed sites. Should it involve chemical waste, the Waste Control Group of EPD will be notified.
Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors are provided. A recording system for the amount of wastes generated/ recycled and disposal sites is developed and implemented.	Throughout works	the Each Week	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to comply.

Note: ET – Environmental Team, IEC – Independent Environmental Checker

Based on the result of the SI conducted under this EIA, no land contamination was identified within the Site. Therefore, no adverse environmental impact in respect of land contamination within the Site is expected. No mitigation measures are recommended.

During construction stage, good house-keeping practices shall be maintained by the contractor(s) to minimise the risk of land contamination due to construction activities, including but not limited to the following:

- Minimise the chemical stock within the 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.

To ensure that the construction contractor(s) has (have) implemented these recommendations, regular site inspections and audits during construction phase of the two units shall be conducted. The visual inspections/audits will look at all aspects of construction activities that disturb soil. The first inspection/audit will be conducted at the commencement of the construction works. The recommended good house-keeping practices for construction phase are summarised in the Implementation Schedule provided in *Annex A*.

The assessment indicates that unacceptable construction phase impacts and operation phase impacts are not expected to occur to terrestrial and marine ecological resources. Appropriate mitigation measures are proposed in the EIA to control the environmental impacts to ecology to within acceptable levels. Impacts of construction activities will be monitored through impacts to water quality. Measures recommended to minimise impacts on water quality are also expected reduce impacts on marine ecological resources. Therefore no ecology specific EM&A activities are considered necessary for both construction and operation phases.

In accordance with the recommendations of the EIA, specific measures and additional precautionary measures will be instituted for marine mammals during the construction works of CCGT Unit No.2. These are summarised in the Implementation Schedule of Mitigation Measures (*Annex A*).

As no unacceptable impacts have been predicted to occur during the construction and operation of this Project, monitoring of fisheries resources during these project phases is not considered necessary.

Monitoring activities designed to detect and mitigate impacts to water quality during construction and operation phases are also expected to serve to protect against impacts to fisheries. The details of the water quality monitoring programme are presented in the *EM&A Manual*.

The LVIA recommended a series of measures for the design, construction and operation phase to mitigate the landscape and visual impacts of the Project and help enhance these aspects of the site. Details of all the recommended mitigation measures are summarised in the Implementation Schedule provided in *Annex A*.

Measures to mitigate impacts from the Project on landscape and visual resources recommended in the EIA Report should be implemented as early as possible. Any soft landscaping works, in particular relocating moveable planters to agreed locations, are recommended to be implemented prior to construction works and overseen by the qualified landscape professional who should ensure re-location to suitable location and if any planted vegetation within the moveable planters deteriorate in health during the construction period, suitable measures are taken to rectify this, including replacement of any plants that die. Landscape and visual mitigation will be monitored through the site inspection and audit programme during the construction phase. No operation phase EM&A programme is required.

As no impacts to terrestrial and marine cultural heritage resources are expected, no mitigation measure and environmental monitoring is required.

No unacceptable health impacts associated with the operation of the proposed Project is anticipated from the Project. No EM&A activities related to health impact at the representative Human Sensitive Receivers are required.

14.1

SITE INSPECTIONS

Site inspections provide a direct means to assess and confirm that the Contractor(s)'s environmental protection and pollution control measures are in compliance with the contract specifications. The site inspection will be undertaken routinely by the ET throughout the construction phases of CCGT Unit No.1 and No.2 to verify that appropriate environmental protection and pollution control mitigation measures are properly implemented in accordance with the EIA. In addition, the ET will be responsible for defining the scope of the inspections, detailing any deficiencies that are identified, and reporting any necessary action or additional mitigation measures that were implemented as a result of the inspection.

Regular site inspections will be carried out by the ET each month. The IEC will also undertake monthly site audit to assess the performance of the Contractor(s). The areas of inspection will not be limited to the site area and should also include the environmental conditions outside the site which are likely to be affected, directly or indirectly, by the site activities. The ET will make reference to the following information while conducting the inspections:

- the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- ongoing results of the EM&A programme;
- work progress and programme;
- individual works methodology proposals;
- the contract specifications on environmental protection;
- the relevant environmental protection and pollution control laws; and
- previous site inspection results.

The Contractor(s) will update the ET with relevant information on the construction works prior to carrying out the site inspections. The site inspection results will be submitted to the IEC, CAPCO and the Contractor(s) within 24 hours. Should actions be necessary, the ET will follow up with recommendations on improvements to the environmental protection and pollution control works and will submit these recommendations in a timely manner to the IEC, CAPCO and the Contractor(s). They will also be presented, along with the remedial actions taken, in the monthly EM&A report. The Contractor(s) will follow the procedures and time frame stipulated in the environmental site inspection for the implementation of mitigation proposal and the resolution of deficiencies in the Contractor(s)' EMS. An action reporting system will be formulated and implemented to

report on any remedial measures implemented subsequent to the site inspections.

Ad hoc site inspections will also be carried out by the ET and site audits by the IEC if significant environmental issues are identified. Inspections and audits may also be required subsequent to receipt of an environmental complaint or as part of the investigation work as specified in the Action Plan for environmental monitoring and audit.

14.2 *COMPLIANCE WITH LEGAL & CONTRACTUAL REQUIREMENTS*

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which the construction activities will comply.

In order that the works are in compliance with the contractual requirements, the works method statements submitted by the Contractor(s) to CAPCO for approval will be sent to the ET for review.

The ET will also review the progress and programme of the works to check the regulatory compliance.

The Contractor(s) will regularly copy relevant documents to the ET so that the checking and auditing work can be carried out. The relevant documents are expected to include at a minimum the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permits under the environmental protection laws and all valid licences/permits. The site diary will also be available for the ET inspection upon request.

After reviewing the document, the ET will advise the IEC, CAPCO and the Contractor(s) of any non-compliance from the contractual and legislative requirements on environmental protection and pollution control for follow-up actions. The ET will also advise the IEC, the Contractor(s) and CAPCO on the current status on licence/permit applications and any environmental protection and pollution control preparation works that may not be suitable for the works programme or may result in potential nonconformity of environmental protection and pollution control requirements.

Upon receipt of the advice, the Contractor(s) will undertake immediate action to remedy the situation. The ET, IEC and CAPCO will follow up to confirm that appropriate action will be taken by the Contractor(s) in order that the environmental protection and pollution control requirements are fulfilled.

14.3 *ENVIRONMENTAL COMPLAINTS*

The ET will undertake the following procedures (see *Figure 14.1*) upon receipt of a complaint:

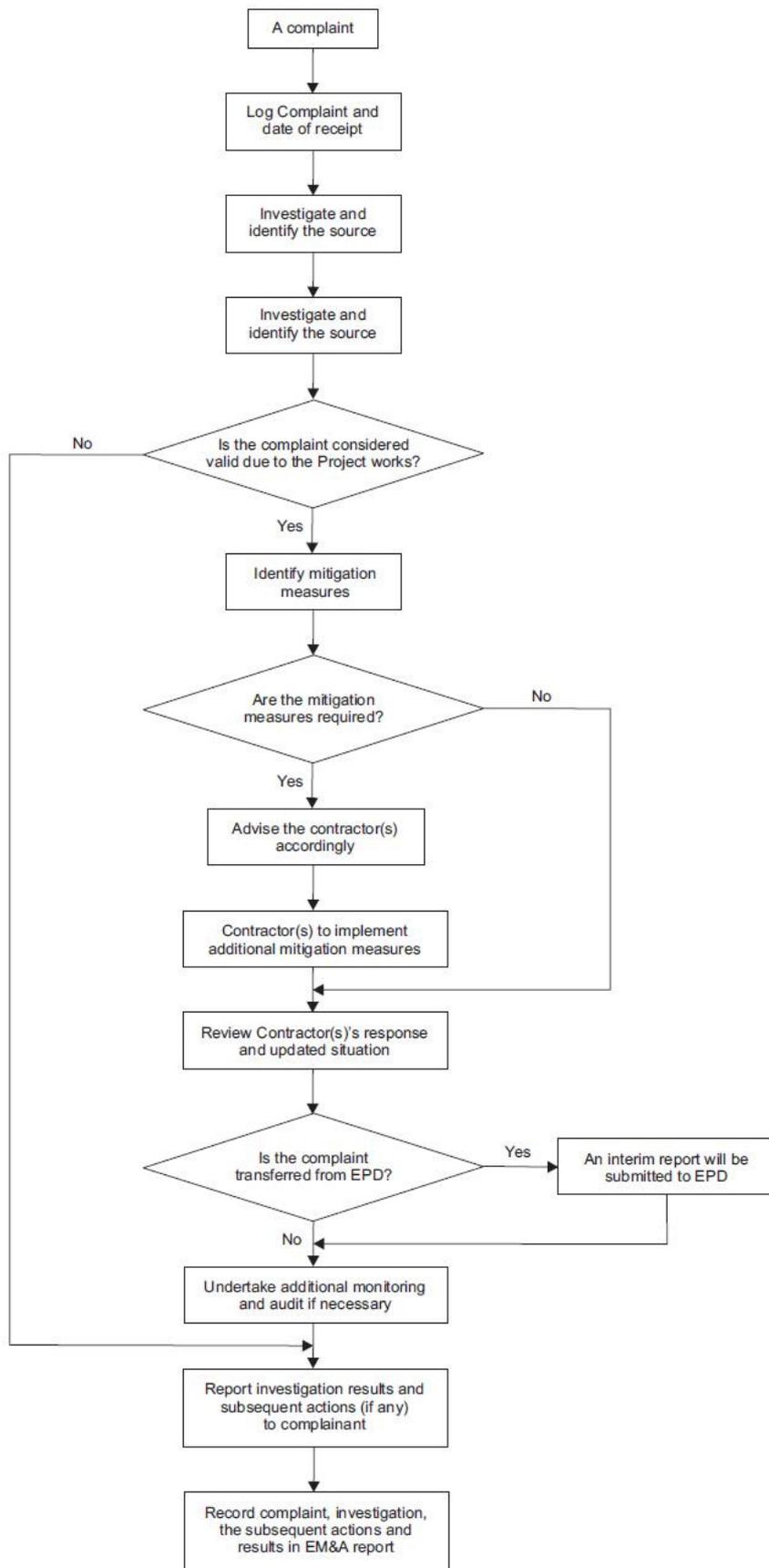


Figure 14.1

Flow Chart for Handling Environmental Complaints

FILE:
DATE: 15/01/16

**Environmental
Resources
Management**



- (1) log complaint and date of receipt into the complaint database and inform the IEC immediately;
- (2) investigate the complaint and discuss with the Contractor(s) and CAPCO to determine its validity and to assess whether the source of the issue is due to works activities;
- (3) if a complaint is considered valid due to the works , the ET will identify mitigation measures in consultation with the Contractor(s), CAPCO and IEC;
- (4) if mitigation measures are required, the ET will advise the Contractor(s) accordingly;
- (5) review the Contractor(s)'s response on the identified mitigation measures and the updated situation;
- (6) if the complaint is transferred from EPD, an interim report will be submitted to EPD on the status of the complaint investigation and follow-up action within the time frame assigned by EPD;
- (7) undertake additional monitoring and audit to verify the situation if necessary and confirm that any valid reason for complaint does not recur;
- (8) report the investigation results and the subsequent actions on the source of the complaint for responding to complainant. If the source of complaint is EPD, the results should be reported within the time frame assigned by EPD; and
- (9) record the complaint, investigation, the subsequent actions and the results in the Monthly EM&A Reports.

During the complaint investigation work, the ET, Contractor(s) and CAPCO will cooperate with the IEC in providing the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor(s) will promptly carry out the mitigation measures. CAPCO will approve the proposed mitigation measures and the ET and IEC will check that the measures have been carried out by the Contractor(s).

14.4

LOG-BOOK

The ET Leader will keep a contemporaneous log-book of each and every instance or circumstance or change of circumstances which may affect the EIA and every non-compliance from the recommendations of the EIA Report or the EP. The ET Leader will notify the IEC within one working day of the occurrence of any such instance or circumstance or change of circumstance. The ET Leader's log-book will be kept readily available for inspection by persons assisting in supervision of the implementation of the EIA Report

recommendations (such as CAPCO, IEC and Contractor(s)) and the EP or by EPD or his authorised officers.

15 REPORTING

15.1 GENERAL

Reports can be provided in an electronic medium upon agreeing the format with CAPCO and EPD. The monitoring data (baseline and impact) will also be made available through a dedicated internet website that would be agreed with relevant authority.

Types of reports that the ET Leader will prepare and submit include baseline monitoring report, post-construction water quality monitoring report, monthly EM&A report, quarterly EM&A summary report, final EM&A review report, and water quality monitoring report for the first-year of additional CCGT commissioning. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports will be made available to the Director of Environmental Protection.

15.2 BASELINE WATER QUALITY MONITORING REPORT

In respect of the construction phase water quality EM&A works for CCGT Unit No.2, the ET will prepare and submit a Baseline Water Quality Monitoring Report no less than 2 weeks before commencement of the dredging works for CCGT Unit No.2 for agreement on the Action/Limit Levels. Copies of the Baseline Environmental Monitoring Report will be submitted to the following: the Contractor(s), the IEC, CAPCO, the EPD and the AFCD as appropriate. The ET will liaise with the relevant parties on the exact number of copies required.

The Baseline Water Quality Monitoring Report for the construction phase will include at least the following:

- (1) Up to half a page executive summary.
- (2) Brief project background information.
- (3) Drawings showing locations of the baseline monitoring stations.
- (4) Monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration; and

- quality assurance (QA)/quality control (QC) results and detection limits.
- (5) Details on influencing factors, including:
- major activities, if any, being carried out on the site during the period;
 - weather conditions during the period; and
 - other factors which might affect the results.
- (6) Determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data, the analysis will conclude if there is any significant difference between control and impact stations for the parameters monitored;
- (7) Revisions for inclusion in the EM&A Manual; and
- (8) Comments, recommendations and conclusions.

15.3

POST-CONSTRUCTION WATER QUALITY MONITORING REPORT

The ET will prepare and submit a Post-Construction Water Quality Monitoring Report within six weeks following the completion of the Post Project Water Quality Monitoring for CCGT Unit No.2. Copies of the Post-Construction Water Quality Monitoring Report will be submitted to the following: the Contractor(s), the IEC, CAPCO, the EPD and the AFCD as appropriate. The ET will liaise with the relevant parties on the exact number of copies required.

The Post-Construction Water Quality Monitoring will include at least the following:

- (1) Up to half a page executive summary.
- (2) Brief project background information.
- (3) Drawings showing locations of the monitoring stations.
- (4) Monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);

- monitoring date, time, frequency and duration;
 - environmental quality performance limits (Action and Limit levels);
 - Event-Action Plans;
 - environmental mitigation measures, as recommended in the Project EIA study final report;
 - environmental requirements in contract documents;
 - graphical plots of trends of monitored parameters at key stations over the monitoring; and
 - quality assurance (QA)/quality control (QC) results and detection limits.
- (5) Details on influencing factors, including:
- major activities, if any, being carried out on the site during the period;
 - weather conditions during the period; and
 - other factors which might affect the results.
- (6) comments, recommendations and conclusions.

15.4

MONTHLY EM&A REPORTS

The results and findings of the construction phase EM&A work required in this Manual will be recorded in the Monthly EM&A Reports prepared by the ET Leader. The EM&A report will be prepared and submitted within 2 weeks of the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report will be submitted to the following parties: the Contractor(s), the IEC, CAPCO and the EPD, as well as to other relevant departments as required. Before submission of the first EM&A Report, the ET will liaise with the parties on the exact number of copies and format of the reports in both hard copy and electronic medium.

The ET Leader will review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

15.4.1

Contents of First Monthly EM&A Report

- (1) 1-2 pages executive summary, comprising:
- breaches of AL levels;

- complaint Log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - forecast of impact predictions.
- (2) Basic project information including a synopsis of the project organisation, programme and management structure, and a drawing of the Project area showing the environmentally sensitive receivers and the locations of monitoring and control stations, programme, management structure and the work undertaken during the month.
- (3) Environmental Status, comprising:
- works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates, percentage fines in the fill material used); and
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (4) A brief summary of EM&A requirements including:
- monitoring parameters;
 - environmental quality performance limits (Action and Limit levels);
 - Event-Action Plans;
 - environmental mitigation measures, as recommended in the Project EIA study final report; and
 - environmental requirements in contract documents.
- (5) Advice on the implementation of environmental protection, mitigation and pollution control measures as recommended in the Project EIA study report and summarised in the updated implementation schedule.
- (6) Monitoring results (in both hard and diskette copies) together with the following information:
- monitoring methodology;
 - name of laboratory and equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency, and duration; and

- (7) Graphical plots of trends of monitored parameters for representative monitoring stations annotated against the following:
 - major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results;
- (8) Advice on the solid and liquid waste management.
- (9) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
- (10) A review of the reasons for and the implications of non-compliance including a review of pollution sources and working procedures.
- (11) A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (12) A summary record of complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints.
- (13) A summary record of notifications of summons, successful prosecutions for breaches of environmental protection/pollution control legislation and actions to rectify such breaches.
- (14) A forecast of the works programme, impact predictions and monitoring schedule for the next one month; and
- (15) Comments, recommendations and conclusions for the monitoring period.

15.4.2 *Contents of the Subsequent Monthly EM&A Reports*

- (1) Title page.
- (2) Executive summary (1-2 pages), including:
 - reaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - forecast of impact predictions.
- (3) Contents page.

- (4) Environmental status, comprising:
 - drawing showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - summary of non-compliance with the environmental quality performance limits; and
 - summary of complaints.

- (5) Environmental issues and actions, comprising:
 - review issues carried forward and any follow-up procedures related to earlier non-compliance (complaints and deficiencies);
 - description of the actions taken in the event of non-compliance and deficiency reporting;
 - recommendations (should be specific and target the appropriate party for action); and
 - implementation status of the mitigatory measures and the corresponding effectiveness of the measures.

- (6) Appendices, including:
 - action and limit levels;
 - graphical plots of trends of monitored parameters at key stations over the past reporting month for representative monitoring stations annotated against the following: major activities being carried out on site during the period; weather conditions during the period; and any other factors which might affect the monitoring results;
 - monitoring schedule for the present and next reporting period;
 - cumulative complaints statistics; and
 - details of complaints, outstanding issues and deficiencies.

15.5 *QUARTERLY EM&A SUMMARY REPORT*

The ET Leader will submit Quarterly EM&A Summary Reports for the construction phase EM&A works only. These reports should contain at least the following information:

- (1) Up to half a page executive summary.
- (2) Basic project information including a synopsis of the Project organisation, programme, contacts of key management, compliance with EP condition

(status of submission) and a synopsis of work undertaken during the quarter.

- (3) A brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (Action and Limit levels); and
 - environmental mitigation measures, as recommended in the Project EIA study final report.
- (4) Advice on the implementation of environmental protection and pollution control/mitigation measures as recommended in the Project EIA study report and summarised in the updated implementation schedule.
- (5) Drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (6) Graphical plots of the trends of monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
- (7) Advice on the solid and liquid waste management.
- (8) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
- (9) An Impact Prediction Review will be prepared to compare project predictions with actual impacts for the purpose of assessing the accuracy of predictions on the EIA study. The review will focus on the comparison between the EIA study predictions with the EM&A monitoring results. If any excessive variation was found, a summary of investigation and follow up procedure taken will be addressed accordingly.
- (10) A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures.
- (11) A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance.

- (12) A summarised record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.
- (13) Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter.
- (14) Proponents' contacts for the public to make enquiries.

15.6

ANNUAL/ FINAL EM&A REVIEW REPORTS

An annual EM&A report will be prepared by the ET at the end of each construction year during the course of the Project. A final EM&A report will be prepared by the ET at the end of the construction phase of each of the CCGT units. The annual/final EM&A reports will contain at least the following information:

- (1) Executive Summary (1-2 pages).
- (2) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (3) Basic project information including a synopsis of the project organization, contacts for key management staff and a synopsis of work undertaken during the course of the project.
- (4) A brief summary of EM&A requirements including:
 - environmental mitigation measures as recommended in the project EIA study final report;
 - environmental impact hypotheses tested;
 - environmental quality performance limits (Action and Limit Levels);
 - monitoring parameters; and
 - Event-Action Plans.
- (5) A summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report and summarised in the updated implementation schedule.
- (6) Graphical plots and the statistical analysis of the trends of monitored parameters over the course of the project including the post-project monitoring for monitoring stations annotated against the following:
 - -the major activities being carried out on site during the period;

- weather conditions during the period;
 - any other factors which might affect the monitoring results; and
- (7) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
 - (8) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate.
 - (9) A description of the actions taken in the event of non-compliance.
 - (10) A summary record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.
 - (11) A summary record of notifications of summonses and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches investigation, follow-up actions taken and results.
 - (12) A comparison of the EM&A data with the EIA predictions with annotations and explanations for any discrepancies, including a review of the validity of EIA predictions and identification of shortcomings in the EIA recommendations.
 - (13) A review of the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness, including cost effectiveness;
 - (14) A review of the success of the EM&A programme, including a review of the effectiveness and efficiency of the mitigation measures, and recommendations for any improvements in the EM&A programme.
 - (15) A clear cut statement on the environmental acceptability of the project with reference to specific impact hypotheses and a conclusion to state the return to ambient and/or the predicted scenario as the EIA findings.

15.7

WATER QUALITY MONITORING REPORT FOR THE FIRST YEAR OF ADDITIONAL CCGT COMMISSIONING

A water quality monitoring report will be prepared by the ET at the end of the first year of operation for each of the CCGT units to include the results of weekly marine water quality monitoring exercise as well as the daily effluent monitoring exercise. The report will contain at least the following information:

- (1) Executive Summary (1-2 pages).
- (2) Brief project background information.

- (3) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (4) A brief summary of monitoring requirements including:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration;
 - environmental quality performance limits (Action and Limit Levels);
 - Event-Action Plans; and
 - quality assurance (QA)/quality control (QC) results and detection limits
- (5) Graphical plots and the statistical analysis of the trends of monitored parameters over the course of the monitoring including the monitoring stations annotated against the following:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
- (6) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
- (7) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate.
- (8) A description of the actions taken in the event of non-compliance.
- (9) A summary record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.
- (10) A summary record of notifications of summonses and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches investigation, follow-up actions taken and results.

- (11) A comparison of the EM&A data with the EIA predictions with annotations and explanations for any discrepancies, including a review of the validity of EIA predictions and identification of shortcomings in the EIA recommendations.
- (12) A review of the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness, including cost effectiveness;
- (13) A review of the success of the EM&A programme, including a review of the effectiveness and efficiency of the mitigation measures, and recommendations for any improvements in the EM&A programme.
- (14) A clear cut statement on the environmental acceptability of the Project Operation and a conclusion to state the return to the predicted scenario as the EIA findings.

15.8

DATA KEEPING

The site documents such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the EM&A Reports for submission. However, the documents will be kept by the ET Leader and be ready for inspection upon request. Relevant information will be clearly and systematically recorded in the documents. The monitoring data will also be recorded in magnetic media, and the software copy will be available upon request. The documents and data will be kept for at least one year after the completion of the construction phase EM&A works.

15.9

ELECTRONIC REPORTING OF EM&A INFORMATION

To enable the public inspection of the Baseline Water Quality Monitoring Report and Monthly EM&A Reports via the EIAO Internet Website and at the EIAO Register Office, electronic copies of monthly EM&A Reports will be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF, version 4.0 or later), unless otherwise agreed with EPD and will be submitted at the same time as the hard copies. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EM&A Reports will be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EM&A Reports will be provided in the main text where the respective references are made. Graphics in the reports will be in interlaced GIF format unless otherwise agreed with EPD. The content of the electronic copies of the Monthly EM&A Reports must be the same as the hard copies.

The internet address and the environmental monitoring data will be made available to the public via the EIAO Internet Website and the EIAO Register Office.

The internet website as described above will enable user friendly public access to the monitoring data and with features capable of:

- providing access to environmental monitoring data collected since the commencement of works;
- searching by data;
- searching by types of monitoring data (water quality);
- hyperlinks to relevant monitoring data after searching; and
- or otherwise as agreed with EPD.

15.10

INTERIM NOTIFICATIONS OF ENVIRONMENTAL QUALITY LIMIT EXCEEDANCES

With reference to Event/Action Plans, when the environmental quality limits are exceeded, the ET will notify the Contractor(s), CAPCO, EPD and the AFCD as appropriate within 24 hours of the identification of the exceedance. The notification will be followed up with each party on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in *Annex B*.

Annex A

Implementation Schedule

Annex A - Implementation Schedule of Recommended Mitigation Measures

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
					D	C	O	
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.	Land site/ During Construction	Contractor(s)		✓		<i>Air Pollution Control (Construction Dust) Regulation</i>
S4.10.1	S3.1	Impervious sheet will be provided for skip hoist for material transport.	Land site/ During Construction, particularly dry season	Contractor(s)		✓		-
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.	Land site/ During Construction	Contractor(s)		✓		-
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.	Land site/ During Construction	Contractor(s)		✓		-
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.	Land site/ During Construction	Contractor(s)		✓		-
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.	Land site/ During Construction	Contractor(s)		✓		-
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.	Land site/ During Construction	Contractor(s)		✓		-
S4.10.1	S3.1	Road sections between vehicle-wash areas and vehicular entrance will be paved.	Land site/ During Construction	Contractor(s)		✓		-

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
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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.	Land site/ During construction	Contractor(s)	✓	✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
S4.10.1	S3.1	All exposed areas will be kept wet always to minimise dust emission.	Land site/ During construction	Contractor(s)		✓		-
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 <i>Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No 19/2005</i> on Environmental Management on Construction Sites.	Land site/ During construction/ During Operation	Contractor(s)		✓	✓	<i>Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No 19/2005 on Environmental Management on Construction Sites</i>
S4.10.1	S3.1	The engine of the construction equipment during idling will be switched off.	Land site/ During construction	Contractor(s)		✓		-
S4.10.1	S3.1	Regular maintenance of construction equipment deployed on-site will be conducted to prevent black smoke emission.	Land site/ During construction	Contractor(s)		✓		-
S4.11.1	S3.1	To ensure proper implementation of the recommended dust mitigation measures and good construction site	Land site/ During construction	Contractor(s)/ Environmental Team		✓		-

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
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		practices during the construction phase, environmental site audits on weekly basis is recommended throughout the construction period.		(ET) & Independent Environmental Checker (IEC)				
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.	During operation	CAPCO			✓	-
Hazard to Life								
S5.6	S4	All construction workers shall comply with CLP's safety policy and requirements.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	Method statements and risk assessments shall be prepared and safety control measures shall be in place before commencement of work.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	All work procedures shall be complied with the operating plant procedures or guidelines and regulatory requirements.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	Work permit system, on-site pre-work risk assessment and emergency response procedure shall be in place before commencement of work.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	All construction workers shall equip with appropriate PPE when working at the Project Site.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	Safety training and briefings shall be provided to all construction workers.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	All construction workers shall be under close site supervision.	Land site/ During construction	Contractor(s)		✓		-
S5.6	S4	Regular site safety inspections shall be conducted during	Land site/ During	Contractor(s)		✓		-

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
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		the construction phase of the Project.	construction					
S5.13	S4	Ensure speed limit enforcement is specified in the contractor's method statement to limit the speed of construction vehicles on-site.	Land site/ During construction	Contractor(s)		✓		-
S5.13	S4	Conduct speed checks to ensure enforcement of speed limits and to ensure adequate site access control.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
S5.13	S4	A lifting plan, with detailed risk assessment, should be prepared and endorsed for heavy lifting of large equipment.	Land site/ During construction	Contractor(s)		✓		-
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 1 st CCGT unit construction phase. Also, a vehicle crash barrier is to be provided between the construction site and the 1 st CCGT unit during 2 nd CCGT unit construction phase.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
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	Land site/ During construction	Contractor(s)		✓		-

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		and movement of construction vehicles in the vicinity.						
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.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
S5.13	S4	Ensure effective communication system/ protocol is in place between the construction contractors and operation staff.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-
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.	Land site/ During construction	Contractor(s)		✓		-

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Noise								
S6.8	S5	Monthly site inspections and audits are recommended to be carried out during the construction phase in order to confirm that regulatory requirements are being met.	All area/ During construction	Contractor(s)/ Environmental Team (ET) & Independent Environmental Checker (IEC)		✓		-
Water Quality								
S7.9	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	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	S6.5	Deploy floating type silt curtain around grab dredger	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	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.	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	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.	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	S6.5	Construction of intake and outfall structure shall be conducted behind drained cofferdam.	Marine Construction of Intake and Outfall Structure / During construction	Contractor(s)		✓		-
S7.9	S6.5	All vessels should be well maintained and inspected before use to limit any potential discharges to the marine	Marine Dredging/ During construction	Contractor(s)		✓		-

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
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		environment.						
S7.9	S6.5	All vessels must have a clean ballast system.	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	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.	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	S6.5	No soil waste is allowed to be disposed overboard.	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	S6.5	Construction of intake and outfall structure shall be conducted behind drained cofferdam.	Marine Dredging/ During construction	Contractor(s)		✓		-
S7.9	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.	Land site & drainage/ During construction	Contractor(s)		✓		ProPECC PN 1/94, TM Standard under the WPCO
S7.9	S6.5	Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	S6.5	Appropriate surface drainage will be designed and provided where necessary.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	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	Land site & drainage/ During construction	Contractor(s)		✓		ProPECC PN 1/94

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
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		to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94.						
S7.9	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.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	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.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	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.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	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.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	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.	Land site & drainage/ During construction	Contractor(s)		✓		-
S7.9	S6.5	The contingency plan for the existing operation of the BPPS is considered sufficient for directing immediate response to any accidental spillage event.	Fuel spillage/ During operation	CAPCO			✓	
S7.9	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	Marine Dredging/ During operation	Contractor(s)			✓	

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S7.9 and S7.12	S6.2-S6.5	A water quality monitoring programme shall be implemented for the construction phase.	Designated monitoring stations as defined in EM&A Manual/ During marine construction period	Environmental Team (ET)		✓		-
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.	During operation	Environmental Team (ET)/ CAPCO		✓		TM Standard under the WPCO, WPCO license requirements, WQO
Waste Management								
S8.5.1	Table 7.1	The contractor(s) must ensure that all the necessary waste disposal and marine dumping permits or licences are obtained prior to the commencement of the construction works.	Contract mobilisation/ During construction	Contractor(s)		✓		-
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.	Contract mobilisation/ During construction	Contractor(s)		✓		Cap 354N Waste Disposal (Charges for Disposal of Construction Waste) Regulation
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.	Contract mobilisation/ During construction	Contractor(s)		✓		DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials
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.	All area/ During construction	Contractor(s)		✓		PNAP ADV-19

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S8.5.1	Table 7.1	The management of dredged/ excavated sediment management requirement from <i>PNAP ADV-21</i> will be incorporated in the Specification of the Contract Documents.	Marine works/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	<i>PNAP ADV-21 and Dumping at Sea Ordinance (DASO)</i>
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.	Contract mobilisation/ During construction	Contractor(s)		✓		-
S8.5.1	S7.2	The contractor(s) will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>
S8.5.1	S7.2	Containers used for storage of chemical wastes will: <ul style="list-style-type: none"> • 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. 	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>
S8.5.1	S7.2	The storage area for chemical wastes will: <ul style="list-style-type: none"> • 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, whichever is the greatest; 	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>

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		<ul style="list-style-type: none"> 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. 						
S8.5.1	S7.2	<p>Chemical waste will be disposed of:</p> <ul style="list-style-type: none"> 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. 	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>
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.	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	-
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.	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	-
S8.5.1	S7.2	To avoid any odour and litter impact, appropriate number of portable toilets will be provided for workers on-site.	All area/ During construction/ During operation	CAPCO/ Contractor(s)		✓	✓	-
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.	During construction	Contractor(s)		✓		-
S8.7	S7.2	It is recommended that monthly audits of the waste management practices be carried out during the construction phase to determine if wastes are being managed in accordance with the recommended good site	All area/ During construction	Contractor(s)		✓		-

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		practices and WMP. The audits will investigate all aspects of waste management including waste generation, storage, handling, recycling, transportation and disposal.						
Land Contamination								
S9.8	S8	<p>During construction stage, good house-keeping practices shall be maintained by the contractor(s) to minimise the risk of land contamination due to construction activities, including but not limited to the followings:</p> <ul style="list-style-type: none"> 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. 	All area/ During construction	Contractor(s)		✓		-
S9.8	S8	To ensure that the construction contractor(s) has (have) implemented the above recommendations, regular site inspections and audits during construction phase shall be conducted in accordance with the Environmental Monitoring & Audit (EM&A) Manual. The visual inspections/ audits will look at all aspects of construction activities that disturb soil. The first inspection/ audit will be conducted at the commencement of the construction works.	All area/ During construction	Contractor(s)		✓		-
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.	Marine works/ During construction/ During operation	Contractor(s)		✓	✓	
S10.9.2	S9.1	A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced. This will also be	Marine works/ During construction/ During	Contractor(s)		✓	✓	

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		covered in the contractor briefings.	operation					
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.	All area/ During construction	Contractor(s)		✓		<i>ProPECC PN 1/94, TM Standard under the WPCO</i>
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.	Marine works/ During construction/ During operation	Contractor(s)		✓	✓	
S10.9.3	S9.1	The vessel operators of this Project will be required to use predefined and regular routes.	Marine works/ During construction/ During operation	Contractor(s)		✓	✓	
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.	Marine works/ During construction/ During operation	Contractor(s)		✓	✓	
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.	All area/ Detailed design/ During operation	CAPCO	✓		✓	
S10.9.4	S9.1	All of the major lighting sources will be pointed inward and downwards to avoid disturbances to wildlife.	All area/ Detailed design/ During construction/ During operation	CAPCO	✓	✓	✓	
S10.9.4	S9.1	Good site practices and precautionary measures are recommended to be implemented to avoid encroachment	All area/ During construction	CAPCO/ Contractor(s)	✓	✓		

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		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) and water quality (Section 7) assessments will be consequently instigated to minimise dust and surface runoff to adjacent wildlife and natural habitats during construction activities.						
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.	Land site/ During construction	CAPCO/ Contractor(s)	✓	✓		
S10.9.4	S9.1	Avoid any damage and unnecessary disturbance to the surrounding natural habitats.	Land site/ During construction	CAPCO/ Contractor(s)	✓	✓		
Fisheries								
S11.7		N/A						
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.	All area/ Detailed design/ During operation	CAPCO/ Design Contractor	✓	✓	✓	
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.	All area/ During construction	CAPCO/ Contractor(s)		✓		
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.	All area/ During construction	CAPCO/ Contractor(s)	✓			

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Location/ duration of recommended measures & timing of completion of recommended measures	Implementation Agent	Implementation Stage			Relevant Legislation & Guidelines
					D	C	O	
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.	All area/ Detailed design/ During operation	Qualified Landscape Professional employed by Project Proponent	✓	✓	✓	
Cultural Heritage								
S13.7		N/A						-
Health Impact								
S14.7		N/A						-

Annex B

Proforma for Construction Phase EM&A Programme

IMPLEMENTATION STATUS PROFORMA

Ref**	Environmental Protection Measures*	Implementation Status

* *All recommendations and requirements resulted during the Course of EIA/EA Process, including ACE and / or accepted public comment to the proposed project*

** *EIA Ref / EM&A Log Ref / Design Document Ref*

Signed by Environmental Team Leader:

Date: _____

Audited by Independent Environmental Checker:

Date: _____

SITE INSPECTION PROFORMA

Ref: _____

Date	Location	Req. Ref.*	Observation / Deficiency	Mitigation Action** (Responsible Agency)	Date*** of Confirmation

* EIA Ref / EM&A Log Ref / Design Document Ref / Environmental Protection Contract Clause
 ** Specific Environmental Mitigation Measures should be stated, such as, equipment, processes, systems, practices or technologies
 *** The required completion date to confirm the specified Environmental Protection Action

This Proforma is an Environmental Protection Instruction for:

Signed by Environmental Team Leader:

Date: _____

Copy to Independent Environmental Checker

Date: _____

REGULATORY COMPLIANCE PROFORMA

Ref: _____

Ref*	Environmental License / Permit*	Control Area / Facility / Location	Effective Date

* *Name of Applicant, Business Corporation, relevant regulation and remark of license / permit conditions*

** *File reference of the licensee / permittee*

Recorded by Environmental Team Leader:

Date: _____

Signed by Independent Environmental Checker :

Date: _____

COMPLAINT LOG

Ref: _____

Log Ref.	Date / Location	Complainant/ Date of Contract	Details of Complaint	Investigation / Mitigation Action	File Closed

Filed by Environmental Team Leader:

Date: _____