

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

Black Point Gas Supply Project

Environmental Monitoring & Audit (EM&A) Manual (Rev 3)

8 February 2010

Environmental Resources Management

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Black Point Gas Supply Project

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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), a joint venture between CLP Power Hong Kong Limited (CLP) and ExxonMobil Energy Limited (EMEL). The Manual is a supplementary document to the EIA Study of the Black Point Gas Supply 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-208/2009) 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 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), Environmental Team (ET), and the Independent Environmental Checker (IEC) with respect to the environmental monitoring and audit requirements during the course of the project;
- Project organisation;
- Requirements with respect to the construction and operational programme schedule and the necessary environmental monitoring and audit programme to track the varying 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 environmental monitoring and audit 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.

An Environmental Team (ET) shall be appointed to conduct the monitoring works 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 ET should not be in any way an associated body of the Contractor(s). 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, an Independent Environmental Checker (IEC) will be engaged to verify and validate/ audit the environmental performance of CAPCO's Contractor(s). 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.

1.2 *PROJECT DESCRIPTION*

1.2.1 *Project Scope*

This Project will provide facilities to import replacement gas from the Mainland China. The present proposal will involve the construction and operation of two submarine natural gas pipelines connecting BPPS with gas export facilities in Mainland China, and two GRSs at BPPS.

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)*:

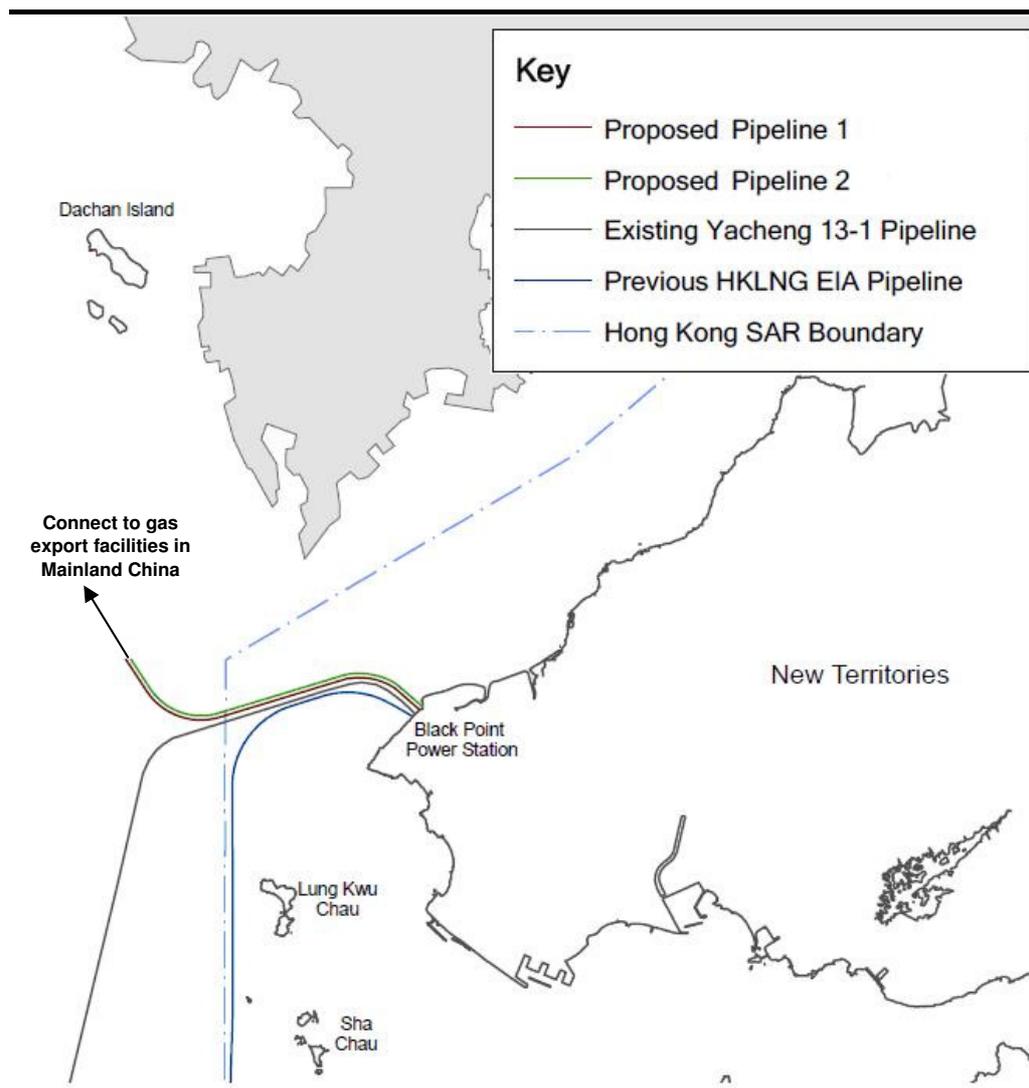
- *Schedule 2, Part I, Item H.2* – Installation of submarine gas pipelines connecting the proposed Gas Receiving Stations at the Black Point Power Station (BPPS) and gas export facilities in southern Guangdong Province.
- *Schedule 2, Part I, Item C.12* – A dredging operation exceeding 500,000 m³ for the reclamation and pipeline trenches.

1.2.2

Site Location

The proposed pipelines will traverse from the BPPS to natural gas export facilities in southern Guangdong Province, across the Urmston Road shipping channel and the Tonggu Waterway. They will be installed to the north of the existing Yacheng 13-1 Pipeline by approximately 100 – 200 m ⁽¹⁾. Indicative routing of the proposed pipelines is depicted in *Figure 1.1*.

Figure 1.1 *Indicative Alignment of the Cross-Boundary Submarine Gas Pipelines Connecting the BPPS and the New Gas Export Facilities in Mainland China*

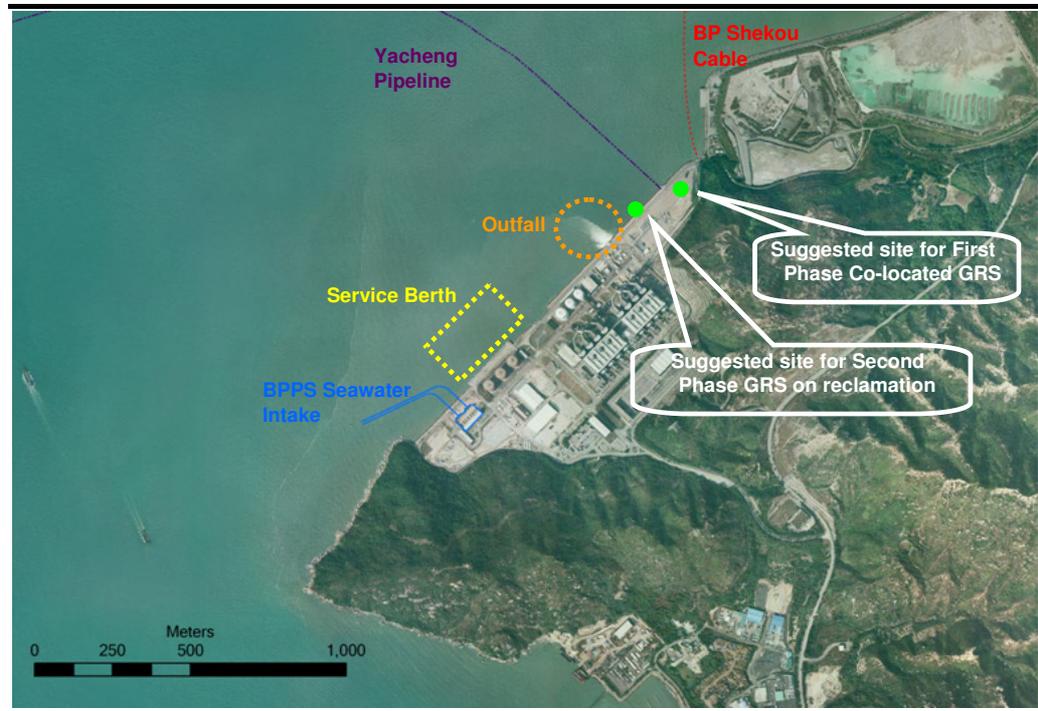


The two GRSs are proposed to be located at the BPPS and it is expected that they will be constructed in two phases. First Phase GRS will be constructed and operated within the site boundary of the BPPS, co-located with the existing GRS operated by CNOOC (hence referred to as the *Co-located GRS*). The Second Phase GRS will be constructed and operated on newly reclaimed land (approximately 0.5 ha of land area) constructed along the existing

(1) The proposed Pipeline 1 will be located at about 100 m north of the existing Yacheng 13-1 Pipeline.

artificial seawall of the BPPS (hence referred to as the *GRS on reclamation*). It should be noted that the site for the new reclamation will be the same as that proposed for the GRS of the South Soko option in the HKLNG EIA ⁽²⁾. The proposed locations of the GRSs are presented on *Figure 1.2*.

Figure 1.2 Suggested Location of the Gas Receiving Stations (GRSs)



1.3 OBJECTIVE OF THE EM&A

The broad objective of this EM&A 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;

(2) ERM (2006) *Liquefied Natural Gas (LNG) Receiving Terminal and Associated Facilities: EIA Study (EIA Study Brief ESB-126/2005)*. Prepared for CAPCO

- 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 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.

The EIA Study indicates that an EM&A programme will only be required for the design and construction phases of this Project. Unacceptable environmental impacts are not predicted to occur during the Project's operation phase, thus specific operation phase EM&A measures are not considered necessary. A summary of the requirements for each of the environmental parameters is detailed in *Table 1.1*.

Table 1.1 Summary of EM&A Requirements

Parameter	EM&A Phase			
	Design Phase ⁽²⁾	Construction Phase	Post-Construction Phase	Operation Phase
Air Quality	-	SI	-	-
Noise	-	SI	-	-
Water Quality	-	Yes	Yes	-
Waste	-	SI	-	-
Marine Ecology (Marine Mammal)	- ⁽¹⁾	Yes	Yes	-
Fisheries	- ⁽¹⁾	-	Yes	-
Landscape and Visual	-	SI	-	-
Cultural Heritage	-	-	-	-
Quantitative Risk	-	-	-	-

Note: - = no EM&A required; SI = Site Inspection forms the main checking method

⁽¹⁾ Pre- construction monitoring may overlap the design phase.

⁽²⁾ 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.

1.4 SCOPE OF THE EM&A PROGRAMME

The scope of this EM&A programme is to:

- establish baseline water quality levels at specified locations and implement monitoring requirements for water quality monitoring programme;
- implement inspection and audit requirements for waste management;
- implement monitoring requirements for marine mammal monitoring programme;
- implement post-construction requirements for fisheries, i.e. conduct of a geophysical survey upon completion of the pipeline installation works;
- 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:
 - the level of the Contractor(s)'s general environmental awareness;
 - the Contractor(s)'s implementation of the recommendations in the EIA and their contractual obligations;
 - the Contractor(s)'s performance as measured by the EM&A;
 - the need for specific mitigation measures to be implemented or the continued usage of those previously agreed;
 - 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.

1.5

WORKS PROGRAMME & WORKS LOCATIONS

The construction works are anticipated to commence in 2011. The preliminary construction programme is given in *Figure 1.3*. The locations of works are shown in *Figure 1.4*. The Sensitive Receivers in the vicinity of the proposed reclamation at BPPS and along the proposed pipeline route are shown in *Figure 1.5*.

First Phase Construction <i>Co-located GRS & Pipeline 1</i>	Month														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Construction of GRS															
- Installation of GRS Facilities															
Construction of Submarine Pipeline															
- Dredging															
- Installation															
- Jetting															
- Rock Dumping															
- Testing															

Second Phase Construction <i>GRS on Reclamation & Pipeline 2</i>	Month																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Construction of GRS																					
- Dredging																					
- Seawall																					
- Backfilling																					
- Installation of GRS Facilities																					
Construction of Submarine Pipeline																					
- Dredging																					
- Installation																					
- Jetting																					
- Rock Dumping																					
- Testing																					

Figure 1.3

Preliminary Construction Programme for This Project



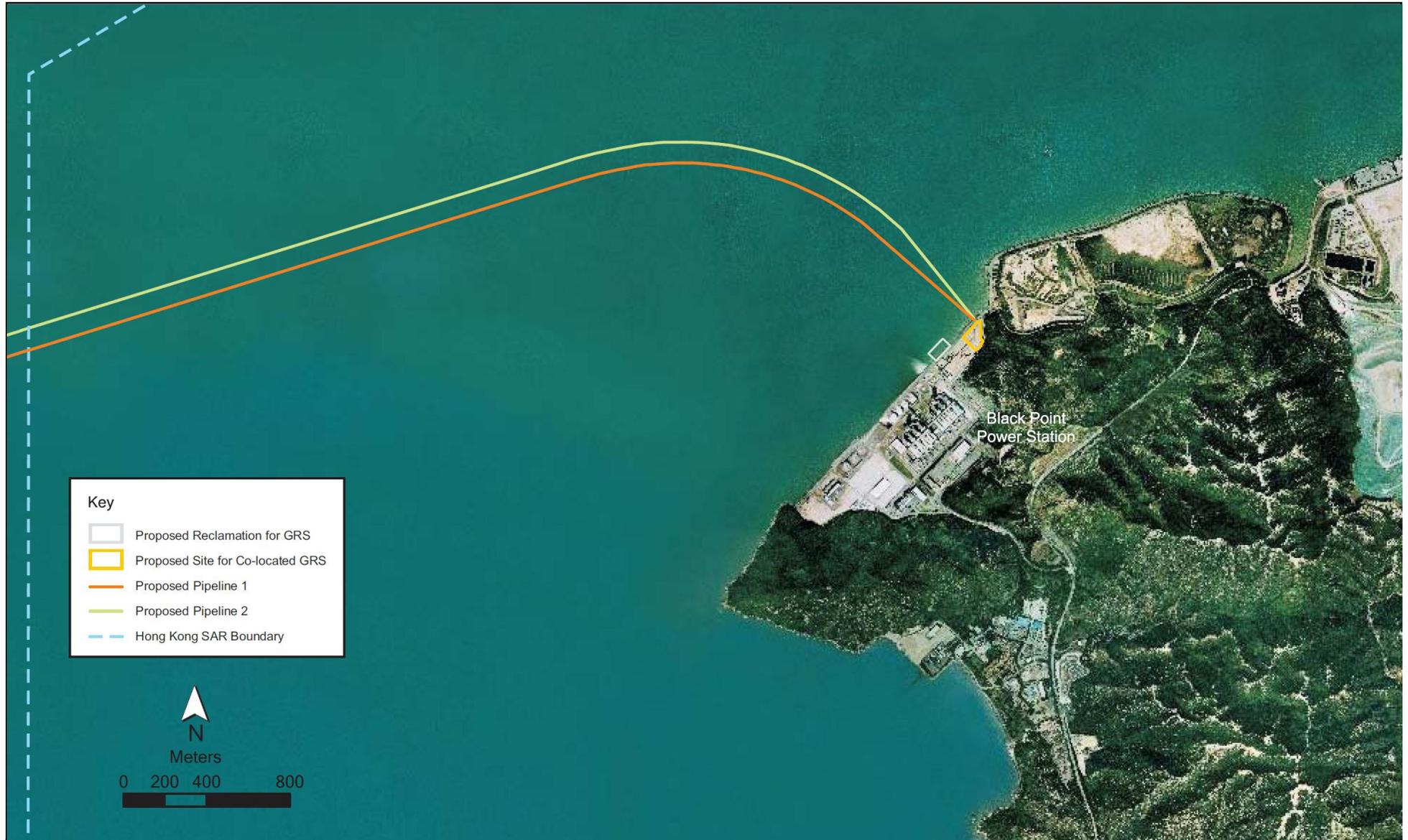


Figure 1.4

Locations of Works for the Black Point Gas Supply Project

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Date 09/12/2009

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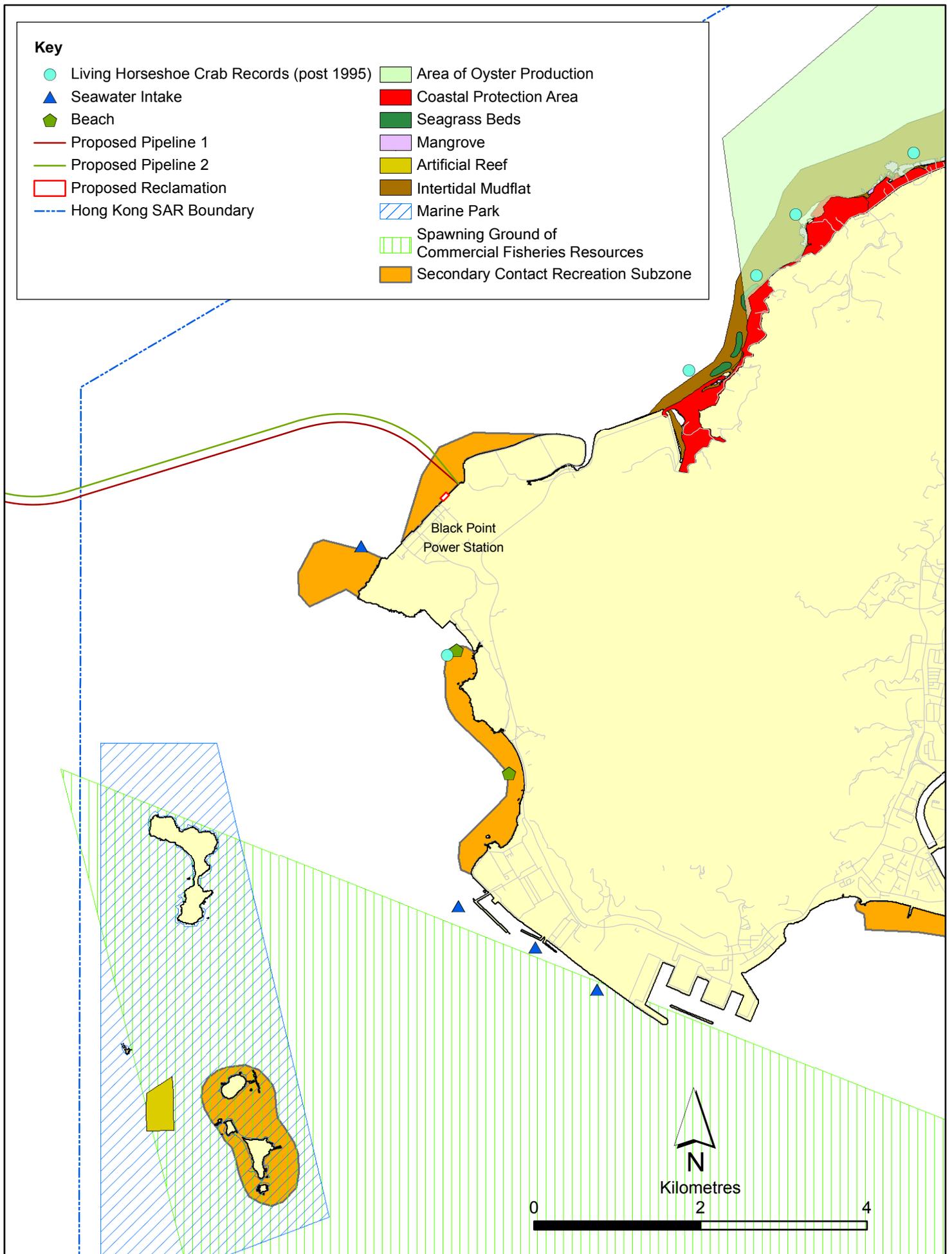


Figure 1.5

Surrounding Environment in the vicinity of Black Point

1.6 ORGANISATION & STRUCTURE OF THE EM&A

The EM&A will require the involvement of CAPCO, an Environmental Team (ET), an Independent Environmental Checker (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 section and in *Figure 1.6*.

1.6.1 Project Organisation

CAPCO will appoint an Environmental Team (ET) to conduct the site inspection and monitoring and, to provide specialist advice on implementation of environmental responsibilities.

The ET will have previous relevant experience with managing similarly sized EM&A programmes and the Environmental Team Leader (ET Leader) will be a recognised environmental professional, preferably with a minimum of seven years relevant experience in impact assessments and impact monitoring programmes. The ET Leader will be responsible for, and in charge of, the Environmental Team; and will be the person responsible for executing the EM&A requirements, and to provide advice (if required) on environmental Contract Clauses for Contractor Contract.

To maintain strict control of the EM&A process, CAPCO will appoint independent environmental consultants to act as an Independent Environmental Checker (IEC) to verify and validate/ audit the environmental performance of CAPCO's Contractor(s) 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, preferably with a minimum of seven years relevant experience in impact assessments and impact monitoring programmes.

Roles & Responsibilities

CAPCO will:

- employ an Environmental Team (ET) as described above;
- employ an Independent Environmental Checker (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;

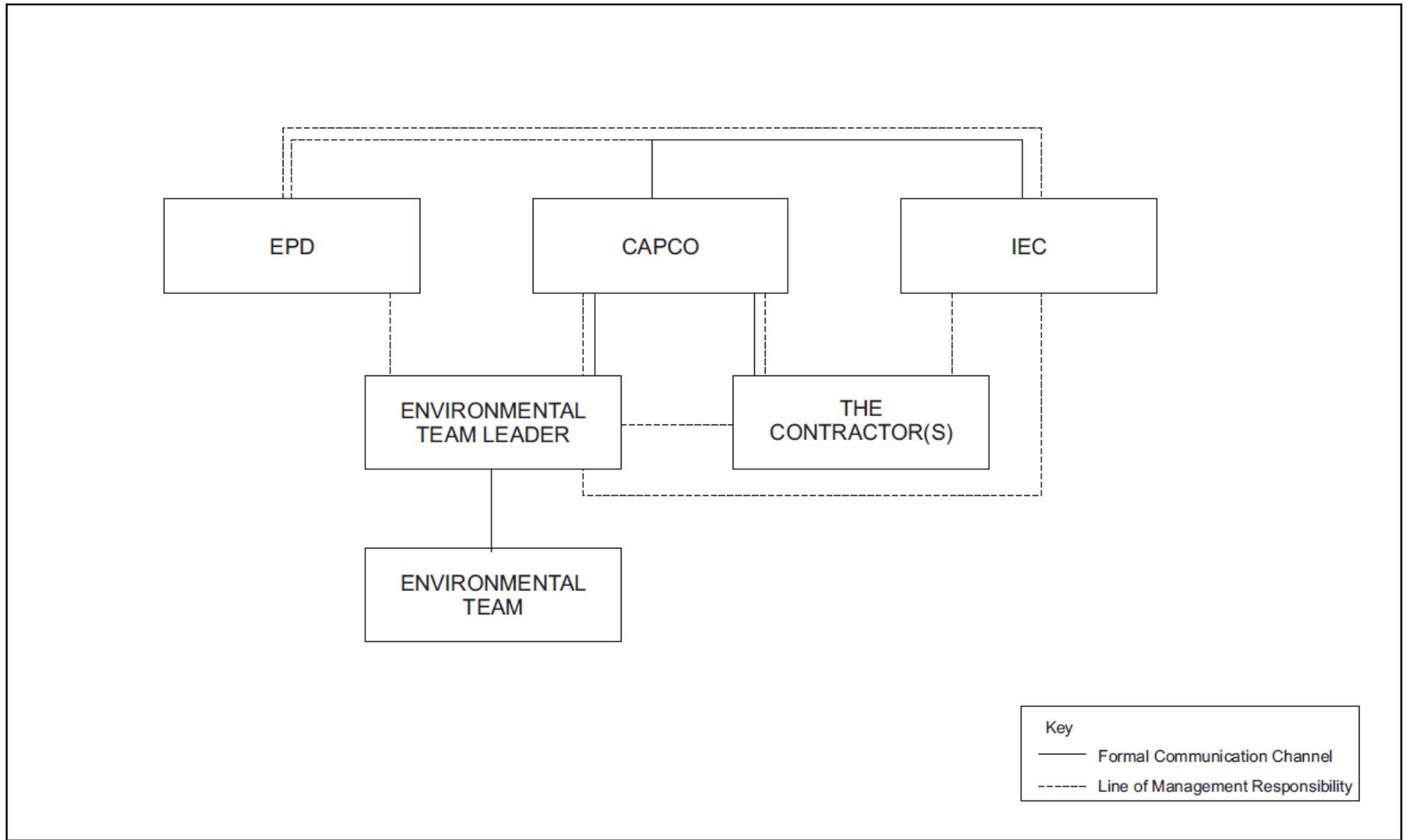


Figure 1.6

Indicative Project Organisation Chart

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Date 14/09/2009

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- adhere to the procedures for carrying out complaint investigation; and
- participate in joint site inspections undertaken by the ET and IEC.

The Contractor(s) 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 Environmental Team (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 Independent Environmental Checker (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).

1.6.2 *Key Contact Information*

Key contact information will be provided in a similar format as in *Table 1.2*.

Table 1.2 *Contact Information - to be completed prior to commencement of construction*

Name	Position	Telephone	Facsimile	E-mail
CAPCO – Environmental Permit Holder				
To be confirmed				
Contractor(s)				
To be confirmed				
Environmental Team				
To be confirmed				
Independent Environmental Checker				
To be confirmed				

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 and EIAO Permit Conditions;
- *Section 3* sets out the EM&A requirements for air quality;
- *Section 4* sets out the EM&A requirements for noise;
- *Section 5* details the requirements for water quality baseline and impact monitoring, and lists relevant monitoring equipment, compliance and Event and Action Plans (EAPs);
- *Section 6* details the requirements for waste management;
- *Section 7* details the requirements for marine ecology and fisheries;
- *Section 8* sets out the EM&A requirements for landscape and visual;
- *Section 9* describes the scope and frequency of site environmental inspection; and
- *Section 10* details the reporting requirements for the EM&A.

2 EM&A GENERAL REQUIREMENT

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.

2.2 CONSTRUCTION PHASE EM&A

2.2.1 General

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

During the construction phases of the Project, air quality, noise, water quality, marine ecology, fisheries, landscape and visual and waste will be subject to EM&A, with environmental monitoring being undertaken for water quality and marine ecology 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 period will be carried out in accordance with this EM&A and reported by the ET. Monitoring works will cover water quality and marine mammals and will form an important part of the whole EM&A programme.

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. These Levels are quantitatively defined later in the relevant sections of this manual and described in principle below:

- *Action Levels*: levels beyond which there is a clear indication of a deteriorating environmental conditions for which appropriate remedial

actions are likely to be necessary to prevent environmental quality from falling outside the Limit Levels, which would be unacceptable; and

- *Limit Levels*: statutory and/or agreed contract limits stipulated in the relevant pollution control ordinances, HKPSG or Environmental Quality Objectives established by the EPD. If these are exceeded, works will not proceed without appropriate remedial action, including a critical review of plant and working methods.

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 & Audits*

In addition to water quality monitoring and marine mammal surveys as a means of assessing the ongoing performance of the Contractor(s), the ET will undertake site inspections of on-site practices and procedures each month. The primary objective of the inspection programme will be to assess the effectiveness of the environmental controls established by the Contractor(s) and the implementation of the environmental mitigation measures recommended in the EIA Report. The IEC will undertake monthly site audits to assess the performance of the Contractor(s) and the effective of the ET.

Whilst the inspection and audit programme will complement the monitoring activity, the criteria against which the inspection/ 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 9 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, Complaint 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 television media and community groups.

Enquiries, complaints and requests for information concerning the environmental effects of the construction works, irrespective of how they are received, will be reported to CAPCO and directed to the ET which will set up procedures for the handling, investigation and storage of such information. The following steps will then be followed:

- 1) The ET Leader will notify CAPCO of the nature of the enquiry.
- 2) An investigation will be initiated to determine the validity of the complaint and to identify the source of the issue.
- 3) The Contractor(s) will undertake the following steps, as necessary:
 - investigate and identify source of the issue;
 - if considered necessary by CAPCO following consultation with the IEC, undertake additional monitoring to verify the existence and severity of the alleged complaint;
 - liaise with EPD to identify remedial measures;
 - liaise with the IEC to identify remedial measures;
 - implement the agreed mitigation measures;
 - repeat the monitoring to verify effectiveness of mitigation measures; and
 - repeat review procedures to identify further practical 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) Enquires which trigger this process will be reported in the monthly reports which will include results of inspections undertaken by the Contractor(s), and details of the measures taken, and additional monitoring results (if deemed necessary). It should be noted that the receipt of complaint or enquiry will 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, quarterly and final reports will be prepared by the ET on behalf of CAPCO and certified by the ET Leader and verified by the IEC. The reports will be submitted to the Contractor(s), 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 Review Report*, agreement with the IEC and approval from EPD.

2.3 *OPERATION PHASE EM&A*

As no unacceptable impacts were identified during the operation phase of the Project, no operation phase EM&A is considered necessary. However, should other operational licenses that require specific monitoring or audit conditions or practices be required, plans under the respective ordinances/guidelines will need to be put in place.

AIR QUALITY

The EIA study concluded that no air sensitive receivers (ASRs) will be affected by construction dust through the implementation of mitigation measures to reduce dust levels. During the operation phase, emissions will be controlled by integrated measures, regular inspections and relevant emissions licenses. Emissions from construction or operation phase are not predicted to yield concentrations that would lead to significant air quality impacts at the ASRs. Therefore, no air quality monitoring will be required for either the construction or operation phase, aside from that required by specific emissions licenses.

Regular site inspections and audits will be carried out during the construction phase in order to confirm that the mitigation measures are implemented and are working effectively. The Contractor(s) will be responsible for the design and implementation of the mitigation measures which are presented in *Annex A*.

NOISE

The EIA study of the Project concluded that no existing noise sensitive receiver (NSR) has been identified within the 300 m Study Area, and no planned NSR has been identified within 2 km from the Project Site. This applies to both the proposed GRSs and submarine gas pipelines. Based upon this, no noise monitoring is necessary for either the construction or operation phases.

Regular site inspections and audits will be carried out during the construction phase in order to confirm compliance with the regulatory requirements and conformity of the Contractor with regard to noise control and contract conditions.

5 WATER QUALITY

5.1 INTRODUCTION

In accordance with the recommendations of the EIA, water quality EM&A is required during dredging and jetting for the submarine pipelines and, during dredging and sandfilling for the reclamation activities. In addition, baseline water quality monitoring will be required prior to the commencement of marine construction activities. The following Section provides details of the water quality monitoring to be undertaken by the Environmental Team (ET) to verify the distance of sediment 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 Document. If required, the ET in consultation with CAPCO will propose updated monitoring locations and seek approval from the IEC and EPD.

5.2 SAMPLING AND TESTING METHODOLOGY

5.2.1 Water Quality Parameters

The parameters that have been selected for measurement *in situ* and in the laboratory are those that were either (a) determined in the EIA to be those with the most potential to be affected by the construction works (ie suspended solids, turbidity and dissolved oxygen) or are a standard check on water quality conditions (ie salinity and temperature).

The parameters to be measured *in situ* are:

- Dissolved Oxygen (DO) (% saturation and mg L⁻¹)
- Salinity (‰ or ppt)
- Temperature (°C)
- Turbidity (NTU)

The only parameter to be measured in the laboratory is:

- Suspended solids (SS) (mg L⁻¹)

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.

5.2.2 *Monitoring Equipment*

For water quality monitoring, the following equipment will be supplied and used by the ET:

- ***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 metre, 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 (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. However, 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 DGPS 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. Marine anchors will not be used when sampling the impact stations within or on the boundaries of the Sha Chau and Lung Kwu Chau Marine Park.
- **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.

5.2.3 *Sampling / Testing Protocols*

All *in situ* monitoring instruments will be checked, calibrated and certified by a laboratory accredited under HOKLAS 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 Field and On-Site Test Methods for the Analysis of Waters*”, BS 1427: 1993. Sufficient stocks of spare 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.

5.2.4 *Laboratory Measurement and Analysis*

All laboratory work shall be carried out in a HOKLAS accredited laboratory. Water samples of about 1,000 mL shall be collected at the monitoring and control stations for carrying out the laboratory analyses. The determination work shall start within the next working day after collection of the water samples. The SS laboratory measurements shall be provided to the client within 2 days (48 hours) upon the receipt of the samples. The analyses shall follow the standard methods as described in APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, unless otherwise specified (APHA 2540D for SS) with a detection limit of 1 mg L⁻¹ or less.

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.

5.2.5 *Monitoring Locations for Dredging / Jetting and Reclamation Fill Activities in Hong Kong Waters*

Water quality monitoring will be conducted during dredging, jetting and reclamation fill activities in Hong Kong waters. The monitoring stations for these activities in Hong Kong waters are shown in *Figure 5.1* and detailed in *Table 5.1*.

The monitoring locations were determined based upon the locations of the dredging, jetting and reclamation fill activities for the submarine pipelines as well as the reclamation area. As seen in *Figure 5.1*, Impact Stations are defined as at a distance of approximately 500 m away from the construction works area. Depending on the works this typically represents the maximum extent of the zone of influence resulting from these activities. Therefore at the Impact locations, impact from these activities should be at minimum.

In addition, Reference Stations have been chosen to facilitate comparison of the water quality of the Impact Stations with ambient water quality conditions, Reference Stations are located in areas not expected to be affected by other projects and which lie within the path of water body movements affecting the Impact Stations but are well outside the predicted influence of the construction works. Monitoring data from these Reference Stations will be used as upstream and downstream controls for the Impact stations.

Apart from the Impact and Reference Stations, Control Stations have been proposed to assist in the identification of the source of any impact. They are approximately 1,000 m away from the construction works area and 500 m away from the Impact Stations. Control Stations are particularly useful for the identification of the pollution source and pathway if exceedances are found at Impact Stations but not at the Reference Stations.

In addition, water quality monitoring will also be conducted at the Sensitive Receiver Stations including Intertidal mudflat/horseshoe crab nursery ground at Ha Pak Nai (M1) and, Seawater intake at Black Point Power Station (M2) when dredging/ jetting works are located close to these locations.

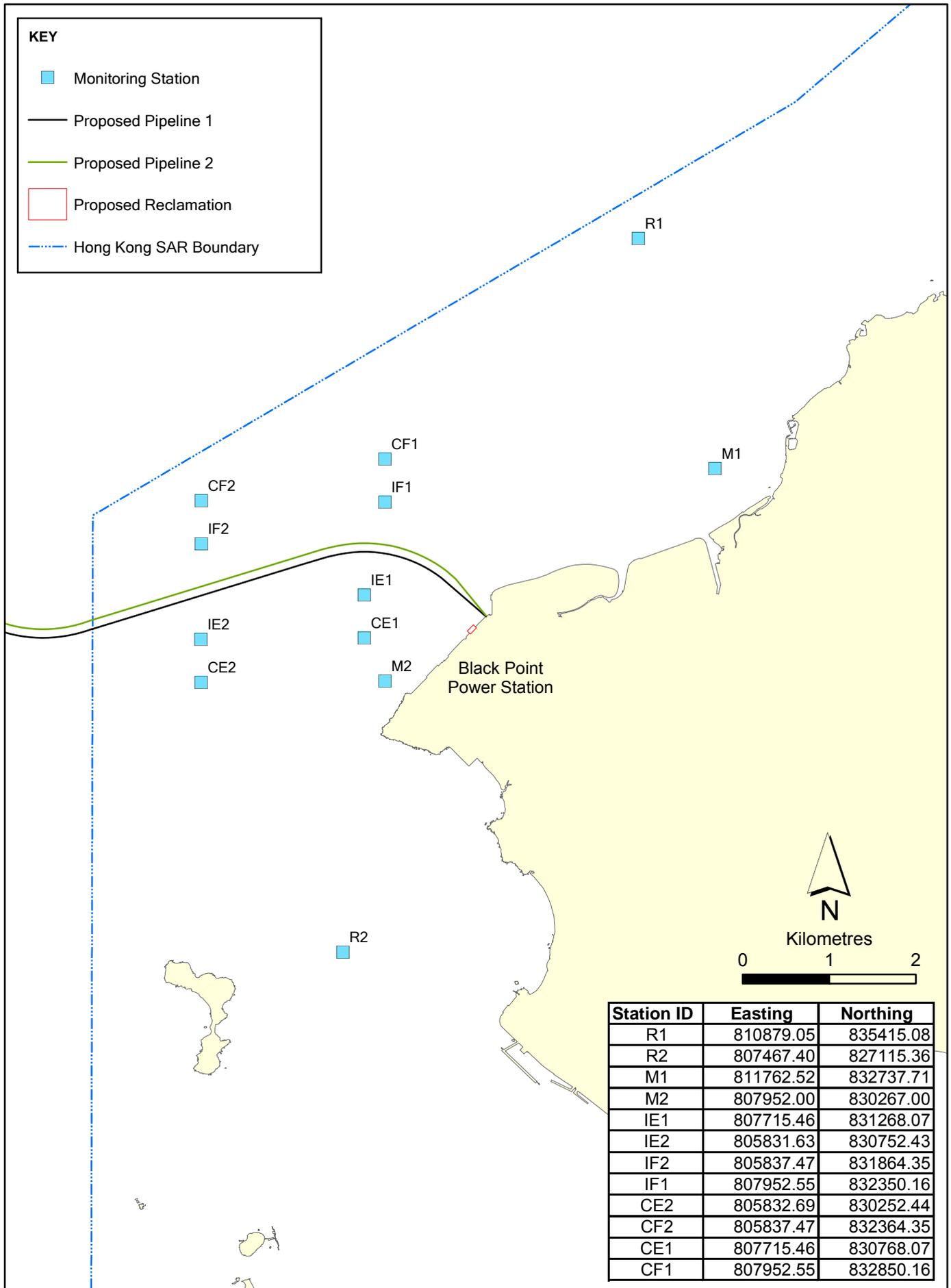


Figure 5.1

Water Quality Monitoring Stations for Dredging, Jetting and Reclamation Fill Activities in Hong Kong Waters

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Table 5.1 *Locations of Marine Quality Monitoring Stations for Dredging, Jetting and Reclamation Fill Activities*

Station ID	Type	Coordinates	
		Easting	Northing
IE 1 (ebb)	Impact	807715.46	831268.07
IE 2 (ebb)	Impact	805831.63	830752.43
IF 1 (flood)	Impact	807952.55	832350.16
IF 2 (flood)	Impact	805837.42	831864.35
CE 1 (ebb)	Control	807715.46	830768.07
CE 2 (ebb)	Control	805832.69	830252.44
CF 1 (flood)	Control	807952.55	832850.16
CF 2 (flood)	Control	805837.47	832364.35
M1	Sensitive Receiver (Intertidal/horseshoe Crab)	811762.52	832737.71
M2	Sensitive Receiver (Seawater Intake)	807952.00	830267.00
R1	Reference	810879.05	835415.08
R2	Reference	807467.40	827115.36

5.2.6 *Monitoring Locations for Dredging / Jetting Activities in PRC Waters*

In order to examine and verify the effects of submarine pipeline installation activities in PRC waters on sensitive receivers in HKSAR waters, it is recommended to carry out water quality monitoring within HKSAR waters when the dredging/ jetting works in PRC waters is approaching HKSAR waters. It is proposed that the monitoring works will commence when dredging/ jetting works are conducted within a distance of about 2.5 km from the HKSAR Boundary.

The monitoring station locations have been established to identify potential impacts to the ecological sensitive receivers (i.e. Sha Chau and Lung Kwu Chau Marine Park) which are shown in *Figure 5.2*. The suggested co-ordinates of these monitoring stations are listed in *Table 5.2*.

Table 5.2 *Locations of Marine Quality Monitoring Stations for Dredging / Jetting Activities in PRC Waters*

Station ID	Type	Coordinates	
		Easting	Northing
IE 3 (ebb)	Impact	804844.07	830452.06
IF 3 (flood)	Impact	804844.29	831556.81
CE 3 (ebb)	Control	804844.07	829452.06
CF 3 (flood)	Control	805258.29	832336.81
M3	Sensitive Receiver (Sha Chau and Lung Kwu Chau Marine Park)	804856.00	827916.00
M4	Sensitive Receiver (Sha Chau and Lung Kwu Chau Marine Park)	806261.00	827897.00
R3	Reference	807538.00	826455.00
R4	Reference	806157.31	832592.03

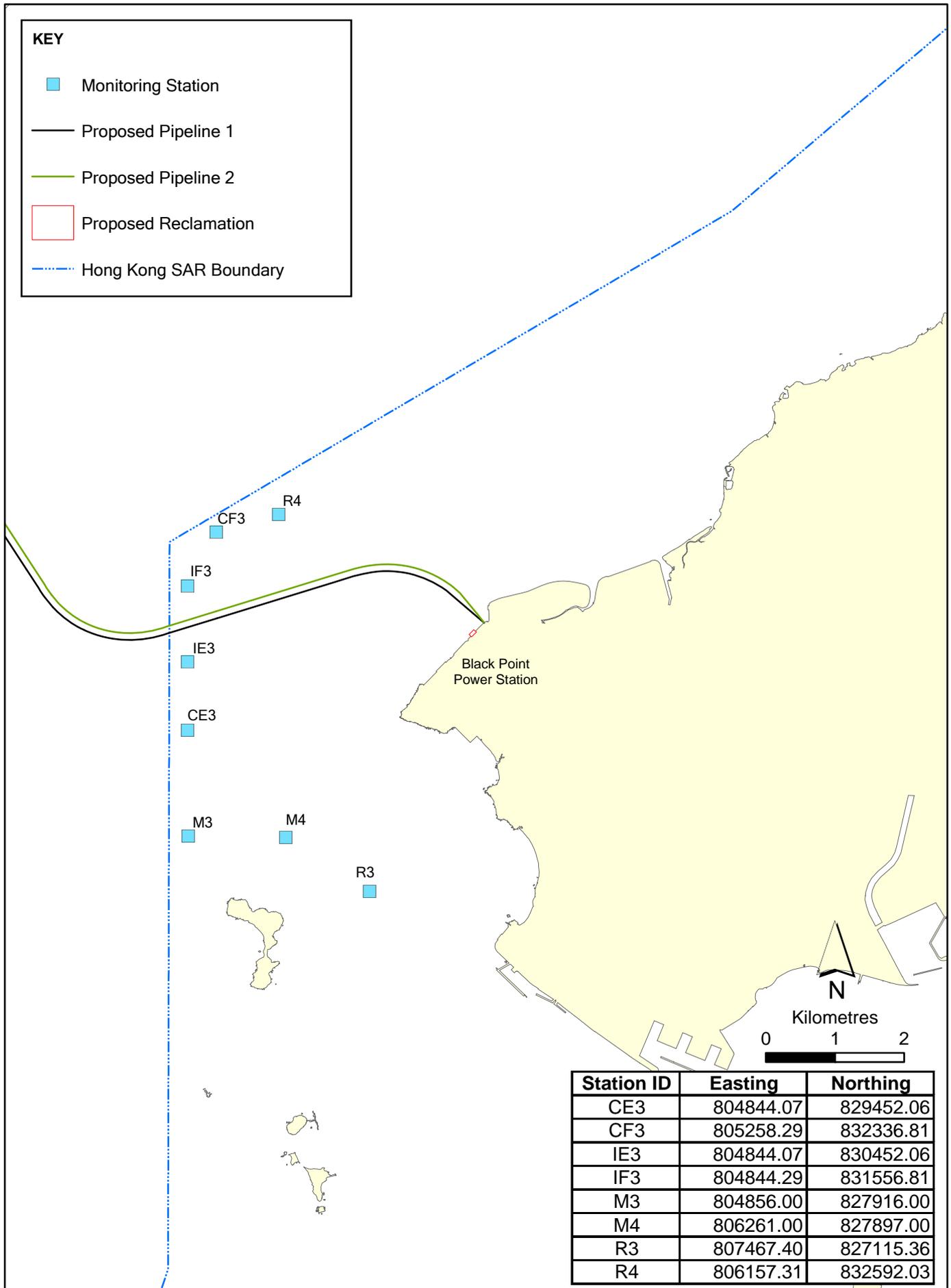


Figure 5.2

Water Quality Monitoring Stations During Dredging or Jetting Activities in PRC Waters

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5.2.7 *Sampling Depths*

Each station will be sampled and measurements 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.

5.3 *MONITORING FREQUENCY*

Schedule for baseline and impact monitoring will be submitted to EPD and AFCD at least 2 weeks before commencement of the monitoring works for agreement.

5.3.1 *Baseline Monitoring*

Baseline monitoring will be conducted to collect representative water quality data from the areas where marine works will be undertaken. This baseline monitoring will provide data for comparison with water quality data collected during impact monitoring works.

Baseline monitoring will be conducted at Impact (IE1, IF1, IE2, IF2, IE3 and IF3), Control stations (CE1, CF1, CE2, CF2, CE3 and CF3), Reference stations (R1, R2, R3 and R4) as well as Receiver Stations (M1, M2, M3 and M4) specified in *Tables 5.1* and *5.2* three times a week at mid-flood and mid-ebb tides for four consecutive weeks prior to the commencement of any marine works for the Project. The tidal range selected for the baseline monitoring should be at least 0.5 m for both flood and ebb tides. There shall not be any marine construction activities in the vicinity of the stations during the baseline monitoring. The interval between 2 sets of consecutive monitoring shall not be less than 36 hours. Baseline monitoring programme should be passed to EPD at least two weeks prior to commencement of baseline monitoring.

5.3.2 *Impact Monitoring*

During the course of the marine works, impact monitoring should be undertaken at the monitoring stations as shown in *Figures 5.1* and *5.2* and *Tables 5.1* and *5.2* 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 should be at least 0.5 m for both flood and ebb tides. 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 Impact monitoring schedule should be passed to EPD at least two weeks prior to commencement of impact monitoring.

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.

During the first two days of the jetting operations for the shore approach works of Section 2 of the proposed pipelines, intensive water quality monitoring will be conducted to verify the predictions from the modelling work presented in the EIA Report. A set of monitoring stations will be arranged perpendicularly to the jetting path for each of the two monitoring days. Monitoring will be conducted every four hours of turbidity (the methods for taking and analysing the samples will be as presented above) and duplicate water samples shall be taken and analyzed at all monitoring stations. The IEC will be on site to inspect the works during the first two days of jetting and will review the associated monitoring results in order to verify that the jetting is proceeding in accordance with the EIA modelling predictions. The details of intensive water quality monitoring including monitoring station, parameters, frequency, reporting, protocol for analyzing the results and actions shall be agreed with EPD in advance of conduct of the intensive water quality monitoring.

5.3.3 *Post Project Monitoring*

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

5.4 *WATER QUALITY COMPLIANCE*

Water quality monitoring will be evaluated against Action and Limit Levels. The key assessment parameters are dissolved oxygen and suspended sediment 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 an Action Limit is 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 5.3 (Hong Kong)* and *Table 5.4 (PRC Works)*.

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 5.5*) should be undertaken and a review of works should 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.

Table 5.3 *Action and Limit Level for Water Quality – Hong Kong Dredging, Jetting & Reclamation Works*

Parameter	Action Level	Limit Level
DO in mgL ⁻¹ ^b	<u>Surface and Middle</u> 5%-ile of baseline data for surface and middle layer	<u>Surface and Middle</u> 4 mg L ⁻¹
	<u>Bottom</u> 5%-ile of baseline data for bottom layers	<u>Bottom</u> 2 mg L ⁻¹
Turbidity (Tby) in NTU (Depth-averaged ^a) ^c	95%-ile of baseline data, and 20% exceedance of value at any impact station compared with corresponding data from control station	99%-ile of baseline data, and 30% exceedance of value at any impact station compared with corresponding data from control station
SS in mgL ⁻¹ (Depth-averaged ^a) ^c	95%-ile of baseline data, and 20% exceedance of value at any impact station compared with corresponding data from control station	99%-ile of baseline data, and 30% exceedance of value at any impact station compared with corresponding data from control station
Notes:		
a.	"Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.	
b.	For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.	
c.	For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.	

Table 5.4 *Action and Limit Level for Water Quality – PRC Jetting / Dredging Works (within 2.5 km of HKSAR Boundary)*

Parameter	Action Level	Limit Level
DO in mgL ⁻¹ ^b	<u>Surface and Middle</u> 5%-ile of baseline data for surface and middle layer	<u>Surface and Middle</u> 4 mg L ⁻¹
	<u>Bottom</u> 5%-ile of baseline data for bottom layers	<u>Bottom</u> 2 mg L ⁻¹
Turbidity (Tby) in NTU (Depth-averaged ^a) ^c	95%-ile of baseline data, and 20% exceedance of value at any impact station compared with corresponding data from control station	99%-ile of baseline data, and 30% exceedance of value at any impact station compared with corresponding data from control station

Parameter	Action Level	Limit Level
SS in mgL ⁻¹ (Depth-averaged ^{a)} ^c	95%-ile of baseline data, and 20% exceedance of value at any impact station compared with corresponding data from control station	99%-ile of baseline data, and 30% exceedance of value at any impact station compared with corresponding data from control station

Notes:

- a. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- b. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- c. For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 5.5 Event and Action Plan for Water Quality Monitoring during Construction Phase

EVENT	ACTION		
	Environmental Team (ET)	Contractor(s)	CAPCO
Action Level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s) and CAPCO; 4. Check monitoring data, plant, equipment and the Contractor(s)'s working methods; 5. Discuss mitigation measures with the Contractor(s); 	<ol style="list-style-type: none"> 1. Inform CAPCO and confirm notification of the exceedance in writing; 2. Rectify unacceptable practice; 3. Check plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET and propose mitigation measures to the CAPCO; 6. Implement the agreed mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with the ET on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented.
Action Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s) and CAPCO; 4. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 5. Discuss mitigation measures with the Contractor(s); 6. Confirm mitigation measures are implemented; 	<ol style="list-style-type: none"> 1. Inform CAPCO and confirm notification of the exceedance in writing; 2. Rectify unacceptable practice; 3. Check plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET and propose mitigation measures to the CAPCO within 3 working days; 6. Implement the agreed mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with the ET on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess effectiveness of the implemented mitigation measures.

EVENT	ACTION		
	Environmental Team (ET)	Contractor(s)	CAPCO
Limit Level being exceeded by one consecutive sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s) and EPD; 4. Check monitoring data, plant, equipment and the Contractor(s)'s working methods; 5. Discuss mitigation measures with CAPCO and the Contractor(s); 6. confirm mitigation measures are implemented; 	<ol style="list-style-type: none"> 1. Immediate stoppage of works; 2. Inform CAPCO and confirm notification of the exceedance in writing; 3. Rectify unacceptable practice; 4. Check plant and equipment; 5. Consider changes of working methods; 6. Discuss with the ET and CAPCO and propose mitigation measures to CAPCO within 3 working days; 7. Implement the agreed mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with the ET and the Contractor(s) on the proposed mitigation measures; 2. Request the Contractor(s) to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures.
Limit Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s) and DEP; 4. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 5. Discuss mitigation measures with CAPCO and the Contractor(s); 6. Confirm mitigation measures are implemented; 	<ol style="list-style-type: none"> 1. Immediate stoppage of works; 2. Inform CAPCO and confirm notification of the exceedance in writing; 3. Rectify unacceptable practice; 4. Check plant and equipment; 5. Consider changes of working methods; 6. Discuss with the ET and CAPCO and propose mitigation measures to CAPCO within 3 working days; 7. Implement the agreed mitigation measures; 8. As directed by CAPCO, slow down or stop all or part of the construction activities. 	<ol style="list-style-type: none"> 1. Discuss with the ET and the Contractor(s) on the proposed mitigation measures; 2. Request Contractor(s) to critically review working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor(s) to slow down or to stop all or part of the marine work until no exceedance of Limit Level.

5.5 WATER QUALITY MITIGATION MEASURES

Section 6 of the EIA Report has outlined a variety of recommended water quality mitigation measures. These are summarised in the Implementation Schedule of Mitigation Measures (*Annex A*).

6 WASTE MANAGEMENT

6.1 INTRODUCTION

The proposed Project is expected to generate the following types of waste during the construction phase:

- Dredged marine sediment;
- C&D materials;
- Chemical waste;
- Sewage; 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.

6.2 WASTE MANAGEMENT PRACTICES

The Contractors will incorporate the recommended mitigation measures into a Waste Management Plan (WMP) for managing the different types of wastes on site. The Contractors will submit the WMP to CAPCO's Environmental Team for endorsement and to EPD for approval prior to the commencement of the construction works. The WMP will be certified by the Environmental Team Leader as conforming to the information and recommendations contained in the *Waste Management Impact Assessment* and this Programme.

The WMP will describe the arrangements for avoidance, re-use, recover and recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities and will include the

recommended mitigation measures on waste management detailed in *Annex A* of this Manual. The WMP will indicate the disposal location(s) of all surplus excavated spoil and other waste.

Prior to the commencement of dredging activities, the disposal strategy for the dredged sediment will be determined in accordance with the *PNAP 252: Management Framework for Disposal of Dredged/ Excavated Sediment*.

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, construction and demolition (C&D) materials, chemical wastes, general refuse and sewage from the workforce. The WMP should be refined and updated as more detailed information is generated on the volume of dredged marine mud and the agreed disposal arrangements. Similarly, it should 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 should also outline the requirements for a waste audit program to verify that the measures outlined in the plan are effectively implemented and adhered to.

6.3

WASTE MANAGEMENT EM&A

To facilitate monitoring and control over the contractors' performance on waste management, a waste inspection and audit programme will be implemented throughout the construction phase. The programme should look at the aspects of waste management including waste generation, storage, recycling, transport and disposal. An appropriate audit programme should be undertaken with the first audit conducted at the commencement of the construction works.

The aims of the waste inspection and audit programme are:

- To review the Contractor's WMP including the quantities and types of C&D materials generated, reused and disposed of off-site; the amount of fill materials exported from/imported to the site and the quantity of timber used in temporary works construction for each process/activity;
- To confirm that the wastes arising from works are handled, stored, collected, transferred and disposed of an environmentally acceptable

manner and comply with the relevant requirements under the *Waste Disposal Ordinance (WDO)* and its regulations;

- To confirm that the construction Contractor(s) properly implements the appropriate environmental protection and waste pollution control mitigation measures, as outlined in the Implementation Schedule and presented in *Annex A*, to reduce and control the potential for waste impacts.
- To monitor the implementation and achievement of the WMP on site to assess its effectiveness; and
- To monitor the follow-up action on deficiencies identified.

Joint site inspections and audits by the ET, the IEC and the contractor will be undertaken each month. Particular attention will be given to the contractor's provision of sufficient spaces, adequacy of resources and facilities for on-site sorting and temporary storage of C&D materials. The C&D materials to be disposed of from the site will be visually inspected. The public fill for delivery to the off-site stockpiling area will contain no observable non-inert materials (e.g. general refuse, timber, etc). Furthermore, the waste to be disposed of at refuse transfer stations or landfills will as practicable contains no observable inert or reusable/recyclable C&D materials (e.g. soil, broken rock, metal, and paper/cardboard packaging, etc). Any irregularities observed during the site audits will be raised promptly to the contractor for rectification.

The findings of the waste audits will be reported in the *Monthly EM&A Reports*.

6.3.1 *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:

General Legislation

- *Waste Disposal Ordinance (Cap 354);*
- *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354);*
- *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*;
- *Dumping at Sea Ordinance (1995)*; and
- The storage, handling and disposal of chemical waste should be audited with reference to the requirements of the *Code of Practice on the Package, Labelling and Storage of Chemical Wastes* published by the EPD.

Other Relevant Guidelines

- *Waste Disposal Plan for Hong Kong (December 1989)*, Planning, Environment and Lands Branch Government Secretariat, Hong Kong Government;
- *Chapter 9 – Environment (1999)*, Hong Kong Planning and Standards Guidelines, Hong Kong Government;
- *New Disposal Arrangements for Construction Waste (1992)*, Environmental Protection Department & Civil Engineering Department, Hong Kong Government;
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992)*, Environmental Protection Department, Hong Kong Government;
- *Works Branch Technical Circular (WBTC) No. 32/92, The Use of Tropical Hard Wood on Construction Site*; Works Branch, Hong Kong Government;
- *WBTC No. 2/93, Public Dumps*, Works Branch, Hong Kong Government;
- *WBTC No. 2/93B, Public Filling Facilities*, Works Branch, Hong Kong Government
- *WBTC No. 16/96, Wet Soil in Public Dumps*; Works Branch, Hong Kong Government;
- *WBTC Nos. 4/98 and 4/98A, Use of Public Fill in Reclamation and Earth Filling Projects*; Works Bureau, Hong Kong SAR Government;
- *Waste Reduction Framework Plan, 1998 to 2007*, Planning, Environment and Lands Bureau, Government Secretariat, 5 November 1998;
- *WBTC Nos. 25/99, 25/99A and 25/99C, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers*; Works Bureau, Hong Kong SAR Government;
- *WBTC No. 12/2000, Fill Management*; Works Bureau, Hong Kong Government;

- WBTC No. 19/2001, *Metallic Site Hoardings and Signboards*, Works Bureau, Hong Kong SAR Government;
- WBTC Nos. 6/2002 and 6/2002A, *Enhanced Specification for Site Cleanliness and Tidiness*, Works Bureau, Hong Kong SAR Government;
- WBTC No. 11/2002, *Control of Site Crusher*, Works Bureau, Hong Kong SAR Government;
- WBTC No. 12/2002, *Specification Facilitating the Use of Recycled Aggregates*. Works Bureau, Hong Kong SAR Government;
- ETWBTC(W) No. 33/2002, *Management of Construction and Demolition Material Including Rock*; Environment, Transport and Works Bureau, Hong Kong SAR Government;
- PNAP 252, *Management Framework for Disposal of Dredged/ Excavated Sediment*; Buildings Department, Hong Kong SAR Government;
- ETWBTC(W) No. 31/2004, *Trip Ticket System for Disposal of Construction & Demolition Materials*, Environment, Transport and Works Bureau, Hong Kong SAR Government;
- ETWBTC(W) No. 19/2005, *Environmental Management of Construction Site*, Environment, Transport and Works Bureau, Hong Kong SAR Government; and
- WBTC No. 25/99A and 25/99C, *Incorporation of Information on Construction and Demolition Material Management in Public Works Sub-committee Papers*; Works Bureau, Hong Kong SAR Government.

The Contractor(s)'s waste management practices will be audited with reference to the checklist detailed in *Table 6.1* below.

6.4 MITIGATION MEASURES

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

Table 6.1 Waste Management Checklist

Activities	Timing	Checking Frequency	If non-compliance noted, Action Required
Necessary waste disposal permits or licences have been obtained	Before the commencement of works	Once	The ET will inform the Contractor(s) and CAPCO. The Contractor(s) should 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 the <i>PNAP 252: Management Framework for Disposal of Dredged/ Excavated Sediment</i> .	Throughout the dredging works. Sediment assessment to be completed prior to dredging	Each Month	The ET will inform the Contractor(s) 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 haulier are used for waste collection.	Throughout the works	Each Month	The ET will inform the Contractor(s) 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 the works	Each Month	The ET will inform the Contractor(s) 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.
Wastes are removed from site in a timely manner. General refuse is collected on a daily basis.	Throughout the works	Each Month	The ET will inform the Contractor(s) and CAPCO. CAPCO will instruct the Contractor(s) to remove waste accordingly.
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance.	Throughout the works	Each Month	The ET will inform the Contractor(s) and CAPCO. CAPCO will instruct the Contractor(s) to clean the storage area and/or cover the waste.

Activities	Timing	Checking Frequency	If non-compliance noted, Action Required
Different types of waste are segregated in different containers or skip to enhance recycling of material and proper disposal of waste.	Throughout the works	Each Month	The ET will inform the Contractor(s) 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 Code of Practice on the Packaging, Handling and Storage of Chemical Wastes, published by the EPD.	Throughout the works	Each Month	The ET will inform the Contractor(s) 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 the works	Each Month	The ET will inform the Contractor(s) 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 the works	Each Month	The ET will inform the Contractor(s) 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.

Note: ET – Environmental Team

7 MARINE ECOLOGY

7.1 INTRODUCTION

The constraints on construction works defined within the EIA will act as appropriate mitigation measures to control the environmental impacts to marine ecological resources to within acceptable levels. In addition to the Indo-Pacific humpback dolphin (*Sousa chinensis*) exclusion zone monitoring, 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 (see *Section 5* of this EM&A Manual).

In accordance with the recommendations of the EIA, specific measures and additional precautionary measures will be instituted for marine mammals during the construction works. These are summarised in the Implementation Schedule of Mitigation Measures (*Annex A*).

Likewise, in accordance with the recommendation of the EIA regarding fisheries impact assessment, geophysical survey will be conducted in the post-construction phase of the pipeline works to confirm that the seabed profile would be restored to its original configurations after the completion of pipeline works.

The following sections provide details of the marine mammal monitoring programme to be undertaken by the ET to verify that the additional precautionary measures for marine mammals recommended in the EIA are carried out.

7.2 MARINE MAMMAL EXCLUSION ZONE MONITORING

Dedicated marine mammal monitoring will be instituted for the dredging and jetting works for the submarine gas pipelines and the GRS reclamation.

A marine mammal exclusion zone within a radius of 250 m from the dredgers / jetting machine will be implemented during the marine works taking place in daylight hours. The marine mammal exclusion zone will be monitored by qualified observer(s) ⁽¹⁾ with an unobstructed, elevated view of the area. The view will be undertaken from the dredging / jetting vessel. The viewpoint(s) will be proposed by the ET.

(1) The qualification and experience of the qualified observer(s) shall be to the satisfaction of the Director of Agriculture, Fisheries and Conservation (DAFC). The qualified observer(s) for the marine mammal monitoring must be suitably trained to conduct the visual monitoring works.

Qualified observer(s) will stand on the open upper decks of the vessel, allowing for observer eye heights of 4 to 5 m above water level and relatively unobstructed forward visibility between 270° and 90°. Vessel-based observation by the observer(s) shall be conducted by searching the 180° swath in front of the dredger (270° to 90°) with appropriate marine binoculars, scanning the same area with the naked eyes and occasional binocular check.

Qualified observer(s) will scan the 250 m exclusion zone for at least 30 minutes prior to the start of dredging / jetting. If cetaceans are observed in the exclusion zone, dredging / jetting will be delayed until they have left the area. This measure will confirm that the area in the vicinity of the dredging/ jetting work is clear of marine mammals prior to the commencement of works and will serve to reduce any disturbance to marine mammals. As per previous practice in Hong Kong, should cetaceans move into the works area during dredging / jetting, it is considered that cetaceans will have acclimatised themselves to the works therefore cessation of dredging / jetting is not required ⁽¹⁾.

The marine mammal exclusion zone monitoring will be required during the period of marine dredging / jetting works. Daily monitoring will be conducted till the completing of dredging / jetting works.

Reports on marine mammal monitoring, e.g. sighting records ⁽²⁾, shall be included in the *Monthly EM&A Reports*.

7.3

ADDITIONAL MARINE MAMMAL MONITORING

CAPCO will conduct additional monitoring of the distribution and abundance of dolphins during the pre-construction, construction and post-construction phases of the Project to record information on dolphin distribution in the Project areas. Details of the monitoring programme will be developed at a later stage (e.g. during Environmental Monitoring & Audit) upon approval of the EIA Report.

At this early stage it is envisaged that during the pre-construction stage monitoring surveys will be conducted per month for three months before dredging commences. The survey area will be defined later and agreed with AFCD but is expected to focus on the pipeline route and cover where practical the transect lines that are used in the AFCD long term monitoring dataset.

- (1) This precautionary measure is consistent with conditions for grab dredging works inside the Sha Chau and Lung Kwu Chau Marine Park included in the issued Environmental Permit for the Permanent Aviation Fuel Facility for Hong Kong International Airport project
- (2) A sighting record may be in the form a log-sheet recording the initial sighting time, position, distance and angle data of the sighted marine mammal. Other information on sea state, weather conditions (Beaufort scale), as well as notes on dolphin appearance, behaviour, direction of movement, response to vessel, group size, etc can also be recorded.

In the construction phase a similar frequency of monitoring will be conducted during the marine construction period (i.e. one survey per month). Given that the project works maybe conducted in two phases, the survey work may cease upon completion of marine works for First Phase and then re-commence once marine works for Second Phase start.

The post-construction phase monitoring will essentially repeat the frequency of the pre-construction phase monitoring. The post-construction phase monitoring would commence once marine works for Second Phase have been completed.

It is envisaged that findings of the additional monitoring will be reported in the *Monthly EM&A Reports* (for pre-construction and construction phase monitoring) and Final EM&A Report (for post-construction phase monitoring).

7.4

MITIGATION MEASURES

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

LANDSCAPE & VISUAL

The EIA has recommended that checking of implementation of the mitigation measures for landscape and visual resources can be undertaken as part of the site inspection programme (*Section 9*). The implementation and maintenance of mitigation measures (*Annex A*) should be checked to confirm that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest practical date and without compromise to the intention of the mitigation measures.

9 ENVIRONMENTAL SITE INSPECTION

9.1 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 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.

9.2

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.

9.3

ENVIRONMENTAL COMPLAINTS

The ET will undertake the following procedures (see *Figure 9.1*) upon receipt of a complaint:

- (i) log complaint and date of receipt into the complaint database and inform the IEC immediately;
- (ii) 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;
- (iii) 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;
- (iv) if mitigation measures are required, the ET will advise the Contractor(s) accordingly;
- (v) review the Contractor(s)'s response on the identified mitigation measures and the updated situation;
- (vi) 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;
- (vii) undertake additional monitoring and audit to verify the situation if necessary and confirm that any valid reason for complaint does not recur;
- (viii) 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
- (ix) 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).

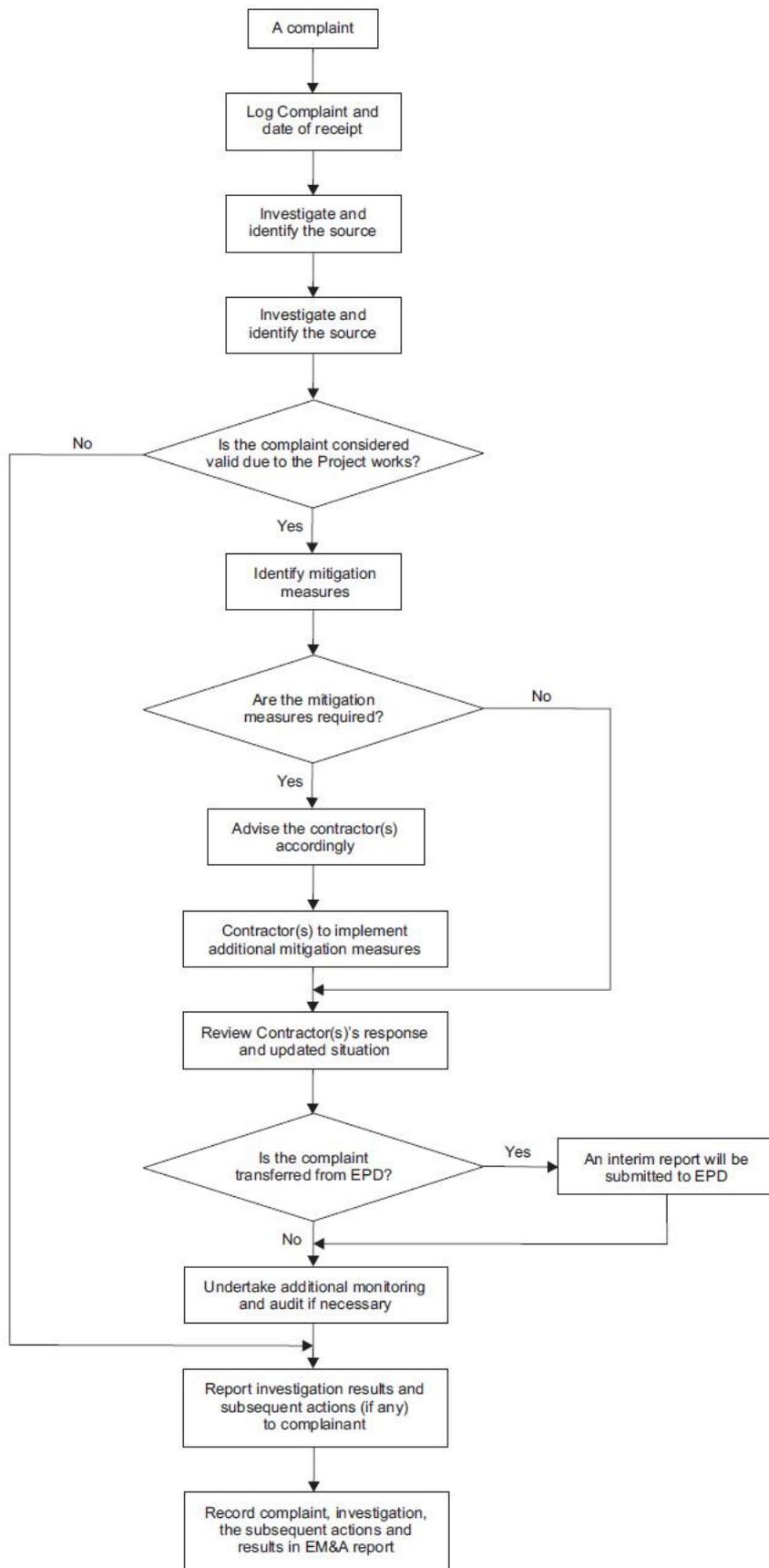


Figure 9.1

Flow Chart for Handling Environmental Complaints

FILE:
DATE: 14/09/09

**Environmental
Resources
Management**



9.4

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 environmental impact assessment and every non-compliance from the recommendations of the EIA Reports or the Environmental Permit. 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 Reports recommendations (such as CAPCO, IEC and Contractor(s)) and the EPs or by EPD or his authorised officers.

10 REPORTING

10.1 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, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. 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.

10.2 BASELINE WATER QUALITY MONITORING REPORT

In respect of the construction phase EM&A works, the ET will prepare and submit a Baseline Water Quality Monitoring Report no less than 2 weeks before commencement of the works for the Project 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:

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

- f. quality assurance (QA)/quality control (QC) results and detection limits.
- (v) Details on influencing factors, including:
 - a. major activities, if any, being carried out on the site during the period;
 - b. weather conditions during the period; and
 - c. other factors which might affect the results.
- (vi) 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;
- (vii) Revisions for inclusion in the EM&A Manual; and
- (viii) Comments, recommendations and conclusions.

10.3

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. 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:

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

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

10.4

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.

10.4.1

Contents of First Monthly EM&A Report

- (i) 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.
- (ii) 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.
- (iii) 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.
- (iv) 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.
- (v) 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.
- (vi) 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
- (vii) 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;
- (viii) Advice on the solid and liquid waste management.
- (ix) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
- (x) A review of the reasons for and the implications of non-compliance including a review of pollution sources and working procedures.
- (xi) 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.
- (xii) 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.
- (xiii) A summary record of notifications of summons, successful prosecutions for breaches of environmental protection/pollution control legislation and actions to rectify such breaches.
- (xiv) A forecast of the works programme, impact predictions and monitoring schedule for the next one month; and
- (xv) Comments, recommendations and conclusions for the monitoring period.

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

- (i) Title page.
- (ii) Executive summary (1-2 pages), including:
- breaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;

- reporting changes; and
 - forecast of impact predictions.
- (iii) Contents page.
- (iv) 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.
- (v) 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.
- (vi) 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.

10.5

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:

- (i) Up to half a page executive summary.
- (ii) 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.
- (iii) 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.
- (iv) 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.
- (v) Drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (vi) 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.
- (vii) Advice on the solid and liquid waste management.
- (viii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
- (ix) 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 prediction with the EM&A monitoring result. If any excessive variation was found, a summary of investigation and follow up procedure taken will be addressed accordingly.

- (x) A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures.
- (xi) A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance.
- (xii) A summarised record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.
- (xiii) Comments (eg effectiveness and efficiency of the mitigation measures), recommendations (eg any improvement in the EM&A programme) and conclusions for the quarter.
- (xiv) Proponents' contacts for the public to make enquiries.

10.6

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. The annual/final EM&A reports will contain at least the following information:

- (i) Executive Summary (1-2 pages).
- (ii) Drawings showing the project area any environmental sensitive receivers and the locations of the monitoring and control stations.
- (iii) 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.
- (iv) 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.
- (v) 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.
- (vi) 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
- (vii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).
- (viii) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate.
- (ix) A description of the actions taken in the event of non-compliance.
- (x) A summary record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.
- (xi) 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.
- (xii) 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.
- (xiii) A review of the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness, including cost effectiveness;
- (xiv) 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.

- (xv) 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.

10.7 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.

10.8 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.

10.9

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 of Mitigation & Precautionary Measures

Annex A-1 Implementation Schedule for Environmental Protection Measures for the Black Point Gas Supply Project

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
1. Air Quality Measures								
S4.8	Dust control measures stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i> will be implemented during the construction of the GRSs to control the potential fugitive dust emissions.	Land Site / During Construction	Contractor(s)		✓			Air Pollution Control (Construction Dust) Regulation
S4.8	Site practices such as regular maintenance and checking of the diesel powered mechanical equipment will be adopted to avoid any black smoke emissions and to minimize gaseous emissions.	Land Site / During Construction	Contractor(s)		✓			-
S4.10	EM&A in the form of site inspection and audit of dust generating activities.	Land Site / During Construction	Environmental Team (ET) & Independent Environmental Checker (IEC)		✓			Environmental Impact Assessment Ordinance
2. Noise								
No mitigation measures were specified in the EIA report as no noise sensitive receivers are located in the Project Area.								
3. Water Quality								
S6 Annex 6A	Dredging/ jetting plants will be required to comply with the rates modelled in the EIA (S6 Annex 6A) for the various activities assessed.	Marine works areas / During Construction	Contractor(s) and ET		✓			-
S6.9	Dredged marine mud will be disposed of in a gazetted marine disposal area in accordance with the <i>Dumping at Sea Ordinance (DASO)</i> permit conditions.	Dredged areas/ During Construction	Contractor(s)		✓			Dumping at Sea Ordinance
S6.9	Disposal vessels will be fitted with tight bottom seals in order to prevent leakage of material during transport.	Dredged areas/ During Construction	Contractor(s)		✓			Dumping at Sea Ordinance

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S6.9	Barges will be filled to a level, which ensures that material does not spill over during transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action.	Dredged areas/ During Construction	Contractor(s)		✓			-
S6.9	After dredging, any excess materials will be cleaned from decks and exposed fittings before the vessel is moved from the dredging area.	Dredged areas/ During Construction	Contractor(s)		✓			Dumping at Sea Ordinance
S6.9	The contractor(s) will confirm that the works cause no visible foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the dredging site.	Dredged areas/ During Construction	Contractor(s)		✓			-
S6.9	Monitoring and automation systems will be used to improve the crew's information regarding the various dredging parameters to improve dredging accuracy and efficiency.	Dredged areas/ During Construction	Contractor(s)		✓			-
S6.9	Control and monitoring systems will be used to alert the crew to leaks or any other potential risks such as chemicals and oils.	Dredged areas/ During Construction	Contractor(s)		✓			-
S6.9	When the dredged material has been unloaded at the disposal areas, any material that has accumulated on the deck or other exposed parts of the vessel will be removed and placed in the hold or a hopper. Under no circumstances will decks be washed clean in a way that permits material to be released overboard.	Dredged areas/ During Construction	Contractor(s)		✓			Dumping at Sea Ordinance
S6.9	Dredgers will maintain adequate clearance between vessels and the seabed at all states of the tide and reduce operations speed to ensure that excessive turbidity is not generated by turbulence from vessel movement or propeller wash.	Dredged areas/ During Construction	Contractor(s)		✓			-
S6.9	Mitigation measures to be implemented during reclamation sand-filling, reclamation dredging and submarine pipeline installation activities are presented in <i>Annex 14A-2</i> .	Marine works at Various Locations	Contractor(s)		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S6.9	Channels, earth bunds or sand bag barriers will be provided on site to direct stormwater to silt removal facilities. The design of silt removal facilities will make reference to the guidelines in <i>Appendix A1 of ProPECC PN 1/94</i> . 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 / During Construction	Contractor(s)		✓			ProPECC PN 1/94 TM standard under the WPCO
S6.9	Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.	Land Site / During Construction	Contractor(s)		✓			-
S6.9	Appropriate surface drainage will be designed and provided where necessary.	Land Site / During Construction	Contractor(s)		✓			-
S6.9	The precautions to be taken at any time of year when rainstorms are likely together with the actions to be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in <i>Appendix A2 of ProPECC PN 1/94</i> .	Land Site / During Construction	Contractor(s)		✓			ProPECC PN 1/94
S6.9	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 / During Construction	Contractor(s)		✓			-
S6.9	Temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge will be adequately designed for the controlled release of storm flows.	Land Site / During Construction	Contractor(s)		✓			-
S6.9	The temporary diverted drainage will be reinstated to the original condition when the construction work has finished or when the temporary diversion is no longer required.	Land Site / During Construction	Contractor(s)		✓			-
S6.9	During the early stages of work, portable chemical toilets will be used and the effluent will either be shipped offsite or be disposed of at sewage treatment work (STW) at BPPS.	All facilities / During Construction	Contractor(s)		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S6.9	Debris and refuse generated on-site will be collected, handled and disposed of properly to avoid entering the nearby WSRs. Stockpiles of cement and other construction materials will be kept covered when not being used.	All facilities / During Construction	Contractor(s)		✓			-
S6.9	Oil leakage or spillage will be contained and clean up immediately. Waste oil will be collected and stored for recycling or disposal, in accordance with the <i>Waste Disposal Ordinance</i> .	All facilities / During Construction	Contractor(s)		✓			Waste Disposal Ordinance
S6.10	Water quality monitoring shall be undertaken for suspended solids, salinity, turbidity, and dissolved oxygen. If exceedances occur due to dredging/ jetting activities, event and action plan shall be adopted.	Designated monitoring stations as defined in EM&A Manual / Construction period for dredging/ jetting works	ET		✓			Environmental Impact Assessment Ordinance
S6.9	The surface runoff from the GRSs should be connected to a storm water channel via a grit and oil interceptor. These grit and oil interceptors will be regularly cleaned and maintained in good working condition. Trapped oil and grease should be disposed of periodically by waste collection contractor using a suitable liquid waste collection vehicle	GRSs/ During Operation	CAPCO			✓		-
S6.9	Any oil leakage or spillage will be contained and cleaned up immediately.	GRSs/ During Operation	CAPCO			✓		-
S6.9	Waste oil will be collected and stored for recycling or disposal in accordance with the <i>Waste Disposal Ordinance</i> .	GRSs/ During Operation	CAPCO			✓		Waste Disposal Ordinance
4. Waste Management								
S7.5	The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation / During construction	Contractor(s)		✓			-
S7.5	The waste coordinator shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed.	Contract mobilisation / During construction	Contractor(s)		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Contract mobilisation / During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes WBTC No 5/99, Trip-ticket System for Disposal of Construction and Demolition Material Water Pollution Control Ordinance
S7.5	No waste shall be burnt on site. Wastes shall be collected by licensed waste haulier and be disposed of at licence sites.	Land site/ During construction	Contractor(s)		✓			Air Pollution Control Ordinance
S7.5	Rock and soil may be excavated from site formation works and that will be reused as fill material for the reclamation within the Project as far as practicable.	Land site / During construction	Contractor(s)		✓			WBTC No. 2/93, Public Dumps
S7.5	Material shall be reused on site as far as practicable, including formwork plywood, topsoil and excavated material.	Land site / During construction	Contractor(s)		✓			WBTC 32/92, The Use of Tropical Hard Wood on Construction Site

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	C&D materials will be sorted on site into inert waste (public fill) and non-inert waste (construction waste). Public fill will be disposed of at public fill reception facilities (e.g. Tuen Mun Area 38 or other locations as agreed with CEDD). Construction waste, such as timber, paper, plastics and general refuse, cannot be reused and need to be disposed of at the West New Territories (WENT) Landfill.	Land site / During construction	Contractor(s)		✓			-
S7.5	The site and surroundings shall be kept tidy and litter free. Waste storage area shall be properly cleaned and shall not cause windblown litter and dust nuisance.	All areas / During construction	Contractor(s)		✓			WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness. Works Bureau, Hong Kong SAR Government
S7.5	Stockpiled material shall avoid vegetated areas.	Land site / During construction	Contractor(s)		✓			
S7.5	Stockpiles shall be covered by tarpaulins and/or watered as needed.	Land site / During construction, particularly dry season	Contractor(s)		✓			Air Pollution Control (Construction Dust) Regulation
S7.5	Storage of material on site shall be kept to a minimum. Construction materials shall be planed and stocked carefully to reduce amount of waste generated and avoid unnecessary generation of waste.	All areas / During construction	Contractor(s)		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	Use of reusable non-timber formwork to reduce the amount of C&D materials	All areas / During construction	Contractor(s)		✓			Works Branch Technical Circular (WBTC) No. 32/92, The Use of Tropical Hard Wood on Construction Site
S7.5	Wheel washing facilities shall be used by all trucks leaving the site to prevent the transfer of mud onto public roads.	Site entrances and exits / During construction	Contractor(s)		✓			Air Pollution Control (Construction Dust) Regulation
S7.5	Suitable chemical waste storage areas shall be formed at the works site for temporary storage pending collection. Chemical wastes shall be separated for special handling and shall be disposed at appropriate treatment at the Chemical Waste Treatment Centre at Tsing Yi.	Land site / During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
S7.5	Any unused chemicals and those with remaining functional capacity shall be recycled to the extent practical.	Land site / During construction	Contractor(s)		✓			-
S7.5	A licensed contractor shall be employed to collect chemical waste for delivery to a licensed treatment facility.	Chemical Waste Treatment Centre at Tsing Yi/ During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	Temporary storage areas for general refuse shall be enclosed or contained to avoid environmental impacts.	All areas / During construction	Contractor(s)		✓			WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.
S7.5	Sufficient dustbins shall be provided for storage of waste.	All areas / During construction	Contractor(s)		✓			WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness. Works Bureau, Hong Kong SAR Government
S7.5	General refuse shall be timely cleared and shall be disposed of to the nearest licensed facility.	All areas / During construction	Contractor(s)		✓			WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.
S7.5	Waste oils, chemicals or solvents shall not be disposed of to drain. Drainage systems, sumps and oil interceptors shall be cleaned and maintained regularly.	All facilities / During construction	Contractor(s)		✓			-
S7.5	Standard site practice shall be implemented to avoid waste generation and promote waste minimisation.	All facilities / During construction	Contractor(s)		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	Waste materials such as paper, metal, timber and waste oil shall be recycled as far as practicable. Different types of waste shall be segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling of material and their proper disposal. Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the site.	Land Site / During construction	Contractor(s)		✓			ETWBTC No. 33/2002, Management of Construction and Demolition Material Including Rock
S7.5	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the <i>Dumping at Seas Ordinance</i> . Marine mud shall be assessed in accordance with the PNAP 252 prior to the dredging to identify the suitable disposal ground.	Dredging / During construction	Contractor(s)		✓			Dumping at Sea Ordinance
S7.5	Waste containers shall be in good condition and fitted with lids or covers to prevent waste from escaping or the ingress of water.	All facilities / During construction	Contractor(s)		✓			WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.
S7.5	Waste containers shall be in a secure area on hardstanding.	All facilities / During construction	Contractor(s)		✓			WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.
S7.5	Proper storage and site practices shall be adopted to reduce the potential for damage or contamination of construction materials.	All facilities / During construction	Contractor(s)		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	Emergency equipment to deal with any spillage or fire shall be kept on site.	All facilities / During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
S7.5	Containers used for storage of chemical waste shall be: <ul style="list-style-type: none"> • Maintained in good condition and clearly labelled in both English and Chinese; • Suitable for the substance they are holding, resistant to corrosion, and securely closed; and • Capacity of less than 450 L unless the specifications have been approved by the EPD. 	All facilities / During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
S7.5	Storage areas for chemical waste shall: <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 adequate ventilation; • Be arranged so that incompatible materials are appropriately separated • 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; and • Be covered to prevent rainfall from entering 	All facilities / During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S7.5	Leaking containers shall be contained and removed from site as soon as is reasonably practicable.	All facilities / During construction	Contractor(s)		✓			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
S7.5	Training shall be provided to site personnel in proper waste management and chemical handling procedures, the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling.	All facilities / During construction	Contractor(s)		✓			-
S7.5	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site inspection and audit programme shall be undertaken.	All facilities / During construction	ET and IEC		✓			-
S7.5	Nomination of approved personnel to be responsible for standard site practices, arrangements for collection and effective disposal to an appropriate facility of the wastes generated at the site.	All facilities / During construction	Contractor(s)		✓			-
S7.5	Appropriate measures to reduce windblown litter and dust transportation of waste by either covering trucks or by transporting wastes in enclosed containers.	All facilities / During construction	Contractor(s)		✓			-
S7.5	Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. A recording system for the amount of wastes generated/recycled and disposal sites.	All facilities / During construction	Contractor(s)	✓				-
5. Marine Ecology (Marine Mammals)								
S8.8	The vessel operators will be required to control and manage all effluent from vessels	Marine works area / During construction	Contractor(s) and ET		✓			-

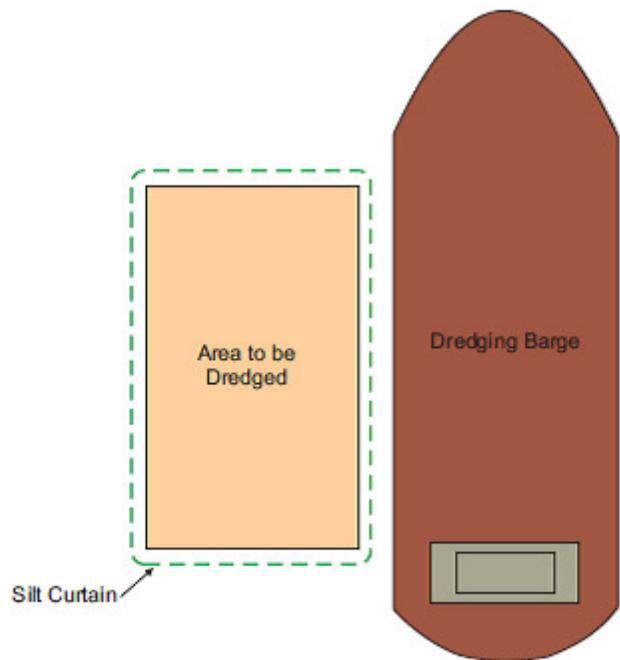
EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S8.8	A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced. This will also be covered in the contractor briefings	Marine works area / During construction	Contractor(s) and ET		✓			-
S8.8	All vessel operators working on the Project construction phase will be given a briefing, alerting them to the possible presence of dolphins in the area, and the guidelines for safe vessel operation in the presence of cetaceans. If high speed vessels are used by the contractors, they will be required to slow to 10 knots when passing through a high density dolphin area (Sha Chau and Lung Kwu Chau)	Marine works area / During construction	Contractor(s) and ET		✓			-
S8.8	The vessel operators engaged during the construction phase will be required to use predefined and regular routes, as these will become known to dolphins using these waters	Marine works area / During construction	Contractor(s) and ET		✓			-
S8.8	A marine mammal exclusion zone within a radius of 250 m from dredgers/ jetting machine will be implemented during the construction phase. Qualified observer(s) will scan the 250 m-exclusion zone for at least 30 minutes prior to the start of dredging. If cetaceans are observed in the exclusion zone, dredging/ jetting will be delayed until they have left the area. As per previous practice in Hong Kong, should cetaceans move into the works area during dredging/ jetting, it is considered that cetaceans will have acclimatised themselves to the works therefore cessation of dredging is not required	Works areas along the pipeline route / During Dredging/ Jetting for the Gas Pipeline Installation	Contractor(s) and ET		✓			-
S8.8	Except for the pipeline section along Urmston Road, dredging/ jetting works shall be restricted to a daily maximum of 12 hours with daylight operations. Because of marine traffic constraints, dredgers/ jetting machine may need to operate 24 hours on the pipeline section which crosses the Urmston Road channel off Black Point enabling completion in the shortest possible time	Works areas along the pipeline route / During Dredging/ Jetting for the Gas Pipeline Installation	Contractor(s) and ET		✓			-

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation & Guidelines
				Des	C	O	Dec	
S8.8	Monitoring will be conducted for the distribution and abundance of dolphins during the construction and post-construction phase of the project. A suitable pre-construction period of dolphin monitoring will also be conducted. The protocols for this will be agreed with AFCD in advance.	Marine works areas / Pre-construction, during construction and post-construction	CAPCO		✓			-
6. Fisheries								
S9.10	Geophysical survey will be conducted during the post-construction of pipeline works to confirm the seabed would be reinstated to its original level.	Post-construction after pipeline works	ET		✓	✓		-
7. Landscape & Visual								
S10.5.11	Site hoardings to be compatible with surrounding landscape.	Land site / During Construction	Contractor(s)		✓			-
S10.5.11	Edges of the new reclamation to be constructed to match the existing Rocky Seawall.	Land site / During Construction	Contractor(s)	✓	✓			-
S10.5.11	The tree requiring removal is to be compensated in accordance with relevant government guidelines	Land site / During Construction	Contractor(s)		✓			-
S10.6.13	The colours of the proposed GRS should be selected to complement the existing industrial surroundings.	Land site / Pre-Construction (Detail Design)	Contractor(s)	✓				-
8. Cultural Heritage								
No mitigation measures were specified in the EIA report as no sites of terrestrial or marine archaeological potential are located in the Project Area.								
9. Hazard to Life								
No unacceptable risks are foreseen as a result of the operation of the GRSs and submarine gas pipelines and no mitigation measures are thus deemed necessary.								

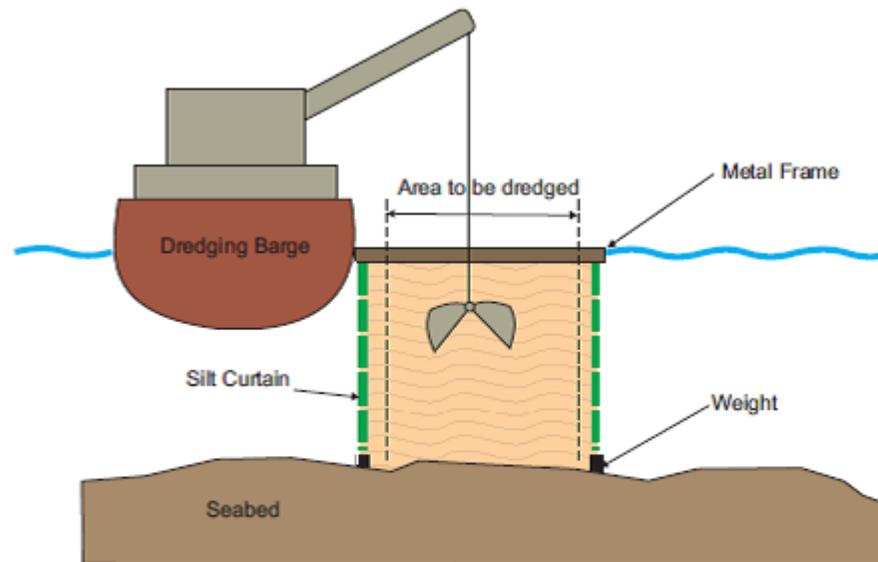
Annex A-2

Summary of Mitigation Measures during the Dredging/ Jetting Activities for this Project

Marine Work Location (Zone)	Marine Work & Plant Type	No. of Plant	Proposed Mitigation Measures
Gas Receiving Station at Black Point	Dredging by Closed Grab Dredger	2	Not required due to no predicted WQO exceedances.
Gas Receiving Station at Black Point	Sandfilling of reclamation area by Pelican Barge	1	A constructed seawall (above the high water level with a 50 - 100 m opening for barge access) in place prior to sandfilling of the reclamation area.
Gas Pipeline – Shore Approach (KP 4.89 – KP 4.78)	Dredging by Closed Grab Dredger	1	Not required due to no predicted WQO exceedances. However, silt curtain(s) will be installed during grab dredging operations along this pipeline section.
Gas Pipeline – Black Point to Urmston Road (KP 4.78 – KP 2.52)	Trenching by Jetting Machine	1	Not required due to no predicted WQO exceedances. However, silt curtain(s) will be installed along the marine works areas during jetting operations for the installation of this pipeline section. The extent of silt curtain(s) installation will be determined based on site condition (e.g. bathymetry of the works area) and navigation safety considerations. Details of the design and implementation of the silt curtain(s) will be developed before construction and verified by the Independent Environmental Checker (IEC) and agreed with EPD. Should non-compliance occur at the respective impact station during water quality monitoring, the use of additional mitigation measures will be examined by the ET, discussed with the Contractor, EPD and CAPCO.
Gas Pipeline – across Urmston Road (KP 2.52 – KP 0.73)	Dredging by Closed Grab Dredger	1	Not required due to no predicted WQO exceedances. Should non-compliance occur at the respective impact station during water quality monitoring, the use of additional mitigation measures, such as cage-type silt curtain (<i>Figure A1</i>), will be examined by the ET, discussed with the Contractor, EPD and CAPCO.
Gas Pipeline – from Urmston Road to HKSAR boundary (KP 0.73 – KP 0)	Trenching by Jetting Machine	1	Not required due to no predicted WQO exceedances. Should non-compliance occur at the respective impact station during water quality monitoring, the use of additional mitigation measures will be examined by the ET, discussed with the Contractor, EPD and CAPCO.



(a) Cage Type Silt Curtain Arrangement for Grab Dredging



(b) Cross-section of Cage Type Silt Curtain Arrangement

Figure A1

Indicative Arrangement of Cage Type Silt Curtain

File:
Date 17/10/2009

Environmental
Resources
Management



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: _____