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1 INTRODUCTION

1.1 Purpose of the Manual

The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the set up of an EM&A programme for both construction and operation stages of the proposed on-site concrete batching plant (hereinafter called “the Project”) to ensure compliance with the recommendations of the Environmental Impact Assessment (EIA) study prepared under the EIAO, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. Implementation of the EIA requirements shall not remove the project proponents or his/her agents’ liability and responsibility under other ordinances and regulations currently in force in the HKSAR.

This EM&A programme is aimed to supplement the current EM&A programme which has been implemented since September 1999 in partial fulfilment of the Environmental Permit conditions for “Infrastructural works for Cyberport Development at Telegraph Bay”.

The Manual contains the following :

- Responsibilities of the Contractor, the Engineer or Engineer’s Representative (ER), Environmental Team (ET), and the Independent Checker (Environment) IC(E) with respect to the EM&A requirements during the course of the project
- Information on project organisation and programming of construction activities for the project
- The hypotheses of potential impacts, the basis for, and description of the broad approach underlying the EM&A programme
- Requirements with respect to the construction schedule and the necessary EM&A programme to track the varying environmental impact
- The specific questions and testable hypotheses that the monitoring programme is designed to answer
- Full details of the methodologies to be adopted, including all field, laboratory and analytical procedures, and details on quality assurance and quality control programme
- The rationale on which the environmental monitoring data will be evaluated and interpreted and the details of the statistical procedures that will be used to interpret the data
- Definition of action and Limit levels
- Establishment of Event and Action Plans
- Requirements of reviewing pollution sources and working procedures required in the event of non-compliance of the environmental criteria and complaints

- Requirements of presentation of environmental monitoring and appropriate reporting procedures
- Requirements for review of EIA predictions and effectiveness of the EM&A programme

For the purpose of this manual, the “Engineer” shall refer to the Engineer as defined in the Contract and the Engineer’s Representative (ER), in cases where the Engineer’s powers have been delegated to the ER, in accordance with the Contract. The ET shall refer to the person delegated the role of executing the EM&A requirements. The IC(E) shall refer to the person responsible for reviewing the work carried out by the ET.

1.2 Background

The approved EIA report “Infrastructural Works for the Proposed Development at Telegraph Bay” (hereinafter called “approved EIA Report”) has assumed that ready-mixed concrete in concrete mixer trucks would be delivered by barges to Telegraph Bay for the construction of Cyberport. In fact, the barge traffic would create marine traffic and environmental impacts during the peak period. In case where a large quantity of concrete is required, the progress of concreting would be limited by the available berthing place. In this connection, an on-site concrete batching plant is desirable from an operational point of view.

In order to facilitate the construction works for the Cyber Port Development, the Project Proponent intends to erect a concrete batching plant for the day-to-day consumption at the site. However, the proposed facility has the potential to cause adverse cumulative impacts on the air quality and to a lesser extent the noise level, water quality, waste management and visual quality at the nearby sensitive receivers. As the issue was not addressed in the approved EIA Report for the proposed development, the establishment of the proposed facility is considered to constitute a Material Change to the approved EIA Report. An EIA report has been prepared to address this Material Change in fulfilment of the requirement of the Environmental Impact Assessment Ordinance (EIAO).

Maunsell Consultant Asia Limited (MCAL) in association with Maunsell Environmental Management Consultants Limited (MEMCL) were commissioned by Cyber-Port Limited to assess the potential environmental impact of constructing and operating the proposed concrete batching plant on the nearby sensitive receivers. The assessment has also addressed the cumulative effect due to the concurrent construction activities on site including advance works and main construction works.

Besides, the proposed concrete batching plant would reduce significantly the noise and air pollution from barges for the delivery of materials and concrete mixer trucks to the site. It would also eliminate marine traffic impact and reduce environmental impacts caused by one of the concrete batching plant off-site which is currently operated by Ready Mixed Concrete (H.K.) Limited (RMC).

Appendix A1 indicates the site location plan of the purposed On-site concrete Batching Plant.

1.3 Environmental Monitoring and Audit Requirements

The EIA study identified the likely environmental impacts during construction and operation phases, including: air quality, noise, water quality, waste management as well as visual impacts. These impacts can be minimized to acceptable levels with the implementation of environmental mitigation measures. However, in order to ensure the compliance, compliance monitoring works have been recommended and are described in details in the subsequent sections. As the advanced works and the main construction works at Telegraph Bay are in progress before the construction of the proposed concrete batching plant, it is considered that no further baseline monitoring is required, and that the baseline conditions prior to the advanced works and main construction works are applicable to this Project.

1.4 Project Organization

Different level involvement is essential to ensure that the project progresses in an environmental acceptable manner. In general, the parties involved in the project organisation should include :

- Information Technology Broadcasting Bureau (ITBB) (Project Proponent)
- EPD, Plan D & AMO (The Authorities)
- Engineer Representative (ER) (Project Proponent's Representative)
- Contractor
- Environmental Team (ET)
- Independent Checker (Environment) (IC(E))

The proposed project organisation is shown in Figure 1.1. The responsibility of respective parties are :

Carlyle International Limited

- Hold ultimate responsibility for the project
- Decision-making authority
- Liaise with EPD, Plan D and AMO with respect to environmental related issues

EPD/Plan D/AMO

- Statutory bodies for relevant environmental protection matters in Hong Kong
- Provide mandatory environmental standards
- Consultation board for environmental issues arising from the project

The Contractor

- Employ an ET to undertake monitoring, laboratory analysis and reporting of EM&A
- Provide assistance to ET in carrying out monitoring
- 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

- Adhere to the procedures for carrying out complaint investigation in accordance with the section 6.3.

ER

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans
- Review the EM&A works performed by the ET
- Audit the monitoring activities and results
- Review the EM&A reports submitted by ET
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans
- Adhere to the procedures for carrying out complaint investigation in accordance with the section 6.3.

ET

ET Leader

- Overall supervision and administration of the Environmental Team's daily operation;
- Managing the various specialist and professionals who are designated as the member of the Team
- Liaison with other government departments or external parties regarding any environmental issues arising from the project; and
- Ensuring the outputs of the Team meet the objectives and requirements set out in this manual.

Environmental Engineer / Scientist

- To schedule the environmental monitoring activities;
- To check the validity of data upon receipt of field measurement and laboratory results;
- To prepare reports, which are specified in the EM&A Manual, in timely manner and ensure the quality of the outputs;
- To liaise with ER and Contractor upon receipt of complaints and/or breaching of statutory limits;
- To ensure the Event/Action Plan is implemented;
- To investigate the causes of complaints and/or limit exceedances;
- To advise on required mitigation measures;
- To ensure the proposed mitigation measures are implemented;
- To perform regular audits of the environmental monitoring data;
- To perform site inspections during audit;
- To provide advice on any pollution control measures, if necessary, after a site inspection;
- Provision, calibration and maintenance of monitoring equipment.

Environmental Technician

- To perform monitoring activities for the environmental parameters as required by the EM&A Manual;
- To be proficient in the monitoring methodologies and QA/QC procedure set out in this EM&A Manual;
- To ensure the quality of the monitoring data;
- To know the specified Action and Limit Levels in the EM&A Manual;
- To alert the ET Leader of any observed exceedances of the Action/Limit Levels;
- Calibration and general maintenance of monitoring equipment; and
- To assist the Environmental Engineer / Scientist in performing regular site inspections as required.

Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibility, as required under the EM&A programme for the duration of the project. The ET shall not be in any way an associated body of the Contractor. The ET Leader shall have relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the ER.

Independent Checker (Environment)

- Review the EM&A works performed by the ET;
- Audit the monitoring activities and results;
- Report the audit results to the ER and EPD in parallel;
- Review the EM&A reports submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor whenever necessary in accordance with the Event and Action Plans; and
- Adhere to the procedures for carrying out complaint investigation in accordance with the relevant section of this Manual.

1.5 Construction & Operation Programme

The construction and operation programme of the proposed concrete batching plant is presented in Table 1.1. The working programmes for various works are shown in Figures 1.2 and 1.3. This programme is for information of the ET to get an initial idea of the projection of the works. The ET shall make reference to the actual works progress and programme during the construction and operation of the Concrete Batching Plant to schedule the EM&A works, and the Contractor shall provide the respective information to the ET for formulating the EM&A schedule.

Table 1.1 Construction and Operation Programme of the Proposed Concrete Batching Plant

12/2000 Phase 1	01/2001 – 03/2001 Phase 2	04/2001 – 12/2001 Phase 3
Construction of Stage 1 batching plant	Construction of Stage 2 batching plant and operation of Stage 1 batching plant	Operation of Stage 2 batching plant

1.6 Environmental Mitigation Measures proposed in the EIA

A list of the recommended environmental mitigation measures for both construction and operation phases is at Appendix C. The EM&A programme shall cover all the recommended mitigation measures to ensure timely implementation of these measures to the satisfaction of relevant authorities.

2 AIR QUALITY

2.1 Introduction

In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impacts during construction and operation of the on-site concrete batching plant are presented.

At present, dust monitoring is carried out at 4 stations in Telegraph Bay at a frequency of once every six days, using Higher Volume Samplers. In order to have effective management of the site, it is proposed that continuous, on-site real-time monitoring data is collected at 2 of the four stations. In addition, one meteorological station and 2 web cameras are proposed to be installed. All real-time monitoring data will be accessible whenever there is a need through dial up telephone line. This will also allow quick responses to complaints on environmental issues.

A database for all real-time monitoring data will be developed and updated on a daily basis. The data will be audited within 2 working days of sampling and the audited data will be posted onto the Web-site for public access two working days after sampling.

2.2 Measurement Parameters

Air Quality

Continuous Total Suspended Particulate (TSP) concentrations shall be measured at two stations and the data shall be posted onto the web as 24-hour and 1-hour averaged concentrations which indicate the impacts of construction dust from the construction and operation of concrete batching plant. Discrete 24-hr average TSP concentrations shall continue to be measured at a frequency of once every 6 days at the other two stations, except during the initial period as described below.

Meteorological Conditions

Wind speed, wind direction and rainfall shall be monitored and the data will provide supplementary information for determining the source of dust. These data shall be posted onto the Web-site after 2 working days.

2.3 Monitoring Equipment

A schematic diagram illustrating the monitoring system is presented in Figure B1 of Appendix B.

Air Quality

TSP shall be measured using the state-of-the-art technology – Tapered Element Oscillating Microbalance (TEOM) at A3 and A4. Instantaneous TSP concentrations are displayed and 5-minute average concentrations are stored in an internal buffer memory. A schematic diagram for the monitoring system in Figure B2 of Appendix B.

Using a dial up line, the 5-minute averaged data will be transferred from the instrument to the ET office, where the data will be audited and converted to hourly and daily average TSP concentrations.

The ET is responsible for provision of the monitoring equipment. Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at three month intervals. The calibration data shall be properly documented for future reference by the concern parties such as ER. All the data should be converted into standard temperature and pressure conditions.

TSP shall continue to be measured at A1 and A2 using High Volume Sampler. Details of the equipment have been described in “Infrastructural Works for the Proposed Development at Telegraph Bay: EM&A Manual”.

Meteorological Parameters

Wind data monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the ER in consultation with the ER. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- a) The wind sensors should be installed 10m above ground so that they are clear of obstructions or turbulence caused by buildings
- b) The wind data should be captured by a data logger. The data shall be down loaded to a dedicated computer in the site office. All the data can be accessed by the environmental audit through dial up line.
- c) The wind data monitoring equipment should be re-calibrated at least once every six months
- d) Wind direction should be divided into 16 sectors of 22.5 degrees each.

Figure B4 of Appendix B presents the design of the sampling system.

In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from EPD.

Data Management

ET shall audit the data and check against the construction activities and meteorological data on each working day. If exceedance is found, the data will be further verified with the resident site staff to see if there were construction works when the exceedance occurred. Remarks and justifications will be recorded together with the data set in the centralized database. All the audit result will be posted to the Web-site 2 working days after sampling. The data management is summarized in Figure B5 of Appendix B.

Internet

ET shall provide a web server containing all environmental related information. All the audited monitoring data will be updated on a daily basis and other general environmental information will be updated on a weekly basis.

A link shall be added to the index page of the Cyberport Homepage so that the data is accessible to the public. The advantage is that the dynamic database can be separated from the Internet Server, which stores other Cyberport information. This will simplify the security problem such that only the audited data and non-confidential information is accessible to the public.

2.4 Monitoring Locations

Tables 2.1 gives the proposed monitoring stations for 1-hour and 24-hour TSP monitoring and their locations are shown in Figures 2.1. Locations have been based on the likely affected sensitive receptors.

Table 2.1 Proposed Air Quality Monitoring Stations During the Construction Works

Identification No.	Location	Type of monitoring
A1	No. 60 Sassion Road	High Volume Sampler
A2	Upper Kong Sin Wan Tsuen	High Volume Sampler
A3	Baguio Villa	Continuous
A4	Pui Ying Secondary School	Continuous

If for whatever reasons it is necessary to establish alternative monitoring stations, the ET shall propose alternative monitoring locations and seek approval from ER and IC(E). When selecting alternative monitoring locations, the following criteria, as far as practicable, should be followed:

- a) At the site boundary or such locations close to the major dust emission source
- b) Close to the sensitive receptors (Figures 2.1)
- c) Take into account the prevailing meteorological conditions.

The ET shall agree with the ER on the position for the installation of the TEOM. When positioning the equipment, the following points shall be noted:

- a) A horizontal platform with appropriate support to secure the samplers against gusty wind should be provided
- b) No two samplers should be placed less than 2 meters apart
- c) The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler
- d) A minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers
- e) A minimum of 2 meters separation from any supporting structure, measured horizontally is required
- f) No furnace or incinerator flue is nearby

- g) Airflow around the sampler is unrestricted
- h) The sampler is more than 20 meters from the dripline
- i) Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring
- j) Permission must be obtained to set up the samplers and to obtain access to the monitoring stations
- k) A secured supply of electricity is needed to operate the samplers.

2.5 Baseline Monitoring

Baseline results shall be referred to “Infrastructural Works for the Proposed Development at Telegraph Bay: Baseline Monitoring Report”. No additional baseline monitoring shall be required.

2.6 Impact Monitoring

The ET shall carry out initial impact monitoring during the construction and operation of concrete batching plant. During construction and for the first month of the full operation, the sampling frequency at the High Volume Sampling stations (locations A1 and A2) shall be twice in every six days. For 1-hr TSP monitoring, the sampling frequency of at least four times in every six days should be undertaken at A1 and A2. The increase in frequency of monitoring is to closely monitor the impacts from the concrete batching plant and the effectiveness of the mitigation measures.

If there is no action/limit exceedance that is attributable to the Project during the initial reporting month, the frequency of the impact monitoring shall be returned to normal. That is, for regular impact monitoring, the sampling frequency shall be once in every six days for A1 and A2. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs. If there is interim exceedance report during the first operation month, the more frequency monitoring will continue until no valid exceedance report during the month.

The specific time to start and stop the High Volume TSP monitoring shall be clearly defined for each location and be strictly followed by the operator.

At locations A3 and A4, continuous air quality monitoring will be conducted.

In case of non-compliance with the air quality criteria, more frequent monitoring, as specified in the Action Plan in Section 2.7, shall be conducted within 24 hours after the result is obtained at locations A1 and A2. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

2.7 Event and Action Plan for Air Quality

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. Table 2.2 shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occur, actions in accordance with the Action Plan in Table 2.3 shall be carried out.

Table 2.2 Action / Limit Levels for Air Quality

Parameters	Action	Limit
24 Hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 200 \mu\text{g}/\text{m}^3$, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level $> 200 \mu\text{g}/\text{m}^3$ Action level = Limit level	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level $> 384 \mu\text{g}/\text{m}^3$, Action level = Limit level	500

Table 2.3 Event / Action Plan for Air Quality

EVENT	ACTION			
	ET	IC(E)	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> Identify source, investigate the causes of exceedance and propose remedial measures; Inform IC(E) and ER; Repeat measurement to confirm finding; Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method. 	<ol style="list-style-type: none"> Notify Contractor. 	<ol style="list-style-type: none"> Rectify any unacceptable practice; Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> Identify source; Inform IC(E) and ER; Advise the ER on the effectiveness of the proposed remedial measures; Repeat measurements to confirm findings; Increase monitoring frequency to daily; Discuss with IC(E) and Contractor on remedial actions required; If exceedance continues, arrange meeting with IC(E) and ER; If exceedance stops, cease additional monitoring; 	<ol style="list-style-type: none"> Checking monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the ET on the effectiveness of the proposed remedial measures; Supervise Implementation of remedial measures. 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Notify Contractor; Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> Submit proposals for remedial to ER within 3 working days of notification; Implement the agreed proposals; Amend proposal if appropriate.
LIMIT LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> Identify source, investigate the causes of exceedance and propose remedial measures; Inform ER, Contractor and EPD; Repeat measurement to confirm finding; Increase monitoring frequency to daily; Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results. 	<ol style="list-style-type: none"> Checking monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the ER on the effectiveness of the proposed remedial measures; Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Notify Contractor; Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IC(E) within 3 working days of notification; Implement the agreed proposals; Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> Notify IC(E), ER, Contractor and EPD; Identify source; Repeat measurement to confirm findings; Increase monitoring frequency to daily; Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; Arrange meeting with IC(E) and ER to discuss the remedial actions to be taken; Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results; If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> Discuss amongst ER, ET, and Contractor on the potential remedial actions; Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Notify Contractor; In consolidation with the IC(E), agree with the Contractor on the remedial measures to be implemented; Ensure remedial measures properly implemented; If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the excessdance is abated. 	<ol style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IC(E) within 3 working days of notification; Implement the agreed proposals; Resubmit proposals if problem still not under control; Stop the relevant portion of works as determined by the ER until the exceedance is abated.

2.8 Mitigation Measures

Mitigation measures during operational phase proposed in EIA Report are listed in Table 2.4.

Table 2.4 Mitigation Measures on the Concrete Batching Plant

Item/ Process	Description	Mitigation Measures
Unloading of Sand And Aggregates	a. Unloading of Sand and Aggregates from Barge to aggregate Receiving Hopper at Seafront	<ul style="list-style-type: none"> • Water spray installed on barge for wetting the sand and aggregates₁ • Conveyor barge designed for unloading aggregate₃ • Fully enclosed conveyor used to unload the material to the aggregate receiving hopper₁ • Aggregate receiving hopper installed with 3 sides and water spray₁
	b. Unloading of wetted Sand and Aggregates from Aggregate Receiving Hopper to Tipper truck	<ul style="list-style-type: none"> • The wetted sand and aggregates are loaded into the tipper truck in enclosed loadout section₁
Storage of Sand and Aggregates	Storage of Sand and Aggregates in Ground Storage Yards and Aggregate Storage Bins. Storage of Sand and Aggregates in Fully Enclosed Aggregate Overhead Storage Bins	<ul style="list-style-type: none"> • The storage yards are installed with 3 sides enclosure and roof, curtain at entrance₁ • Water spray is installed in storage yard for wetting the sand and aggregates₁ • Aggregate Storage Bins and Aggregate Overhead Storage Bins are fully enclosed₁
Transfer of Sand And Aggregates	a. Transfer of sand and Aggregates from Loadout Section to Storage Yards by tipper truck	<ul style="list-style-type: none"> • The tipper trucks with wetted sand and aggregates are covered with plastic canvas₂ • The aggregate materials are unloaded into storage yards, which have 3 sides and roof enclosed and curtain at entrance and water spray₁
	b. Transfer of Sand and Aggregates from Storage Yards to Aggregate Receiving Hoppers by loader	<ul style="list-style-type: none"> • The sand and aggregates are wetted before transferring to aggregate receiving hopper₁ • Aggregate receiving hopper installed with 3 sides and roof and water spray₁
	c. Transfer of Sand and Aggregates from Seafront Aggregate Receiving Hopper to Aggregate Storage Bins OR from Ground Aggregate Receiving Hopper or from Aggregate Storage Bins to Overhead Aggregates Storage Bins	<ul style="list-style-type: none"> • The sand and aggregates are transferred by fully enclosed conveyors₁ • Aggregate conveyor and Transfer Points are fully enclosed₁ • The sand and aggregates are unloaded into fully enclosed overhead storage bins₁
Batching of Sand And Aggregates	a. Weighing and Batching of Sand and Aggregate by Aggregate Weigh Hopper	<ul style="list-style-type: none"> • The sand and aggregates are transferred and weighed within an enclosed structure₁
Unloading of Cementitious Material	a. Transfer of Cementitious Material from Cement Barge to Cement Tankers or directly to Plant Silos	<ul style="list-style-type: none"> • All cementitious materials are transferred within a fully enclosed piping system_{1,2} • The cement blower of barge is enclosed_{1,2} • The cement tanker and silos are fully enclosed systems_{1,2} • Dust-laden air is filtered through bag filter and vented to the dust collectors_{1,2}

Item/ Process	Description	Mitigation Measures
Transferring of Cementitious Material	a. Transferring of Cementitious Material from cement tanker to Silos	<ul style="list-style-type: none"> The silos are fully enclosed_{1,2} Dust-laden air is filtered through bag filter and vented to the dust collectors_{1,2} The level alarms are installed for all silos to prevent overfilling_{1,2} Cement Tanker will transfer the materials within an enclosure_{1,2}
Batching of Cementitious Material	a. Weighing and batching of Cementitious Material by Cement Weigh Hoppers	<ul style="list-style-type: none"> The weigh hopper is fully enclosed_{1,2} Dust-laden air from the cementitious weigh hoppers is filtered through bag filter and vented to the dust collector_{1,2} Cementitious transfer using fully enclosed pipes and screw conveyors_{1,2}
Mixing of Sand, Aggregates and Cementitious Material	a. Mixing of Batched Sand, Aggregates and Cementitious Material in the Concrete Mixer	<ul style="list-style-type: none"> The mixer is fully enclosed_{1,2} Dust-laden air in the mixer is filtered through bag filter and vented to the dust collector_{1,2}
Truck Loading	a. Loading of mixed concrete into the trucks	<ul style="list-style-type: none"> All mixing & loading conduct in fully enclosed area₁ Truck loaded with concrete in “Wet” form_{1,2}
Plant Yard	a. The Concrete Batching Plant Area	<ul style="list-style-type: none"> Floor to be concrete paved_{1,2} Pavement to be kept moist with water_{1,2}
Concrete trucks	a. Concrete Delivery Mixer Trucks within Cyber Port Site	<ul style="list-style-type: none"> Well maintained trucks₃ Clean trucks regularly₁ Trucks comply with APCO regulations₂
Plant Equipment	a. Facilities and equipment operates within the batching plant for handling materials and producing concrete	<ul style="list-style-type: none"> Perform regular maintenance works for plant equipment_{1,3} Maintain all environmental control facilities in operating condition₃

1 Recommended by the Best Practicable Means Requirement for Cement Works (Concrete Batching Plant)

2 Recommended by the Air Pollution Control (Construction Dust) Regulation in Dust Control

3 Good Site Management Practices

The recommended mitigation measures and their implementation schedule are presented in Appendix C1. On the other hand, impact prediction review checklist (Appendix F1) should be employed to check the extent of discrepancy between the actual and the predicted impact at the designated monitoring stations. ET should estimate the efficiency of proposed mitigation and plan it carefully for the ongoing construction activities.

The Contractor shall be responsible for the design and implementation of these measures. If the above measures are not sufficient to restore the air quality to acceptable levels upon the advice and discussion with the ET and ER, the ET, upon consultation with the IC(E) if necessary, shall propose and Contractor shall implement some other mitigation measures.

3 NOISE

3.1 Introduction

In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of noise impacts during construction and operation of the on-site concrete batching plant are presented.

At present, noise monitoring is carried out once a week at three locations. In order to have effective management of the site, continuous, on-site real-time monitoring is proposed at 4 noise monitoring stations, including the three current locations and one new station. All real-time monitoring data will be accessible whenever there is a need through dial up telephone line. This will also allow quick responses to complaints on environmental issues.

A database for all real-time monitoring data will be developed and updated on a daily basis. The data will be audited within 2 working days of sampling and the audited data will be posted onto the Web-site for public access two working days after sampling.

3.2 Noise Parameters

Noise

Noise level, $Leq(30\text{-mins})$, at every 30 minute interval between 0700-1900 hours and noise levels, $Leq(5\text{-mins})$, at every 5 minutes interval between 1900-0700 hours will be collected and posted on Website. As supplementary information for data auditing, statistical results such as L_{10} and L_{90} levels of the same intervals will be logged for internal reference only. They will not be posted onto the Website.

3.3 Monitoring Equipment

Sound level meters, type I model, will be installed on site for round-the-clock monitoring, Leq , L_{10} and L_{90} levels will be stored in the memory of the sound level meter which can be remotely accessed though dial-up lines. This will be done normally on a daily basis, or whenever necessary. A typical design of the noise monitoring station is illustrated in Figure B3 of Appendix B.

To protect the microphone from rain and sunlight, an outdoor shield shall be installed on the microphone to protect it against the effects of wind, rain and perching birds. Correction to the shield can be made though this is normally not necessary for such small value.

As referred to in the Technical Memorandum (TM) issued under NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0dB.

Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

The ET is responsible for the provision of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and *ad hoc* monitoring. All the equipment and associated instrumentation shall be clearly labelled.

3.4 Monitoring Locations

Based on the EIA findings there may be residual impacts therefore potentially noise sensitive receptors have been identified. Table 3.1 shows the noise monitoring stations.

Table 3.1 Proposed Noise Monitoring Stations during Construction Works

Identification No.	Description of NSR
N1	No. 60 Sasson Road
N2	Upper Kong Sin Wan Tsuen
N3	Baguio Villa
N4	Pui Ying Secondary School

a) Locations of the stations are indicated in Figure 2.1.

The monitoring station shall normally be at a point 1 m from the exterior of the sensitive receivers building facade and be at a position 1.2 m above the ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to the free field measurements. The ET shall agree with the ER on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the impact monitoring shall be carried out at the same positions.

3.5 Baseline Monitoring

Baseline levels shall be referred to the Baseline Monitoring Report of “Infrastructural Works for the Proposed Development at Telegraph Bay”.

3.6 Impact Monitoring

Continuous noise monitoring shall be carried out at all the designated monitoring stations during the construction and operation phases of the concrete batching plant.

3.7 Event and Action Plan for Noise

The Action and Limit levels for construction noise are defined in Table 3.2. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 3.3, shall be carried out.

Table 3.2 Action/Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700-1900 hours on normal weekdays	When one documented complaint is received	75* dB(A)
0700-2300 hours on holidays; and 1900-2300 hours on all other days		60/65/70** dB(A)
2300-0700 hours of next day		45/50/55** dB(A)

* reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods

** to be selected based on Area Sensitivity Rating

Note : If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

Table 3.3 Event/Action Plan for Construction and Operation Noise

EVENT	ACTION			
	ET	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IC(E) and Contractor; 2. Carry out investigation 3. Report the results of investigation to the IC(E) and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness; 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IC(E); 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Notify IC(E), ER, EPD and Contractor; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor’s working procedures to determine possible mitigation to be implemented; 6. Inform IC(E), ER and EPD the causes & actions taken for the exceedances; 7. Assess effectiveness of Contractor’s remedial actions and keep IC(E), EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions; 2. Review Contractor’s remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedances is abated.

3.8 Noise Mitigation Measures

The EIA report has recommended noise control and mitigation measures during construction and operational phases.

Construction Phase

The Contractor shall be responsible for the implementation of these construction noise mitigation measures during the construction of concrete batching plant. The key measures are shown below

- Use of quiet type equipment including generator, excavator, mobile crane and vibration poker.

Operation Phase of the Development

During the operation of the concrete batching plant, the following mitigation measures are suggested,

- Fully enclose the conveyor to unload the material to the aggregate receiving hopper
- Fully enclose the concrete mixer
- Use of electric motor for mixing
- Conduct all mixing and loading in fully enclosed area
- Well maintain all concrete trucks
- Perform regular maintenance works for plant equipment

The implementation schedule is also presented in Appendix C2. On the other hand, impact prediction review checklist (Appendix F2) should be employed to check the extent of discrepancy between the actual and the predicted impact at the designated monitoring stations. ET should estimate the efficiency of proposed mitigation and plan it carefully for the ongoing construction activities

If the above measure is not sufficient to restore the construction noise quality to an acceptable levels upon the advice of ET, the Contractor shall liaise with the ET on some other mitigation measures, propose to ER for approval, and carry out the mitigation measures.

4 WATER QUALITY

4.1 Introduction

As the proposed site for the concrete batching plant is located near the seawall, the coastal waters could potentially be impacted by sediment laden and construction runoff. With the implementation of proposed mitigation measures stipulated in EIA Report, it is expected that no unacceptable water quality impacts are anticipated from the construction of the concrete batching plant. During operational phase, no wastewater will be discharge outside the boundary of the plant, there will not be any potential water quality impacts associated with the operation of the facility. Therefore, no water quality monitoring will be required for both construction and operation of concrete batching plant. Auditing works such as checking of surface run-off and pre-treatment facilities, etc. should be carried out.

4.2 Water Quality Mitigation Measures

Regular site inspections should be carried out in order to ensure that the mitigation measures are implemented and are working effectively. The Contractor shall be responsible for the design and implementation of these measures illustrated below:

Construction Runoff and Drainage

The site practices outlined in the *Practice Note for Professional Persons on Construction Site Drainage, EPD, 1994 (ProPECC PN 1/94)* include :

- Provision of perimeter channels to intercept storm-runoff from outside the site. These should be constructed in advance of site formation works and earthworks.
- Programming of the works to minimise earthworks during the rainy season whenever possible.
- Sand/silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum on Effluent Standards under the Water Pollution Control Ordinance. The silt traps should be designed as per the guidelines given in Appendix A1 of ProPECC PN 1/94. Sedimentation basins should be configured so as to provide sufficient time for the suspended solids to settle out. Baffles should be provided in the basins to reduce water velocity, promote settling and prolong the residence time of the runoff. These facilities should be regularly desilted to maintain their effectiveness.
- Channels or earth bunds should be constructed to direct the surface runoff to sand/silt removal facilities.
- Exposed soil surfaces should be protected by paving as soon as possible to reduce the potential for soil erosion.
- Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric to prevent surface erosion during rainstorms.

General Construction Activities

- Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid entering the nearby coastal waters.

- All fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank.
- Open drainage channels and culverts near the works areas should be covered to block the entrance of large debris and refuse.

Sewage Effluent

- Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor must be responsible for appropriate disposal and maintenance of these facilities.

In addition the Contractor should ensure the mitigation measures for the proposed on-site concrete batching plant in Appendix C3 are properly implemented throughout the whole construction and operation period.

If the above measures are not sufficient to restore the water quality to an acceptable level, the Contractor shall liaise with the ET on some other mitigation measures, propose to ER for approve, and carry out the mitigation measures.

5 WASTE MANAGEMENT

The Contractor is responsible for waste control within the construction site, removal of the waste material produced from the site and to implement any mitigation measures to minimise waste or redress problems arising from the waste from the site. The waste material which will be generated during construction phase of the development include the following :

- Excavated materials;
- Construction and demolition (C&D) materials (e.g. wood, scrap metal, concrete);
- Chemical wastes generated by general site practices (e.g. vehicle and plant maintenance/servicing); and
- General refuse.

When handling the waste material, the following measures shall be undertaken :

Storage, Collection and Transport of Waste

Permitted waste hauliers should be used to collect and transport waste to the appropriate disposal points. The following measures to minimise adverse impacts should be instigated:

- Handle and store waste in a manner which ensures that it is held securely without loss or leakage, thereby minimising the potential for pollution;
- Use waste hauliers authorised or licensed to collect specific categories of waste;
- Remove waste in a timely manner;
- Maintain and clean waste storage areas regularly;
- Minimise windblown litter and dust during transportation by either covering trucks or transporting waste in enclosed containers;
- Obtain the necessary waste disposal permits from the appropriate authorities, if they are required, in accordance with the Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), the Land (Miscellaneous Provision) Ordinance (Cap 28);
- Dispose of waste at licensed waste disposal facilities;
- Develop procedures such as a ticketing system to facilitate tracking of loads, particularly for chemical waste, and to ensure that illegal disposal of waste does not occur; and
- Maintain records of the quantities of waste generated, recycled and disposed.

Construction and Demolition Material

In order to minimise waste arisings and to keep environmental impacts within acceptable levels, the environmental control measures described below should be adopted:

- Careful design, planning and good site management can minimise over-ordering and generation of waste materials such as concrete, mortar and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.

- The contractor should recycle as much of the C&D material as possible on-site. Proper segregation of waste types on site will increase the feasibility of certain components of the waste stream by recycling contractors. For example, concrete and masonry can be used as general fill and reinforcement can be taken to steel mills. Different areas of the worksite should be designated for such segregation and storage wherever site conditions permit.
- The handling and disposal of bentonite slurries, if any, should be undertaken in accordance with ProPECC PN 1/94 on construction site drainage.
- To maximise landfill life, Government policy discourages the disposal of C&D wastes with more than 30% inert material (by weight) at landfills. Inert C&D materials are directed to reclamation areas, where they have the added benefit of offsetting the need for removal of materials from borrow areas for reclamation purposes.

Chemical Waste

- Chemical waste that is produced, as defined by Schedule 1 of the *Waste Disposal (Chemical Waste) (General) Regulation*, should be handled in accordance with *the Code of Practice on the Packaging*.
- Containers used for the storage of chemical waste should be suitable for the substance they are holding, resistant to corrosion, maintained in good condition, and securely closed;
- Containers should have a capacity of less than 450 litres unless the specifications have been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.
- The storage area for chemical waste should:
 - Be clearly labelled and used solely for the storage of chemical waste;
 - Be enclosed on at least 3 sides;
 - Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
 - Have adequate ventilation;
 - Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and
 - Be arranged so that incompatible materials are adequately separated.
- Disposal of chemical waste should:
 - Be via a licensed waste collector; and
 - Be a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers; or
 - Be to a re-user of the waste, under approval from the EPD.

General Refuse

- General refuse should be stored in enclosed bins or compaction units separate from C&D material and chemical wastes.
- A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material and chemical wastes, on a daily or every second day basis to minimise odour, pest and litter impacts.
- The burning of refuse on construction sites is prohibited.

Operation Phase of the Development

- Municipal wastes should be stored in suitable containers, within a designated storage area which is kept clean and tidy;
- Regular, daily collections are required by an approved waste collector; and
- Sludge material from the CEPT requiring landfill disposal must satisfy specific criteria with respect to percentage solid content (in general 70% moisture content are acceptable at Hong Kong's strategic landfill sites).

In addition, the Contractor should ensure that the mitigation measures for the on-site concrete batching plant in Appendix C4 are properly implemented throughout the construction and operation period.

The Contractor is required to apply for permits/licences or follow instructions in handling and disposal of wastes generated from the site under Hong Kong's Ordinances. The followings are the general guidelines for application of permits or licences under various ordinances and government documents :

- Chemical Waste Permit or licences under the *Waste Disposal Ordinance* (Cap 354);
- Public Dumping Licence under the *Land (Miscellaneous Provisions) Ordinance* (Cap 28);
- Marine Dumping Permit under the *Dumping at Sea Ordinance* (Cap 466);
- Effluent Discharge Licence under the *Water Pollution Control Ordinance* (Cap 358);
- Storage, handling and disposal of chemical waste refer to the *Code of Practice on the Package, Labelling and Storage of Chemical Wastes* published by EPD

During the site inspections and the document review procedures as mentioned in Sections 6.1 and 6.2 of this manual, the ET shall pay special attention to the issues relating to waste management, and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong.

6 SITE ENVIRONMENTAL AUDIT

6.1 Site Inspections

Site inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They shall be undertaken routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

The ET responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works. He shall submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER for approval.

Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site; it should also review the environmental situation outside the site area which is likely to be affected, directly or indirectly, by the site activities. The ET shall make reference to the following information in conducting the inspection:

- a) The EIA recommendations on environmental protection and pollution control mitigation measures
- b) Works progress and programme
- c) Individual works methodology proposals (which shall include proposal on associated pollution control measures)
- d) The contract specifications on environmental protection
- e) The relevant environmental protection and pollution control laws
- f) Previous site inspection results.

The Contractor shall update the ET with all relevant information of the construction contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the ER and the Contractor within 24 hours, for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET to report on any remedial measures subsequent to the site inspections.

Ad hoc site inspections shall also be carried out if significant environmental problems are identified. Inspections 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 EM&A.

A mitigation implementation status proformas and a site inspection proforma are provided in Appendix D1 and D2 respectively.

6.2 Compliance with Legal and Contractual Requirements

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

In order that the works are in compliance with the contractual requirements, all the works method statements submitted by the Contractor to the ER for approval shall be sent to the ET and IC(E) for vetting to see whether sufficient environmental protection and pollution control measures have been included.

The ET shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that the any foreseeable potential for violating the laws can be prevented.

The Contractor shall regularly copy relevant documents to the ET so that the checking work can be carried out. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permits under the environmental protection laws, and all the valid licence/permit. The site diary shall also be available for the ET's inspection upon his request.

After reviewing the document, the ET shall advise the ER and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractor and the ER accordingly.

Upon receipt of the advice, the Contractor shall undertake immediate action to remedial the situation. The ER shall follow up to ensure that appropriate action has been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

A regulatory compliance proforma is presented in Appendix D3.

6.3 Environmental Complaints

Complaints shall be referred to the ET for carrying out complaint investigation procedures. The ET shall undertake the following procedures upon receipt of the complaints:

- a) Log complaint and date of receipt onto the complaint database and inform the IC(E) immediately;
- b) Investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- c) If a complaint is valid and due to works, identify mitigation measures in consultation with the IC(E);
- d) If mitigation measures are required, advise the Contractor accordingly;
- e) Review the Contractor's implementation of the identified and required mitigation measures, and the current situation;
- f) If the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;
- g) Undertake additional monitoring and audit to verify the situation if necessary, and ensure that any valid reason for complaint does not recur through proposed amendments to work methods, procedures, machines and/or equipment, etc.;
- h) Report the investigation results and the subsequent actions to the source of complaint (If the source of complaint is identified through EPD, the results should be reported within the time frame assigned by EPD); and
- i) Log a record of the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

During the complaint investigation work undertaken by the ET, the Contractor and ER shall cooperate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures (in consultation with the IC(E), see Section 7.3c above) are required following the investigation, the Contractor shall promptly carry out the mitigation. The ER shall ensure that the measures have been carried out by the Contractor.

A complaint log sheet is provided in Appendix D4.

ET should provide a flow chart of the complaint response procedures. This should address complaint receiving channels, responsible parties/contacts for information/action, the investigation processes, procedures for the implementation of mitigation measures, guidelines for communication and public relation with the complainant.

7 REPORTING

7.1 General

The primary reporting function, undertaken within the EM&A programme, will be the issuance of formal exceedance notifications, corrective actions and ongoing feedback between the ET, the Contractor and the Engineer. Reporting will be driven by the results of the monitoring and audit programme and will be recorded through written correspondence, site inspections and minutes and notes of meetings.

In addition, periodic reviews of the EM&A process and subsequent revisions to the EM&A Manual, as appropriate, will be prepared and circulated to relevant personnel within the Contractors' Project Team as a means of gauging site staff and contractor performance. The periodic reviews will comprise Monthly and Quarterly EM&A Reports; these reports will be copied to the EPD for comment. The exact details of the frequency, distribution and time frame for submission shall be agreed with the EPD prior to the commencement of the works.

To enable the public inspection of the Baseline Monitoring Report, Monthly EM&A Report via the EIAO Internet website and at the EIAO Register Office, electronic copies of the Monthly EM&A Reports shall be prepared in Hyper Text Markup Language (HTML) and in Portable Document Format (PDF), unless otherwise agreed by the Director and shall be submitted at the same time as the hard copies. For the HTML version a content page capable of providing hyperlinks to each section and sub-section of the EM&A Reports shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EM&A Report shall be provided in the main text from where the respective references are made. All graphics in the Report shall be interfaced GIF format unless otherwise agreed by the Director. The content of the electronic copies of the EM&A Reports must be the same as the hard copies.

7.2 Baseline Monitoring Report

Baseline Monitoring Report of "Infrastructural Works for the Proposed Development at Telegraph Bay Engineering Feasibility Study" was adopted as a reference.

7.3 EM&A Reports

The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET. The EM&A report shall be prepared and submitted within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. Each monthly report shall be submitted to the relevant parties including the Contractor, the IC(E), the ER, EPD and related government departments. A maximum of 4 copies of each monthly EM&A report shall be submitted to each of the three parties: the Contractor, the ER and the EPD. Before submission of the first EM&A report, the ET shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium requirement. The ET shall review the number and location of monitoring stations and parameters to monitor every 6

months or on an as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

7.3.1 First Monthly EM&A Report

The first monthly EM&A report shall include at least but not be limited to the following:

- (a) Executive summary (1-2 pages)
 - breaches of Action and Limit levels
 - complaint log
 - notifications of any summons and successful prosecutions;
 - reporting changes
 - future key issues.
- (b) Basic project information
 - project organisation including key personnel, contact names and telephone numbers
 - construction programme with fine turning of construction activities showing the interrelationship with environmental mitigation measures for the month
 - management structure
 - works undertaken during the month
- (c) Environmental status
 - works undertaken during the month with illustrations such as location of works
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring stations.
- (d) Summary of EM&A requirements
 - all 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
 - environmental requirements in contract documents.
- (e) Implementation status
 - advice on the implementation of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule.
- (f) Monitoring results (in both hard and diskette copies)
 - monitoring methodology
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored
 - monitoring locations
 - monitoring date, time, frequency, and duration
 - weather conditions during the period
 - any other factors which might affect the monitoring results
 - QA/QC results and detection limits

- all monitoring results should be tabulated with exceedances highlighted for ease of referencing
- (g) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
- record of all noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels)
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary
 - record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary
 - review of the reasons for, and the implications of, non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures
 - description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance.
- (h) Others
- an account of the future key issues as reviewed from the works programme and work method statements;
 - advice on the solid and liquid waste management status; and
 - submission of implementation status proforma, environmental protection proforma, regular compliance proforma, site inspection proforma and complaint log, etc, summarising EM&A of the period.

7.3.2 Subsequent EM&A Reports

The subsequent monthly EM&A reports shall include the following:

- (a) Executive Summary (1-2 pages)
- breaches of Action and Limit levels
 - complaint log
 - notification of any summons and successful prosecutions
 - reporting changes
 - future key issues.
- (b) Environmental status
- construction programme with fine tuning of construction activities showing the interrelationship with environmental protection/mitigation measures for the month
 - works undertaken during the month with illustrations including key personnel contact names and telephone numbers
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring stations.

- (c) Implementation status
 - advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report, summarised in the updated implementation schedule.

- (d) Monitoring results (in both hard and diskette copies)
 - monitoring methodology
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored
 - monitoring locations
 - monitoring date, time, frequency, and duration
 - weather conditions during the period
 - any other factors which might affect the monitoring results
 - QA/QC results and detection limits
 - all monitoring results should be tabulated with exceedances highlighted for ease of referencing

- (e) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
 - record of all noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels)
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary
 - record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary
 - review of the reasons for, and the implications of, non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures
 - a description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance.

- (f) Others
 - an account of the future key issues as reviewed from the works programme and work method statements
 - advice on the solid and liquid waste management status.

- (g) Appendix
 - Action and Limit levels
 - graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - i) major activities being carried out on site during the period;
 - ii) weather conditions during the period; and
 - iii) any other factors which might affect the monitoring results
 - monitoring schedule for the present and next reporting period

- cumulative statistics on complaints, notifications of summons and successful prosecutions
- outstanding issues and deficiencies

7.3.3 Quarterly EM&A Summary Reports

The quarterly EM&A summary report which should generally be around 5 pages (including about 3 of text and tables and 2 of figures) should contain at least the following information. Apart from these, the first quarterly summary report should also confirm that the monitoring work is proving effective and that is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

- (a) Up to half a page executive summary
- (b) Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter
- (c) A brief summary of EM&A requirements including:
 - monitoring parameters
 - environmental quality performance limits (Action and Limit levels)
 - environmental mitigation measures, as recommended in the project EIA study final report
- (d) Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule
- (e) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations
- (f) Graphical plots of the trends of monitored parameters over the past 4 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
 - any other factors which might affect the monitoring results
- (g) Advice on the solid and liquid waste management status
- (h) A summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels)
- (i) A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures
- (j) A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance

- (k) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken
- (l) A summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation, locations and nature of the breaches, investigation, follow-up actions taken and results
- (m) Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter
- (n) Proponents' contacts and any hotline telephone number for the public to make enquiries.

Apart from the above, the first quarterly summary report should also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

7.3.4 Final EM&A Report

The termination of EM&A programme shall be determined on the following basis:

- (a) Completion of construction activities and insignificant environmental impacts of the remaining outstanding construction works
- (b) Trends analysis to demonstrate the narrow down of monitoring exceedances due to construction activities and the return of ambient environmental conditions in comparison with baseline data
- (c) No environmental complaint and prosecution involved.

The proposed termination should be endorsed by the ER, IC(E) and the project proponent prior to final approval from the DEP.

The final EM&A report should contain at least the following information:

- (a) An executive summary (1-2 pages)
- (b) Basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period
- (c) A brief summary of EM&A requirements including:
 - monitoring parameters
 - environmental quality performance limits (Action and Limit levels)

- environmental mitigation measures, as recommended in the project EIA study final report
- (d) Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation proformas
- (e) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring stations
- (f) Graphical plots and the statistical analysis of the trends of monitored parameters over the construction project for representative monitoring stations annotated against:
 - 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
 - the return of ambient environmental conditions in comparison with baseline data
- (g) Compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies
- (h) Provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis
- (i) Advice on the solid and liquid waste management status
- (j) A summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limits levels)
- (k) A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate
- (l) A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance
- (m) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken
- (n) Review the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness)
- (o) A summary record of notifications of summons 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
- (p) Review the practicality and effectiveness of the EIA process and EM&A programme (e.g. effectiveness and efficiency of the mitigation measures), recommend any improvement in the EM&A programme

- (q) A conclusion to state the return of ambient and/or the predicted scenario as per EIA findings

7.4 Data Keeping

The site document such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document shall be well kept by the ET and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. The monitoring data shall also be recorded in magnetic media form, and the software copy can be available upon request. All the document and data shall be kept for at least one year after completion of the construction contract.

7.5 Interim Notifications of Environmental Quality Limit Exceedances

With reference to Event/Action Plans in Tables 2.2, 3.4 and 4.5, when the environmental quality limits are exceeded, the ET shall immediately notify the IC(E), ER & EPD, as appropriate. The notification shall be followed up with advice to ER and EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. An interim notification form is shown in Appendix E for reference.