# CHINA HARBOUR ENGINEERING CO., LTD.

## Contract Specific EM&A Manual

*for*

Contract No. HY/2013/02

Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing Facilities
– Infrastructure Works Stage I (Western Portion)

**Highways Department**

**The Government of the Hong Kong Special Administrative Region**

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| | | Environmental Officer |
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# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Not applicable.

**Hong Kong Link Road**

1.1.2 Not applicable.

1.1.3 Not applicable.

1.1.4 Not applicable.

**Hong Kong Boundary Crossing Facilities**

1.15A This Contract Specific Environmental Monitoring and Audit (EM&A) Manual is prepared for Contract HY/2013/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Infrastructure Works Stage I (Western Portion) (hereafter referred to as "the Contract") for the Highways Department of Hong Kong Special Administrative Region (HKSAR). The Contract was awarded to China Harbour Engineering Company Limited (hereafter referred to as "the Contractor") and ETS-Testconsult Limited was appointed as the Independent Environmental Team (ET) by the Contractor.

1.16A The Contract is part of Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) which is "Designated Projects", under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499). An Environmental Impact Assessment (EIA) Report together with an EM&A Manual (hereafter referred to as approved EM&A Manual) (Register No. AEIAR-145/2009) was prepared for the Project and approved by Environmental Protection Department (EPD). These documents are available through the EIAO Register.

1.17A This Contract Specific EM&A Manual is to outline the monitoring and audit programme to be undertaken during the course of the construction works and provide systematic procedures for monitoring, auditing and minimization of the environmental impacts associated with the constriction. The Site Area of the Contract is shown in **Appendix A**.

## 1.2 PURPOSES OF THIS MANUAL

1.2.1 The purposes of the EM&A Manual are to:

- Guide the set up of an EM&A programme to ensure compliance with the EIA recommendations;
- Specify the requirements for monitoring equipment;
- Propose environmental monitoring points, monitoring frequency etc.;
- Propose Action/Limit Level; and
- Propose Event/Action Plan.

- Assess the effectiveness of the recommended mitigation measures.

1.2.2 This Manual outlines the monitoring and audit programme for the construction of the Contract and provide systematic procedures for monitoring, auditing and minimising environmental impacts.

1.2.3 Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines (HKPSG) have served as environmental standards and guidelines in the preparation of this Manual. In addition, this Contract Specific EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the Technical Memorandum on the EIA Process (TM-EIAO).

1.2.4 This Manual contains of the following information:

- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET), and the Independent Environmental Checker (IEC) under the context of the EM&A;
- Role of the Environmental Protection Office (ENPO);
- Project organization for the EM&A works;
- The basis for, and description of the broad approach underlying the EM&A programme;
- Details of the methodologies to be adopted, including all laboratories 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;
- 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 non-compliance with the environmental criteria and complaints; and
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures.
- Requirements for reviewing the EIA predictions and the effectiveness of mitigations measures, environmental management system and the EM&A programme.

1.2.5 For the purpose of this manual, the ER shall refer to the Engineer as defined in the Construction Contract, in cases where the Engineer's powers have been delegated to the ER, in accordance with the Construction Contract. The ET Leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the environmental monitoring and audit requirements.

# 2 PROJECT DESCRIPTION

## 2.1 PROJECT DESCRIPTION

**Hong Kong Link Road**

2.1.1 Not applicable.

**Hong Kong Boundary Crossing Facilities**

2.1.2A The proposed works under this Contract comprise the following:

(i) Construction of the viaducts and roads at the western portion of Hong Kong Boundary Crossing Facilities (HKBCF) mainly for connection with the Hong Kong – Zhuhai – Macao Bridge (HZMB), Hong Kong Link Road (HKLR), Hong Kong International Airport (HKIA) and the Tuen Mun-Chek Lap Kok Link (TM-CLKL);

(ii) Construction of the road modification at the SkyCity Interchange at Airport Island;

(iii) Construction of associated street lighting, street furniture, road marking, road signage, drainage, sewerage, fresh water and flushing water supply, irrigation, landscape, electrical and mechanical (E&M), utilities and services works;

(iv) Provisioning of civil engineering works and power supply installation for the Traffic Control and Surveillance System (TCSS); and

(v) Other works in accordance with the Contracts.

## 2.2 IMPLEMENTATION PROGRAMME

2.2.1A The Construction of this contract will start in the 3rd quarter of 2014 and tentatively completed in the 4th quarter of 2017

2.2.2 **Appendix B** illustrates the tentative construction programme for the Contract. All the key construction activities are shown with the tentative dates for commencement and completion.

2.2.3 Detailed EIA assessments have been conducted and presented in the EIA report. All necessary mitigation measures have been identified and recommended. The Environmental Mitigation Implementation Schedule (EMIS) is given in **Appendix C**. It specifies the extent, locations, time frame and responsibilities for the implementation of the environmental mitigation measures identified.

## 2.3 CONCURRENT PROJECTS DURING CONSTRUCTION PHASE

2.3.1A The advance works of Tuen Mun Check Lap Kok Link (TMCLKL), i.e. reclamation works of the southern landfall of the TMCLKL sub-sea tunnel commenced in late 2011. The southern connection of the TMCLKL was scheduled to complete in 2016 to tally with the commissioning of the HZMB, and to complete the northern connection in 2018. The Construction of Hong Kong Link Road (HKLR) commenced in Year 2012 and is scheduled to complete in Year 2016.

2.3.2 The Main Bridge of the HZMB within the Guangdong water would also be concurrent with the construction of HKBCF and southern landfall of TMCLKL. The tentative commissioning date is also 2016.

2.3.3 Another concurrent project during the construction of HKBCF is the 72 ha reclamation for Lantau Logistics Park. This has been considered as a concurrent project in the EIA.

# 3 PROJECT ORGANIZATION

## 3.1 PROJECT ORGANIZATION

3.1.1 The proposed project organization and lines of communication with respect to environmental protection works are shown in **Appendix D**.

3.1.2 The leader of the ET shall be an independent party from the Contractor and has relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the Engineer's Representative (ER) and EPD.

3.1.3.1 **The Contractor**

- Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of environmental monitoring and audit;
- Provide assistance to ET, IEC and ENPO in carrying out monitoring and auditing;
- Provide site and works information upon the request of ET, IEC or ENPO within two working days of such request;
- Participate in site inspections undertaken by the ET, as required, and undertake any corrections as instructed by the Engineer;
- 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; and
- Adhere to the procedures for environmental complaint investigation as set out in Section 15.3 of this EM&A Manual.
- Adhere to the agreed procedures for carrying out complaint investigation.

3.1.3.2 **The Environmental Team (ET)**

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyse the environmental monitoring and audit data and review the success of EM&A programme to confirm the adequacy of mitigation measures implemented and the validity of EIA predictions, and to identify any adverse environmental impacts arising;
- To conduct environmental investigation and submit the ET Leader certified investigation report to the Contractor, IEC, ENPO and ER upon receive of environmental enquiry and/or complaint;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and take proactive actions to pre-empt problems;

- Audit and prepare audit reports on the environmental monitoring data and site environmental conditions
- Report on the environmental monitoring and audit results to the IEC, ENPO, Contractor, the ER and EPD or its delegated representative;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Undertake regular on-site audits/inspections and report to the Contractor, IEC, ENPO and the ER of any potential non-compliance; and
- Follow up and close out non-compliance actions.

3.1.3.3 **Engineer or Engineer's Representative**

- 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;
- Assists the IEC and ENPO to audit the results of the EM&A works carried out by the ET; and
- Comply with the agreed Event and Action Plan in the event of any exceedance.

3.1.3.4 **Independent Environmental Checker**

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Report the audit results to the ER and EPD in parallel;
- Review the EM&A reports (monthly and quarterly summary reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary; and
- Report the findings of site inspections and other environmental performance reviews to ER and EPD.

3.1.3.5 **Environmental Protection Office (ENPO)**

Notwithstanding the above, given that the TMCLKL, HKBCF and HKLR will be constructed concurrently, an ENPO or equivalent to oversee the cumulative construction projects in North Lantau area will be established by the Project Proponent.

The responsibility of the ENPO would be similar to that of the IEC but should also include:

- coordinate the monitoring and auditing works for all the on-going projects in the area in order to identify possible sources/causes of exceedances and recommend suitable remedial actions where appropriate;
- review cumulative impacts including possible sources/causes of exceedance and recommending suitable remedial actions;
- liaise with the mainland project teams for HZMB Main Section to identify and assess any cross-boundary cumulative impacts in order to establish suitable remedial actions where necessary; and
- coordinate the assessment and response to complaints/enquires from locals, green groups, district councils or the public at large.

The exact responsibilities and organization of the ENPO have been defined by the Project Proponent in accordance with the relevant Environmental Permits.

3.1.4 Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibilities, as required under the EM&A programme for the duration of the Project.

3.1.5 The ET Leader shall have at least 7 years if experience in conducting EM&A for infrastructure projects. His qualification shall be vetted by the ER and the IEC.

# 4 ENVIRONMENTAL SUBMISSION

## 4.1 INTRODUCTION

4.1.1 The Contractor shall prepare the Environmental Management Plan (including a Waste Management Plan), Construction Method Statement and obtain approval from ER, IEC and relevant authorities to encompass the recommended environmental protection / mitigation measures with respect to their latest construction methodology and programme. All environmental submission shall be certified by the ET leader before seeking the IEC's verification.

## 4.2 ENVIRONMENTAL MANAGEMENT PLAN

4.2.1 A systematic Environmental Management Plan (EMP) shall be set up by the Contractor to ensure effective implementation of the mitigation measures, monitoring and remedial requirements presented in the EIA, EM&A and EMIS. The ER and the IEC will audit the implementation status against the EMP and advise the necessary remedial actions required. These remedial actions shall be enforced by the ER through contractual means.

4.2.2 The EMP will define in details how the Contractor (together with its sub-contractors) implements the recommended mitigation measures in order to achieve the environmental performance defined in the Hong Kong environmental legislation and the EIA documentation.

4.2.3 The review of on-site environmental performance shall be undertaken by ER and IEC through a systematic checklist and audit once the construction commences. The environmental performance review programme comprises a regular assessment on the effectiveness of the EMP. Reference should be made to Environment, Transport and Works Bureau Technical Circular (Works) No. 19/2005 "Environmental Management on Construction Sites" or its latest versions, and any other relevant Technical Circulars.

## 4.3 WASTE MANAGEMENT PLAN (WMP)

4.3.1 As part of the EMP, the Contractor shall include a WMP for the construction of the assignment and submit to the ET, IEC and EPD for approval. Where waste generation is unavoidable, the opportunities for recycling or reusing should be maximised. If wastes cannot be recycled, recommendations for appropriate disposal routes should be provided in the WMP. A method statement for stockpiling and transportation of the excavated materials and other construction wastes should also be included in the WMP and approved before the commencement of construction. All mitigation measures arising from the approved WMP shall be fully implemented.

4.3.2 For the purpose of enhancing the management of Construction and Demolition (C&D) materials including rock, and minimising its generation at source, construction would be undertaken in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 - Management of Construction and Demolition Material Including Rock, or its latest versions. The management measures stipulated in the Technical Circular should be incorporated into the WMP.

## 4.4 CONSTRUCTION METHOD STATEMENT

4.4.1 In case the Contractor would like to adopt alternative construction methods or implementation schedules, it is required to submit details of methodology and equipment to the ER for approval before the work commences. Any changes in construction method shall be reflected in a revised EMP or the Contractor will be required to demonstrate the manner in which the existing EMP should accommodate the proposed changes. The Contractor may need to apply for a Further Environmental Permit (FEP) from EPD before commencement of any construction activities.

# 5 AIR QUALITY

## 5.1 AIR QUALITY PARAMETERS

5.1.1 Monitoring and audit of the Total Suspended Particulates (TSP) levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

5.1.2 1-hour and 24-hour TSP levels should be measured to indicate the impacts of construction dust on air quality. The 24-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval of the IEC, 1-hour TSP levels can be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts.

5.1.3 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and any other local atmospheric factors affecting or affected by site conditions, etc., shall be recorded down in detail. A sample data sheet is shown in **Appendix E**.

## 5.2 MONITORING EQUIPMENT

5.2.1 High volume samplers (HVSs) complying with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

a) 0.6 - 1.7 $m^3$ per minute adjustable flow range;

b) equipped with a timing / control device with +/- 5 minutes accuracy for 24 hours operation;

c) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;

d) capable of providing a minimum exposed area of 406 $cm_2$;

e) flow control accuracy: +/- 2.5% deviation over 24-hour sampling period;

f) equipped with a shelter to protect the filter and sampler;

g) incorporated with an electronic mass flow rate controller or other equivalent devices;

h) equipped with a flow recorder for continuous monitoring;

i) provided with a peaked roof inlet;

j) incorporated with a manometer;

k) able to hold and seal the filter paper to the sampler housing at horizontal position;

l) easily changeable filter; and

m) capable of operating continuously for a 24-hour period.

5.2.2 The ET is responsible for the provision, installation, operation, maintenance, dismantling of the monitoring equipment. They shall ensure that sufficient number of HVSs with an appropriate calibration kit is available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc., shall be clearly labelled.

5.2.3 Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The ET shall provide the relevant calibration data and laboratory calibration certificate which should be properly document for future reference by the IEC and other concerned parties. All the data should be converted into standard temperature and pressure condition.

5.2.4 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded in the data sheet as mentioned in **Appendix E**.

5.2.5A If the ET leader proposes alternative dust monitoring equipment / methodology (e.g. use a direct reading dust meter to measure 1-hour TSP levels) after the approval of this EM&A manual, he shall seek approval from the IEC by submitting sufficient information to the IEC indicating that the instrument is capable of achieving a comparable result to the HVS.. The instrument should also be calibrated regularly as specified by equipment's manufacturer, in which calibration certificate shall be submitted to IEC for Approval. The 1-hour sampling shall also be determined periodically by the HVS to check the validity and accuracy of the results measured by direct reading method, and the checking result shall also submitted to the IEC for approval.

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

a) The wind sensors should be installed 10 m 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 downloaded for analysis at least once a month.

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.

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

## 5.3 LABORATORY MEASUREMENT / ANALYSIS

5.3.1 A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS board accredited.

5.3.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER and the measurement procedures shall be witnessed by the IEC. Any measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and IEC. IEC shall regularly audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

5.3.3 Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling.

5.3.4 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

5.3.5 All the collected samples shall be kept in a good condition for 6 months before disposal.

## 5.4 MONITORING LOCATIONS

5.4.1 **Figure 1** shows the locations of the proposed dust monitoring station for the Contract. The status and locations of dust sensitive receivers may change after issuing this Manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from ER and agreement from the IEC.

**Table 5.1 Construction Dust Monitoring Locations**

| ID | Location Description |
|---|---|
| AMS 6(1) | Dragonair/CNAC (Group) Building |
| AMS 7A(1) | Chu Kong Air-Sea Union Transportation Co. Ltd |

Remarks:
(1) The ET of this Contract should conduct impact air quality monitoring at the AMS listed in the table as part of EM&A programme according to the latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the air quality monitoring station(s) is/are as part of EM&A programme.

5.4.2 If alternative monitoring locations are proposed due to the situation mentioned in para 5.4.1, the proposed site should be selected based on the following principle:

a) Situating at the site boundary or such locations close to the major dust emission source(s);

b) Monitoring as close as possible to the sensitive receptor(s);

c) Taking into account the prevailing meteorological conditions; and

d) Assuring minimal disturbance to the occupants and working under a safe condition during monitoring.

5.4.3 The ET shall agree with the ER in consultation with the IEC on the position of the HVS for the installation of the monitoring equipment. When positioning the samplers, 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; and

k) a secured supply of electricity is needed to operate the samplers.

5.4.4 The ENPO may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed/ relocated during any stage of the construction phase.

## 5.5 BASELINE MONITORING FOR FUGITIVE DUST

5.5.1 Baseline monitoring shall be carried out at all of the designated monitoring locations (see Table 5.1) for at least 14 consecutive days prior to the commissioning of major construction works to obtain daily 24-hour TSP samples. The selected baseline monitoring stations should reflect baseline conditions at the impact stations. One-hour sampling should also be done at least 3 times per day while the highest dust impact is expected.

5.5.2 During the baseline monitoring, there should not be any major construction or dust generation activities in the vicinity of the monitoring stations. Before commencing

baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that, if required, the ER can conduct on-site audit to ensure accuracy of the baseline monitoring results.

5.5.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations, the ET Leader shall carry out the monitoring at alternative locations that can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with the IEC.

5.5.4 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.

5.5.5 Ambient conditions may vary seasonally and shall be reviewed once every three months. When the ambient conditions have changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be at times when the Contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with the IEC and EPD.

5.5.6 It is noted that baseline monitoring was undertaken for the Project between September and November 2011 under Agreement CE No. 35/2011 (EP) Baseline Environmental monitoring for Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects – Investigation prior to the construction of the Project. The baseline monitoring results obtained under Agreement CE No. 35/2011(EP) will be adopted for this Contract.

## 5.6 IMPACT MONITORING FOR FUGITIVE DUST

5.6.1 The ET shall carry out impact monitoring during the entire construction period. For regular impact monitoring, the sampling frequency of at least once in every 6 days, shall be strictly observed at all the monitoring stations for 24-hour TSP monitoring. For 1-hour TSP monitoring, the sampling frequency of at least 3 times in every 6 days should be undertaken when the highest dust impact occurs. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the monitoring results.

5.6.2 The specific time to start and stop the 24-hour TSP monitoring shall be clearly defined for each location and be strictly followed by the ET.

5.6.3 In case of non-compliance with the air quality criteria, more frequent monitoring, as specified in the Action Plan in the following section, shall be conducted within the specified timeframe after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified, and agreed with the ER and the IEC.

## 5.7 ACTION AND LIMIT LEVELS

5.7.1 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 5.2** shows the air quality criteria, namely Action and Limit levels to be used.

**Table 5.2 Action and Limit Levels for Air Quality**

| Parameter | Action Level | Limit Level |
|---|---|---|
| 24-hour TSP Level in $\mu g/m^3$ | For baseline level ≤ 200 $\mu g/m^3$, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 200 $\mu g/m^3$, Action level = Limit Level<br><br>For Monitoring station AMS6 Action Level =(66.4*1.3+260)/2 = 173 $\mu g/m^3$<br><br>For Monitoring station AMS7 Action Level =(82.3*1.3+260)/2 = 183 $\mu g/m^3$ | 260 $\mu g/m^3$ |
| 1-hour TSP Level in $\mu g/m^3$ | For baseline level ≤ 384 $\mu g/m^3$, Action level = (baseline level * 1.3 + Limit level)/2;<br><br>For baseline level > 384 $\mu g/m^3$, Action level = Limit Level<br><br>For Monitoring station AMS6 Action Level =(169.2*1.3+500)/2 = 360 $\mu g/m^3$<br><br>For Monitoring station AMS7 Action Level =(184.2*1.3+500)/2 = 370 $\mu g/m^3$ | 500 $\mu g/m^3$ |

## 5.8 EVENT AND ACTION PLAN

5.8.1 Should non- compliance of the air quality criteria occur, actions in accordance with the Action Plan in **Table 5.3** shall be carried out.

**Table 5.3 Event/Action Plan for Air Quality**

| EVENT | ACTION | | | |
|---|---|---|---|---|
| | ET | IEC | ER | CONTRACTOR |
| **ACTION LEVEL** | | | | |
| 1. Exceedance for one sample | 1. Identify source, investigate the causes of exceedance and propose remedial measures;<br>2. Inform IEC and ER;<br>3. Repeat measurement to confirm finding;<br>4. Increase monitoring frequency to daily. | 1. Check monitoring data submitted by ET;<br>2. Check Contractor's working method. | 1. Notify Contractor. | 1. Rectify any<br>2. unacceptable practice;<br>3. Amend working methods if appropriate. |

| EVENT | ACTION | | | |
|---|---|---|---|---|
| | ET | IEC | ER | CONTRACTOR |
| **ACTION LEVEL** | | | | |
| 2. Exceedance for two or more consecutive samples | 1. Identify source;<br>2. Inform IEC and ER;<br>3. Advise the ER on the effectiveness of the proposed remedial measures;<br>4. Repeat measurement s to confirm findings;<br>5. Increase monitoring frequency to daily;<br>6. Discuss with IEC and Contractor on remedial actions required;<br>7. If exceedance continues, arrange meeting with IEC and ER;<br>8. If exceedance stops, cease additional monitoring. | 1. Check monitoring data submitted by ET;<br>2. Check Contractor's working method;<br>3. Discuss with ET and Contractor on possible remedial measures;<br>4. Advise the ER on the effectiveness of the proposed remedial measures;<br>5. Supervise Implementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. Ensure remedial measures properly implemented. | 1. Submit proposals for remedial to ER within 3 working days of notification;<br>2. Implement the agreed proposals;<br>3. Amend proposal if appropriate. |
| **LIMIT LEVEL** | | | | |
| 1. Exceedance for one sample | 1. Identify source, investigate the causes of exceedance and propose remedial measures;<br>2. Inform ER, Contractor and EPD;<br>3. Repeat measurement to confirm finding;<br>4. Increase monitoring frequency to daily;<br>Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. | 1. Check monitoring data submitted by ET;<br>2. Check Contractor's working method;<br>3. Discuss with ET and Contractor on possible remedial measures;<br>4. Advise the ER on the effectiveness of the proposed remedial measures;<br>5. Supervise implementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. Ensure remedial measures properly implemented. | 1. Take immediate action to avoid further exceedance;<br>2. Submit proposals for remedial actions to IEC within 3 working days of notification;<br>3. Implement the agreed proposals;<br>4. Amend proposal if appropriate. |

| EVENT | ACTION | | | |
|---|---|---|---|---|
| | ET | IEC | ER | CONTRACTOR |
| **LIMIT LEVEL** | | | | |
| 2. Exceedance for two or more consecutive samples | 1. Notify IEC, ER, Contractor and EPD;<br>2. Identify source;<br>3. Repeat measurement to confirm findings;<br>4. Increase monitoring frequency to daily;<br>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;<br>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;<br>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;<br>8. If exceedance stops, cease additional monitoring. | 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;<br>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;<br>3. Supervise the implementation of remedial measures. | **1.** Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;<br>4. Ensure remedial measures properly implemented;<br>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. | 1. Take immediate action to avoid further exceedance;<br>2. Submit proposals for remedial actions to IEC within 3 working days of notification;<br>3. Implement the agreed proposals;<br>4. Resubmit proposals if problem still not under control;<br>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated |

## 5.9 MITIGATION MEASURES

5.9.1 The approved EIA Report has recommended dust control measures including 8 times of watering per day. Good site practices such as road surface paving, dust enclosures, wheel wash facilities would be implemented to reduce the generation of dust.

5.9.2 All the proposed mitigation measures are summarized in the Environmental Mitigation Implementation Schedule (EMIS) in **Appendix C**.

## 5.10 REPORTING OF MONITORING DATA TO ENPO

5.10.1 The Assignment, which involves multiple construction contracts, would be constructed concurrently with other major infrastructures such as the HKLR and TM-CLKL. These interface projects will be overviewed by the ENPO. The ENPO will also oversee and coordinate the cumulative environmental issues arising from the concurrent projects.

5.10.2 To facilitate the ENPO to evaluate environmental impacts and investigate complaints, the ET Leaders shall provide the impact air quality monitoring results within one week

after the monitoring event. If the 1-Hr TSP is measured by direct reading, the results shall be submitted to ENPO in the next working day. The ET Leader shall follow ENPO's requirements on the data submission format and procedure" as per the current ET's practice and enable rapid response by all concerned parties.

# 6 NOISE

## 6.1 NOISE QUALITY PARAMETERS

6.1.1 Construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level ($L_{eq}$). $L_{eq,\ 30\ mins}$ shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq\ 5\ min}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.

6.1.2 As supplementary information for data auditing, statistical results such as $L_{10}$ and $L_{90}$ shall also be obtained for reference.

## 6.2 MONITORING EQUIPMENT

6.2.1 As referred to in the Technical Memorandum (TM) issued under the 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 agrees to within 1.0 dB.

6.2.2 Noise measurements should be made in accordance with standard acoustical principles and practices in relation to weather conditions.

6.2.3 The ET is responsible for the provision, installation, operation, maintenance, dismantle 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 labeled.

6.2.4 Due to rejection from Ho Yu College (NMS3) for setting up a noise monitoring station at their school, an alternative location at site boundary of the ER's site office area at Works Area WA2 (NMS3B) is proposed. Same baseline and Action and Limit Levels for noise, as derived from the baseline monitoring data recorded at Ho Yu College, will be adopted for this alternative noise monitoring location.

## 6.3 MONITORING LOCATIONS

6.3.1 The location of construction noise monitoring stations for the Contract are presented in **Table 6.1** and shown in **Figure 2**.

**Table 6.1 Proposed Airborne Construction Noise Monitoring Locations**

| ID | Location Description |
|---|---|
| NMS2(1) | Seaview Crescent |
| NMS3B(1)(2) | Site Boundary of ER's Site Office Area at Works Area WA2 |

Remarks:
(1) The ET of this Contract should conduct impact noise monitoring at the NMS listed in the table as part of EM&A programme according to the latest notification from ENPO when the monitoring

station(s) is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the noise monitoring station(s) is/are as part of EM&A programme.

(2) The Action and Limit Levels for schools will be applied for this alternative monitoring location.

6.3.2 The ET shall select the monitoring location from the above table based on the locations of the construction activities and seek approval from ER and agreement from the IEC and EPD to the proposal. The monitoring location should be chosen based on the following criteria:

- at locations close to the major site activities which are likely to have noise impacts;
- close to the most affected existing noise sensitive receivers; and
- for monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring.

6.3.3 The monitoring station shall normally be at a point 1 m from the exterior of the sensitive receiver 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 +3 dB(A) shall be made to the free field measurements. The ET shall agree with the IEC on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same position.

6.3.4 The ENPO may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed/ relocated during any stage of the construction phase.

## 6.4 BASELINE MONITORING FOR CONSTRUCTION NOISE

6.4.1 The ET shall carry out baseline monitoring prior to the commencement of the construction works. There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. Continuous baseline noise monitoring for the A-weighted levels $L_{eq}$, $L_{10}$ and $L_{90}$ shall be carried out daily for a period of at least two weeks in a sample period of 5 minutes or 30 minutes between 07:00 and 19:00, and 5 minutes between 19:00 and 07:00. A schedule on the baseline monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

6.4.2 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to the ER for approval.

6.4.3 It is noted that baseline monitoring was undertaken for the Project between September and November 2011 under Agreement CE No. 35/2011 (EP) Baseline Environmental monitoring for Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects – Investigation prior to the construction of the Project. The baseline monitoring results obtained under Agreement CE No. 35/2011(EP) will be adopted for this Contract.

## 6.5 IMPACT MONITORING FOR CONSTRUCTION NOISE

6.5.1 During normal construction working hour (07:00-19:00 Monday to Saturday), monitoring of $L_{eq}$, 30 minutes noise levels (as six consecutive $L_{eq}$, 5 minutes readings) shall be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM.

6.5.2 If a school exists near the construction activity, noise monitoring shall be carried out at the monitoring stations for the schools during the school examination periods. The ET Leader shall liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

6.5.3 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan, shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

6.5.4 A schedule on the compliance monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

## 6.6 EVENT AND ACTION PLAN FOR CONSTRUCTION NOISE

6.6.1 The Action and Limit Levels for construction noise are defined in **Table 6.2**. Should non-compliance of the criteria occur, actions in accordance with the Action Plan in **Table 6.3** shall be carried out.

**Table 6.2 Action and Limit Levels for Construction Noise**

| Parameter | Action Level | Limit Level |
|---|---|---|
| 07:00 – 19:00 hours on normal weekdays | When one documented complaint is received | 75 dB(A)* |

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.
* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination period.

**Table 6.3 Event / Action Plan for Construction Noise Monitoring**

| EVENT | ACTION | | | |
|---|---|---|---|---|
| | ET | IEC | ER | CONTRACTOR |
| Action Level | 1. Notify IEC and Contractor;<br>2. Identify source, investigate the causes of exceedance and propose remedial measures;<br>3. Report the results of investigation to the IEC, ER and Contractor;<br>4. Discuss with the Contractor and formulate remedial measures;<br>5. 5 Increase monitoring frequency to check mitigation | 1. Review the analysed results submitted by the ET;<br>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly;<br>3. Supervise the implementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. Require Contractor to propose remedial measures for the analysed noise problem;<br>4. Ensure remedial measures are properly implemented. | 1. Submit noise mitigation proposals to IEC;<br>2. Implement noise mitigation proposals. |
| Limit Level | 1. Inform IEC, ER, EPD and Contractor;<br>2. Identify source;<br>3. Repeat measurements to confirm findings;<br>4. Increase monitoring frequency;<br>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;<br>6. Inform IEC, ER and EPD the causes and actions taken for the exceedances;<br>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;<br>8. If exceedance stops, cease additional monitoring. | 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;<br>2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;<br>3. Supervise the implementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. Require Contractor to propose remedial measures for the analysed noise problem;<br>4. Ensure remedial measures properly implemented;<br>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. | 1. Take immediate action to avoid further exceedance;<br>2. Submit proposals for remedial actions to IEC within 3 working days of notification;<br>3. Implement the agreed proposals;<br>4. Resubmit proposals if problem still not under control;<br>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated. |

## 6.7 MITIGATION MEASURES

6.7.1 The EIA Report has recommended construction noise control measures including the use of quiet plant and temporary noise barriers. All the proposed mitigation measures are summarised in the EMIS in **Appendix C**.

6.7.2 Not applicable.

6.7.3 The recommended noise control measures are summarized as follows:-

- Good site practices and noise management techniques;
- Use of site hoarding;
- Use of movable noise barrier and full enclosure for relatively static plant;
- Use of “quiet” plant and working methods;
- Sequencing operation of construction plant equipment; and
- Rescheduling to avoid noise construction works during school examination.

## 6.8 REPORTING OF MONITORING DATA TO ENPO

6.8.1 The Assignment, which involves multiple construction contracts, would be constructed concurrently with other major infrastructures such as the HKLR and TM-CLKL. These interface projects will be overviewed by the ENPO. The ENPO will also oversee and coordinate the cumulative environmental issues arising from the concurrent projects.

To facilitate the ENPO to evaluate environmental impacts and investigate complaints, the ET Leaders shall provide the impact noise monitoring results within one working day after the monitoring event. The ET Leader shall follow ENPO’s requirement on the data submission format and procedure.

# 7 SEDIMENT QUALITY

## 7.1 SUMMARY

7.1.1 The sediment quality data has been reviewed and the findings of the site investigation for sediment quality in relation to the current study area for HKBCF and HKLR is summarized in the EIA Report, there is no requirement on environmental monitoring and audit for sediment quality.

7.1.2 The requirements as recommended in ETWB TC 34/2002 Management of Dredged/Excavated Sediment shall be included in the Particular Specification as appropriate for sediment disposal.

# 8 WASTE MANAGEMENT

## 8.1 GENERAL

8.1.1 The quantity and timing of the generation of waste during the construction phase have been estimated. Measures including the opportunity for on-site sorting, reusing excavated materials for reclamation etc. are devised in the construction methodology to minimise the surplus materials to be disposed off-site. Proper disposal of chemical waste should be via a licensed waste collector.

8.1.2 All the proposed mitigation measures are stipulated in the EIA Report and summarized in the EMIS in **Appendix C**.

8.1.3 The types and quantities of waste that would be generated during the operational phase have been assessed. It is anticipated there would not be any insurmountable impacts during the operation phase. A trip-ticket system should be operated to monitor all movements of chemical wastes which will be collected by a licensed collector to a licensed facility for final treatment and disposal.

8.1.4 Recommendations have been made to ensure proper treatment and proper disposal of these wastes in the EIA Report and all the proposed mitigation measures are stipulated in the EIA Report are summarised in the EMIS in **Appendix C**.

8.1.5 EM&A requirements are required for waste management during the construction phase only and the effective management of waste arising during the construction phase will be monitored through the site audit programme. The aims of the waste audit are:

- to ensure the waste arising from the works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner; and
- to encourage the reuse and recycling of material.

## 8.2 WASTE EM&A REQUIREMENTS

8.2.1 The Contractor shall be required to pay attention to the environmental standard and guidelines and carry out appropriate waste management and obtain the relevant licence/permits for waste disposal. The ET shall ensure that the Contractor has obtained from the appropriate authorities the necessary waste disposal permits or licences including:

- Chemical Waste Permits/licenses 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); and
- Effluent Discharge Licence under the Water Pollution Control Ordinance.

8.2.2 The Contractor shall refer to the relevant booklets issued by the DEP when applying for the licence/permit and the ET shall refer to these booklets for auditing purposes.

8.2.3 During the site inspections and the document review procedures, 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. In addition to the site inspections, the ET shall review the documentation procedures prepared by the Waste Coordinator once a week to ensure proper records are being maintained and procedures undertaken in accordance with the WMP.

8.2.4 The Contractor's waste management practices should be audited with reference to the checklist detailed in **Table 8.1** below:

**Table 8.1 Waste Management Checklist**

| Activities | Timing | Monitoring Frequency | If non-compliance, Action Required |
|---|---|---|---|
| All necessary waste disposal permits or licences have been obtained. | Before the commencement of demolition works | Once | Apply for the necessary permits/ licences prior to disposal of the waste. The ET shall ensure that corrective action has been taken. |
| Only licensed waste hauliers are used for waste collection. | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to use a licensed waste haulier. The Contractor shall temporarily suspend waste collection of that particular waste until a licensed waste haulier is used. Corrective action shall 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 shall be recorded (quantity of waste can then be estimated based on average truck load. Should landfill charging be implemented, the receipts of the charge could be used for estimating the quantity). | Throughout the works | Weekly | The Contractor shall estimate the missing data based on previous records and the activities carried out. The ET shall audit the results and forward to the ER and IEC for approval. |
| Wastes are removed from site in a timely manner. General refuse is collected on a daily basis. | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to remove waste accordingly. |
| Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance. | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to clean the storage area and/or cover the waste. |
| Different types of waste are segregated in different containers or skip to enhance recycling of material and proper disposal of waste. | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to provide separate skips/ containers. The Contractor shall ensure 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 | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to rectify the problems immediately. Warning shall be given to the |

| Activities | Timing | Monitoring Frequency | If non-compliance, Action Required |
|---|---|---|---|
| EPD. | | | Contractor if corrective actions are not taken within 24 hrs and the Waste Control Group of the EPD shall be identified. |
| Demolition material/waste in dump trucks are properly covered before leaving the site. | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to comply. The Contractor shall prevent trucks shall leaving the site until the waste are properly covered. |
| Wastes are disposal of at licensed sites. | Throughout the works | Weekly | The ET shall inform the ER and IEC of the non-compliance. The ER shall warn the Contractor and instruct the Contractor to ensure the wastes are disposed of at the licensed sites. Should it involve chemical waste, the Waste Control Group of EPD shall be notified |

Note:
ET- Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

# 9 WATER QUALITY

## 9.1 WATER QUALITY PARAMETERS

9.1.1A The EIA Report has assessed the water quality impacts caused by the construction and operation stages. Mitigation measures have been recommended in the EIA to ensure compliance with the relevant legislative requirements. The hanging-type silt-curtain will be deployed around the site during marine work is carry out.

9.1.2 Prior to the commencement of the construction work, a detailed site drainage management plan should be submitted to EPD. The plan should cover measures to minimize all potential water quality impact arising from the surface runoffs of all the related constructions.

9.1.3 The guidelines outlined in the Practice Note for Professional Persons Environmental Consultative Committee (ProPECC), Construction Site Drainage (PN 1/94) should be adopted to control construction site runoff. Mitigation measures to minimise water quality impacts from construction site runoff and wastewater and sewage generated from construction activities are:

- Provision of site drainage systems over the entire construction site with sediment control facilities. Regular inspection and maintenance of the site drainage systems are required to ensure proper and efficient operation at all times.
- Sedimentation tanks or package treatment systems are required to treat the large amount of sediment-laden wastewater generated from foundation construction work, wheel washing, site runoff. Any construction activities that generate wastewater with high concentrations of suspended solid (SS) should also be collected to these facilities for proper treatment prior to disposal. Treated wastewater can be reused for vehicle washing, dust suppression and general cleaning.
- The construction programme should be properly planned to avoid soil excavation in rainy seasons. Exposed stockpiles of excavated soils or construction materials should be covered with tarpaulin or impervious sheets to avoid release of pollutants into the drainage channels.
- Sewage generated from site toilets and canteen should be collected using a temporary storage system. Chemical toilets should be provided at different locations for use by the workers on site. Licensed waste collectors should be employed for collection and disposal of the sewage. The drainage system for collection of wastewater generated from canteen, if any, should be equipped with grease trap capable of providing at least 20 minutes retention during peak flow.
- Wheel washing facilities should be installed at all site entrances/exits.
- An emergency plan should be developed by the contractors to deal with accidental spillage of chemicals.

9.1.4 Upon completion of the HKBCF development, stormwater drainage systems would be completed to collect stormwater generated from the whole area including new roads.

Sewage generated from the HKBCF development would be treated on site to fulfill effluent limit for discharge. Additional mitigation measures would not be required.

9.1.5A Marine water quality monitoring shall be carried out during the construction phase to ensure that any unacceptable increase in suspended solids / turbidity and decrease in dissolved oxygen due to dredging and filling activities could be readily detected and timely action bIe taken to rectify the situation.

9.1.6 Dissolved oxygen (DO), turbidity (NTU), suspended solids (SS) and other general in situ parameters shall be monitored at all designated marine water quality monitoring stations during the whole construction period. DO and turbidity should be measured in-situ whereas SS should be determined by an accredited laboratory.

9.1.7 Other relevant data shall also be recorded, including monitoring location / position, time, water depth, pH value, salinity, temperature, tidal stages, weather conditions and any special phenomena or work underway at the construction site.

9.1.8 According to the EIA report, there is low concentration for PAH, PCB, TBT, and chlorinated pesticides. Monitoring of these chemicals would not be required during the construction stage.

9.1.9 The proposed water quality monitoring schedule shall be submitted to EPD at least 2 weeks before the first day of the monitoring month. EPD shall also be notified immediately for any changes in schedule by fax.

## 9.2 MONITORING EQUIPMENT

**Dissolved Oxygen and Temperature Measuring Equipment**

9.2.1 The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring:

- a DO level in the range of 0 - 20 mg/ L and 0 - 200% saturation; and
- a temperature of 0 - 45 degree Celsius.

9.2.2 It should have a membrane electrode with automatic temperature compensation complete with a cable.

9.2.3 Should salinity compensation not be built-in to the DO equipment, in-situ salinity should be measured to calibrate the DO equipment prior to each DO measurement.

**Turbidity Measurement Instrument**

9.2.4 The instrument should be a portable and weatherproof turbidity measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (for example, Hach model 2100P or an approved similar instrument).

**Sampler**

9.2.5 A water sampler is required. It should comprise a transparent PVC cylinder, with a

capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should 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 (for example, Kahlsico Water Sampler or an approved similar instrument)

**Water Depth Detector**

9.2.6 A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

**Salinity**

9.2.7 A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.

**pH Measuring Equipment**

9.2.8 A portable pH meter capable of measuring a range between 0.0 and 14.0 shall be provided to measure pH under the specified conditions (e.g., Orion Model 250A or an approved similar instrument)

**Sample Containers and Storage**

9.2.9 Water samples for SS determinations should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory within 24 hours of collection and be analysed as soon as possible after collection.

**Monitoring Position Equipment**

9.2.10 A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message 'screen pop-up' facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instrument of similar accuracy, should be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

**Calibration on In-Situ Instruments**

9.2.11 The pH meter, DO meter and turbidimeter shall be checked and calibrated before use. DO meter and turbidimeter shall be certified by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

**Back-up Equipment and Vessels**

9.2.12 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 some equipment is under maintenance, calibration, etc. For the on site calibration of field equipment, the BS127:1993, "Guide to Field and on-site test methods for the analysis of waters" shall be observed

9.2.13 The Water Quality Monitoring will involve a large number of monitoring stations and measurements should be conducted within the prescribed tidal conditions (within ± 1.75 hour of the predicted mid-ebb or mid-flood tides) in order to ensure the measurement/samples are representative. A multiprobe monitoring equipment set integrated with water sampler(s) is highly recommended to improve the monitoring efficiency. It is, also, likely that more than one field survey vessels will be required simultaneously to ensure the monitoring are conducted within the acceptable monitoring windows. The ET shall also consider the use of unattended automatic sampling/monitoring devices at fixed stations where monitoring are required throughout the construction period. The use of such unattended automatic devices, however, shall be subject to the approval of the ER, IEC and EPD.

## 9.3 LABORATORY MEASUREMENT/ANALYSIS

9.3.1 Duplicate samples from each independent sampling event are required for SS measurement, which shall be carried in a HOKLAS or other international accredited laboratory. Sufficient water samples (of about 1L) shall be collected at the monitoring stations for carrying out the laboratory measurement and analysis. The laboratory determination work shall start within 24 hours after collection of the water samples. The analysis for SS is summarized in Table 9 .1.

Table 9.1 Laboratory analysis for SS

| Parameters | Instrumentation | Analytical Method | Reporting Limit | Detection Limit |
|---|---|---|---|---|
| Suspended Solid (SS) | Weighting | APHA 2540-D | 0.5mg/L | 0.5mg/L |

9.3.2 If a site laboratory is set up or a non-HOKLAS and non-international accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control shall be approved by EPD. All the analysis shall be witnessed by the ER. The ET Leader shall provide the ER with one copy of the relevant chapters of the “APHA Standard Methods for the Examination of Water and Wastewater” 19th edition and any other relevant document for his reference.

## 9.4 MONITORING LOCATIONS

9.4.1 The water quality monitoring stations, control stations and locations for during the construction and operation phase of HKBCF are shown in **Figure 3**. The demarcation

of the monitoring stations for different projects will be further determined by the ENPO before the commencement of the construction. The selections of these stations are based on the following criteria:

(i) Impact stations (IS) within 250m – 500m envelope of the construction works. (i.e. 3 impact locations)

(ii) Sensitive receiver stations (SR) near to key sensitive receivers. (i.e. 7 impact stations).

(iii) Control / far field stations (CS) at representative locations with less influence by the project (i.e 5 Control / far field stations). Control stations should be located, as far as practicable, both upstream and downstream of the works area.

(iv) Stations for sensitivity test result (ST), which are located close to the HKSAR boundary (i.e 3 sensitivity test stations).

(v) Not used.

(vi) Mf receiving pit are not required based on the supporting documents for application for variation of environmental permit (EP 353/2009). Therefore, monitoring of nutrients and heavy metals of Mf Stations are no longer required.

9.4.2 The co-ordinates of the proposed monitoring stations during the construction phase are listed in **Table 9.2.** and shown in **Figure 3**.

Table 9.2 Water Quality Monitoring Stations (construction phases)

| Station | Description | East | North |
|---|---|---|---|
| IS7 | Impact Station (Close to HKBCF construction site) | 812244 | 818777 |
| IS10 | Impact Station (Close to HKBCF construction site) | 812577 | 820670 |
| IS(Mf)11 | Impact Station (Close to HKBCF construction site) | 813562 | 820716 |
| SR3 | Sensitive receivers (San Tau SSSI) | 810525 | 816456 |
| SR4(N) | Sensitive receivers (Tai Ho) | 814705 | 817859 |
| SR5 | Sensitive receivers (Artificial Reef in NE Airport) | 811489 | 820455 |
| SR6 | Sensitive receivers (Sha Chau and Lung Kwu Chau Marine Park) | 805837 | 821818 |
| SR7 | Sensitive receivers (Tai Mo Do) | 814293 | 821431 |
| SR10A[1] | Sensitive receivers (Ma Wan FCZ) 1 | 823741 | 823495 |
| SR10B(N) [1] | Sensitive receivers (Ma Wan FCZ)2 | 823683 | 823187 |
| CS(Mf)3 | Control Station | 809989 | 821117 |

| | | | |
|---|---|---|---|
| CS(Mf)5 | Control Station | 817990 | 821129 |
| CS4 | Control Station | 810025 | 824004 |
| CS6 | Control Station | 817028 | 823992 |
| CSA[2] | Control Station | 818103 | 823064 |

Note [1]: Additional monitoring station for Ma Wan FCZ.

[2]: Additional control monitoring station for Ma Wan FCZ

Remarks:

(1) The ET of this Contract should conduct impact water quality monitoring at the station listed in the table 9.2 as part of EM&A programme according to the latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the water quality monitoring station(s) is/are as part of EM&A programme.

9.4.3 Control stations (CS(Mf)3, CS4, CS(Mf)5, CS6 and CSA[2]) are necessary to compare the water quality from potentially impacted sites with the ambient water quality. Control stations shall be located within the same body of water as the impact monitoring stations but should be outside the area of influence of the works and, as far as practicable, not affected by any other works. If there are any changes on the monitoring location, that shall be submitted 4 weeks before commencement of baseline monitoring for EPD approval.

9.4.4 In-situ monitoring (DO, temperature, turbidity, pH, salinity) and water sample for SS shall be taken at 3 water depths, namely, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted. Should the water depth be less than 3 m, only the mid-depth station will be monitored. The status and locations of water sensitive receivers and the marine activities may change after issuing this Manual. If such cases exist, the ET Leader shall propose with justification for changes to monitoring locations or other requirements of the EM&A programme, and seek approval from the IEC and EPD.

9.4.5 The ENPO may, depending on site conditions and monitoring results, decides whether additional monitoring locations shall be included or any monitoring locations could be removed / relocated during any stage of the construction phase after getting approval from EPD.

## 9.5 BASELINE MONITORING FOR WATER QUALITY

9.5.1 Baseline conditions for marine water quality shall be established and agreed with EPD prior to the commencement of works. The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the works and to demonstrate the suitability of the proposed impact and control monitoring stations. The baseline conditions shall normally be established by measuring the DO, temperature, turbidity, pH, salinity and SS at all designated locations. The measurements shall be taken at all designated monitoring stations including control stations, 3 days per week, at mid-flood (within ± 1.75 hour of the predicted time) and mid-ebb (within ± 1.75 hour of the predicted time) tides, for at least 4 weeks prior to the commencement of marine works. Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database.

9.5.2 Baseline monitoring programme may overlap with other reclamation activities. The

monitoring exercise should be scheduled as far as possible to avoid concurrent dredging / backfilling activities around the monitoring stations such that representative ambient data could be sampled.

9.5.3 Other relevant data shall also be recorded, such as monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena underway near the monitoring station. There shall not be any marine construction activities in the vicinity of the stations during the baseline monitoring.

9.5.4 Not applicable.

9.5.5 Baseline monitoring schedule shall be faxed to EPD 2 weeks prior to the commencement of baseline monitoring. The interval between two sets of monitoring shall not be less than 36 hours.

## 9.6 EFFICIENCY OF SILT CURTAIN AND CAGE CURTAIN

9.6.1 Not applicable

9.6.2 Not applicable.

9.6.3 Not applicable.

9.6.4 Not applicable.

9.6.5 Not applicable.

9.6.6 Not applicable.

9.6.7 Not applicable.

## 9.7 IMPACT MONITORING FOR WATER QUALITY

**Reclamation**

9.7.1A Impact monitoring for water quality shall be undertaken 3 days per week, at mid-flood (within ± 1.75 hour of the predicted time) and mid-ebb (within ± 1.75 hour of the predicted time) tides, with sampling / measurement at the designated monitoring stations. Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and / or Limit levels, in which case the monitoring frequency will be increased. Two consecutive measures of DO concentration, DO saturation, pH, salinity, temperature, turbidity and water samples for SS will be taken in situ at 1 m below the surface, mid-depth and 1 m above the seabed at each location. If the water depth is less than 6 m, the mid-depth measurement may be omitted subject to the approval of the ER. If the depth is less than 3 m, only the mid-depth measurements need to be taken subject to the approval of the ER. The monitoring probes shall be retrieved out of water after the first measurement and then redeployed for the second measurement. Where the difference in value between the first and second readings of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further

readings shall be taken.

9.7.2 Not applicable

**Relocation of Mf Sediment with Reclamation Area**

9.7.3 Not applicable.

9.7.4 Not applicable.

**Water Quality Monitoring along the Water Boundary of Hong Kong and Mainland**

9.7.5 Not applicable.

## 9.8 POST-MONITORING FOR WATER QUALITY

9.8.1 Upon completion of all marine-based construction activities, a post-project monitoring exercise on water quality shall be carried out for 4 weeks in the same manner as the Baseline monitoring. Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database. The measurement parameters for Post-construction monitoring shall include DO concentration and saturation, temperature, turbidity, pH, salinity and SS. The measurement shall be taken at all designated monitoring stations including control stations, 3 days per week, at mid-flood (within ± 1.75 hour of the predicted time) and mid-ebb (within ± 1.75 hour of the predicted time) tides, for at least 4 weeks. Since the southern and northern landfalls of TM-CLKL are distant from each other and based on the tentative programme available during the EIA stage the two landfall has different construction time frame, the Post-construction monitoring for each landfalls may conducted separately. The ET should review the actual implantation programme and recommend if a separate post-construction monitoring for each landfall is required.

## 9.9 IMPACT OPERATIONAL PHASE MONITORING

9.9.1 Not applicable

9.9.2 Not applicable

## 9.10 EVENT AND ACTION PLAN

9.10.1 The Action and Limit levels for water quality are defined in Table 9.3. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 9.4 shall be carried out.

9.10.2 Table 9.3 Action and Limit Levels for Water Quality

| Parameters | Action | Lmit |
|---|---|---|
| DO in mg L-1 (Surface, Middle & Bottom) | Surface and Middle 5.0 Bottom 4.7 | Surface and Middle 4 .2 (except 5 mg/L for FCZ) Bottom 3.6 |
| SS in mg L-1 (depthaveraged) at all monitoring stations and control stations | 23.5 and 120% of upstream control station's SS at the same tide of the same day* | 34.4 and 130% of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes* |
| Turbidity in NTU (depth- | 27.5 and 120% of | 47.0 and 130% of |

| | | |
|---|---|---|
| averaged) | upstream control station's turbidity at the same tide of the same day* | upstream control station's turbidity at the same tide of the same day* |

* Remarks: Reference is made to EPD approval of adjustment of water quality assessment criteria issued and became effective on 18 February 2013.

Notes: 1. "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.

2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

3. For turbidity, SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

4. All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

5. The 1%-ile of baseline data for dissolved oxygen (surface and middle) and dissolved oxygen (bottom) are 4.2mg/L and 3.6mg/L respectively

Table 9.4 Event and Action Plan for Water Quality

| Event | ET Leader | IEC | ER | Contractor |
|---|---|---|---|---|
| Action level being exceeded by one sampling day | 1. Repeat in situ measurement on next day of exceedance to confirm findings;<br>2. Identify source(s) of impact;<br>3. Inform IEC, contractor and ER;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods; | 1. Check monitoring data submitted by ET and Contractor's working methods; | 1. Confirm receipt of notification of noncompliance in writing;<br>2. Notify Contractor | 1. Inform the ER and confirm notification of the noncompliance in writing;<br>2. Rectify unacceptable practice;<br>3. Amend working methods if appropriate. |
| Action level being exceeded by two or more consecutive sampling days | 1. Repeat in situ measurement to confirm findings;<br>2. Identify source(s) of impact;<br>3. Inform IEC, Contractor and ER;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, ER and Contractor;<br>6. Ensure mitigation | 1. Check monitoring data submitted by ET and Contractor's working method;<br>2. Discuss with ET and Contractor on possible remedial actions;<br>3. Review the proposed mitigation | 1. Confirm receipt of notification of noncompliance in writing;<br>2. Discuss with IEC on the proposed mitigation measures;<br>3. Make agreement on mitigation measures to be implemented;<br>4. Ensure | 1. Inform the Engineer and confirm notification of the noncompliance in writing;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment and consider changes of working |

| | | | | |
|---|---|---|---|---|
| | measures are implemented;<br>7. Increase the monitoring frequency to daily until no exceedance of Action level;<br>8. Repeat measurement on next day of exceedance to confirm findings. | measures submitted by Contractor and advise the ER accordingly;<br>4. Assess the effectiveness of the implemented mitigation measures. | mitigation measures are properly implemented;<br>5. Assess the effectiveness of the implemented mitigation measures. | methods;<br>4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER within 3 working days of notification;<br>5. Implement the agreed mitigation measures;<br>6. Amend working methods if appropriate. |
| Limit level being exceeded by one sampling day | 1. Repeat in-situ measurement to confirm findings;<br>2. Identify source(s) of impact;<br>3. Inform IEC, Contractor, ER and EPD;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, ER and Contractor;<br>6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level. | 1. Check monitoring data submitted by ET and Contractor's working method;<br>2. Discuss with ET and Contractor on possible remedial actions;<br>3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly;<br>4. Assess the effectiveness of the implemented mitigation measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Discuss with IEC, ET and Contractor on the proposed mitigation measures;<br>3. Request Contractor to critically review the working methods;<br>4. Ensure mitigation measures are properly implemented;<br>5. Assess the effectiveness of the implemented mitigation measures | 1. Inform the ER and confirm notification of the noncompliance in writing;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment and consider changes of working methods;<br>4. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER;<br>5. Implement the agreed mitigation measures;<br>6. Amend working methods if appropriate. |
| Limit level | 1. Repeat in-situ | 1. Check | 1. Confirm | 1. Inform the |

| | | | | |
|---|---|---|---|---|
| being exceeded by two or more consecutive sampling days | measurement to confirm findings;<br>2. Identify source(s) of impact;<br>3. Inform IEC, contractor, ER and EPD;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, ER and Contractor;<br>6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days | monitoring data submitted by ET and Contractor's working method;<br>2. Discuss with ET and Contractor on possible remedial actions;<br>3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the ER accordingly. | receipt of notification of failure in writing;<br>2. Discuss with IEC, ET and Contractor on the proposed mitigation measures;<br>3. Request Contractor to critically review the working methods;<br>4. Make agreement on the mitigation measures to be implemented;<br>5. Ensure mitigation measures are properly implemented;<br>6. Assess the effectiveness of the implemented mitigation measures;<br>7. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level. | ER and confirm notification of the noncompliance in writing;<br>2. Take immediate action to avoid further exceedance;<br>3. Rectify unacceptable practice;<br>4. Check all plant and equipment and consider changes of working methods;<br>5. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER;<br>6. Implement the agreed mitigation measures;<br>7. Resubmit proposals of mitigation measures if problem still not under control;<br>8. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level. |

## 9.11 MITIGATION MEASURES

9.11.1 The EIA Report has recommended construction and operational phase mitigation measures. All the prepared mitigation measures are summarized in the EMIS as shown in **Appendix C**.

# 10 ECOLOGY

## 10.1 INTRODUCTION

10.1.1 The EIA Report has assessed the ecological impacts caused by the construction phase. Mitigation measures have been recommended in the EIA to ensure compliance with the relevant legislative requirements. The mitigation measures and ecological monitoring surveys are stated in this manual in the sections below. A detailed ecological monitoring plan with specification and detailed methodology will be prepared prior to the baseline monitoring, and submitted to AFCD and EPD for approval.

## 10.2 ECOLOGICAL MITIGATION MEASURES AND IMPLEMENTATIONS

### *Marine Water Quality*

10.2.1 Low disturbance construction method: Any significant changes in water quality or turbidity should be avoided. This could be mitigated through construction methods. Silt curtains around the marine works areas should be used.

10.2.2 Not applicable.

10.2.3 Not applicable.

10.2.4 Good Site Practices: Effluent monitoring should be incorporated to make sure that the discharged effluent from construction sites meets the relevant effluent discharge guidelines.

10.2.5 Strict enforcement on No-dumping – To avoid degrading the Chinese White Dolphin Habitat, restrictions prohibiting dumping of rubbish, food, oil, or chemicals will be strictly enforced.

10.2.6 Site runoff control - For works on land, standard site runoff control measures will be established and strictly enforced to ensure that discharge of contaminated or silt- laden runoff into North Lantau waters is minimized.

10.2.7 Spill response plan – In the event of vessels operating in the works areas transporting oil or other hazardous chemicals, an oil-spill response plan, with specific provisions for protection marine ecology and dolphins, will be formulated.

10.2.8 Not applicable.

### *Terrestrial Disturbance*

10.2.9 The impact from this minor and short-term source can be reduced by good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time.

### *Sedimentation from Land-based Works Areas*

10.2.10A Good site practices (e.g., watering to reduce dust generation, prevention of siltation of freshwater habitats) are recommended to be implemented. Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter existing streams and standing freshwater

### *Marine Noise and Disturbance*

#### 1) Bored Piling

10.2.11 Not applicable.

10.2.12 Not applicable.

10.2.13 Not applicable.

#### 2)A Sheet Piling / Tubular Steel Piling

10.2.14A Vibratory piler for installation and removal of Tubular Steel Piling – Tubular Steel Piling into the soft seabed sediment (i.e. not requiring to drill onto rock surface) is required at the western edge of HKBCF reclamation for construction and dismantling of temporary loading and unloading point. To minimize the acoustic disturbance to Chinese White Dolphin (CWD), pile piles will be driven by using vibratory piler, which is a type of silence piling equipment and the noise generated is anticipated to be minimal.

10.2.15A Dolphin Exclusion Zone – dolphin exclusion zone of 250m radius should be implemented in the western edge of HKBCF reclamation for installation and removal of Tubular Steel Piling. Works will be suspended when any Chinese White Dolphin (CWD) is found within the exclusion zone..

#### 3)A Temporary Loading and unloading point and Works Vessels

10.2.16A Dolphin Exclusion Zone – dolphin exclusion zone of 250m radius should be implemented at the temporary loading and unloading point in the western edge of HKBCF reclamation during the installation of the perimeter silt curtains and any re-deployment of the perimeter silt curtains. Works will be suspended when any Chinese White Dolphin (CWD) is found within the exclusion zone.

10.2.17 Dolphin Watching Plan - A dolphin watching plan for works areas will also be included in the EM&A programme. For the marine working sites, once the perimeter silt curtains are installed or re-deployed, the marine works would be conducted inside the silt curtains and a dolphin exclusion zone is not needed. Instead a dolphin watching plan will be performed. The plan would include regular inspection of the silt curtains, scanning of the waters surrounded by the curtains, and an action plan should be devised to cope with any unpredicted incidents such as in case dolphins are found within the waters surrounded by the silt curtains.

10.2.18 Acoustic decoupling of compressors and other equipment – Air compressors and other noisy equipment that must be mounted on construction vessels will be acoustically-decoupled to the greatest extent feasible, for instance by using rubber air-filled tires.

### *Marine Traffic*

10.2.19 Vessel speed limit control – It is known that fast-moving vessels are a threat to dolphins and porpoises, a speed limit of 10 knots will be strictly enforced within the working areas. This speed limit for vessels within the boundaries of the Sha Chau/Lung Kwu Chau Marine Park appears to be effective in protecting the dolphins from vessel collisions.

10.2.20 Skipper training – Captains of construction vessels working in the West Lantau waters

and near the Brothers Islands should undergo training to learn about local dolphins and porpoises. They should be trained to be aware of the protocol for "dolphin friendly" vessel operation (reference made to Code of Conduct for Dolphin Watching Activities available from AFCD).

10.2.21 Predefined and regular routes for working vessels – Captains of all working vessels should be required to use regular travel routes, in order to minimize the chance of vessel collision. And the routes would not go through the dolphin hotspot in Brothers Islands.

### *Road Surface Runoff*

10.2.22 Silt grease traps should be deployed to prevent a direct input of road surface runoff to the marine water.

### *Chemical Spillage*

10.2.23 A Maritime Oil Spill Response Plan (MOSRP) has been developed by Marine Department to deal with oil spill and their potential hazard to the Hong Kong waters. The main objective of the MOSRP is to ensure a timely and effective response to oil spillage and /or their potential treats in the Hong Kong waters.

10.2.24 Similar to the Shenzhen Western Corridor project, a contingency plan will be formulated to deal with the accidental event of the serious spillage of oil or other harmful chemicals. A contingency plan in this regard will be primarily for safety issues and water quality, but could also help to safeguard the dolphin population. Following the example of Shenzhen Western Corridor, it will be specified in the contingency plan that AFCD must be alerted by the Hong Kong Police Force and Fire Services Department in case an accident of spillage of chemical or oil is reported.

### *Precautionary/Enhancement Measures*

10.2.25 Not applicable.

10.2.26 Not applicable.

10.2.27 Not applicable.

## 10.3 MONITORING AND AUDIT FOR ECOLOGY

10.3.1 An ecological monitoring and audit programme would be needed for the Project. The monitoring programme will include monitoring of physical parameters such as air, noise and water quality, and ecological aspects such as CWD. The ecological monitoring and audit programme will monitor potential impacts through construction activities, and will verify the assessments which were made in the EIA report. The monitoring includes the following tasks:

10.3.2A Vessel-based dolphin monitoring – A dolphin monitoring programme at Northeast and Northwest Lantau , in particular the dolphin sighting hotspots (e.g. Brothers Islands) and areas where juveniles have been sighted, should be set up to verify the predictions of impacts and to ensure that there are no unforeseen impacts on the dolphin population during construction phase. The monitoring period should cover the pre-

construction phase (baseline conditions), the entire period of construction phase (tentatively 2012 – 2016), and at least two years after the completion of construction works[1] .

10.3.3 Not applicable

10.3.4 Not applicable

10.3.5 Not applicable

10.3.6 Not applicable

10.3.7 The ecological monitoring surveys shall be undertaken by suitably qualified specialist(s), (i.e. dolphin specialist), who shall have sufficient (at least 5-10 years) relevant post-graduate experience and publication in the respective aspects and should be independent of the construction contractor and should form part of the independent ET. Approval on the specialist(s) responsible for ecological monitoring survey shall be sought from AFCD and EPD..

## 10.4 MONITORING LOCATION

10.4.1A The dolphin monitoring should adopt line-transect vessel survey method, and cover the following line-transect survey areas (Shown **Figure 4**) as in AFCD annual marine mammal monitoring programme:

- Northeast Lantau survey area; and
- Northwest Lantau survey area

10.4.2 Not applicable

10.4.3 Not applicable

10.4.4 Not applicable

10.4.5 Not applicable

## 10.5 BASELINE MONITORING FOR ECOLOGY

10.5.1 Baseline for dolphin monitoring shall be established by two surveys per month in each survey area stated in Section 10.4 for a period of three months prior to the commencement of works and agreed with AFCD. The purpose of the baseline monitoring is to establish pre-construction conditions prior to the commencement of the works and to demonstrate the suitability of the proposed monitoring method.

10.5.2 Not applicable

10.5.3 Not applicable

10.5.4 Not applicable

[1] This Contract involves impact monitoring of dolphins during construction phase only. The responsibility of post construction dolphin monitoring will be assigned to relevant contract by the Authority in the later stage of the Hong Kong-Zhuhai-Macao Bridge project.

10.5.5 As the project will last for a few years, the ET Leader should seek approval from the IEC, AFCD and EPD on an appropriate methodology and parameters to be recorded. A detailed ecological monitoring plan with specification and detailed methodology for baseline monitoring will be prepared prior to the baseline monitoring, and submitted to AFCD and EPD for approval.

## 10.6 IMPACT MONITORING FOR ECOLOGY

10.6.1 Dolphin monitoring[1] will be conducted twice a month in each survey area stated in Section 10.4.1 throughout the entire construction period.

10.6.2 Not applicable

10.6.3 Not applicable

10.6.4A Should dolphin sighting numbers, density or the distribution pattern in the construction or post construction be significantly different (taking into account naturally occurring alterations to distribution patterns such as due to seasonal change) to the pre-construction baseline activity, the ET should inform AFCD and investigate the possible causes of the change. Appropriate actions and a further monitoring should be recommended and additional mitigation measures should be implemented as necessary. Data should then be re-assessed and the need for any further monitoring established. The monitoring results should be made available to EPD, AFCD, ER and IEC within 2 weeks after the last survey day of the monitoring month.

10.6.4B The data from impact monitoring should be compared with the pre-construction baseline findings. Any apparent differences in density among survey phases should be analysed for trends and the statistical power of the analysis to detect effects of the desired size should be tested. Statistical procedures shall be used for data comparison. A range of applicable statistical procedures exist (e.g., t-test, ANOVA and ANCOVA, etc.) and the ET shall propose the procedure to be applied as part of the impact and post-construction dolphin monitoring programme design to be agreed with AFCD prior to the monitoring being undertaken.

10.6.4C Comparison of the impact and post-construction dolphin monitoring with that of over the preconstruction baseline dolphin monitoring will allow the assessment of the overall efficacy of the project-specific mitigation measures through the implementation of an Event and Action Plan detailed in the Table 10.2.

10.6.5 Not applicable

Table 10.2 Event / Action Plan for Dolphin Monitoring

| Event | ET Leader | IEC | ER / SOR | Contractor |
|---|---|---|---|---|

[1] The ET of this Contract should conduct dolphin monitoring at the location listed at 10.4.1 as part of EM&A programme according to the latest notification from ENPO when the dolphin monitoring is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the dolphin monitoring is/are as part of EM&A programme.

| | | | | |
|---|---|---|---|---|
| Action Level | 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences;<br>3. Identify source(s) of impact;<br>4. Inform the IEC, ER/SOR and Contractor;<br>5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. | 1. Check monitoring data submitted by ET and Contractor;<br>2. Discuss monitoring results and finding with the ET and the Contractor. | 1. Discuss monitoring with the IEC and any other measures proposed by the ET;<br>2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented. | 1. Inform the ER/SOR and confirm notification of the noncompliance in writing;<br>2. Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR;<br>3. Implement the agreed measures. |
| Limit Level | 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal | 1. Check monitoring data submitted by ET and Contractor;<br>2. Discuss monitoring results and findings with the ET and the Contractor;<br>3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional | 1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.<br>2. If ER/SOR is satisfied with the proposals for additional dolphin | 1. Inform the ER/SOR and confirm notification of the noncompliance in writing;<br>2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential |

| | | | | |
|---|---|---|---|---|
| | differences;<br>3. Identify source(s) of impact;<br>4. Inform the IEC, ER/SOR and Contractor of findings;<br>5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.<br>7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary. | dolphin monitoring and any other potential mitigation measures.<br>4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise ER/SOR of the results and findings accordingly.<br>5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly | monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures.<br>3. Supervise the implementation of additional monitoring and/or any other mitigation measures. | mitigation measures.<br>3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary.<br>4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures. |

## 10.7 POST-CONSTRUCTION MONITORING FOR ECOLOGY

10.7.1A Dolphin monitoring will be conducted twice a month in each survey area stated in Section 10.4.1 after completion of construction.

## 10.8 EVENT AND ACTION PLAN

10.8.1 The Action and Limit levels for Chinese White Dolphin Monitoring are defined in Table 10.3(a) and 10.3(b). Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 10.2 shall be carried out.

10.8.2 An action plan has been defined to indicate that should dolphin numbers be significantly different (taking into account naturally occurring alterations to distribution patterns such as due to seasonal change) to the baseline monitoring activity following the impact and post-construction[1] monitoring, the ET should inform AFCD and investigate the possible causes of the change. Appropriate actions and a further monitoring should be recommended and additional mitigation measures should be implemented as necessary. Data should then be re-assessed and the need for any further monitoring established. The action plan should be undertaken within a period of 1 month after a significant difference has been determined.

10.8.3 For the purpose of the EM&A works, the "significance" level which will trigger the action plan shall be proposed by the ET as part of the post-construction monitoring programme[1] design to be agreed with AFCD and EPD prior to the monitoring being undertaken.

Table 10.3(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

| | North Lantau Social Cluster | |
|---|---|---|
| | NEL | NWL |
| Action Level | (STG < 70% of baseline) & (ANI < 70% of baseline) | (STG < 70% of baseline) & (ANI < 70% of baseline) |
| Limit Level | [(STG < 40% of baseline) & (ANI < 40% of baseline)] AND [ (STG < 40% of baseline) & (ANI < 40% of baseline)] | |

For North Lantau Social Cluster, action level will be trigger if either NEL or NWL fall below the criteria; limit level will be triggered if both NEL and NWL fall below the criteria.

Table 10.3(b) Derived Value of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

| | North Lantau Social Cluster | |
|---|---|---|
| | NEL | NWL |
| Action Level | (STG < 4.2) & (ANI < 15.5 ) | (STG < 6.9) & (ANI < 31.3) |
| Limit Level | [(STG < 2.4) & (ANI < 3.9)& (ANI < 17.9)] | |

[1] This Contract involves impact monitoring of dolphins during construction phase only. The responsibility of post construction dolphin monitoring will be assigned to relevant contract by the Authority in the later stage of the Hong Kong-Zhuhai-Macao Bridge project

# 11 FISHERIES

## 11.1 SUMMARY

11.1.1 The EIA report identified and assessed the potential impacts

11.1.2 The water quality monitoring and audit requirements are included in **Section 9 Water Quality.**

11.1.3 As mentioned in the EIA report, no further monitoring and audit for fisheries are required.

# 12 CULTURAL HERITAGE

## 12.1 SUMMARY

12.1.1 The marine archaeology investigation has concluded that there is no underwater cultural heritage within the study area. No adverse impact on marine archaeological is anticipated. Hence, further investigation or mitigation measure is not required.

12.1.2 The HKBCF is located in the waters to be north-east of the Airport. It would not have any impacts on known built heritage and archaeological site. Mitigation measure is not required for built heritage and terrestrial archaeology.

# 13 HAZARD TO LIFE

## 13.1 SUMMARY

13.1.1 The HKBCF is a newly reclaimed site, it is anticipated that blasting work will not be required during construction of the HKBCF. Therefore no explosives QRA is required and hence no mitigation measure is required.

# 14 LANDSCAPE & VISUAL IMPACT

## 14.1 INTRODUCTION

14.1.1 The EIA has recommended landscape and visual mitigation measures (refer to Section 14 of EIA Report) to be undertaken during both the construction and operation phases of the project. This section outlines the monitoring and audit of these measures.

## 14.2 MONITORING DETAILS

14.2.1 The design, implementation and maintenance of landscape mitigation measures should be checked to ensure that any potential conflicts between the proposed landscape measures and any other works of the project would be resolved as early as practical without affecting the implementation of the mitigation measures.

**Table 14.1 Monitoring Programme**

| Stage | Monitoring Task | Monitoring Report | Form of Approval | Frequency |
|---|---|---|---|---|
| Detailed Design | Checking of design works against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken during detailed design phase, to ensure that they fulfill the intention of the mitigation measures. Any changes to the design, including design changes on site should also be checked. | Not Required | Not Required | At the end of the Detailed Design Phase |
| Construction | Checking of the contractor's operations during the construction period. | Report on Contractor's compliance by ET | Counter-signature of report by IEC | Bi-weekly |
| Establishment Works | Checking of the planting works during the 12-month Establishment Period after completion of the construction works. | Report on Contractor's compliance by ET | Counter-signature of report by IEC | Every 2 months |
| Long Term Management (10 year) | Monitoring of the long-term management of the planting works in the period up to 10 years after completion of the construction works. | Report on compliance by ET or Maintenance Agency as appropriate | Counter-signature of report by Management Agency | Annually |

Notes: • Environmental Team (ET) – employed by the Contractor

Detailed Design Phase

14.2.2 The mitigation measures, which are proposed in the EIA to mitigate the landscape and visual impacts, should be embodied into the detailed engineering design, landscape design drawings and contract documents. The Detailed Design should be checked to ensure that the measures are fully incorporated. Potential conflicts with civil engineering, geotechnical, structural, lighting, signage, drainage and underground utilities should resolved as early as practical.

14.2.3 The following mitigation measures are proposed to avoid and reduce the identified impacts.

- Minimize the footprint of project and that the quantity of landscape character units and landscape resources affected;
- Minimize temporary works areas for construction works;
- Undertaking good site practices by applying hydroseeding on temporary stockpiles and reclamation areas;
- Conservation of topsoil for reuse;
- Waste limitation by recycling of felled trees into woodchip mulch for use in landscaped areas.

14.2.4 The following design measures will be developed during detailed design stage to remedy and compensate unavoidable impacts:

- Roadside planting and planting along the edge of the reclamation is proposed;
- Transplanting of mature trees in good health and amenity value where appropriate and reinstatement of areas disturbed during construction by compensatory hydro-seeding and planting;
- Protection measures for the trees to be retained during construction activities;
- Optimizing the sizes and spacing of the bridge columns;
- Fine-tuning the location of the bridge columns to avoid visually-sensitive locations;
- Not applicable as the aesthetic design of the bridge is related to the HKLR Contract.
- Not applicable as the decorative urban design is related to the HKLR Contract.
- Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed;
- Providing planting area around peripheral of HKBCF for tree planting screening effect;
- Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline.
- Providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure(e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF; and
- Fine-tuning the sizes of the structural members to minimize the bulkiness of buildings and adjustment of building arrangement to minimise disturbance to surrounding vegetation in the HKBCF.

- Not applicable as the aesthetic design on the viaduct, tunnel portals, at grade roads and reclamation are related to the HKLR Contract.

14.2.5 The following mitigation measures should be monitored during construction and operation phases:

**Table 14.2 Mitigation Measures to be Monitored during Construction and Operation Phases**

| Stage | Description of Mitigation Measures |
|---|---|
| During Construction Phase | Mitigate both Landscape and Visual Impacts<br>G1. Grass-hydroseed bare soil surface and stock pile areas.<br>G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic.<br>G3. Not applicable as this is for HKLR.<br>G4. For HKBCF, providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF (See Figure 14.3.1of the EIA Report for example)<br>G5. Vegetation reinstatement and upgrading to disturbed areas.<br>G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed.<br>G7. Provide planting area around peripheral of and within HKBCF for tree screening buffer effect.<br>G8. Plant salt tolerant native tree and shrubs etc along the planter strip at affected seawall.<br>G9. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt "natural-look" by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of the new coastline (see Figure 14.4.2 of the EIA Report for example). |
| | Mitigate Visual Impacts<br>V1. Minimize time for construction activities during construction period.<br>V2. Provide screen hoarding at the portion of the project site / works areas / storage areas near VSRs who have close low-level views to the Project during HKBCF construction. |
| During Operation Phase | Mitigate both Landscape and Visual Impacts<br>G10.Provide proper planting maintenance on the new planting areas to enhance the aesthetic degree.<br>V3. Lighting design to minimize glare at night. Decorative road lighting to be considered during detailed design stage |

Note:

- Figure 14.3.1 – Landscape Master Plan showing the general arrangement of HKBCF with mitigation. This Plan is preliminary only and subject to further development in detailed design stage. (see Figure 14.3.1of the EIA Report)
- Figure 14.4.2 – Details of mitigation measure – G6 for the new coastline. (see Figure 14.4.2 of the EIA Report).

14.2.6 An implementation programme will be prepared as required by TM-EIAO. Reference will be made to the ETWB TC(W) No. 2/2004 on Maintenance of Vegetation and Hard Landscape Features which defines the management and maintenance responsibilities for natural vegetation and landscape works, including both softworks and hardworks, and the authorities for tree preservation and felling. The format of the preliminary

arrangement of implementation programme is listed in Table 14.3.

**Table 14.3 Proposed Format for Preliminary Funding, Implementation, Management and Maintenance Proposal**

| Mitigation Items | Funding & Implementation Unit (See Remark) | Maintenance Unit (See Remark) |
|---|---|---|
| *During Construction* | | |
| V1 and V2 | Project Proponent (i.e. HyD) | The Contractor |
| G3 | Project Proponent /Initiating Department (e.g. the relevant User Department of the building) | Project Proponent /Initiating Department (e.g. the relevant User Department of the building) |
| G1, G2, G3, G6, G7, G8 and G9 | Project Proponent (i.e. HyD) | HyD / LCSD |
| *During Operation* | | |
| V3 | Project Proponent (i.e. HyD) | HyD |
| G10 | Project Proponent (i.e. HyD) | HyD / LCSD |

Note:
The proposed mitigation measures and arrangements are tentative. The responsible parties are also tentative and subject to further agreements amongst the Government Departments.

### *Construction Phase & Establishment Period*

14.2.7 The implementation of landscape construction works and subsequent maintenance operations during the 12-month Establishment Period must be supervised by qualified Landscape Resident Site Staff (Registered Landscape Architect or Professional Member of the Hong Kong Institute of Landscape Architects).

14.2.8 Measures to mitigate landscape and visual impacts during construction should be checked to ensure compliance with the intended aims of the measures.

14.2.9 The progress of the engineering works shall be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken.

### *Long Term Management (10 Years)*

14.2.10 The planting works shall be monitored during the first 10 years of the operation phase of the project. Any areas of vegetation which is failed to establish, should be corrected by the relevant maintenance parties at the earliest opportunity. The maintenance requirement of the planting works stated under the 10-Year Management Programme is included in the monitoring requirement.

## 14.3 BASELINE MONITORING

14.3.1 A photographic record of the site at the time of the contractor's possession of the site shall be prepared by the Contractor and approved by the ER. The approved

photographic record shall be submitted to the Project Proponent, ET, IEC and EPD for record.

## 14.4 Action Plan for Landscape and Visual Works

**Table 14.4 Action Plan for Landscape and Visual Works**

| EVENT | ACTION | | | |
|---|---|---|---|---|
| | **ET** | **IEC** | **ER** | **CONTRACTOR** |
| Conflicts occur | Check and certify Contractor's proposed remedial design conforms to the requirements of EP and prepare checking report(s). | Check and verify ET Leader certified Contractor's proposed remedial design. | Supervise the Contractor to carry out the proposed remediation work. | Propose remedial design and carry out the proposed work. |

# 15 SITE ENVIRONMENTAL AUDIT

## 15.1 SITE INSPECTION

15.1.1 Site inspection provides an effective and direct means to initiate and enforce specified environmental protection and pollution control measures at the works area. These shall be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

15.1.2 The ET Leader shall be responsible for formulating the environmental site inspections, the deficiency and action reporting system, and for carrying out the site inspection works. Within 21 days of the construction contract commencement, he shall submit a proposal for site inspection and deficiency and action reporting procedures to the Contractor for agreement, and to the ER for approval. The ET's proposal for rectification would be made known to the IEC.

15.1.3 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 situations outside the works area which is likely to be affected, directly or indirectly, by the site activities. The following information should be made reference in conducting the inspection:

(i) EIA recommendations on environmental protection and pollution control mitigation measures;

(ii) works progress and programme;

(iii) individual works methodology proposals (which shall include proposal on associated pollution control measures);

(iv) contract specifications on environmental protection;

(v) relevant environmental protection and pollution control laws; and

(vi) previous site inspection results.

15.1.4 The Contractor shall keep the ET Leader updated with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor within 1 working day. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.

15.1.5 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 environmental monitoring and audit.

## 15.2 COMPLIANCE WITH LEGAL AND CONTRACTUAL REQUIREMENTS

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

15.2.2 In order that the works comply with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval shall be sent to the ET Leader for vetting to ensure sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarized in **Appendix C**.

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

15.2.4 The Contractor shall regularly copy relevant documents to the ET Leader so that checking can be carried out. The document shall at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences / permits. The site diary and environmental records shall be made available for the inspection by the relevant parties.

15.2.5 After reviewing the document, the ET Leader shall advise the IEC and Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he shall also advise the Contractor and the ER accordingly.

15.2.6 Upon receipt of the advice, the Contractor shall undertake immediate actions to correct the situation. The ER shall follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

## 15.3 ENVIRONMENTAL COMPLAINTS

15.3.1 Complaints shall be referred to the ET Leader for action. The ET Leader shall undertake the following procedures upon receipt of any complaint:

(i) Log complaint and date of receipt onto the complaint database and inform the IEC immediately;

(ii) Investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;

(iii) Identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;

(iv) Advise the Contractor if mitigation measures are required;

(v) Review the Contractor's response to identify mitigation measures, and the updated situation;

(vi) If the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;

(vii) Undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;

(viii) Report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results should be reported within the timeframe assigned by the EPD);

(ix) Record the complaint, investigation, the subsequent actions and the results in the monthly EM&A Reports; and.

(x) For each incident of environmental complaint received, prepare and certify the complaint investigation report. The certified complaint investigation report shall be submitted to the IEC and ER for verification.

# 16 REPORTING

## 16.1 GENERAL

16.1.1 Reports can be provided in an electronic medium upon agreeing the format with the ER and EPD. This would enable a transition from a paper/historic and reactive approach to an electronic / real time proactive approach. All the monitoring data (baseline and impact) shall also be submitted on diskettes or other approved media. The formats for air quality and noise to be submitted shall be separately agreed.

16.1.2 Once the monitoring data are available (e.g. noise, dust, water quality etc) and vetted by the IEC, the ET is responsible to upload the relevant data to the dedicated website established and maintained by ENPO. The ET Leader shall follow ENPO's requirements on the data submission format and procedure.

16.1.3 Types of reports that the ET Leader shall 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 shall be made available to the Director of Environmental Protection.

## 16.2 BASELINE MONITORING REPORT

16.2.1 The ET Leader shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report shall be submitted to the Contractor, the IEC, the ER and EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format shall be agreed with the EPD prior to submission.

16.2.2 Baseline monitoring report shall include at least the following:

(i) Executive summary (about half a page);

(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:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations;
- Monitoring date, time, frequency and duration; and
- Quality assurance (QA) / quality control (QC) results and detection limits;

(v) Details of influencing factors, including:

- Major activities, if any, being carried out on the site during the period;
- Weather conditions during the period; and
- Other factors which might affect results;

(vi) Determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data, the analysis shall 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.

## 16.3 MONTHLY EM&A REPORTS

16.3.1 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 Leader. 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 the month after construction commences. Each monthly EM&A report shall be submitted to the following parties: the Contractor, the IEC, the ER and EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

16.3.2 The ET leader shall 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.

***First Monthly EM&A Report***

16.3.3 The first monthly EM&A report shall include at least the following:

(i) Executive summary (1-2 pages):

- Breaches of Action and Limit levels;
- Complaint log;
- Notifications of any summons and successful prosecutions;
- Reporting changes; and
- Future key issues.

(ii) Basic project information:

- Project organization including key personnel contact names and telephone numbers;
- Programme;
- Management structure, and

- Works undertaken during the month.

(iii) Environmental status:

- Works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc); and
- Drawings showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co- ordinates of the monitoring locations).

(iv) A brief summary of EM&A requirements including:

- All monitoring parameters;
- Environmental quality performance limits (Action and Limit levels);
- Event-Action Plans;
- Environmental mitigation measures, as recommended in the approved EIA Report; and
- Environmental requirements in contract documents.

(v) Implementation status:

- Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA.

(vi) Monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations;
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

(vii) Report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- Record of all non-compliance (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 notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, 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; and
- Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non- compliance.

(viii) 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;
- Submission of implementation status proforma, proactive environmental proforma, data regulatory compliance proforma, site inspection proforma, data recovery schedule, and complaint log summarizing the EM&A of the period; and
- Comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

***Subsequent EM&A Reports***

16.3.4 Subsequent monthly EM&A reports shall include the following:

(i) Executive summary (1 - 2 pages):

- Breaches of Action and Limit levels;
- Complaint log;
- Notifications of any summons and successful prosecutions;
- Reporting changes; and
- Future key issues.

(ii) Basic project information:

- Project organization including key personnel contact names and telephone numbers;
- Programme;
- Management structure, and

- Works undertaken during the month.

(iii) Environmental status:

- Construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection / mitigation measures for the month;
- Works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
- Drawing showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations.

(iv) Implementation status:

- Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the approved EIA Report.

(v) Monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations;
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Graphical plots of monitored parameters in the month annotated against;
- Major activities being carried out on site during period;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

(vi) Report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- Record of all non-compliance (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 notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation,

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; and
- Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non- compliance.

(vii) 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
- Comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions

(viii) Appendices

- 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:

  a) Major activities being carried out on site during the period;

  b) Weather conditions during the period; and

  c) Any other factors that might affect the monitoring results.

- Monitoring schedule for the present and next reporting period;
- Cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- Outstanding issues and deficiencies.

## 16.4 QUARTERLY EM&A SUMMARY REPORTS

16.4.1 A quarterly EM&A summary report of around 5 pages shall be produced and shall contain at least the following information:

(i) Executive summary (about half a page);

(ii) Basic project information including a synopsis of the assignment organization, programme, contacts of key management, and a synopsis of works 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 approved EIA Report.

(iv) Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the approved EIA Report, summarized in the updated implementation schedule;

(v) Drawings showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(vi) Graphical plots of any trends in monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:

- 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 status;

(viii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(ix) A brief review of the reasons for and the implications of non-compliance, including a review of pollution sources and working procedures;

(x) A summary description of actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;

(xi) A summarized record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xii) 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;

(xiii) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures and the performance of the environmental management system, that is, of the overall EM&A programme); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and

(xiv) Contacts of Project Proponent and any hotline telephone number for the public to make enquiries.

## 16.5 FINAL EM&A REVIEW REPORTS

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

(i) Executive summary (1 - 2 pages);

(ii) Drawings showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(iii) Basic project information including a synopsis of the assignment organisation, contacts of key management, and a synopsis of work undertaken during the course of the assignment or past twelve months;

(iv) A brief summary of EM&A requirements including:

- Environmental mitigation measures, as recommended in the approved EIA Report;
- Environmental impact hypotheses tested;
- Environmental quality performance limits (Action and Limit levels);
- All 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 approved EIA Report, summarised in the updated implementation schedule;

(vi) Graphical plots and statistical analysis of the trends of monitored parameters over the course of the assignment, including the post-assignment monitoring for all monitoring stations annotated against:

- 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.
- The return of ambient environmental conditions in comparison with baseline data.

(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) Advice on the solid and liquid waste management status;

(xi) Provide clear-cut decisions on the environmental acceptability of the assignment with reference to the specific impact hypothesis;

(xii) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xiii) 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;

(xiv) A review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;

(xv) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and

(xvi) Recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

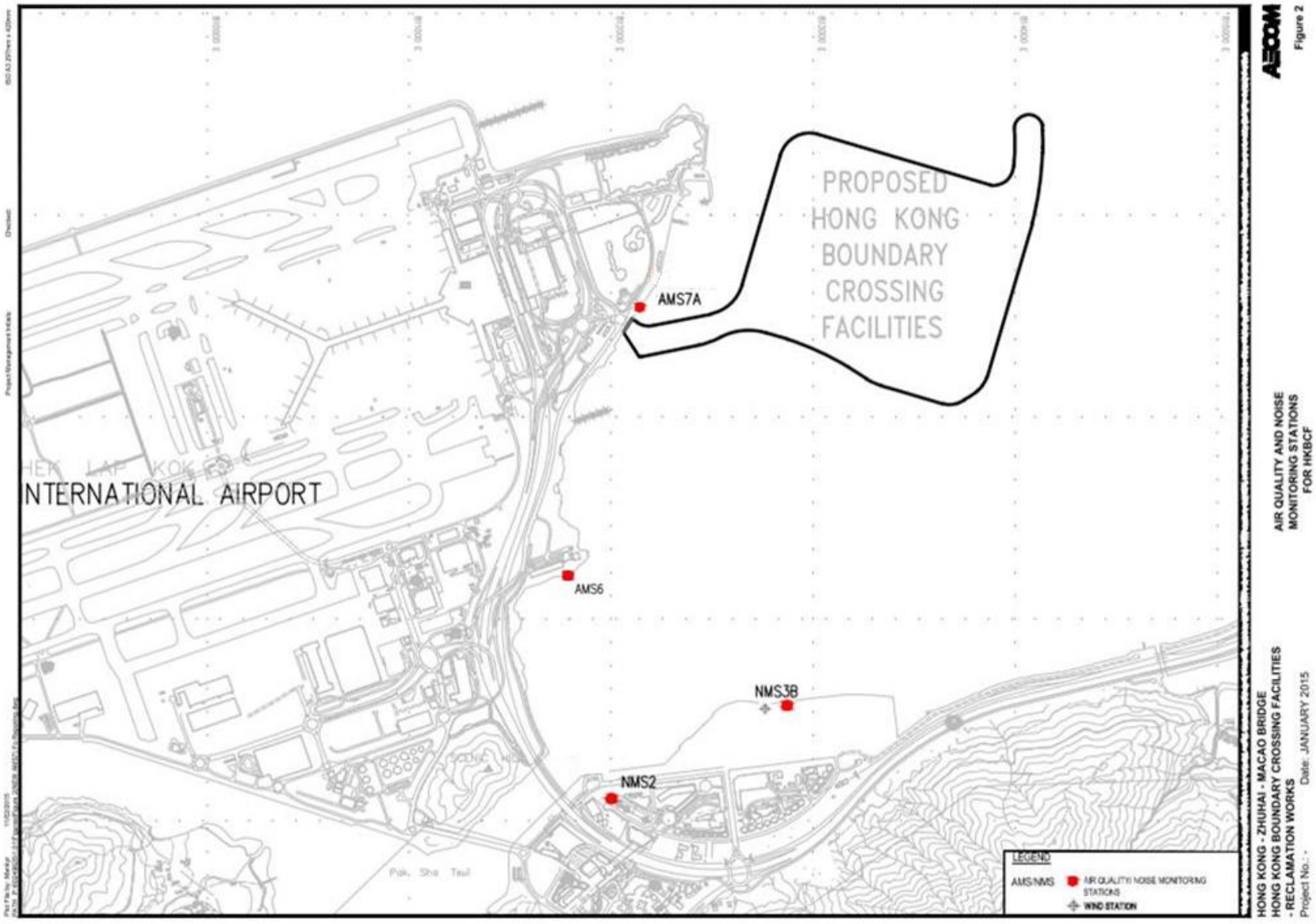
## 16.6 DATA KEEPING

16.6.1 No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such document shall be well kept by the ET Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. Monitoring data shall also be recorded in magnetic media form, and the software copy must be available upon request. Data format shall be agreed with EPD. All documents and data shall be kept for at least one year following completion of the construction contract.

## 16.7 INTERIM NOTIFICATIONS OF ENVIRONMENTAL QUALITY LIMIT EXCEEDANCES

16.7.1 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET leader shall immediately notify the IEC and EPD, as appropriate. The notification shall be followed up with advice to IEC and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in **Appendix F**.

# Figure 1


PROPOSED HONG KONG BOUNDARY CROSSING FACILITIES
AMS7A
AMS6
NMS3B
NMS2
NTERNATIONAL AIRPORT
LEGEND
AMS/NMS AIR QUALITY/ NOISE MONITORING STATIONS
WIND STATION
AECOM
Figure 2
AIR QUALITY AND NOISE MONITORING STATIONS FOR HKBCF
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES - RECLAMATION WORKS
Date: JANUARY 2015
Project No.: -

# Figure 2

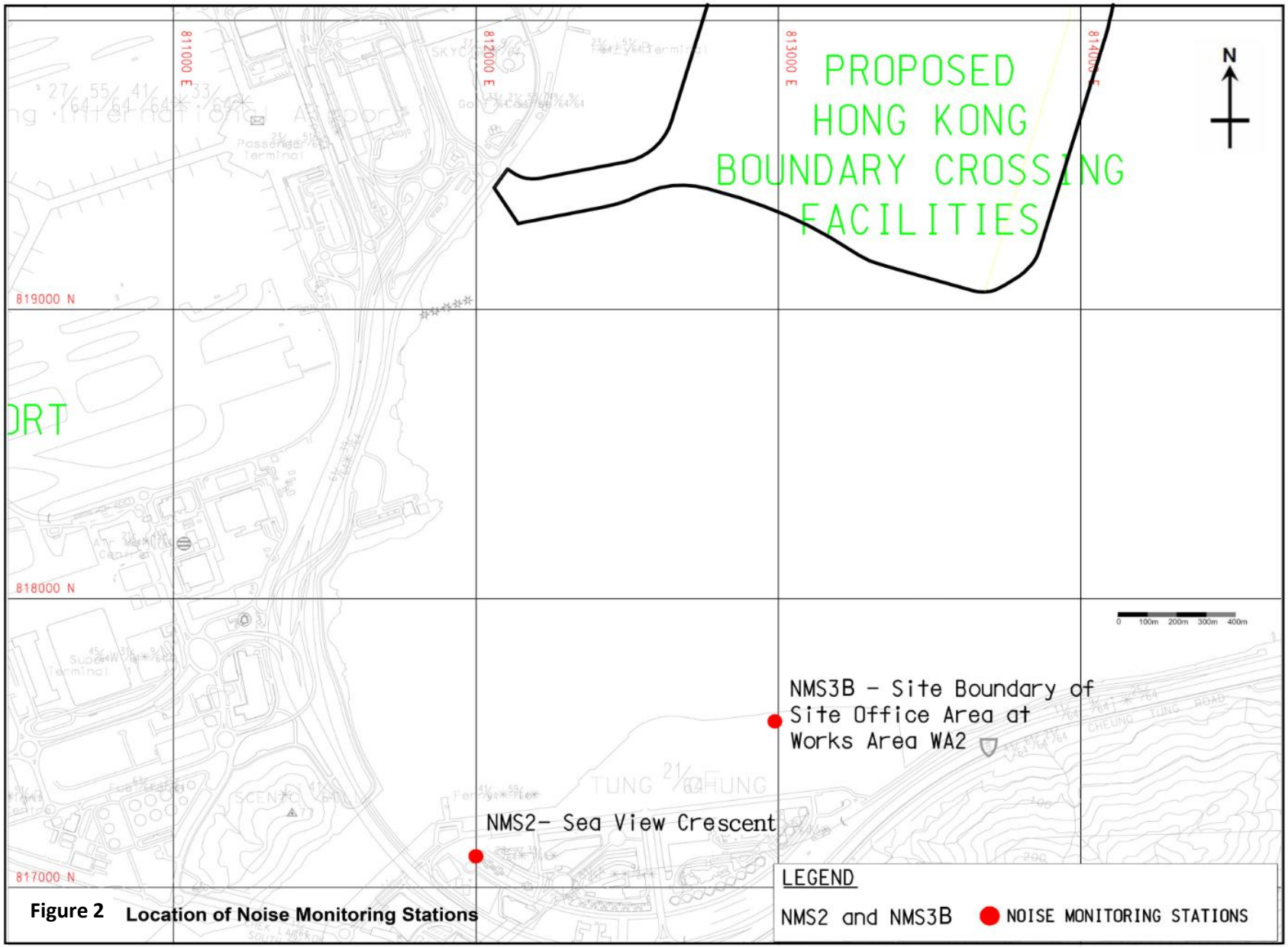
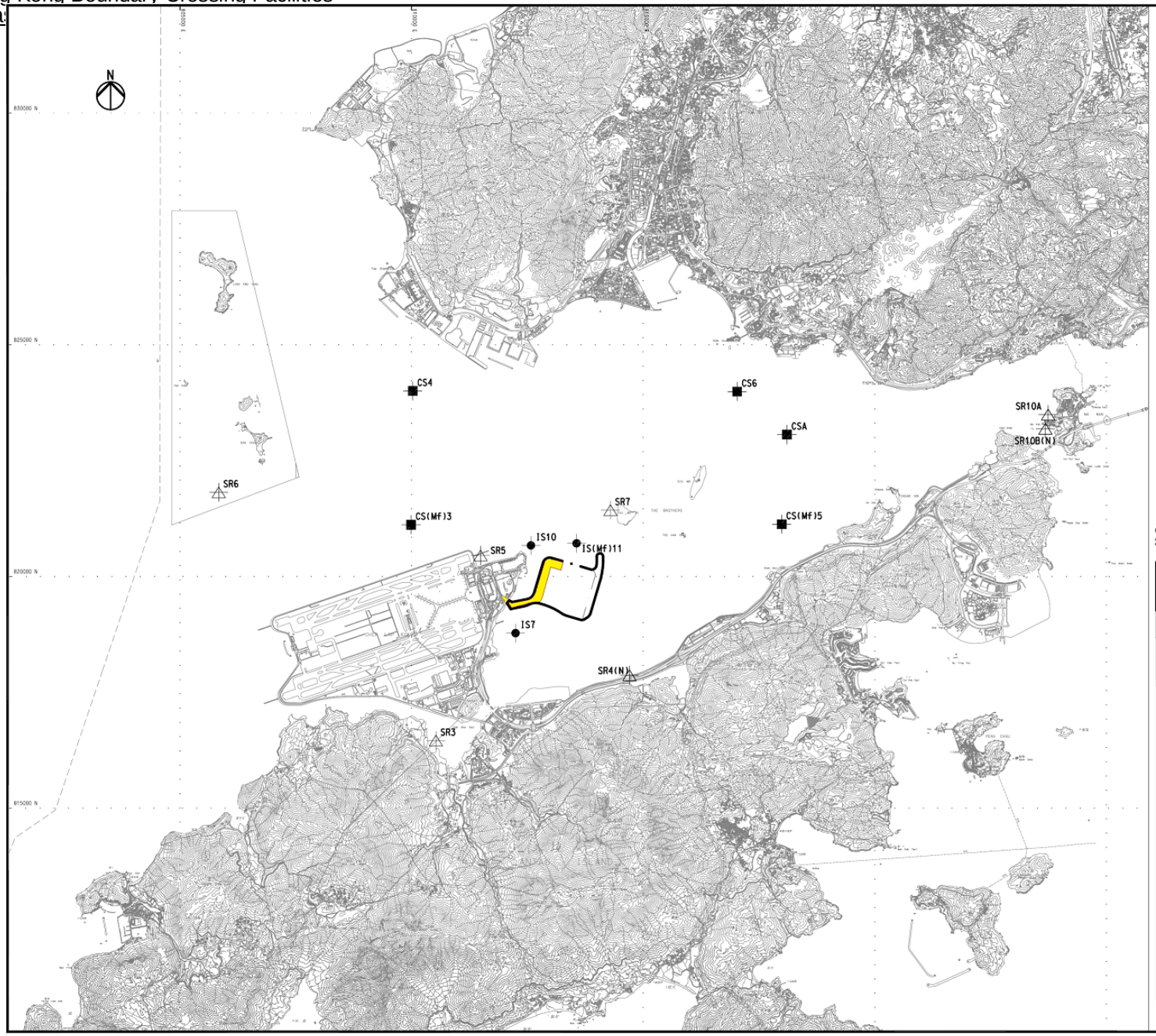



**Figure 2** **Location of Noise Monitoring Stations**

# Figure 3



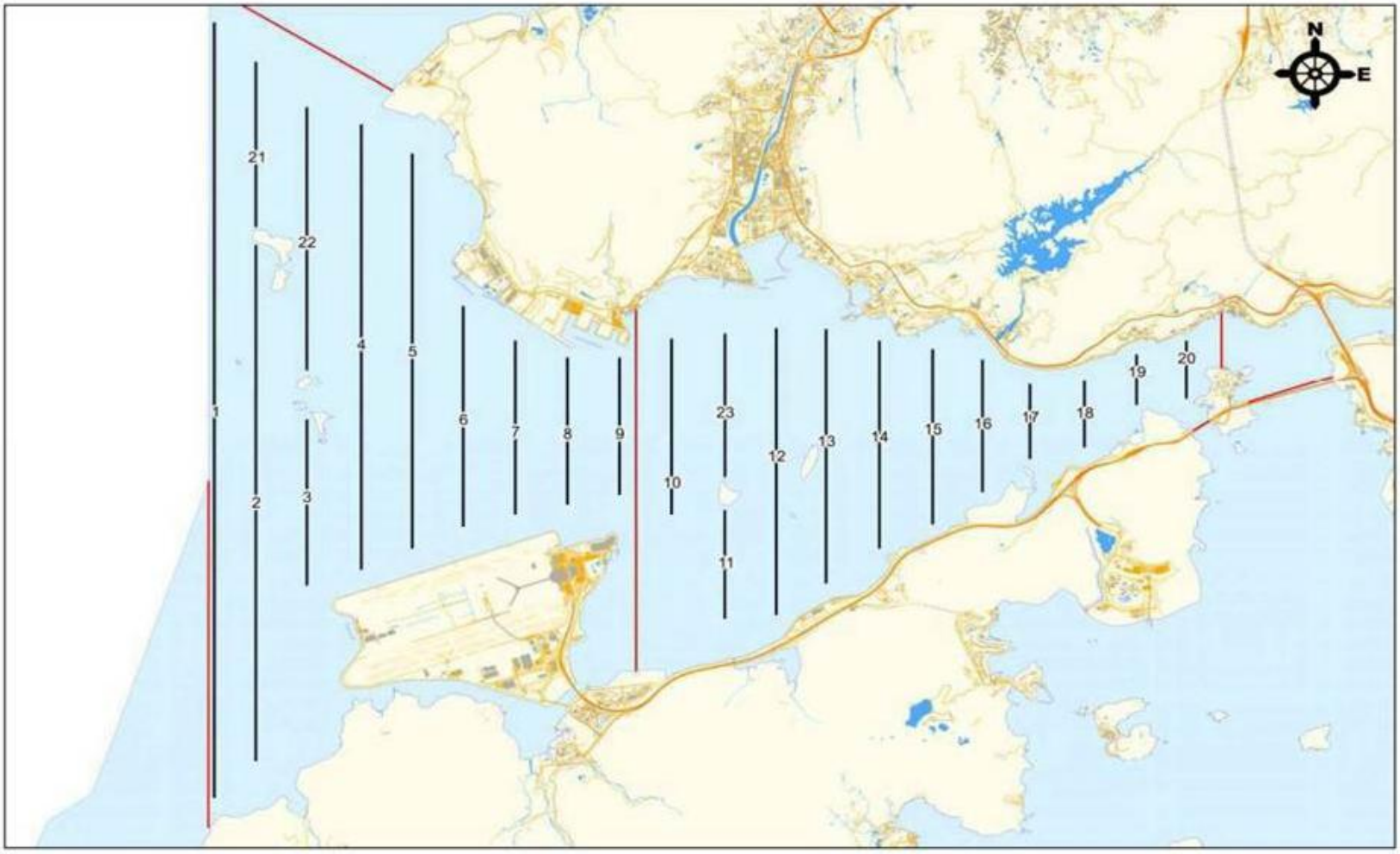

LEGEND

- IS — IMPACT STATIONS
- CS — CONTROL / FAR FIELD STATIONS
- SR — SENSITIVE RECEIVERS STATIONS
- WORKING BOUNDARY OF HY/2013/02

## SETTING OUT SCHEDULE

| MONITORING STATIONS | CO-ORDINATES | |
|---|---|---|
| | EASTING | NORTHING |
| IS7 | 812244 | 818777 |
| IS10 | 812577 | 820670 |
| IS(Mf)11 | 813562 | 820716 |
| SR3 | 810525 | 816456 |
| SR4(N) | 814705 | 817859 |
| SR5 | 811489 | 820455 |
| SR6 | 805837 | 821818 |
| SR7 | 814293 | 821431 |
| SR10A | 823741 | 823495 |
| SR10B(N) | 823683 | 823187 |
| CS(Mf)3 | 809989 | 821117 |
| CS(Mf)5 | 817990 | 821129 |
| CS4 | 810025 | 824004 |
| CS6 | 817028 | 823992 |
| CSA | 818103 | 823064 |

# Figure 4




**Remarks:**

***Transect 10 is now 3.6km in length due to the HKBCF construction site.**

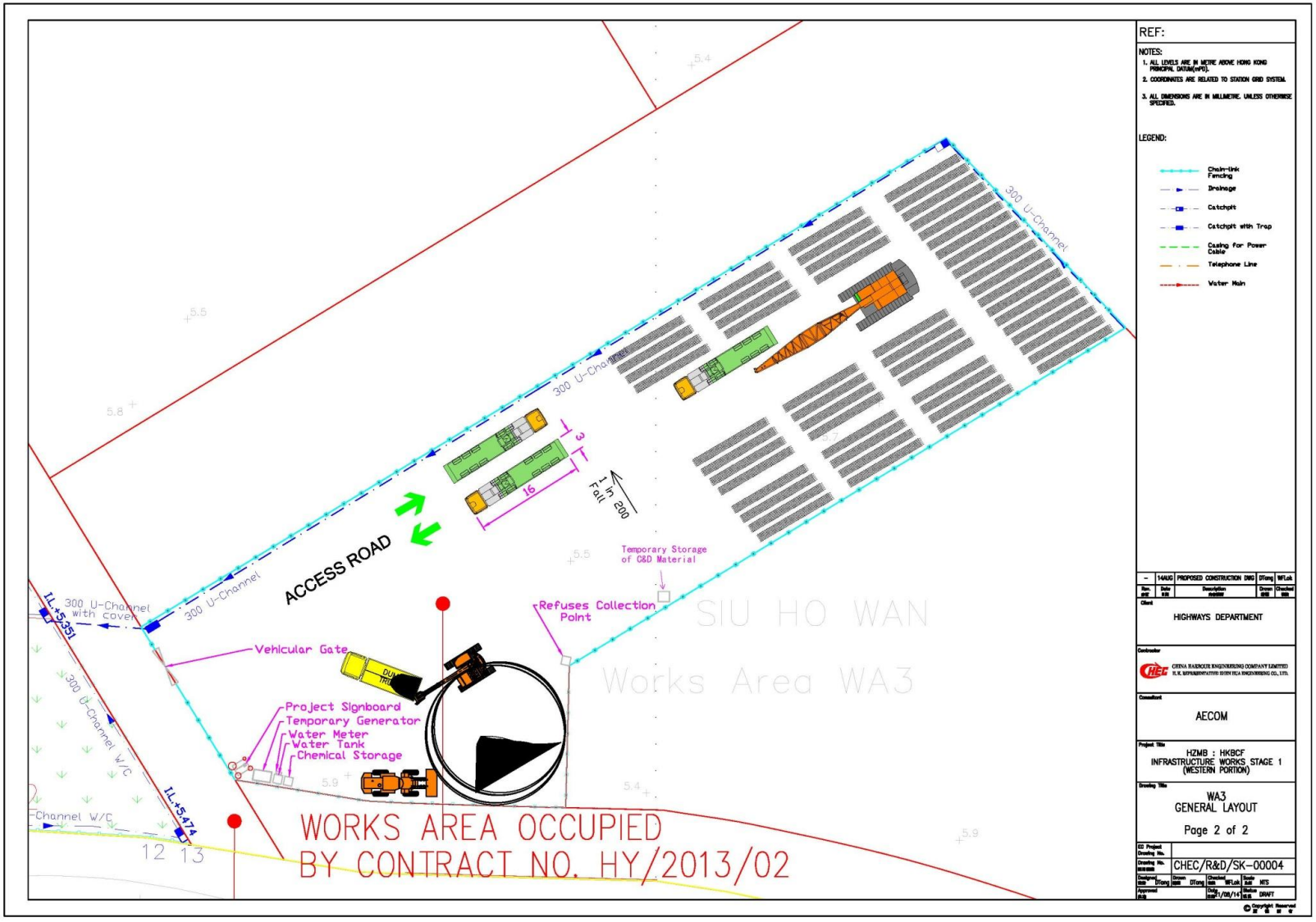
**^Coordinates for transect lines 1, 2, 7, 8, 9 and 11 have been updated in respect to the Proposal for Alteration of Transect Line for Dolphin Monitoring approved by EPD on 19 August 2015. The total transect length for both NEL and NWL combined is 108km.**

# Appendix A

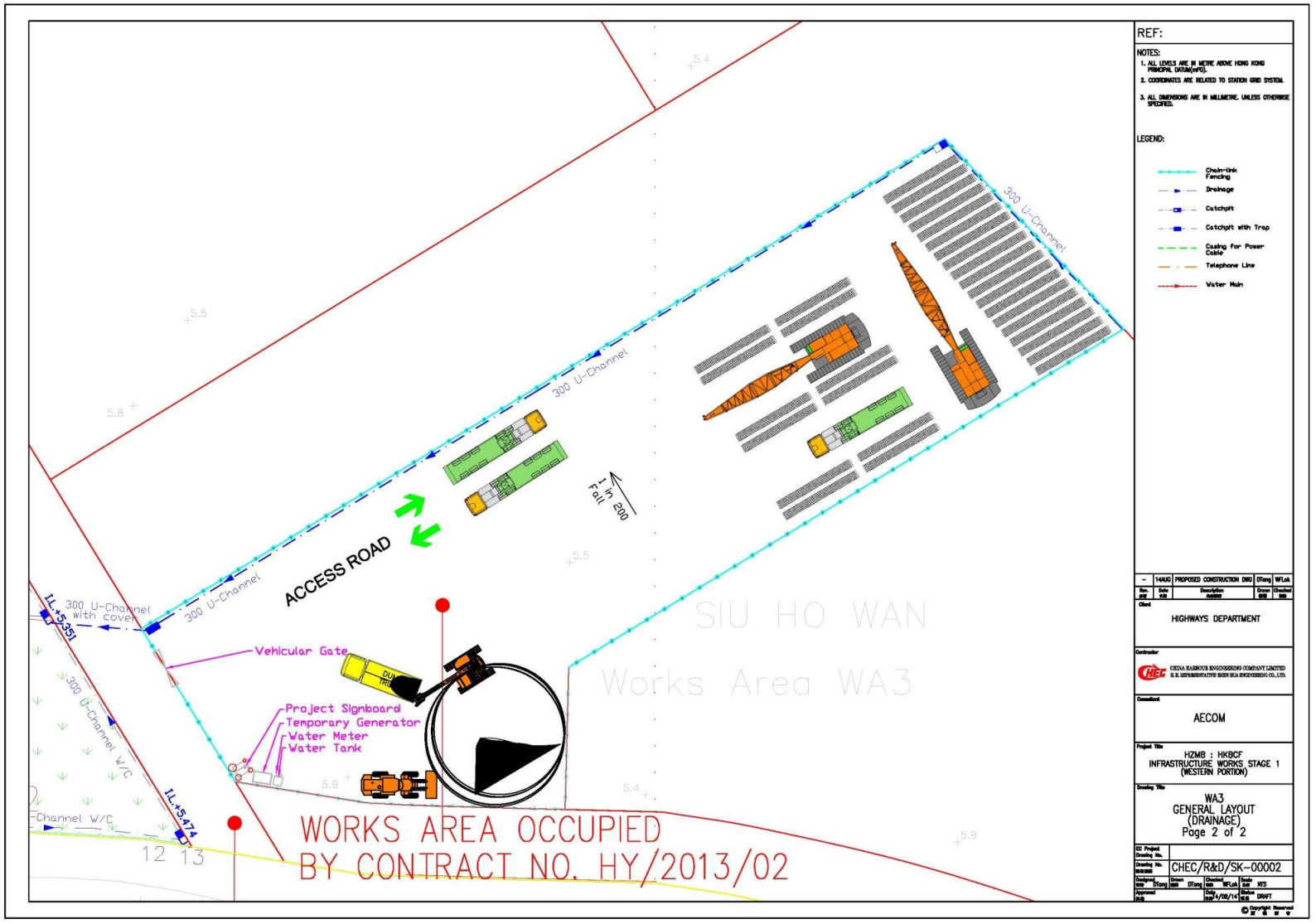
# Site Area of the Contract

## A0: Master Location Plan

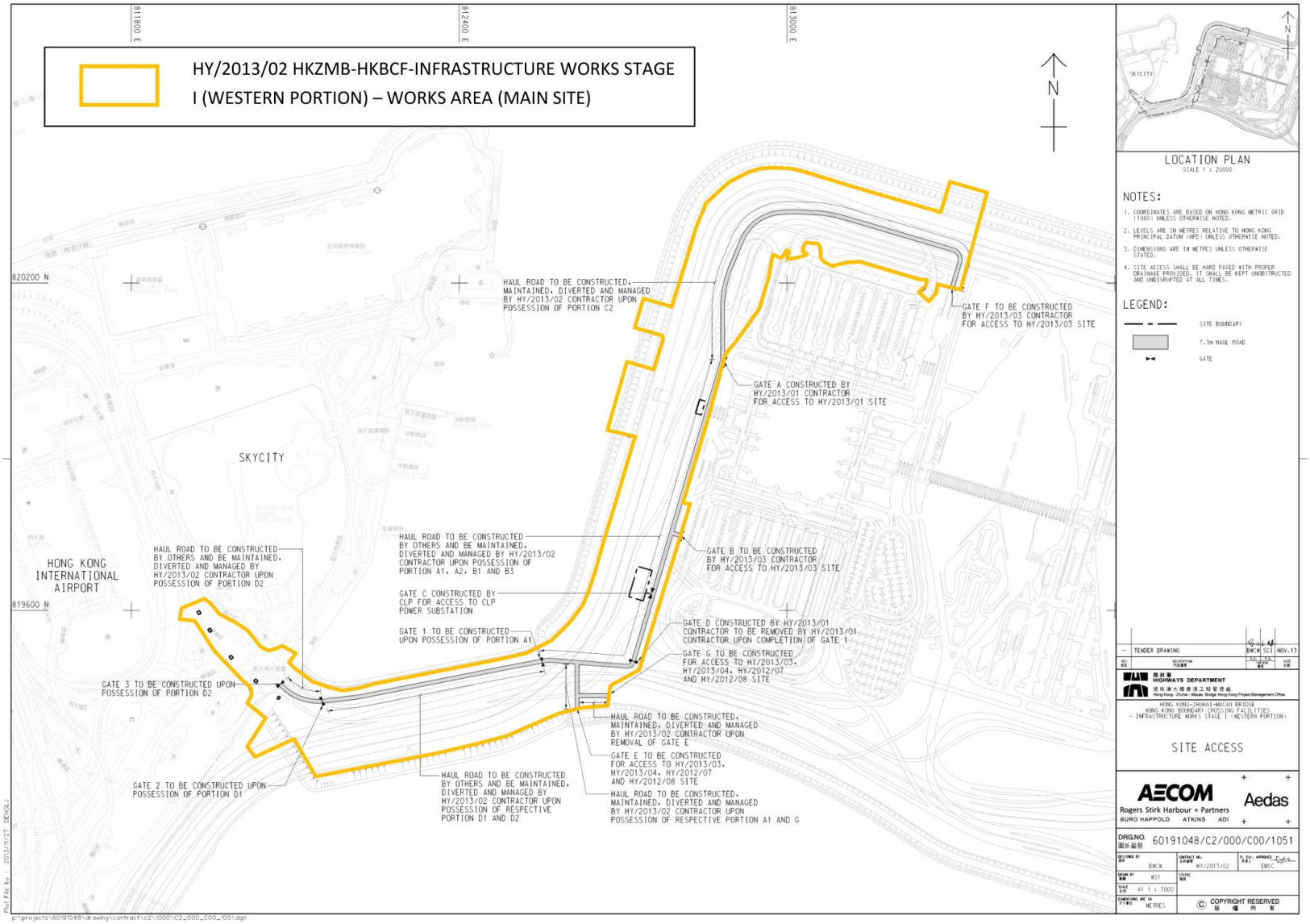
## A1: General Layout of Works Area WA3



## A2: Drainage layout of Works Area WA3

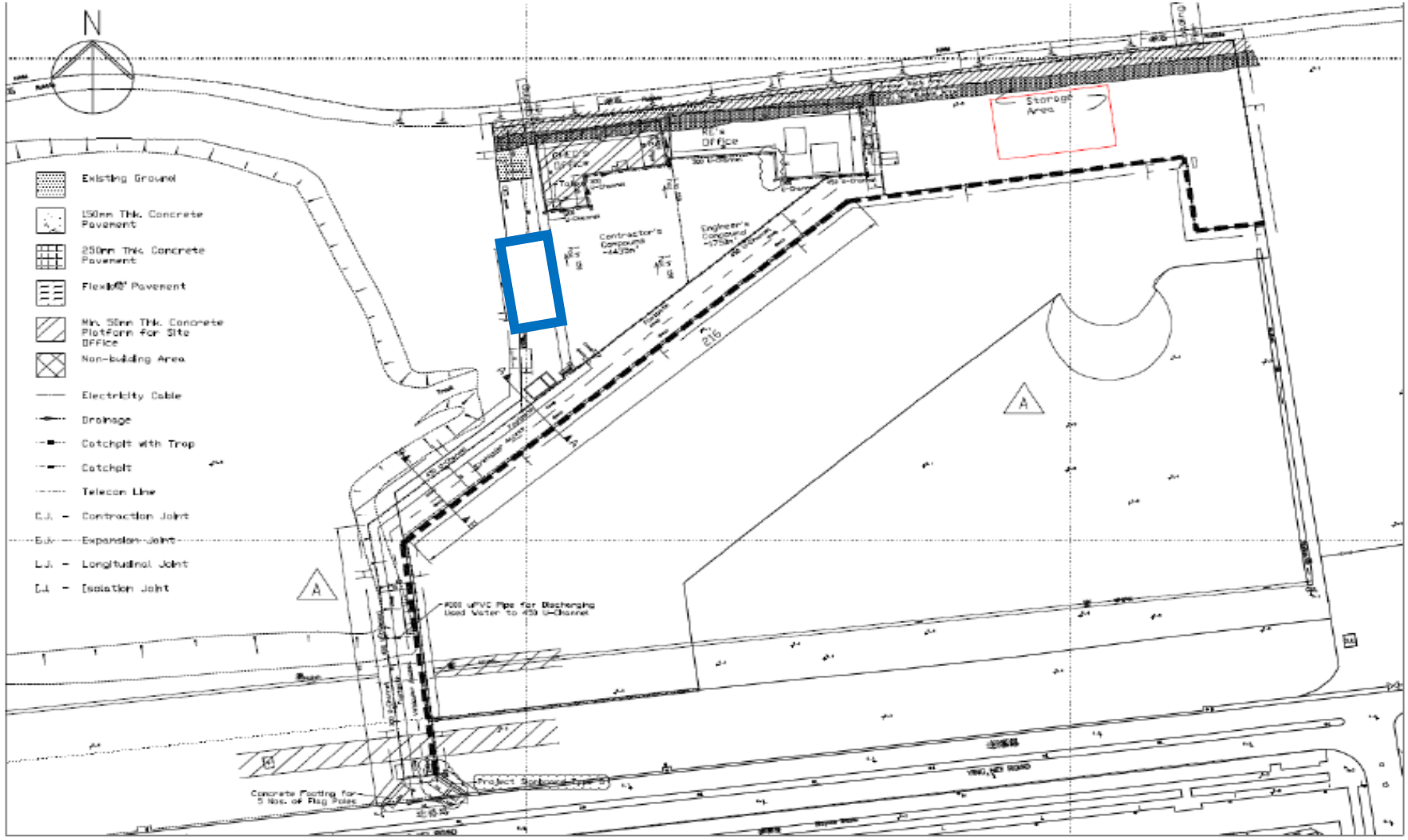


## A3: Layout of HY/2013/02 Main Site



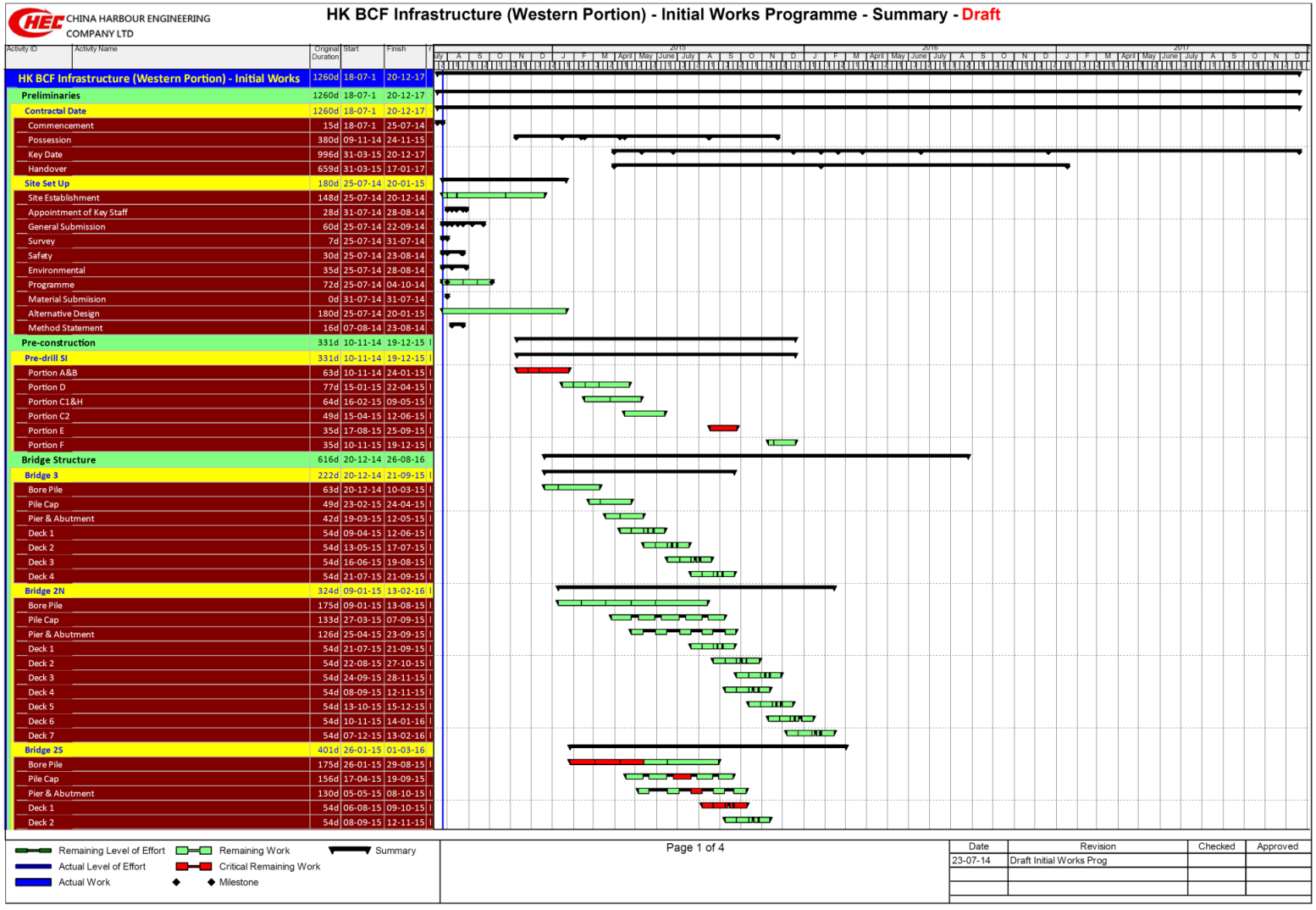
## A4: Layout of HY/2013/02 Works Area 2(WA2)-Site Office

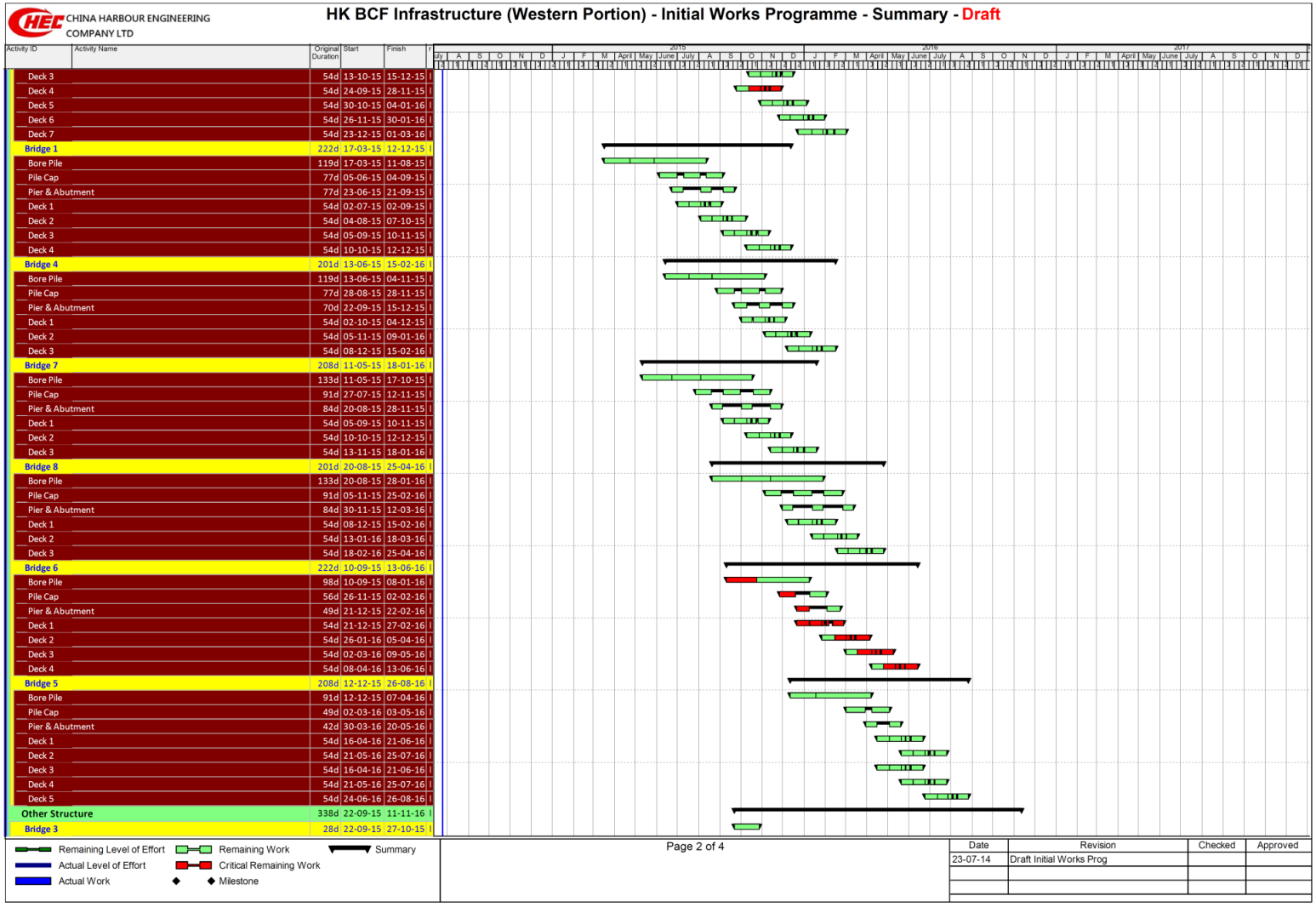
WA2-Site Office



# Appendix B

# Construction Programme


CHINA HARBOUR ENGINEERING COMPANY LTD
HK BCF Infrastructure (Western Portion) - Initial Works Programme - Summary - Draft
Activity ID
Activity Name
Original Duration
Start
Finish
HK BCF Infrastructure (Western Portion) - Initial Works 1260d 18-07-1 20-12-17
Preliminaries 1260d 18-07-1 20-12-17
Contractal Date 1260d 18-07-1 20-12-17
Commencement 15d 18-07-1 25-07-14
Possession 380d 09-11-14 24-11-15
Key Date 996d 31-03-15 20-12-17
Handover 659d 31-03-15 17-01-17
Site Set Up 180d 25-07-14 20-01-15
Site Establishment 148d 25-07-14 20-12-14
Appointment of Key Staff 28d 31-07-14 28-08-14
General Submission 60d 25-07-14 22-09-14
Survey 7d 25-07-14 31-07-14
Safety 30d 25-07-14 23-08-14
Environmental 35d 25-07-14 28-08-14
Programme 72d 25-07-14 04-10-14
Material Submisiion 0d 31-07-14 31-07-14
Alternative Design 180d 25-07-14 20-01-15
Method Statement 16d 07-08-14 23-08-14
Pre-construction 331d 10-11-14 19-12-15
Pre-drill SI 331d 10-11-14 19-12-15
Portion A&B 63d 10-11-14 24-01-15
Portion D 77d 15-01-15 22-04-15
Portion C1&H 64d 16-02-15 09-05-15
Portion C2 49d 15-04-15 12-06-15
Portion E 35d 17-08-15 25-09-15
Portion F 35d 10-11-15 19-12-15
Bridge Structure 616d 20-12-14 26-08-16
Bridge 3 222d 20-12-14 21-09-15
Bore Pile 63d 20-12-14 10-03-15
Pile Cap 49d 23-02-15 24-04-15
Pier & Abutment 42d 19-03-15 12-05-15
Deck 1 54d 09-04-15 12-06-15
Deck 2 54d 13-05-15 17-07-15
Deck 3 54d 16-06-15 19-08-15
Deck 4 54d 21-07-15 21-09-15
Bridge 2N 324d 09-01-15 13-02-16
Bore Pile 175d 09-01-15 13-08-15
Pile Cap 133d 27-03-15 07-09-15
Pier & Abutment 126d 25-04-15 23-09-15
Deck 1 54d 21-07-15 21-09-15
Deck 2 54d 22-08-15 27-10-15
Deck 3 54d 24-09-15 28-11-15
Deck 4 54d 08-09-15 12-11-15
Deck 5 54d 13-10-15 15-12-15
Deck 6 54d 10-11-15 14-01-16
Deck 7 54d 07-12-15 13-02-16
Bridge 2S 401d 26-01-15 01-03-16
Bore Pile 175d 26-01-15 29-08-15
Pile Cap 156d 17-04-15 19-09-15
Pier & Abutment 130d 05-05-15 08-10-15
Deck 1 54d 06-08-15 09-10-15
Deck 2 54d 08-09-15 12-11-15
2015
2016
2017
Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary
Page 1 of 4
Date
Revision
Checked
Approved
23-07-14
Draft Initial Works Prog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HK BCF Infrastructure (Western Portion) - Initial Works Programme - Summary - Draft
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Original Duration
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Finish
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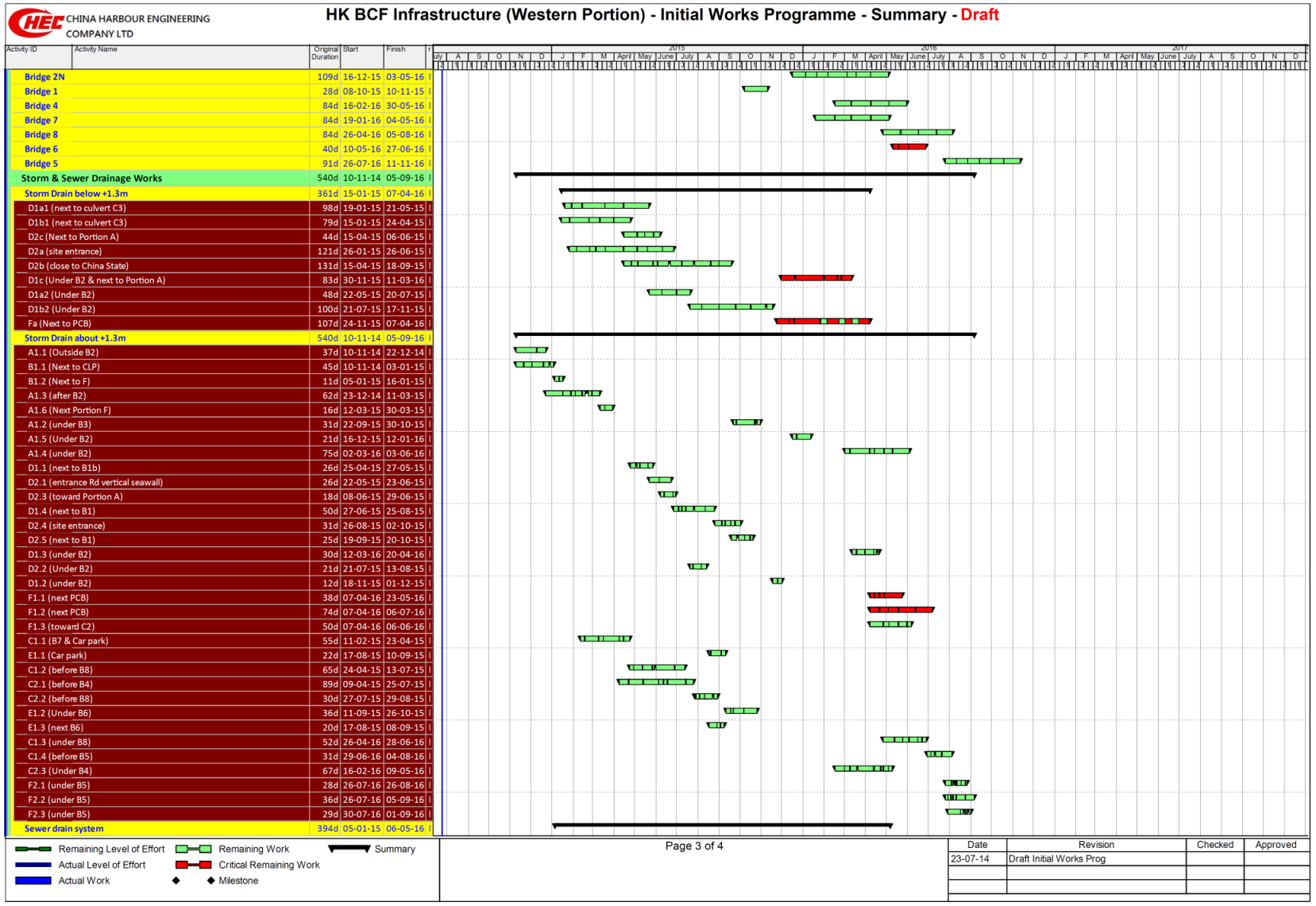
Deck 4 54d 24-09-15 28-11-15
Deck 5 54d 30-10-15 04-01-16
Deck 6 54d 26-11-15 30-01-16
Deck 7 54d 23-12-15 01-03-16
Bridge 1 222d 17-03-15 12-12-15
Bore Pile 119d 17-03-15 11-08-15
Pile Cap 77d 05-06-15 04-09-15
Pier & Abutment 77d 23-06-15 21-09-15
Deck 1 54d 02-07-15 02-09-15
Deck 2 54d 04-08-15 07-10-15
Deck 3 54d 05-09-15 10-11-15
Deck 4 54d 10-10-15 12-12-15
Bridge 4 201d 13-06-15 15-02-16
Bore Pile 119d 13-06-15 04-11-15
Pile Cap 77d 28-08-15 28-11-15
Pier & Abutment 70d 22-09-15 15-12-15
Deck 1 54d 02-10-15 04-12-15
Deck 2 54d 05-11-15 09-01-16
Deck 3 54d 08-12-15 15-02-16
Bridge 7 208d 11-05-15 18-01-16
Bore Pile 133d 11-05-15 17-10-15
Pile Cap 91d 27-07-15 12-11-15
Pier & Abutment 84d 20-08-15 28-11-15
Deck 1 54d 05-09-15 10-11-15
Deck 2 54d 10-10-15 12-12-15
Deck 3 54d 13-11-15 18-01-16
Bridge 8 201d 20-08-15 25-04-16
Bore Pile 133d 20-08-15 28-01-16
Pile Cap 91d 05-11-15 25-02-16
Pier & Abutment 84d 30-11-15 12-03-16
Deck 1 54d 08-12-15 15-02-16
Deck 2 54d 13-01-16 18-03-16
Deck 3 54d 18-02-16 25-04-16
Bridge 6 222d 10-09-15 13-06-16
Bore Pile 98d 10-09-15 08-01-16
Pile Cap 56d 26-11-15 02-02-16
Pier & Abutment 49d 21-12-15 22-02-16
Deck 1 54d 21-12-15 27-02-16
Deck 2 54d 26-01-16 05-04-16
Deck 3 54d 02-03-16 09-05-16
Deck 4 54d 08-04-16 13-06-16
Bridge 5 208d 12-12-15 26-08-16
Bore Pile 91d 12-12-15 07-04-16
Pile Cap 49d 02-03-16 03-05-16
Pier & Abutment 42d 30-03-16 20-05-16
Deck 1 54d 16-04-16 21-06-16
Deck 2 54d 21-05-16 25-07-16
Deck 3 54d 16-04-16 21-06-16
Deck 4 54d 21-05-16 25-07-16
Deck 5 54d 24-06-16 26-08-16
Other Structure 338d 22-09-15 11-11-16
Bridge 3 28d 22-09-15 27-10-15
2015
2016
2017
Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary
Page 2 of 4
Date
Revision
Checked
Approved
23-07-14
Draft Initial Works Prog


CHINA HARBOUR ENGINEERING COMPANY LTD
HK BCF Infrastructure (Western Portion) - Initial Works Programme - Summary - Draft
Activity ID
Activity Name
Original Duration
Start
Finish
Bridge 2N 109d 16-12-15 03-05-16
Bridge 1 28d 08-10-15 10-11-15
Bridge 4 84d 16-02-16 30-05-16
Bridge 7 84d 19-01-16 04-05-16
Bridge 8 84d 26-04-16 05-08-16
Bridge 6 40d 10-05-16 27-06-16
Bridge 5 91d 26-07-16 11-11-16
Storm & Sewer Drainage Works 540d 10-11-14 05-09-16
Storm Drain below +1.3m 361d 15-01-15 07-04-16
D1a1 (next to culvert C3) 98d 19-01-15 21-05-15
D1b1 (next to culvert C3) 79d 15-01-15 24-04-15
D2c (Next to Portion A) 44d 15-04-15 06-06-15
D2a (site entrance) 121d 26-01-15 26-06-15
D2b (close to China State) 131d 15-04-15 18-09-15
D1c (Under B2 & next to Portion A) 83d 30-11-15 11-03-16
D1a2 (Under B2) 48d 22-05-15 20-07-15
D1b2 (Under B2) 100d 21-07-15 17-11-15
Fa (Next to PCB) 107d 24-11-15 07-04-16
Storm Drain about +1.3m 540d 10-11-14 05-09-16
A1.1 (Outside B2) 37d 10-11-14 22-12-14
B1.1 (Next to CLP) 45d 10-11-14 03-01-15
B1.2 (Next to F) 11d 05-01-15 16-01-15
A1.3 (after B2) 62d 23-12-14 11-03-15
A1.6 (Next Portion F) 16d 12-03-15 30-03-15
A1.2 (under B3) 31d 22-09-15 30-10-15
A1.5 (Under B2) 21d 16-12-15 12-01-16
A1.4 (under B2) 75d 02-03-16 03-06-16
D1.1 (next to B1b) 26d 25-04-15 27-05-15
D2.1 (entrance Rd vertical seawall) 26d 22-05-15 23-06-15
D2.3 (toward Portion A) 18d 08-06-15 29-06-15
D1.4 (next to B1) 50d 27-06-15 25-08-15
D2.4 (site entrance) 31d 26-08-15 02-10-15
D2.5 (next to B1) 25d 19-09-15 20-10-15
D1.3 (under B2) 30d 12-03-16 20-04-16
D2.2 (Under B2) 21d 21-07-15 13-08-15
D1.2 (under B2) 12d 18-11-15 01-12-15
F1.1 (next PCB) 38d 07-04-16 23-05-16
F1.2 (next PCB) 74d 07-04-16 06-07-16
F1.3 (toward C2) 50d 07-04-16 06-06-16
C1.1 (B7 & Car park) 55d 11-02-15 23-04-15
E1.1 (Car park) 22d 17-08-15 10-09-15
C1.2 (before B8) 65d 24-04-15 13-07-15
C2.1 (before B4) 89d 09-04-15 25-07-15
C2.2 (before B8) 30d 27-07-15 29-08-15
E1.2 (Under B6) 36d 11-09-15 26-10-15
E1.3 (next B6) 20d 17-08-15 08-09-15
C1.3 (under B8) 52d 26-04-16 28-06-16
C1.4 (before B5) 31d 29-06-16 04-08-16
C2.3 (Under B4) 67d 16-02-16 09-05-16
F2.1 (under B5) 28d 26-07-16 26-08-16
F2.2 (under B5) 36d 26-07-16 05-09-16
F2.3 (under B5) 29d 30-07-16 01-09-16
Sewer drain system 394d 05-01-15 06-05-16
2015
2016
2017
Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary
Page 3 of 4
Date
Revision
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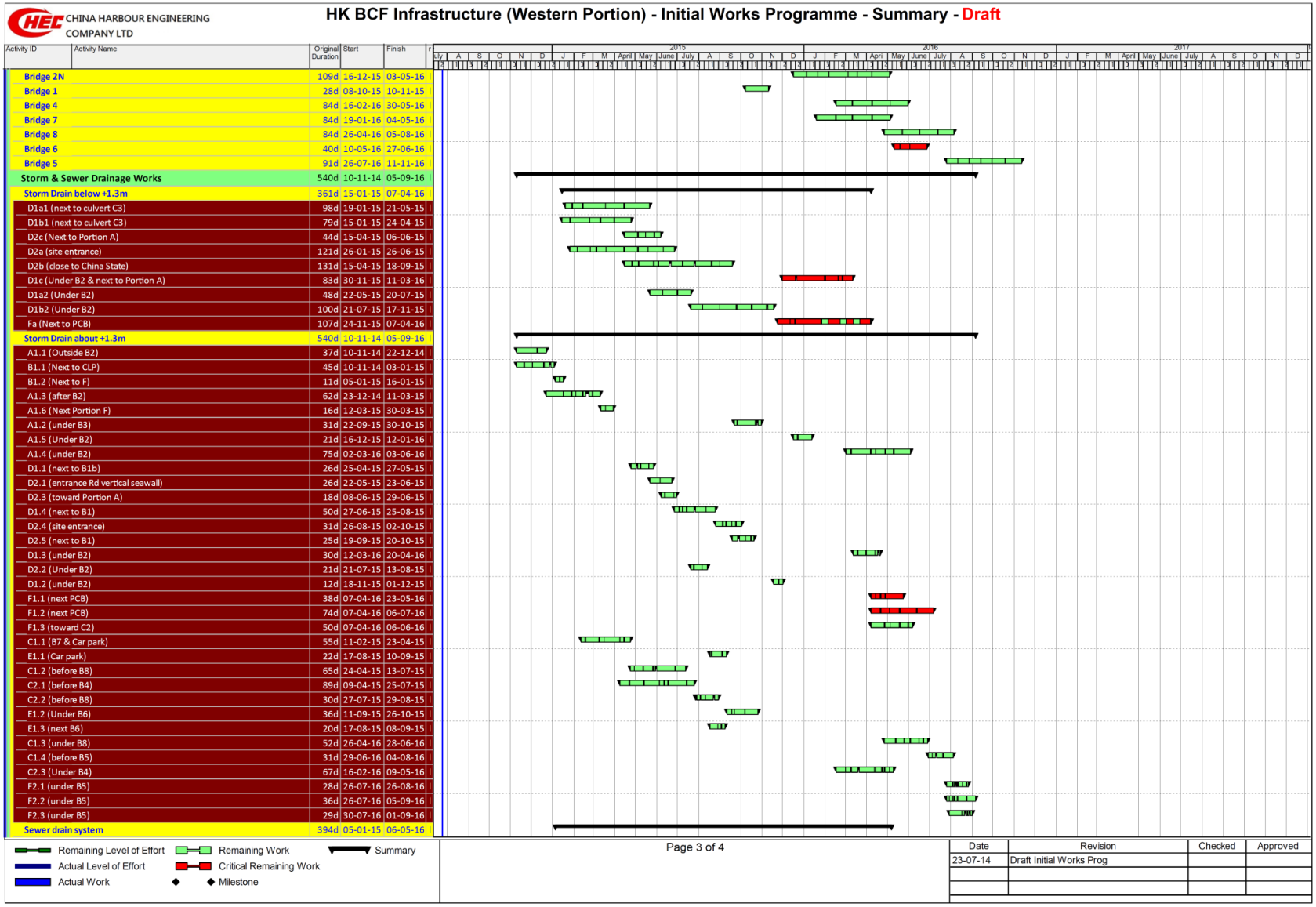
Draft Initial Works Prog


CHINA HARBOUR ENGINEERING COMPANY LTD
HK BCF Infrastructure (Western Portion) - Initial Works Programme - Summary - Draft
Activity ID
Activity Name
Original Duration
Start
Finish
2015
2016
2017
Bridge 2N 109d 16-12-15 03-05-16
Bridge 1 28d 08-10-15 10-11-15
Bridge 4 84d 16-02-16 30-05-16
Bridge 7 84d 19-01-16 04-05-16
Bridge 8 84d 26-04-16 05-08-16
Bridge 6 40d 10-05-16 27-06-16
Bridge 5 91d 26-07-16 11-11-16
Storm & Sewer Drainage Works 540d 10-11-14 05-09-16
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D1a1 (next to culvert C3) 98d 19-01-15 21-05-15
D1b1 (next to culvert C3) 79d 15-01-15 24-04-15
D2c (Next to Portion A) 44d 15-04-15 06-06-15
D2a (site entrance) 121d 26-01-15 26-06-15
D2b (close to China State) 131d 15-04-15 18-09-15
D1c (Under B2 & next to Portion A) 83d 30-11-15 11-03-16
D1a2 (Under B2) 48d 22-05-15 20-07-15
D1b2 (Under B2) 100d 21-07-15 17-11-15
Fa (Next to PCB) 107d 24-11-15 07-04-16
Storm Drain about +1.3m 540d 10-11-14 05-09-16
A1.1 (Outside B2) 37d 10-11-14 22-12-14
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A1.3 (after B2) 62d 23-12-14 11-03-15
A1.6 (Next Portion F) 16d 12-03-15 30-03-15
A1.2 (under B3) 31d 22-09-15 30-10-15
A1.5 (Under B2) 21d 16-12-15 12-01-16
A1.4 (under B2) 75d 02-03-16 03-06-16
D1.1 (next to B1b) 26d 25-04-15 27-05-15
D2.1 (entrance Rd vertical seawall) 26d 22-05-15 23-06-15
D2.3 (toward Portion A) 18d 08-06-15 29-06-15
D1.4 (next to B1) 50d 27-06-15 25-08-15
D2.4 (site entrance) 31d 26-08-15 02-10-15
D2.5 (next to B1) 25d 19-09-15 20-10-15
D1.3 (under B2) 30d 12-03-16 20-04-16
D2.2 (Under B2) 21d 21-07-15 13-08-15
D1.2 (under B2) 12d 18-11-15 01-12-15
F1.1 (next PCB) 38d 07-04-16 23-05-16
F1.2 (next PCB) 74d 07-04-16 06-07-16
F1.3 (toward C2) 50d 07-04-16 06-06-16
C1.1 (B7 & Car park) 55d 11-02-15 23-04-15
E1.1 (Car park) 22d 17-08-15 10-09-15
C1.2 (before B8) 65d 24-04-15 13-07-15
C2.1 (before B4) 89d 09-04-15 25-07-15
C2.2 (before B8) 30d 27-07-15 29-08-15
E1.2 (Under B6) 36d 11-09-15 26-10-15
E1.3 (next B6) 20d 17-08-15 08-09-15
C1.3 (under B8) 52d 26-04-16 28-06-16
C1.4 (before B5) 31d 29-06-16 04-08-16
C2.3 (Under B4) 67d 16-02-16 09-05-16
F2.1 (under B5) 28d 26-07-16 26-08-16
F2.2 (under B5) 36d 26-07-16 05-09-16
F2.3 (under B5) 29d 30-07-16 01-09-16
Sewer drain system 394d 05-01-15 06-05-16
Remaining Level of Effort
Remaining Work
Summary
Actual Level of Effort
Critical Remaining Work
Actual Work
Milestone
Page 3 of 4
Date
Revision
Checked
Approved
23-07-14
Draft Initial Works Prog

# Appendix C

# Environmental Mitigations Implementation Schedule (EMIS)

| EIA Ref. | EM&A Log Ref | Recommended Mitigation Measures | Objectives of the Recommended Measures & Main Concerns to address | Who to implement the measures? | Location of the measures | When to implement the measures? | What requirements or standards for the measures to achieve? |
|---|---|---|---|---|---|---|---|
| ***Air Quality*** | | | | | | | |
| S5.5.6.1 of HKBCFEIA | A1 | The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation | Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria. | Contractor | All construction sites | Construction stage | To control the dust impact to within the HKAQO and TM- EIA criteria (Ref. 1- hr and 24hr TSP levels are 500μgm$^{-3}$ and 260μgm$^{-3}$, respectively) |
| S5.5.6.2 of HKBCFEIA and S4.8.1 of TKCLKLEIA | A2 | Proper watering of exposed spoil should be undertaken throughout the construction phase:<br>• Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading;<br>• Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;<br>• A stockpile of dusty material should not be extended beyond the pedestrian barriers, fencing or traffic cones.<br>• Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;<br>• When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; | Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria. | Contractor | All construction sites | Construction stage | To control the dust impact to within the HKAQO and TM- EIA criteria (Ref. 1- hr and 24hr TSP levels are 500μgm$^{-3}$ and 260μgm$^{-3}$, respectively) |

| EIA Ref. | EM&A Log Ref | Recommended Mitigation Measures | Objectives of the Recommended Measures & Main Concerns to address | Who to implement the measures? | Location of the measures | When to implement the measures? | What requirements or standards for the measures to achieve? |
|---|---|---|---|---|---|---|---|
| ***Air Quality*** | | | | | | | |
| S5.5.6.2 of HKBCFEIA and S4.8.1 of TKCLKLEIA | A2 | • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials;<br>• Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously;<br>• Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet;<br>• Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding;<br>• Any skip hoist for material transport should be totally enclosed by impervious sheeting;<br>• Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;<br>• Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed;<br>• All unpaved roads/exposed area shall be watered which results in dust suppression by forming moist cohesive films among the discrete grains of road surface material.<br>• No burning of debris or other materials on the works areas is allowed;<br>• Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created;<br>• Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading; | Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria. | Contractor | All construction sites | Construction stage | To control the dust impact to within the HKAQO and TM- EIA criteria (Ref. 1- hr and 24hr TSP levels are 500$\mu gm^{-3}$ and 260$\mu gm^{-3}$, respectively) |

| EIA Ref. | EM&A Log Ref | Recommended Mitigation Measures | Objectives of the Recommended Measures & Main Concerns to address | Who to implement the measures? | Location of the measures | When to implement the measures? | What requirements or standards for the measures to achieve? |
|---|---|---|---|---|---|---|---|
| ***Air Quality*** | | | | | | | |
| S5.5.6.2 of HKBCFEIA and S4.8.1 of TKCLKLEIA | A2 | • During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards;<br>• Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and<br>• Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies. | Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria. | Contractor | All construction sites | Construction stage | To control the dust impact to within the HKAQO and TM- EIA criteria (Ref. 1- hr and 24hr TSP levels are 500μgm$^{-3}$ and 260μgm$^{-3}$, respectively) |
| S5.5.6.3 of HKBCFEIA and S4.8.1 of TKCLKLEIA | A3 | The Contractor should undertake proper watering on all exposed spoil and associated work areas (with at least 8 times per day) throughout the construction phase. | Control construction dust | Contractor | All construction sites | Construction stage | To control the dust impact |
| S5.5.6.4 of HKBCFEIA | A4 | Engineer to incorporate the controlled measures into the Particular Specification (PS) for the civil work. The PS should also draw the contractor's attention to the relevant latest Practice Notes issued by EPD. | Control construction dust | Engineer | All construction sites | Design Stage | Air Pollution Control (Construction Dust) Regulation |
| S5.5.6.4 of HKBCFEIA and S4.11 of TKCLKLEIA | A5 | Implement regular dust monitoring under EM&A programme during the construction stage. | Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period. | Contractor | Selected representative dust monitoring station | Construction stage | • Air Pollution Control (Construction Dust) Regulation<br>• To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1-hr and 24hr TSP levels are 500μgm$^{-3}$ and 260μgm$^{-3}$, respectively) |

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| ***Air Quality*** | | | | | | | |
| S5.5.7.1 of HKBCFEIA | A6 | The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant:<br>• Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system;<br>• All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP;<br>• Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system;<br>• The materials which may generate airborne dusty emissions should be wetted by water spray system;<br>• All receiving hoppers should be enclosed on three sides up to 3m above unloading point;<br>• All conveyor transfer points should be totally enclosed;<br>• All access and route roads within the premises should be paved and wetted; and<br>• Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body. | Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period. | Contractor | Selected<br>representative dust monitoring station | Construction<br>stage | • Air Pollution Control (Construction Dust) Regulation<br>• To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1-hr and 24hr TSP levels are 500μgm$^{-3}$ and 260μgm$^{-3}$, respectively) |
| S5.5.2.7 of HKBCFEIA | A7 | The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point:<br>• All road surface within the barging facilities will be paved;<br>• Dust enclosures will be provided for the loading ramp;<br>• Vehicles will be required to pass through designated wheels wash facilities; and<br>• Continuous water spray at the loading points. | Control construction dust | Contractor | All construction sites | Construction<br>stage | Air Pollution Control (Construction Dust) Regulation |

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| ***Construction Noise (Air borne)*** | | | | | | | |
| S6.4.10 of HKBCFEIA | N1 | Use of good site practices to limit noise emissions by considering the following:<br>• only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;<br>• machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;<br>• plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;<br>• silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works;<br>• mobile plant should be sited as far away from NSRs as possible and practicable;<br>• material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. | Control construction airborne noise by means of good site practices | Contractor | All construction sites | Construction stage | Noise Control Ordinance |
| S6.4.11 of HKBCFEIA | N2 | Install temporary hoarding located on the site boundaries<br>between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period. | Reduce the construction noise levels at low-level zone of NSRs through partial screening. | Contractor | All construction sites | Construction stage | • Noise Control Ordinance<br>• Annex 5, TM-EIA |
| S6.4.12 of HKBCFEIA | N3 | Install movable noise barriers (typically density @14kg/m2),<br>acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw. | Screen the noisy plant items to be used at all construction sites | Contractor | For plant items listed<br>in Appendix 6D of the EIA report at all construction sites | Construction stage | • Noise Control Ordinance<br>• Annex 5, TM-EIA<br>• 75dB(A) for residential premises<br>• The movable barrier should achieve at least 5dB(A) and the full enclosure should be designed to achieve 10dB(A) |

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| ***Construction Noise (Air borne)*** | | | | | | | |
| S6.4.13 of HKBCFEIA | N4 | Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards. | Reduce the noise levels of plant items | Contractor | For plant items listed in Appendix 6D of the EIA report at all | Construction stage | • Noise Control Ordinance<br>• Annex 5, TM-EIA |
| S6.4.14 of HKBCFEIA | N5 | Sequencing operation of construction plants where practicable. | Operate sequentially within the same work site to reduce the construction airborne noise | Contractor | All construction sites where practicable | Construction stage | • Noise Control Ordinance<br>• Annex 5, TM-EIA |
| S5.1 of TMCLKLEIA | N6 | Implement a noise monitoring under EM&A programme. | Monitor the construction noise levels at the selected representative locations | Contractor | Selected representative noise monitoring station | Construction stage | • Noise Control Ordinance<br>• Annex 5, TM-EIA<br>• 75dB(A) for residential premises |
| ***Sediment*** | | | | | | | |
| | S1 | All dredged marine mud, which required Type 2 Confined Marine Disposal under Environment, Transport and Works Bureau Technical Circular (Works) No. 34/2002 Management of Dredged/Excavated Sediment, from the Project shall be disposed of inside the sheet pile cellular structures within the Project boundary. | Re-deposition of Contaminated Sediment | Contractor | Dredged Contaminated Sediment | Construction stage | • Waste Disposal Ordinance<br>• ETWB TC34/2002 |
| | S2 | Before re-deposition the contaminated sediment, a layer of geotextile shall be placed at the bottom of the sheet pile cellular structures to avoid direct contact of the contaminated sediment and the bottom sediment. | | | | | |
| | S3 | A miniumum of 2m thick sand fill or public fill shall be placed on top of the contaminated sediment to protect and cover the sediment after re-deposition. | | | | | |
| | S4 | The contaminated sediment shall not be disturbed after re-deposition. No piling works or deep foundation which may disturb the contaminated sediment is allowed within the cellular structures. | | | | | |
| ***Waste Management (Construction Waste)*** | | | | | | | |
| S12.6 of TMCLKLEIA | WM1 | The Contractor shall identify a coordinator for the management of waste. | Proper implementation of WMP | Contractor | All construction sites | Construction | |

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| ***Waste Management (Construction Waste)*** | | | | | | | |
| S12.6 of TMCLKLEIA | WM2 | The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges. | Proper control of wastes disposal in accordance to relevant ordinances | Contractor | All construction sites | Construction stage | • Land (Miscellaneous Provisions) Ordinance (Cap28);<br>• Waste Disposal Ordinance (Cap 354);<br>• Dumping at Sea Ordinance (Cap 466);<br>• Water Pollution Control Ordinance. |
| S12.6 of TMCLKLEIA | WM3 | EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken. | Ensure proper implementation mitigation measures stated in WMP | Contractor | All construction sites | Construction stage | |

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| ***Waste Management (Construction Waste)*** | | | | | | | |
| S8.3.8 of HKBCFEIA and S12.6 of TMCLKLEIA | WM4 | *Construction and Demolition Material*<br><br>The following mitigation measures should be implemented in handling the waste:<br>• Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement;<br>• Carry out on-site sorting;<br>• Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate;<br>• Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible;<br>• Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified;<br>• Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction;<br>• In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation; and<br>• The surplus surcharge should be transferred to a fill bank. | Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal | Contractor | All construction sites | Construction stage | • Land (Miscellaneous Provisions) Ordinance<br>• Waste Disposal Ordinance<br>• ETWB TC19/2005 |

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| ***Waste Management (Construction Waste)*** | | | | | | | |
| S8.3.9 - S8.3.11 of HKBCFEIA and S12.6 of TMCLKLEIA | WM5 | <u>C&D Waste</u><br>• Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding and falsework should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage.<br>• The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage. | Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal | Contractor | All construction sites | Construction stage | • Land (Miscellaneous Provisions) Ordinance<br>• Waste Disposal Ordinance<br>• ETWB TC19/2005 |
| S8.2.12 - S8.3.15 of HKBCFEIA and S12.6 of TMCLKLEIA | WM6 | <u>Chemical Waste</u><br>• 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, Labelling and Storage of Chemical Wastes.<br>• Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation.<br>• The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated.<br>• Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD. | Control the chemical waste and ensure proper storage, handling and disposal. | Contractor | All construction sites | Construction stage | • Waste Disposal (Chemical Waste) General) Regulation<br>• Code of Practice on the Packaging, Labelling and Storage of Chemical Waste |

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| ***Waste Management (Construction Waste)*** | | | | | | | |
| S8.3.16 of HKBCFEIA and S12.6 of TMCLKLEIA | WM7 | *Sewage*<br>• Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly. | Proper handling of sewage from worker to avoid odour, pest and litter impacts | Contractor | All construction sites | Construction stage | Waste Disposal Ordinance |
| S8.3.17 of HKBCFEIA and S12.6 of TMCLKLEIA | WM8 | *General Refuse*<br>• The site and surroundings shall be kept tidy and litter free. General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes.<br>• A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law.<br>• Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible.<br>• Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided.<br>• Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.<br>• Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station.<br>• All waste containers shall be in a secure area on hardstanding. | Minimize production of the general refuse and avoid odour, pest and litter impacts | Contractor | All construction sites | Construction stage | Waste Disposal Ordinance |

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| ***Water Quality (Construction Phase)*** | | | | | | | |
| | W1 | Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of dredging/backfilling, as well as protection measures. Details of the measures are provided below:<br>• No dredging works of marine sediment shall be carried out the Project except for the construction of box culverts and seawalls at Portion D.<br>• Reclamation filling for the Project shall not proceed until at least 200m of leading seawall at the reclamation area formed above +2.2mPD, unless otherwise agreement was obtained from EPD, except for the 300m gaps for marine access. All underwater filling works shall be carried out behind seawalls to avoid dispersion of suspended solids outside the Project limit;<br>• Except for the filling of the cellular structures, not more than 15% public fill shall be used for reclamation filling below +2.5mPD during construction of the seawall;<br>• After the seawall is completed except for the 300m marine access as indicated in the EPs, not more than 30% public fill shall be used for reclamation filling below +2.5mPD, unless otherwise agreement from EPD was obtained;<br>• No more than 2 grab dredgers with a maximum daily dredging rate of 12,000$m^3$ shall be employed for dredging operation at Portion D of the Project;<br>• Upon completion of 200m leading seawall, no more than a total of 60 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 60,000 $m^3$ for HKBCF and TMCLKL southern landfall reclamation during the filling operation; and<br>• Upon completion of the whole section of seawall except for the 300m marine access as indicated in the EPs, no more than a total of 190 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 190,000 $m^3$ for the remaining filling operations for HKBCF and TMCLKL southern landfall reclamation.<br>• Closed grabs should be used for sediment dredging to reduce sediment loss when lifting the grabs to the barges. Only grab dredgers shall be used for dredging works of the Project; | To control construction water quality | Contractor | During dredging and filling | Construction stage | TM-EIAO |

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| ***Water Quality (Construction Phase)*** | | | | | | | |
| | W1 | • All mechanical grabs shall be designed and maintained to avoid spillage;<br>• The moving speed of construction vessels in the dredging area should be reduced to prevent disturbance to the seabed generating sediment plumes;<br>• Floating type silt curtains shall be installed enclosing the entire reclamation site at all time. Staggered layers of silt curtain shall be provided to prevent sediment loss at navigation accesses. The length of each staggered layers shall be at least 200m;<br>• The cage-type silt-curtain with steel enclosure is proposed to be installed to enclose local pollution caused by the grab dredging. The grab dredging work should be carried out within the cage-type silt-curtain;<br>• Single layer silt curtain to be applied around the North-east airport water intake;<br>• The silt-curtains should be maintained in good condition to ensure the sediment plume generated from dredging and filling be confined effectively within the site boundary;<br>• The dredging and filling works shall be scheduled to spread the works evenly over a working day;<br>• Cellular structure shall be used for seawall construction;<br>• A layer of geotextile shall be placed on top of the seabed before any filling activities take place inside the cellular structures to form the seawall;<br>• The conveyor belts shall be fitted with windboards and conveyor release points shall be covered with curtain to prevent any spillage of filling materials onto the surrounding waters;<br>• An additional layer of silt curtain shall be installed near the active stone column installation points. A layer of geotextile with stone blanket on top shall be placed on the seabed prior to stone column installation works. Stone blanket -> with silt curtain. | To control construction water quality | Contractor | During dredging and filling | Construction stage | TM-EIAO |

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| ***Water Quality (Construction Phase)*** | | | | | | | |
| S9.11.1 - S9.11.1.2 of HKBCFEIA and S6.10 of TMCLKLEIA | W1 | • In addition, dredging operations should be undertaken in such a manner as to minimise resuspension of sediments. Standard good dredging practice measures should, therefore, be implemented including the following requirements which should be written into the dredging and filling contract.<br>1. trailer suction hopper dredgers shall not allow mud to overflow;<br>2. use of Lean Material Overboard (LMOB) systems shall be prohibited;<br>3. mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted;<br>4. barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material;<br>5. any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes;<br>6. loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation;<br>7. excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved;<br>8. adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;<br>9. all vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; and<br>10. the works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site. | To control construction water quality | Contractor | During dredging and filling | Construction stage | • TM-EIAO<br>• Marine Fill Committee Guidelines<br>• DASO Permits Conditions |

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| ***Water Quality (Construction Phase)*** | | | | | | | |
| | W2 | *Re-deposition of Contaminated Sediment*<br>• All dredged marine mud, which required Type 2 Confined Marine Disposal under Environment, Transport and Works Bureau Technical Circular (Works) No. 34/2002, from the Project shall be disposed of inside the sheet pile cellular structures within the Project boundary.<br>• Before re-deposition the contaminated sediment, a layer of geotextile shall be placed at the bottom of the sheet pile cellular structures to avoid direct contact of the contaminated sediment and the bottom sediment.<br>• A miniumum of 2m thick sand fill or public fill shall be placed on top of the contaminated sediment to protect and cover the sediment after re-deposition.<br>• The contaminated sediment shall not be disturbed after re-deposition. No piling works or deep foundation which may disturb the contaminated sediment is allowed within the cellular structures. | Re-deposition of Contaminated Sediment | Contractor | Dredged Contaminated Sediment | Construction stage | • Waste Disposal Ordinance<br>• ETWB TC34/2002 |

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| ***Water Quality (Construction Phase)*** | | | | | | | |
| S9.11.1.3 of HKBCFEIA and S6.10 of TMCLKLEIA | W3 | Land Works<br><br>General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include:<br><br>• wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters;<br>• sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided;<br>• storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks;<br>• silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm;<br>• temporary access roads should be surfaced with crushed stone or gravel;<br>• rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities;<br>• measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system;<br>• open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms;<br>• manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers;<br>• discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; | To control construction water quality | Contractor | All land-based construction sites | Construction<br><br>stage | TM-EIAO |

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| ***Water Quality (Construction Phase)*** | | | | | | | |
| S9.11.1.3 of HKBCFEIA and S6.10 of TMCLKLEIA | W3 | • all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit;<br>• wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain;<br>• the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel;<br>• wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects;<br>• vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal;<br>• the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately;<br>• waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance;<br>• all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and<br>• surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system. | To control construction water quality | Contractor | All land-based construction sites | Construction stage | TM-EIAO |
| S9.14 of HKBCFEIA and S6.10 of TMCLKLEIA | W4 | Implement a water quality monitoring programme | Control water quality | Contractor | At identified monitoring location | During construction period | • TM-water<br>• Water Pollution Control Ordinance |
| S6.10 of TMCLKLEIA | W5 | All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice. | To control construction water quality | Contractor | All construction site areas | During construction period | |

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| ***Ecology (Construction Phase)*** | | | | | | | |
| S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA | E1 | • Use closed grab in dredging works.<br>• Install silt curtain during the construction.<br>• Limit dredging and works fronts.<br>• Construct seawall prior to reclamation filling where practicable.<br>• Good site practices<br>• Strict enforcement of no marine dumping.<br>• Site runoff control<br>• Spill response plan | Minimise marine water quality impacts | Contractor | Seawall, reclamation area | During construction | TM-Water |
| S10.7 of HKBCFEIA | E2 | • Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater | Prevent Sedimentation from Land-based works areas | Contractor | Land-based works areas | During construction | TM-Water |
| S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA | E3 | • Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time | Prevent disturbance to terrestrial fauna and habitats | Contractor | Land-based works areas | During construction | |
| S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA | E4 | • Dolphin Exclusion Zone<br>• Dolphin watching plan | Minimize temporary marine habitat loss impact to dolphins | Contractor | Marine works | During marine works | TM-EIAO |
| S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA | E5 | • Decouple compressors and other equipment on working vessels<br>• Proposal on design and implementation of acoustic decoupling measures applied during dredging and reclamation works<br>• Avoidance of percussive piling | Minimise marine noise impacts on dolphins | Contractor | Marine works | During marine works | • TM-EIAO<br>• Marine Park Regulations |
| S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA | E6 | • Control vessel speed<br>• Skipper training.<br>• Predefined and regular routes for working vessels; avoid Brothers Islands. | Minimise marine traffic disturbance on dolphins | Contractor | Marine traffic | During marine works | • Marine Park Regulations<br>• Code of Conduct for dolphin watching activity |
| S10.10 of HKBCFEIA and S8.14 of TMCLKLEIA | E7 | • Vessel based dolphin monitoring | Minimise marine traffic disturbance on dolphins | Contractor | Northeast and Northwest Lantau and | Prior to construction, during | |

| EIA Ref. | EM&A Log Ref | Recommended Mitigation Measures | Objectives of the Recommended Measures & Main Concerns to address | Who to implement the measures? | Location of the measures | When to implement the measures? | What requirements or standards for the measures to achieve? |
|---|---|---|---|---|---|---|---|
| ***Fisheries*** | | | | | | | |
| S11.7 of HKBCFEIA | F1 | • Reduce re-suspension of sediments<br>• Limit dredging and works fronts.<br>• Good site practices | Minimise marine water quality impacts | Contractor | Seawall, reclamation area | During construction | TM-Water |
| S11.7 of HKBCFEIA | F2 | • Install silt-grease trap in the drainage system collecting surface runoff | Minimise impacts on marine water quality impacts | Designer | Reclamation area | During | TM-Water |
| ***Landscape & Visual (Detailed Design Phase)*** | | | | | | | |
| S14.3.3.1 of HKBCFEIA | LV1 | General design measures include:<br>• Roadside planting and planting along the edge of the reclamation is proposed;<br>• Transplanting of mature trees in good health and amenity value where appropriate and reinstatement of areas disturbed during construction by compensatory hydro-seeding and planting;<br>• Protection measures for the trees to be retained during construction activities;<br>• Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed;<br>• Providing planting area around peripheral of HKBCF for tree planting screening effect; and<br>• Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline. | Minimise visual & landscape impact | Detailed designer | HKBCF | Design Stage | |
| ***Landscape & Visual (Construction Phase)*** | | | | | | | |
| S14.3.3.3 of HKBCFEIA and S10.9 of TMCLKLEIA | LV2 | Mitigate Landscape Impacts | Minimise landscape impact | Contractor | All construction site areas | Construction stage | |

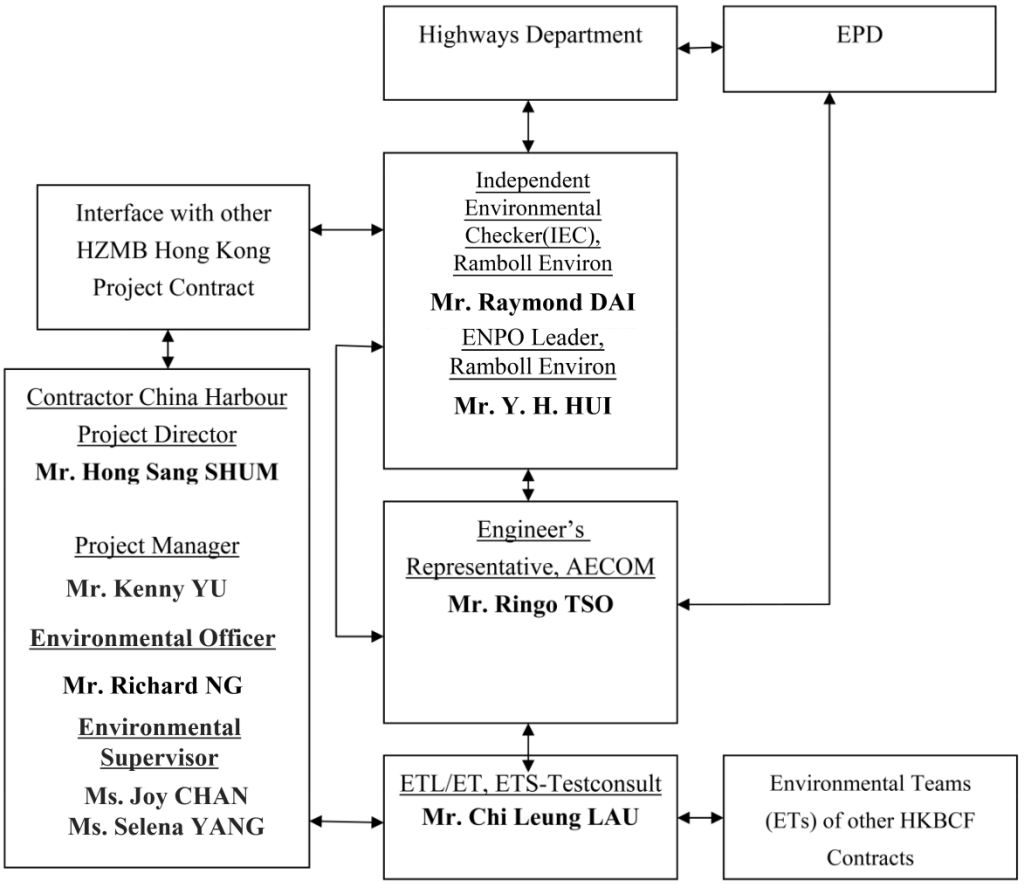
| EIA Ref. | EM&A Log Ref | Recommended Mitigation Measures | Objectives of the Recommended Measures & Main Concerns to address | Who to implement the measures? | Location of the measures | When to implement the measures? | What requirements or standards for the measures to achieve? |
|---|---|---|---|---|---|---|---|
| ***Landscape & Visual (Construction Phase)*** | | | | | | | |
| S10.9 of TMCLKLEIA | LV3 | Mitigate Landscape Impacts<br>CM1. Existing trees on boundary of the Project Area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at Tree Removal Application stage).<br>CM2. Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.<br>CM7. Ensure no run-off into water body adjacent to the Project Area.<br>CM9. Recycle/Reuse all felled trees and vegetation, e.g. mulching. | Minimise landscape impact | Contractor | All construction site areas | Construction stage | |
| S14.3.3.3 of HKBCFEIA | LV4 | Mitigate Visual Impacts<br>V1. Minimize time for construction activities during construction period.<br>V2. Provide screen hoarding at the portion of the project site/ works areas / storage areas near VSRs who have close low- level views to the Project during HKBCF construction. | Minimise visual impact | Contractor | All construction site areas | Construction stage | |
| S10.9 of TMCLKLEIA | LV5 | Mitigate Visual Impacts<br>CM5. Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works.<br>CM6. Control night-time lighting and glare by hooding all lights.<br>CM8. Avoidance of excessive height and bulk of buildings and structures. | Minimise visual impact | Contractor | All construction site areas | Construction stage | |
| ***EM&A*** | | | | | | | |
| S15.2.2 of HKBCFEIA | EM1 | An Independent Environmental Checker needs to be employed as per the EM&A Manual. | Control EM&A Performance | Project Proponent | All construction sites | Construction stage | • EIAO Guidance Note No.4/2002<br>• TM-EIAO |

| EIA Ref. | EM&A Log Ref | Recommended Mitigation Measures | Objectives of the Recommended Measures & Main Concerns to address | Who to implement the measures? | Location of the measures | When to implement the measures? | What requirements or standards for the measures to achieve? |
|---|---|---|---|---|---|---|---|
| ***EM&A*** | | | | | | | |
| S15.5 -<br><br>S15.6 of HKBCFEIA | EM2 | • An Environmental Team needs to be employed as per the EM&A Manual.<br>• Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures.<br>• An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with. | Perform environmental monitoring & auditing | Contractor | All construction sites | Construction<br><br>stage | • EIAO Guidance Note No.4/2002<br>• TM-EIAO |

# Appendix D

# Project Organization for Environmental Works

## Project Organization For Environmental Works



# Appendix E

# Sample Data Sheet for Monitoring

**Data Sheet for TSP Monitoring**

| | | |
|---|---|---|
| Monitoring Location | | |
| Details of Location | | |
| Sampler Identification | | |
| Date & Time of Sampling | | |
| Elapsed-time Meter Reading | Start (min.) | |
| | Stop (min.) | |
| Total Sampling Time (min.) | | |
| Weather Conditions | | |
| Site Conditions | | |
| Initial Flow Rate, Qsi | Pi (mmHg) | |
| | Ti ( C) | |
| | Hi (in.) | |
| | Qsi (Std. $m^3$) | |
| Final Flow Rate, Qsf | Pf (mmHg) | |
| | Tf ( C) | |
| | Hf (in.) | |
| | Qsf (Std. $m^3$) | |
| Average Flow Rate (Std. $m^3$) | | |
| Total Volume (Std. $m^3$) | | |
| Filter Identification No. | | |
| Initial Wt. of Filter (g) | | |
| Final Wt. of Filter (g) | | |
| Measured TSP Level (µg/$m^3$) | | |

| | Name & Designation | Signature | Date |
|---|---|---|---|
| Field Operator: | | | |
| Laboratory Staff | | | |
| Checked by: | | | |

## Noise Monitoring Field Record Sheet

| | | |
|---|---|---|
| Monitoring Location | | |
| Description of Location | | |
| Date of Monitoring | | |
| Measurement Start Time (hh:mm) | | |
| Measurement Time Length (min.) | | |
| Noise Meter Model/Identification | | |
| Calibrator Model/Identification | | |
| Measurement Results | $L_{90}$ (dB(A)) | |
| | $L_{10}$ (dB(A)) | |
| | Leq (dB(A)) | |
| Major Construction Noise Source(s) During Monitoring | | |
| Other Noise Source(s) During Monitoring | | |
| Remarks | | |

| | Name & Designation | Signature | Date |
|---|---|---|---|
| Recorded by | | | |
| Checked by | | | |

# Appendix F

# Sample Template for Interim Notification

**Incident Report on Action Level or Limit Level Non-compliance**

| | |
|---|---|
| Project | |
| Date | |
| Time | |
| Monitoring Location | |
| Parameter | |
| Action & Limit Levels | |
| Measured Level | |
| Possible reason for Action or Limit Level Non-compliance | |
| Actions taken / to be taken | |
| Remarks | |

Location Plan

Prepared by:

Designation:

Signature :

Date: