MOTT MACDONALD

Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities - The Road Connection Between HKBCF and the Airport, Chek Lap Kok

Environmental Monitoring and Audit Manual

February 2022

Mott MacDonald
3/F Manulife Place
348 Kwun Tong Road
Kwun Tong
Kowloon
Hong Kong

T +852 2828 5757
mottmac.hk

Airport Authority Hong Kong

Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities - The Road Connection Between HKBCF and the Airport, Chek Lap Kok

Environmental Monitoring and Audit Manual

February 2022

Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

This Environmental Monitoring and Audit Manual has been

reviewed and certified by the Environmental Team Leader (ETL)

in accordance with Condition 3.1 of

Further Environmental Permit No. FEP-01/353/2009/K.

Certified by:

Heidi Yu
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date 25 February 2022

AECOM
12/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong
香港新界沙田鄉事會路 138 號新城市中央廣場第 2 座 12 樓
www.aecom.com
+852 3922 9000 tel
+852 3922 9797 fax

Our Ref : 60440482/C/RMKY220225

By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau, Hong Kong

Attn: Mr. Lawrence Tsui, Principal Manager, Environmental Compliance

25 February 2022

Dear Sir,

Contract No. 3102
Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilitiies – The Road Connection Between HKBCF and the Airport, Chek Lap Kok - Independent Environmental Checker Consultancy Services

Environmental Monitoring and Audit Manual

We refer to the Environmental Monitoring and Audit Manual submitted and certified by the ET Leader on 25 February 2022.

We would like to inform you that we have no adverse comment on the captioned submission. Therefore we write to verify the captioned submission in accordance with the requirement stipulated in Condition 3.1 of FEP-01/353/2009/K.

Should you have any query, please feel free to contact the undersigned at 3922 9141.

Yours faithfully,
AECOM Asia Co. Ltd.

Roy Man
Independent Environmental Checker

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1 Introduction

1.1 Background

1.1.1 To connect the Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF) with the Hong Kong International Airport (HKIA), roads including an elevated bridge structure (hereinafter referred to as "the HKBCF Viaduct/Roads") were proposed as part of the HKBCF project, as described in Section 4.5 of the approved Environmental Impact Assessment (EIA) report of the HKBCF project. The HKBCF Viaduct/Roads are located partly within the boundary of the Airport Island near Terminal 2 (T2) and partly within the boundary of the land corridor between HKBCF and the Airport Island, i.e. partly within the HKBCF boundary.

1.1.2 Under the HKBCF project, the arrangements for the planning of the construction of the HKBCF Viaduct/Roads were formulated based on the scenario with the existing two-runway system (2RS) at the HKIA. The portion of the HKBCF Viaduct/Roads falling within the boundary of the land corridor between HKBCF and HKIA were originally planned to be constructed by Highways Department (HyD) of the Government of the Hong Kong Special Administrative Region (HKSARG) as part of the HKBCF project.

1.1.3 With the planned expansion of HKIA into a three-runway system (3RS), a revised layout of the HKBCF Viaduct/Roads (the revised layout is hereinafter referred to as the proposed "HKIA-HKBCF Road Connection") was formulated as part of the P282 Terminal 2 Expansion Design Consultancy of Airport Authority Hong Kong (AAHK). The proposed HKIA-HKBCF Road Connection has taken into account the design of the 3RS road network designed around the expanded T2 building. In addition to preparing the detailed design, it was also considered that the proposed HKIA-HKBCF Road Connection within the HKBCF boundary would be constructed by AAHK instead of HyD along with the 3RS road network planned within the Airport Island. Upon completion of the construction works, the new HKIA-HKBCF Road Connection outside the Airport Island would be handed over to HyD for future operation and maintenance.

1.1.4 The EIA for the HKBCF project, which covered the HKBCF Viaduct/Roads as a Designated Project (DP) based on the requirements set out in Item A.8. (i.e., A road bridge more than 100m in length between abutments) in Part 1 of Schedule 2 to the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), was completed and approved (EIA Register No.: AEIAR-145/2009) and an Environmental Permit (EP) (EP No.: EP-353/2009) was granted under the EIAO to HyD.

1.1.5 On the other hand, the 3RS EIA had subsequently commenced and completed (EIA Register No.: AEIAR-185/2014) by AAHK, and it has already taken the layout of the proposed HKIA-HKBCF Road Connection into account and has assessed the relevant cumulative environmental impacts. The planned change in implementation agent from HyD to AAHK for the construction of the proposed HKIA-HKBCF Road Connection outside the Airport Island would involve a transfer of corresponding responsibilities under the HKBCF EP from HyD to AAHK. To this end, an Environmental Review Report (ERR) was prepared and submitted to EPD in November 2018 which concluded that the change of implementation agent form HyD to AAHK for the construction of HKIA-HKBCF Road Connection would not result in any exceedance or violation of the environmental performance requirements set out in the approved HKBCF and 3RS EIAs and the mitigation measures identified in these EIAs remained relevant and valid. A Further

Environmental Permit (EP No. FEP-01/353/2009/K) for the construction of the HKIA-HKBCF Road Connection was granted to AAHK in December 2018 in accordance with Section 12 of EIAO.

1.2 Purpose of the Manual

1.2.1 This Environmental Monitoring and Audit (EM&A) Manual outlines the monitoring and audit programme proposed for the HKIA-HKBCF Road Connection (hereafter referred to as the Project). In accordance with Condition 3.1 of Further Environmental Permit (FEP) (EP No. FEP-01/353/2009/K), an updated EM&A Manual shall be prepared before the commencement of construction works.

1.2.2 The purpose of this EM&A Manual (hereafter referred to as the Manual) is to guide the setup of an EM&A programme to ensure compliance with the recommendations in the approved Environmental Impact Assessment (EIA) Report of Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities – Investigation (hereinafter referred to as “the EIA Report”) and the findings from the ERR, to summarize appropriate EM&A requirements in accordance with the information and recommendations described in the EIA Report and by taking into account any specific site conditions that may be changed before the construction of HKIA-HKBCF Road Connection.

1.2.3 This Manual is prepared by making reference to the framework of the EM&A Manual of the HZMB HKBCF – Investigation and the information and recommendation as described in ERR as approved by EPD. AAHK is the implementation agent for the construction of HKIA-HKBCF Road Connection and the duties for EM&A works have been presented in this Manual.

1.2.4 In this updated submission, Section 6 incorporates the revised quantity of marine sediment to be excavated as estimated by the Contractor. Section 13 incorporates the latest change on the landscape planting proposal.

2 Project Description

2.1.1 The Project will consist of the construction of a road bridge more than 100m in length between abutments connecting between HKBCF and the HKIA which is part of the work for HZMB-HKBCF. The location of Project is shown in **Figure 1**. The proposed construction programme of the Project is provided in **Appendix A**. The FEP required that an Environmental Team (ET) shall not be in any way an associated body of the Contractor and Independent Environmental Checker (IEC) for the Project. ET shall be headed by an ET Leader who has at least seven years of experience in EM&A or environmental management.

2.1.2 The FEP also required that the IEC shall not be in any way an associated body of the Contractor and ET for the Project. IEC shall have at least seven years of experience in EM&A or environmental management.

2.1.3 The responsibilities of respective parties are:

2.1.3.1 **Project Manager (PM) or the PM's Representative of AAHK**

- supervise the Contractor's activities and ensure that the requirements in the Manual are fully complied with;
- employ ET to implement the EM&A Programme; and
- employ IEC to audit the results of the EM&A works carried out by the ET.

2.1.3.2 **The Contractor**

- comply with relevant contract conditions and specifications on environmental protection;
- provide assistance to ET in carrying out monitoring and site inspection;
- participate the site inspection undertaken by the ET and IEC; and undertake any corrective actions;
- provide information / advice to the ET regrading works programme and activities which may contribute to the generation of adverse environmental impacts;
- submit proposals on mitigation measures to reduce environmental impacts;
- implement measures to reduce environmental impacts where necessary; and
- adhere to the agreed procedures for carrying out complaint investigation

2.1.3.3 **Environmental Team**

- review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- 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 site environmental conditions;
- report on the environmental monitoring and audit results to the PM, IEC and EPD;
- undertake regular on-site audits/inspections and report to the PM of any potential non-compliance;
- follow up and close out non-compliance actions;

- keep a contemporaneous log-book of each and every instance or circumstance or change of circumstances, which may affect the compliance with the recommendations of the EIA Report and the FEP. The log-book shall be kept readily available for inspection by all persons assisting in supervision of the implementation of the recommendations of the EIA Report and FEP or by the Director or his authorized officers; and
- notify the IEC within one working day of the occurrence of any such instance or circumstance or change of circumstances.

2.1.3.4 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 PM;
- review the EM&A reports (monthly and quarterly EM&A reports) submitted by the ET;
- verify the submissions required in the EM&A Manual and FEP;
- review the proposal on mitigation measures submitted by the Contractor;
- 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;
- verify the environmental acceptability of permanent and temporary works and relevant design plans;
- report the findings of site inspections and other environmental performance reviews to PM; and
- verify the log-book as maintained by ET.

3 Environmental Submissions

3.1 Introduction

3.1.1 According to the requirements as stipulated in the FEP and Section 3.3.3 of the ERR, the Management Organization of Main Construction Companies, Landscape and Visual Plan (L&V Plan), Waste Management Plan (WMP), Environmental Management Plan (EMP) and Construction Method Statement shall be prepared.

3.2 Management Organization of Main Construction Companies

3.2.1 As per Condition 2.3 of FEP, AAHK shall include the management organization of the main construction companies and/or any form of joint ventures associated with the construction of the corresponding part of the Project and deposit to EPD at least two weeks before the commencement of construction of each relevant contract under the Project. The submitted information shall include at least an organization chart, names of responsible persons and their contact details.

3.3 Landscape and Visual Plan

3.3.1 As per the Condition 2.4 of the FEP, AAHK shall deposit an L&V Plan to EPD at least one month before the commencement of construction of relevant part of the Project. The L&V Plan shall incorporate aesthetic architectural design on buildings structures and related infrastructure of the Project, streetscape elements, planting proposals and other measures including night-time lighting control.

3.4 Waste Management Plan

3.4.1 As per the Condition 2.5 of the FEP, AAHK shall deposit a WMP to EPD at least one month before the commencement of the construction of the Project. The WMP shall describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities and shall include the recommended mitigation measures on waste management in the EIA Report. The WMP should indicate the disposal locations(s) of all surplus excavated spoil and other waste. A trip ticket system shall be included in the WMP. All measures recommended in the WMP shall be fully and properly implemented.

3.4.2 The Contractor should adopt this WMP as a basis to develop their own contract-specific WMPs. The contract-specific WMPs should be updated from time to time and submitted to the ET and IEC for their verification and AAHK for agreement.

3.5 Environmental Management Plan

3.5.1 A systematic EMP shall be prepared by the Contractor to ensure effective implementation of the mitigation measures, monitoring and remedial requirements presented in the EIA, EM&A and Environmental Mitigation Implementation Schedule (EMIS). ET and IEC will audit the implementation status against the EMP and advise

the necessary remedial actions required. These remedial actions shall be enforced by the PM through contractual means.

3.5.2 The Contractor shall define in details in the EMP how to implement the recommended mitigation measures in order to achieve the environmental performance defined in the Hong Kong environmental legislation and the EIA documentation.

3.5.3 The review of on-site environmental performance shall be undertaken by ET 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 shall be made to ETWBTC 19 / 2005 “Environmental Management on Construction Sites” or its latest versions, and any other relevant Technical Circulars.

3.6 Construction Method Statement

3.6.1 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 PM 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 EMP should accommodate the proposed changes.

4 Air Quality

4.1 General

4.1.1 As the Project will involve only construction of HKIA-HKBCF Road Connection on the reclaimed land already formed under the HKBCF project, the construction dust and emissions from construction works of this nature and size would be limited. According to the ERR, with the implementation of the recommended mitigation measures in Section 5.2, the construction phase air quality at all identified air sensitive receivers would comply with the Air Quality Objectives and no adverse air quality impacts would be anticipated from the construction of the Project. In view of the above, no air quality monitoring during the construction phase of the Project is proposed.

4.2 Mitigation Measures

4.2.1 Condition 2.6 of the FEP has stipulated that watering shall be undertaken at least eight times per day on all exposed soil within the Project site and associated work areas throughout the construction period. In addition, relevant dust control measures such as surfaced with crushed stone or coarse gravel on the temporary access road, enclosure for handling of dusty materials, and wheel wash facilities recommended in the EIA Report shall be implemented to minimise generation of dust. All relevant mitigation measures are summarised in the Environmental Mitigation Implementation Schedule (EMIS) in **Appendix B**.

5 Noise

5.1 General

5.1.1 According to the EIA Report, the nearest noise sensitive receivers (NSRs) from the Project is located in the existing Tung Chung New Town at distance of about 2 km from the construction work site of the Project. Given the large separation distance between the works area and the NSRs, no adverse construction noise impact would arise with appropriate mitigation measures in place. In view of the above, no noise monitoring during the construction phase of the Project is proposed.

5.2 Mitigation Measures

5.2.1 The EIA Report recommended construction noise control measures including:

- good site practices to limit noise emissions at the sources;
- use of quiet plant and working methods;
- use of site hoarding as noise barrier to screen noise at ground level of NSRs;
- use of shrouds/ temporary noise barriers to screen noise from relatively static powered mechanical equipment (PME);
- scheduling of construction works outside school examination periods in critical area; and
- alternative use of plant items within one worksite, wherever practicable.

5.2.2 Relevant mitigation measures are summarised in the EMIS in **Appendix B**.

6 Sediment Quality

6.1 General

6.1.1 Based on the EIA Report and the Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TCW) No. 34/2002 on the Management of Dredge/Excavated Sediment, the marine sediments arising from the works within the Project works area were Category L sediments and Category M sediments that had passed the biological screening, which could be handled through open sea disposal and open sea disposal at dedicated sites respectively. In accordance with the Condition 3.27 of the EP (EP No.: EP-353-2009/K), if any off-site disposal is required, the excavated marine sediment shall be disposed of at the designated disposal sites within Hong Kong as allocated by the Marine Fill Committee or other locations as agreed by EPD. The procedures for seeking disposal shall comply with requirements provided in ETWB TCW No. 34/2002.

6.1.2 According to the Contractor, the volume of marine sediment to be excavated from the construction of the foundations of the Project would be about 4,500 m^3. It is recommended that these marine sediments excavated may be treated using cement/ solidification/ stabilization techniques and reused onsite or offsite for backfilling and/or landscaping so that the need for offsite disposal is avoided as far as practicable. As the location where the treated marine sediment to be re-used has yet to be confirmed at the time of the preparation of this manual, it is subject to the final construction design.

6.1.3 The treated marine sediments using cement/solidification/stabilization techniques should be tested against the Toxicity Characteristics Leaching Procedure (TCLP) (as shown in **Table 6.1**) which were recommended in the EPD's *Practice Guide for Investigation and Remediation of Contaminated Land.* The treated sediment should also be tested against relevant engineering requirements to confirm their suitability as backfilling material for respective areas of different future uses. Unconfined Compressive Strength (UCS) will be tested and defined based on respective engineering requirements.

Table 6.1: Universal Treatment Standards (UTS) for Reuse of Sediment Treated by Cement Mixing and Stabilization

Parameters	TCLP Limit (mg/L)
Arsenic	5
Cadmium	0.11
Total Chromium	0.6
Lead	0.75
Mercury	0.025
Nickel	11
Zinc	4.3

Notes:
1) Universal Treatment Standard – US 40 CFR 268.48
2) Antimony and Barium are excluded from the above table as they are not considered as a contaminant of concern for the sediment quality in the EIA study. For Copper, it must be reduced by at least 90% in mobility for copper through cement stabilization/solidification remedial treatment. The reduction of mobility of copper (leachable metals contaminant) should be confirmed through TCLP tests (i.e. to carry out TCLP test for the untreated sediment and for the sediment after treatment and to compare the concentrations of copper in the leachates). By taking account into the scenario where the Copper concentration of the sample is below the limit of the reporting (LOR) of the laboratory analysis (Copper: 0.1 mg/L), the treatment

target is considered to be achieved in case the Copper concentration of the sample taken after treatment is smaller than the LOR.

6.1.4 The testing frequency for TCLP is one sample per 50 m^3 of the broken up solidified mixture of the treated marine sediment mix for the first 1,000 m^3 of the treated marine sediment. Provided that the samples meet the UTS for the tested parameters shown in **Table 6.1** and the UCS test, the subsequent testing frequency will be reduced to be at least two samples per 10,000 m^3. In the event that the treated marine sediment mix does not meet the specified treatment target, the concerned whole batch should be crushed and the material would be further handled and treated as necessary. The testing frequency should be revised to one sample per 50 m^3 (with two further samples kept for contingency) and treated samples should be taken for laboratory testing. Once the UTS and UCS for the relevant tested parameters are attained, the previous sampling frequency should be resumed.

6.1.5 In the worst case scenario where cement/solidification/stabilization techniques cannot achieve the specified treatment target of the excavated marine sediment, the Contractor shall propose alternative method(s) to treat the marine sediment. The Contractor shall seek review without objection from the ET and IEC, and acceptance by EPD on the proposed alternative method(s).

6.2 Mitigation Measures

6.2.1 The proposed mitigation measures are summarised in the EMIS in **Appendix B**.

7 Waste Management

7.1 General

7.1.1 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.

7.1.2 EM&A requirements for waste management are only required during the construction phase. Effective management of waste during the construction phase shall be monitored through 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.

7.1.3 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.

7.2 Waste EM&A Requirements

7.2.1 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:

- Billing account under the Waste Disposal (Charge for Disposal of Construction Waste) Regulation (Cap 354N);
- Chemical Waste Permits/licenses under the Waste Disposal Ordinance (Cap 354C);
- Public Dumping License under the Land (Miscellaneous Provisions) Ordinance (Cap 28); and
- Effluent Discharge License under the Water Pollution Control Ordinance.

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

7.2.3 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 Contractor once a week to ensure proper records are being maintained and procedures undertaken in accordance with the Waste Management Plan.

7.2.4 The Contractor's waste management practices shall be audited with reference to the checklist detailed in **Table 7.1** below:

Table 7.1: Waste Management Checklist

Activities	Timing	Monitoring Frequency	Action Required if non-compliance
All necessary waste disposal permits/ licences have been obtained.	Before commencement of works	Once	Apply for the permits/ licences prior to disposal of waste. The ET shall ensure that corrective actions are taken.
Only licensed waste hauliers are used for waste collection.	Throughout the works	Weekly	The ET shall inform PM and IEC of the non-compliance. The PM 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 waste generated, reused, recycled, and disposed are properly kept. For construction and demolition material/ waste, number of loads each day shall be recorded. *	Throughout the works	Weekly	The Contractor shall estimate the missing data based on previous record and the activities carried out. The ET shall audit the results and forward to PM and IEC for approval.
Waste are removed from site in a timely manner.	Throughout the works	Weekly	The ET shall inform PM and IEC of the non-compliance. The PM 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 PM and IEC of the non-compliance. The PM shall instruct the Contractor to clean the storage and/or properly cover the waste storage areas.
Waste of different types is segregated in different containers or skip to enhance recycling of material and proper disposal of waste.	Throughout the works	Weekly	The ET shall inform PM and IEC of the non-compliance. The PM shall instruct the Contractor to provide separate containers/ skips for different types of waste and ensure the workers place the waste in appropriate containers.
Chemical waste is stored, handled, and disposed of in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes published by EPD.	Throughout the works	Weekly	The ET shall inform PM and IEC of the non-compliance. The PM shall instruct the Contract to rectify the problems immediately. Warning shall be given to the Contractor if corrective actions are not taken within 24 hours and the Waste Control Group of the EPD shall be notified.
Construction and demolition material/ waste in dump trucks are properly covered before leaving the site.	Throughout the works	Weekly	The ET shall inform PM and IEC of the non-compliance. The PM shall instruct the Contractor to comply. The Contractor shall prevent trucks shall leaving the site until the waste are properly covered.
Waste is disposed of at licensed sites.	Throughout the works	Weekly	The ET shall inform PM and IEC of the non-compliance. The PM 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: * Quantity of waste can be estimated based on average truck load and the details of the billing account of the Contractor under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation.

7.3 Mitigation Measures

7.3.1 All the relevant mitigation measures for the Project recommended in the EIA Report are summarised in the EMIS in **Appendix B**.

8 Water Quality

8.1 General

8.1.1 As the construction works of the Project will be land-based, the key water quality issues of the Project include water quality impacts from construction site runoff, and wastewater and sewage generated from construction activities. Mitigation measures are recommended in the EIA Report for controlling potential water pollution from land works and are considered relevant and adequate for the Project.

8.1.2 Prior to the commencement of the construction work, a detailed site drainage management plan should be prepared by the Contractor. The plan should cover measures to minimize all potential water quality impact arising from the surface runoffs of the Project. The plan shall be reviewed by ET and IEC before submission to EPD.

8.2 Mitigation Measures

8.2.1 The construction water quality control measures recommended in the EIA Report such as preventing direct discharge of wastewater from temporary site facilities, providing storm drainage with silt removal facilities, controlling site surface runoff, preventing oil and chemical spillage, and other measures outlined in the Practice Note for Professional Persons (ProPECC), Construction Site Drainage (PN 1/94) should be adopted to control any potential water quality impacts. Mitigation measure to minimise water quality impacts from construction site runoff and wastewater and sewage generated from construction activities include:

(i) 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.

(ii) Sediment-laden wastewater generated from foundation construction work, wheel washing, site runoff and wastewater with high concentration of SS as generated from any construction activities should be treated using sedimentation tanks or package treatment systems. Treated wastewater can be reused for vehicle washing, dust suppression and general cleaning. Bentonite slurry used in bore-pile construction should be reconditioned and reused to minimise the disposal volume of the used slurry.

(iii) 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.

(iv) Licensed waste collector should be employed for the collection and disposal of the sewage generated from portable toilets.

(v) Wheel washing facilities should be installed at all site entrances/exits.

(vi) An emergency plan should be developed by the Contractor to deal with accidental spillage of chemicals.

8.2.2 A license under the Water Pollution Control Ordinance should be obtained prior to any discharge of wastewater under the Project. All discharge should be in compliance with the conditions as stipulated in the license.

8.2.3 All the relevant mitigation measures recommended in the EIA Report are summarised in the EMIS in **Appendix B**.

9 Ecology

9.1 General

9.1.1 The construction works of the Project will be undertaken on reclaimed land with no existing terrestrial ecological habitat. No potential ecological impact associated with the Project works is identified and therefore no mitigation measures are required.

10 Fisheries

10.1 General

10.1.1 As the construction works of the Project will be undertaken on reclaimed land, no potential impacts related to fisheries and marine culture were identified and therefore no mitigation measures are required.

11 Cultural Heritage

11.1 General

11.1.1 The Project works locate on reclaimed land with no existing cultural heritage resources. No adverse impact on built heritage, marine archaeology, and terrestrial archaeology is anticipated. Hence, further investigation or mitigation measure is not required.

12 Hazard To Life

12.1 General

12.1.1 No blasting work will be involved for the construction of the Project. Therefore, no explosives Quantitative Risk Assessment (QRA) was undertaken and no mitigation measures is required.

13 Landscape & Visual

13.1 General

13.1.1 A number of design measures, such as aesthetic architectural on related infrastructure, streetscape elements, landscape planting and other measures including night-time lighting control were recommended in the EIA Report for minimizing landscape and visual impacts from the HKBCF project. This section outlines the relevant monitoring and audit of these measures applicable to this Project.

13.2 Monitoring Details

13.2.1 The design, implementation and maintenance of landscape mitigation measures should be checked by ET to ensure that any potential non-conformity between the proposed landscape measures and any other works of the project shall be resolved as early as practical without affecting the implementation of the mitigation measures.

Table 13.1: 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 fulfil 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 Detailed Design Phase
Construction *	Checking of the contractor's protection and mitigation measures during the construction period.	Report on Contractor's compliance, by ET	Counter-signature of report by IEC	Bi-weekly
Establishment Works *	Checking of the maintenance of existing trees and landscape planting works during the 12-month Establishment Period after completion of the construction works.	Report on Contractor's compliance by Maintenance Agency as appropriate	Counter-signature of report by Management Agency	Every two months
Long Term Management (10 year) *	Monitoring of the long-term management of the landscape planting works in the period up to 10 years after completion of the construction works	Report on Contractor's compliance by Maintenance Agency as appropriate	Counter-signature of report by Management Agency	Annually

Notes:

* During the construction, establishment and long-term management phases, the management and maintenance of existing trees are provided by the Management, Operation and Maintenance (MOM) Contractor and HyD Contract No. HY/2019/01.

** The detailed design of HKIA-HKBCF Road Connection was completed.

Detailed Design Phase

13.2.2 The relevant mitigation measures, which were proposed in the EIA Report to mitigate the landscape and visual impacts, were embodied into the detailed engineering design, landscape design drawings and contract documents. The Detailed Design were checked to ensure that the measures are fully incorporated. The agent for implementation and checking of the measures are summarized in EMIS in **Appendix B**.

13.2.3 The following mitigation measures were 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; and
- Waste limitation by recycling of felled trees into woodchip mulch for use in landscaped areas.

13.2.4 The following design measures were developed during detailed design stage to remedy and compensate unavoidable impacts:

- 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; and
- Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed.

Construction Phase and Establishment Period

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

Table 13.2: Mitigation Measures during Construction and Operation Phases

Stage	Description of Mitigation Measures
Construction Phase	Mitigate both Landscape and Visual Impacts G1. Grass-hydroseed bare soil surface and stock pile areas. G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. G11. All existing trees shall be carefully protected during construction.
	Mitigate Visual Impacts V1. Minimize time for construction activities during construction period. V2. Provide screen hoarding at the portion of the project site / works areas / storage areas near Visual Sensitive Receivers (VSRs) who have close low-level views to the Project during construction.
Operation Phase	Mitigate both Landscape and Visual Impacts G10. Provide proper planting maintenance on the new planting areas to enhance the aesthetic degree.
	Mitigate Visual Impacts V3. Lighting design to minimize glare at night. Decorative road lighting to be considered during detailed design stage.

13.2.6 During the construction, establishment and long-term management phases, the management and maintenance of existing trees are provided by the MOM Contractor and HyD Contract No. HY/2019/01. The remaining landscape and visual mitigation measures are provided by the Contractor of AAHK as stated in Table 13.2.

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

13.2.8 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)

13.2.9 The management and maintenance of existing trees will be provided by the MOM Contractor and HyD Contract No. HY/2019/01 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 in the Long Term Management stage is included in the monitoring requirement.

13.3 Baseline Monitoring

13.3.1 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 PM. The approved photographic record shall be submitted to the PM, ET and IEC for record.

13.4 Event and Action Plan for Landscape and Visual Works

Table 13.3: Event and Action Plan

Event	Action			
	ET	IEC	PM	Contractor
Non-conformity occur	• Check Contractor's proposed remedial design conforms to the requirements of EP and prepare checking report(s)	• Check and endorse ET's report(s) • Check and certify Contractor's proposed remedial design	• Supervise the Contractor to carry out the proposed remediation work	• Propose remedial design and carry out the proposed remediation work

13.5 Mitigation Measures

13.5.1 The mitigation measures as recommended in the EIA Report are summarised in the EMIS in **Appendix B**.

14 Site Environmental Audit

14.1 General

14.1.1 Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. 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. Site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

14.1.2 The ET Leader shall be responsible for formulating the environmental site inspection, 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 IEC for agreement, and to PM for approval. The Contractor's proposal for rectification shall be made known to ET, IEC and PM.

14.1.3 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 ET Leader shall make reference to the following information 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.

14.1.4 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.

14.1.5 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 this Manual.

14.2 Compliance with Legal and Contractual Requirements

14.2.1 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.

14.2.2 In order that the works comply with the contractual requirements, all works method statements submitted by the Contractor to PM 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 summarised in **Appendix B**.

14.2.3 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.

14.2.4 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 shall also be available for the ET Leader's inspection upon his request.

14.2.5 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 PM accordingly.

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

14.3 Environmental Complaints

14.3.1 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 identified 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); and

(ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

15 Reporting

15.1 General

15.1.1 Reports can be provided in an electronic medium upon agreeing the format with PM and EPD. This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach.

15.1.2 The ET is responsible for establishing and maintaining a dedicated website throughout the entire construction period for publishing all the relevant finalized submissions and plans as required under the FEP. The ET shall propose the format and functionality of the website for agreement with PM and IEC prior to publishing of the submissions and plans. Once the environmental submissions and plans are available and vetted by the IEC, the ET is responsible to upload the relevant documents to the dedicated website.

15.1.3 Types of reports that the ET shall prepare and submit include monthly EM&A report, quarterly EM&A report and final EM&A review report. A copy of the monthly, quarterly and final EM&A review reports shall be made available to the Director of Environmental Protection.

15.2 Monthly EM&A Reports

15.2.1 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 IEC, PM and EPD. Before the 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.

First Monthly EM&A Report

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

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

- complaint log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) Basic project information:

- project organisation 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, major site works, etc); and
- drawings showing the project area.

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

- environmental mitigation measures relevant to the Project, as recommended in the EIA Report; and
- environmental requirements in contract documents.

(v) Implementation status:

- advice on the implementation status of environmental protection and pollution control / mitigation measures relevant to the Project, as recommended in the EIA Report.

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

- 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 noncompliance.

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

Subsequent EM&A Reports

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

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

- complaints log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) Basic project information:

- project organisation including key personnel contact names and telephone numbers;
- programme;
- management structure; and
- work undertaken during the month.

(iii) Environmental status:

- works undertaken during the month with illustrations (such as location of works, major site works, etc.); and
- drawing showing the project area.

(iv) Implementation status:

- advice on the implementation status of environmental protection and pollution control / mitigation measures relevant to the Project, as recommended in the EIA Report.

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

- 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 noncompliance.

(vi) 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 examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

(vii) Appendices

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

15.3 Quarterly EM&A Reports

15.3.1 Quarterly EM&A reports shall include the following:

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

(ii) Basic project information:

- project organization;
- programme;
- contacts of key management structure; and
- work undertaken during the quarter.

(iii) Brief summary of EM&A requirements:

- environmental mitigation measures relevant to the Project, as recommended in the EIA Report;

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

(v) Drawings showing the project area;

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

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

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

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

(x) Comments (for examples, 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 Project Proponent's contacts and any hotline telephone number for the public to make enquiries.

15.4 Final EM&A Review Reports

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

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

(ii) Drawings showing the project area;

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

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

- environmental mitigation measures relevant to the Project, as recommended in the EIA Report; and
- environmental impact hypotheses tested;

(v) A summary of the implementation status of environmental protection and pollution control / mitigation measures relevant to the Project, as recommended in the EIA Report, summarised in the updated implementation schedule;

(vi) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;

(vii) A description of the actions taken in the event of non-compliance;

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

(ix) 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;

(x) Review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;

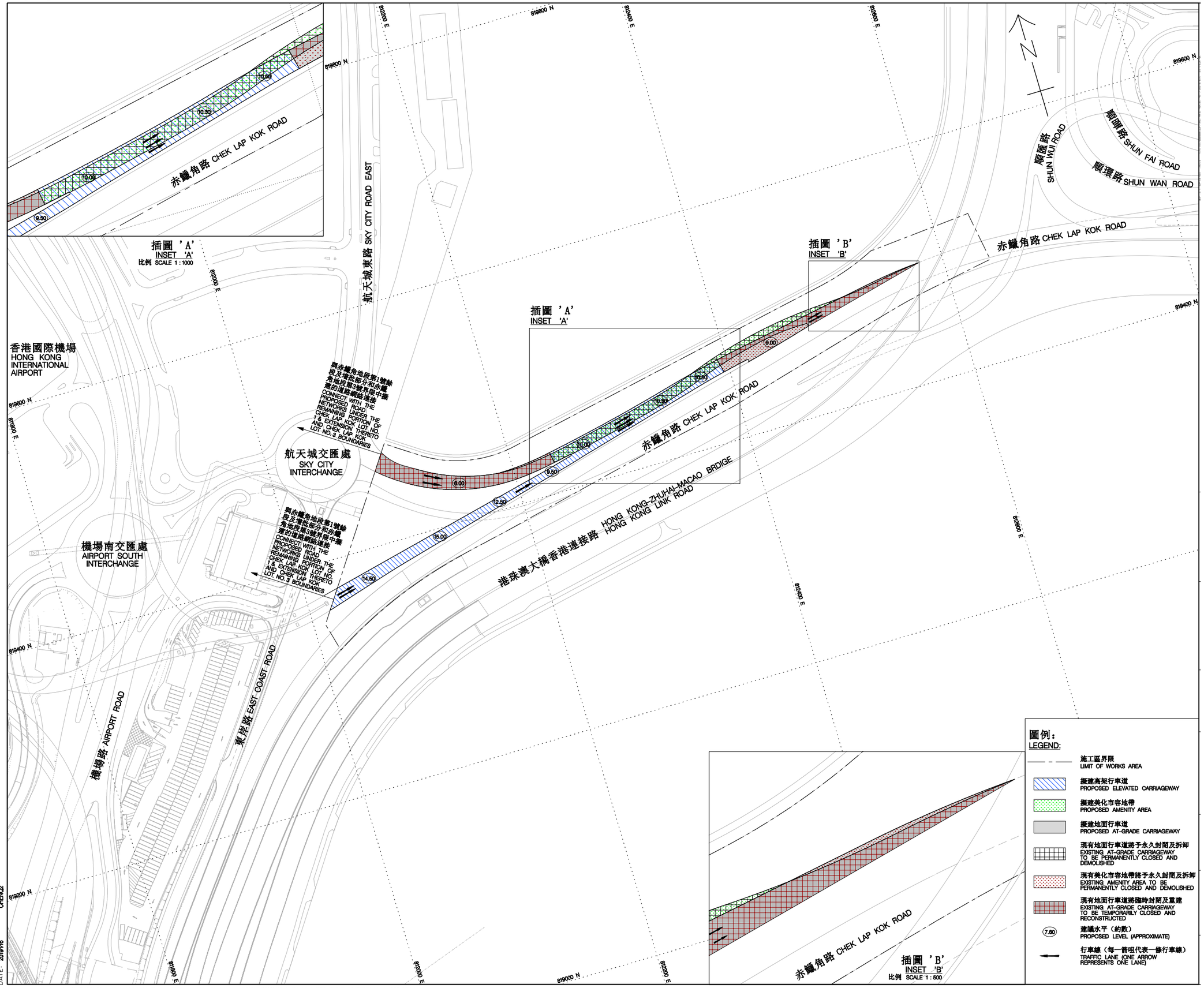
(xi) Comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and

(xii) 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 mitigation measures when necessary).

15.5 Document Keeping

15.5.1 No site-based documents 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. All documents shall be kept for at least one year following completion of the construction contract.

Figure 1 Project Location



DATE: 20190916 CHEN22

File Name : P:\Projects\60278268\01_AECOM\B_CADD\11_CADD_DATA-IN\CIV_STR\Bridge\201812\20181219\16.32\GAZ_2000_181029\60278268_GAZ_2000_002.dgn

Appendix A. Tentative Construction Programme

		2022				2023				2024			
Item	Name	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	**Site Establishment and Enabling Works**												
2	**Bridge SR22**												
2a	Utility Works												
2b	Foundation Works												
2c	Pier and Deck Construction												
2d	ABWF, MEP, Systems & Road Works												
3	**Bridge SR23**												
3a	Utility Works												
3b	Foundation Works												
3c	Pier and Span Construction												
3d	ABWF, MEP, Systems & Road Works												
4	**Bridge SR24**												
4a	Utility Works												
4b	Foundation Works												
4c	Pier and Span Construction												
4d	ABWF, MEP, Systems & Road Works												

Appendix B. Environmental Mitigation Implementation Schedule

Environmental Mitigation Implementation Schedule

HKIA-HKBCF Road Connection

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
Air Quality							
S5.5.6.1	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 24-hr TSP levels are 500μg/m^3 and 260μg/m^3, respectively)
S5.5.6.2	A2	• Proper watering of exposed spoil should be undertaken throughout the construction phase: • 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; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • Stockpile of dusty material should not extend beyond the pedestrian barriers, fencing or traffic cones; • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated	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 24-hr TSP levels are 500μg/m^3 and 260μg/m^3, respectively)

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
		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;					
S5.5.6.2	A2	• 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; • 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; • 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; • 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; • 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; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • 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;	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 24-hr TSP levels are 500μg/m^3 and 260μg/m^3, respectively)

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
		• 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; • 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					
S5.5.6.2	A2	• 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 24-hr TSP levels are 500μg/m^3 and 260μg/m^3, respectively)
S5.5.6.3, Section 2.6 of FEP	A3	• The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) within the Project site and associated work area throughout the construction phase.	Control construction dust	Contractor	All construction sites	Construction stage	To control dust impact
S.5.5.6.4	A4	• AAHK 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	PM / AAHK	All construction sites	Design stage	Air Pollution Control (Construction Dust) Regulation

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
Construction Noise (Airborne)							
S6.4.10	N1	1) Use of good site practices to limit noise emissions by considering the following: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • 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; • Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; • Silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • Mobile plant should be sited as far away from NSRs as possible and practicable; and • Material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	Control airborne construction noise	Contractor	All construction sites	Construction stage	Noise Control Ordinance
S6.4.11	N2	2) Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce noise impact to NSRs through partial screening	Contractor	All construction sites	Construction stage	Noise Control Ordinance; Annex 5, TM-EIA
S6.4.12	N3	3) Install movable noise barriers (typically density @14kg/m^2), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Reduce noise emission by screening noisy plant	Contractor	All construction sites, for plant items listed in Appendix 6D of the EIA Report	Construction stage	Noise Control Ordinance; Annex 5, TM-EIA; Movable barriers should achieve at

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
							least 5dB(A) and full enclosure should be designed to achieve 10dB(A) reduction
S6.4.13	N4	4) Select “Quiet plants” which comply with the BS 5228 Part 1 or TM standards.	Reduce noise levels of plant items	Contractor	All construction sites, for plant items listed in Appendix 6D of the EIA Report	Construction stage	Noise Control Ordinance; Annex 5, TM-EIA
S6.4.14	N5	5) Sequencing operation of construction plants where practicable.	Control construction noise by operating sequentially within the work site	Contractor	All construction sites	Construction stage	Noise Control Ordinance; Annex 5, TM-EIA

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
Sediment							
--	--	Marine sediments excavated are to be treated using cement/solidification/stabilization techniques and tested against TCLP which were recommended in the EPD's Practice Guide for Investigation and Remediation of Contaminated Land. Properly treated marine sediment is to be reused onsite or offsite for backfilling and/or landscaping such that the need for offsite disposal is avoided as far as practicable.	Develop marine sediment treatment and reuse arrangement	Contractor	All construction sites	Construction stage	Universal Treatment Standards for On-site Reuse of Cement Stabilisation/Solidification Treated Soil as shown in the Practice Guide for Investigation and Remediation of Contamination Land issued by EPD

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
Waste Management (Construction Waste)							
S8.3.8	WM1	<u>*Construction and Demolition (C&D) Material*</u> The following mitigation measures should be implemented in handling the waste: • Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; • Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials is properly documented and verified; • 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; and • 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.	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	Land (Miscellaneous Provisions) Ordinance; Waste Disposal Ordinance; ETWB TC 19/2005

EIA Ref. (Register No. AEIAR-145/2009)	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Agent to Implement	Location	Time to Implement	Requirements or Standards for the Measures to Achieve
S8.3.9 - S8.3.11	WM2	<u>*C&D Waste*</u> • 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 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; and • 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 to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	Land (Miscellaneous Provisions) Ordinance; Waste Disposal Ordinance; ETWB TC 19/2005
S8.2.12 - S8.3.15	WM3	<u>*Chemical Waste*</u> • 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; • 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; • 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	Control chemical waste and ensure proper storage, handling, and disposal	Contractor	All construction sites	Construction stage	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Labelling and Storage of Chemical Waste

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		prevent rainfall entering; and arranged so that incompatible materials are adequately separated; and					
S8.2.12 - S8.3.15	WM3	• 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 chemical waste and ensure proper storage, handling, and disposal	Contractor	All construction sites	Construction stage	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
S8.3.16	WM4	*Sewage* • 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	WM5	*General Refuse* • General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes; • 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; • Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily	Minimise production of general refuse and avoid odour, pest, and litter impacts	Contractor	All construction sites	Construction stage	Waste Disposal Ordinance

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		accessible. Separate labelled bins for their deposit should be provided if feasible; • 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, aluminium cans, plastic bottles etc., should be provided; and • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.					

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Water Quality (Construction Phase)							
S9.11.1.3	W2	1) General construction activities should be governed by standard good working practice. Specific measures to be written into the works contracts should include: • Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • 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; • 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; • 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; • Temporary access roads should be surfaced with crushed stone or gravel; • Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system;	Control construction water quality impact	Contractor	All construction sites	Construction stage	TM-EIAO

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		• Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; • 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;					
S9.11.1.7	W1	• Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system • 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; • Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; • The section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; • Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • 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 offsite disposal;	Control construction water quality impact	Contractor	All construction sites	Construction stage	TM-EIAO

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		• The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • 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 • Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.					
Landscape and Visual (Detailed Design Phase)							
S14.3.3.2	LV1	General design measures include: • 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; and • Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed.	Minimise landscape and visual impact	Detailed designer	All construction sites	Design stage	-

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Landscape and Visual (Construction Phase)							
S14.3.3.3	LV2	Mitigate both landscape and visual impacts:					
		G1. Grass-hydroseed bare soil surface and stockpile areas.	Minimise landscape and visual impact	Contractor	All construction sites	Construction stage	-
		G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic.	New planting strip and automatic irrigation system will not be added under this Project. Instead, existing irrigation system would be reinstated after the construction works if necessary.				
		G11. All existing trees shall be carefully protected during construction.(1)	Minimise landscape and visual impact	Contractor	All construction sites	Construction stage	Contract specification
S14.3.3.3	LV3	Mitigate visual impacts: V1. Minimise time for construction activities during construction period. 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 construction.	Minimise visual impact	Contractor	All construction sites	Construction stage	-
Landscape and Visual (Operation Phase)							
S14.3.3.3	LV4	Mitigate both landscape and visual impacts: G10. Provide proper planting maintenance on the new planting areas to enhance the aesthetic degree.	Minimise landscape and visual impact	HyD	All construction sites	Operation stage	-
	LV5	Mitigate visual impacts: V3. Lighting design to minimize glare at night. Decorative road lighting to be considered during detailed design stage.(2)	Minimise visual impact	HyD	All construction sites	Operation stage	-

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Environmental Monitoring and Audit							
S15.2.2	EM1	An Independent Environmental Checker shall be employed as per the EM&A Manual.	Control EM&A performance	AAHK	All construction sites	Construction stage	EIAO Guidance Note No. 4/2002; TM-EIAO
S15.5 - S15.6	EM2	• An Environmental Team shall be employed as per the EM&A Manual. • A systematic Environmental Management Plan shall be prepared to ensure effective implementation of the mitigation measures. • Environmental impact monitoring shall be implemented by the Environmental Team to ensure all requirements stipulated in the EM&A Manual are fully complied.	Perform EM&A	AAHK	All construction sites	Construction stage	EIAO Guidance Note No. 4/2002; TM-EIAO

Notes:

(1) Tree protection zone shall be provided by AAHK's contractor.
(2) Decorative road lighting is not applicable to the Project. However, to minimize glare at night and avoid any unnecessary light spill to nearby VSRs (e.g. those on Airport Island and residents at Tung Chung and north Lantau), only minimum functional lighting will be provided for safety and all directional lighting will be facing towards, instead of away from, the Project Site.