土木工程拓展署
Civil Engineering and Development Department

Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat)

Environmental Monitoring and Audit Manual

Civil Engineering and Development Department

April 2022

ATKINS
Member of the SNC-Lavalin Group

Contents

Chapter

Figures

Appendices

1. Introduction

1.1. Background

1.1.1. The EIA Study Brief (No: ESB-295/2016) for "Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat)" (the Project) includes the requirement to prepare an Environmental Monitoring and Audit (EM&A) programme.

1.1.2. The scope of the Project comprises the following:

i. Construction of new cycle tracks of about 3.6 km long from Hin Fat Lane and Hoi Wing Road at Tuen Mun to Kwun Tsing Road at So Kwun Wat with associated footpaths

ii. Construction of a marine cycle bridge with footpath of about 200 m long between Cafeteria Old Beach and Kadoorie Beach.

iii. Provision of cycle parking areas near Hin Fat Lane, Cafeteria Old Beach and Kwun Tsing Road.

1.1.3. The alignment of cycle track is shown in **Figure 1.1**.

1.2. Project Implementation Programme

1.2.1. The construction is scheduled to commence in the 1st quarter of 2023 and will be completed by the 3rd quarter of 2026 tentatively.

1.3. Purpose of EM&A Manual

1.3.1. The purpose of this EM&A Manual (hereafter refer to as the "Manual") is to guide the setup of an EM&A programme to ensure compliance with the EIA study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme for both the construction and operational phase of the Project. It aims to provide systematic procedures for monitoring, auditing and minimising environmental impacts associated with the construction and operational phases.

1.3.2. This Manual specifies the EM&A requirements to ensure that the mitigation measures recommended in the EIA are effectively implemented and the whole EM&A programme properly managed.

1.4. Contents in this EM&A Manual

1.4.1. This EM&A Manual is prepared in accordance with Annex 21 of the Technical Memorandum on EIA Process (EIAO-TM) and the EIA Study Brief for the Project and follows the approach recommended in the EM&A Guidelines for Development Projects in Hong Kong.

1.4.2. The EM&A Manual contains the following information:

- project organization for the Project;
- responsibilities of the Contractor, the Engineer or Engineer's Representative (ER) and Environmental Team (ET) with respect to the environmental monitoring and audit requirements during the course of the Project;
- requirements with respect to the construction programme schedule and the necessary environmental monitoring and audit programme to track the varying environmental impact;
- details of the methodologies to be adopted, including all field laboratories and analytical procedures, and details on quality assurance and quality control programme;
- definition of Action and Limit Levels;
- establishment of Event and Action Plans;

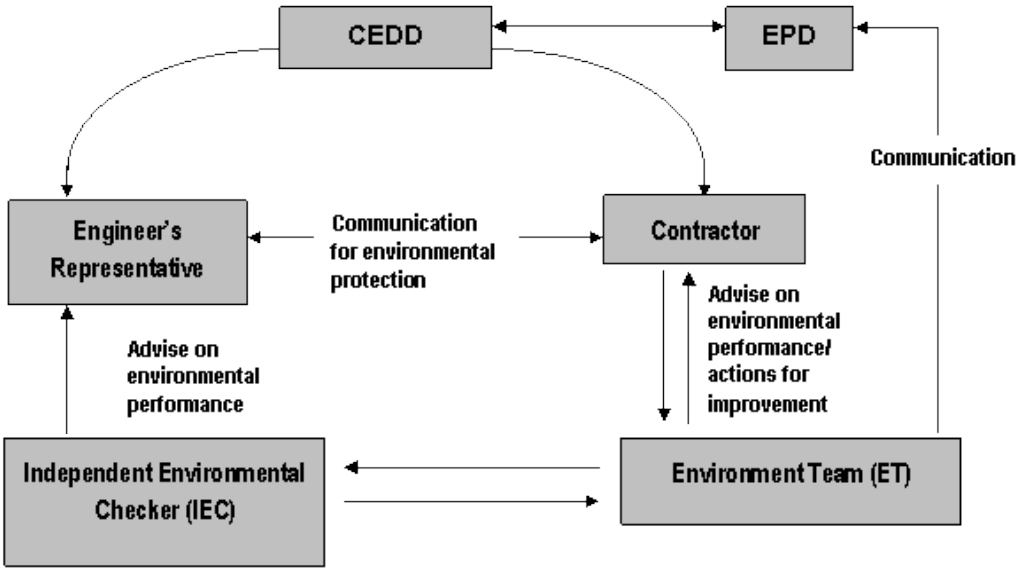
- requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints;
- requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures.

1.4.3. An implementation schedule of the environmental mitigation measures has been developed and presented in Section 14 in accordance with the requirements of Clause 3.5.3 of the EIA Study Brief.

2. Project Organisation

2.1. Key Parties and Organisation Chart

2.1.1. Involvement of relevant parties in a collaborative and interactive manner is essential for the implementation of the recommended EM&A programme. The lines of communication with respect to EM&A works are shown in the Project Organisation diagram below.



Project Organisation

2.1.2. 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 this EM&A Manual for the whole duration of this Project.

Project Proponent

2.1.3. Civil Engineering and Development Department (CEDD) is the project proponent and works department and hence will assume overall responsibility for the construction of the Project.

Environmental Protection Department

2.1.4. Environmental Protection Department (EPD) is the statutory enforcement body for environmental protection matters in Hong Kong.

Engineer's Representative

2.1.5. The Engineer's Representative (ER) shall appoint an appropriate member of the resident site staff, who shall:

(i) monitor the Contractor's compliance with the contract specifications, including the EM&A programme, and the effective implementation and operation of environmental mitigation measures in a timely manner;
(ii) ensure that impact monitoring is conducted at the correct locations at the correct frequency as identified in the EM&A programme;
(iii) instruct the Contractor to follow the agreed protocols or those In the Contract Specifications in the event of exceedances or complaints;
(iv) review the programme of works with a view to identifying any potential environmental impacts before they arise;

(v) check that mitigation measures that have been recommended in the EIA Report, this document and contract documents, or as required, are correctly implemented in a timely manner, when necessary;
(vi) report the findings of site audits and other environmental performance reviews to CEDD;
(vii) verify the environmental acceptability of permanent and temporary works, relevant design plans and submissions; and
(viii) comply with the agreed Event Contingency Plan in the event of any exceedance.

Contractor

2.1.6. The Contractor shall assign an on-site environmental coordinator to oversee Contractor's environmental performance and the implementation of the EM&A duties. The coordinator shall be a person who has relevant professional qualifications in environmental control and is subject to approval by the ER.

2.1.7. The broad categories of works of the Contractor comprise the following:

(i) Work within the scope of the construction contract and other tender conditions with respect to environmental requirements;
(ii) Operate and strictly adhere to the guidelines and requirements in this EM&A programme and contract specifications;
(iii) Provide assistance to ET in carrying out monitoring;
(iv) Participate in the site inspections undertaken by the ET as required, and undertake correction actions;
(v) Provide information / advice to the ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
(vi) Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans;
(vii) Implement measures to reduce impact where Action and Limit levels are exceeded; and
(viii) Adhere to the procedures for carrying out complaint investigation.

2.1.8. The Contractor should also participate in the environmental performance review undertaken by the ER and undertake any corrective actions as instructed by the ER.

Independent Environmental Checker

2.1.9. An Independent Environmental Checker (IEC) shall be employed before the commencement of construction of the Project. The IEC shall not be in any way an associated body of the Contractor or the ET for the Project. The IEC shall be a person who has at least 7 years of experience in EM&A or environmental management.

2.1.10. The IEC shall be responsible for the duties defined in this Manual, and shall audit the overall EM&A programme, including the implementation of all environmental mitigation measures, submissions required in this Manual, as well as any other relevant submissions required under the Environmental Permit. The IEC shall be responsible for verifying the environmental acceptability of permanent and temporary works, relevant design plans and submissions under the EP. The IEC shall verify the logbook prepared and kept by the ET Leader. The IEC shall notify EPD within 24 hours of receipt of notification from the ET Leader of any such instance or circumstance or change of circumstances or non-compliance with the EIA Report or the Environmental Permit, which might affect the monitoring or control of adverse environmental impact.

2.1.11. The main duties of the IEC are to carry out independent environmental audit of the project. This shall include, inter alias, the following:

(i) Review and audit in an independent, objective and professional manner in all aspects of the EM&A programme;
(ii) Validate and confirm the accuracy of monitoring results, appropriateness of monitoring equipment, monitoring locations with reference to the locations of the nearby sensitive receivers, and monitoring procedures;
(iii) Carry out random sample check and audit on monitoring data and sampling procedures, etc.;
(iv) Conduct random site inspection (at least once a month);

(v) Audit the EIA recommendations and EP requirements against the status of implementation of environmental protection measures on site;
(vi) Review the effectiveness of environmental mitigation measures and Project environmental performance; and
(vii) On an as needed basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions under the environmental permit. Where necessary, the IEC shall agree in consultation with the ET Leader and the Contractor the least impact alternative;
(viii) Verify investigation results of complaint cases and the effectiveness of corrective measures;
(ix) Verify EM&A reports submitted and certified by the ET Leader; and
(x) Feedback audit results to ER/ ET by signing according to the Event/ Action Plans specified in this Manual.

Environmental Team

2.1.12. An Environmental Team (ET) shall be established before the commencement of construction of the Project. The ET shall not be in any way an associated body of the Contractor or the IEC for the Project. The ET shall be headed by an ET Leader. The ET Leader shall be a person who has at least 7 years of experience in environmental monitoring and auditing (EM&A) or environmental management.

2.1.13. The ET Leader shall be responsible for the implementation of the EM&A programme in accordance with the EM&A requirements specified in this Manual and the EP. The ET Leader shall keep a contemporaneous logbook for recording each and every instance or circumstance or change of circumstances that may affect the compliance with the recommendations of the EIA report. This logbook shall be kept readily available for inspection by the IEC, and Director of Environmental Protection (DEP) or his authorised officers.

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

2.1.15. The broad categories of works of the ET comprise the following:

(i) To monitor the various environmental parameters as required by the EM&A programme;
(ii) To follow up and close out of the non-compliance actions;
(iii) To investigate and audit the Contractor's equipment and work methodologies with respect to pollution control and environmental mitigation, and to anticipate environmental issues that may require mitigation before the problem arises;
(iv) To audit and prepare audit reports on the environmental monitoring data and the site environmental conditions;
(v) To review the EM&A programme after the collection and analysis of the baseline data;
(vi) To modify the EM&A programme in terms of parameters, sites, sample sizes, frequency etc. if appropriate in consultation with the ER and EPD; and
(vii) To report the environmental monitoring and audit results to the IEC, Contractor and the ER.

3. Air Quality

3.1. Introduction

3.1.1. The air quality impact assessment in the EIA has concluded that no significant impacts would arise from the construction and operation of the Project. With proper implementation of dust control measures required under the Air Pollution Control (Construction Dust) Regulation and good site practices as recommended in the EIA report, the Project would unlikely result in adverse air quality impacts. The ET shall check the Contractor's implementation of air quality control measures to minimize the construction dust emissions during the regular site environmental audits.

3.2. EM&A Requirements During Construction Phase

3.2.1. No specific construction dust monitoring is recommended, given that the dust control measures as required under the Air Pollution Control (Construction Dust) Regulation and the mitigation measures recommended in the EIA are properly implemented.

3.2.2. The ET shall undertake regular environmental site inspection (at least once per week) during the construction works to ensure the proper implementation of mitigation measures for potential construction dust emissions.

Construction Phase Mitigation Measures

3.2.3. To ensure that dust emissions are minimized during the construction phase of the Project, relevant dust control requirements stipulated in Air Pollution Control (Construction Dust) Regulation should be implemented. The following dust suppression measures are recommended to control the potential fugitive dust emissions during the construction phase of the Project.

- The works area for site clearance shall be sprayed with water before, during and after the operation so as to maintain the entire surface wet;
- Restricting heights from which materials are to be dropped, as far as practicable, to minimize the fugitive dust arising from unloading/ loading;
- Immediately before leaving a construction site, all vehicles shall be washed to remove any dusty materials from the bodies and wheels. However, all spraying of materials and surfaces should avoid excessive water usage;
- Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle;
- Travelling speeds should be controlled to reduce traffic induced dust dispersion and re-suspension within the site from the operating haul trucks;
- Erection of hoarding of not less than 2.4 m high from ground level, where appropriate;
- Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 4 sides;
- All dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
- Non-road Mobile Machinery should be approved or exempted with a label issued by EPD. The label should be displayed at a conspicuous position of the machine or vehicle.
- The requirements stipulated in the Works Branch Development Bureau Technical Circular (Works) No. 8/2010 Enhanced Specification for Site Cleanliness and Tidiness should be followed as far as practicable to enhance the cleanliness and tidiness of construction sites.

3.3. EM&A Requirements During Operational Phase

3.3.1. No specific monitoring during the operational phase of the Project is required.

4. Noise

4.1. Introduction

4.1.1. The construction noise impact assessment in the EIA indicated that noise impacts would be expected from the construction of the Project at existing NSRs. Noise monitoring during construction phase of the project is therefore recommended.

4.1.2. Regular site audits should be undertaken to inspect the construction activities and works area in order to ensure the recommended mitigation measures are properly implemented to minimize the noise disturbance to the existing NSRs.

4.2. EM&A Requirements During Construction Phase

Noise Monitoring Station

4.2.1. Noise monitoring is recommended to be undertaken at the following monitoring stations. Details of the proposed monitoring stations are provided in **Table 4.1** and their locations are indicated in **Figure 4.1**.

Table 4.1 Proposed Noise Monitoring Stations

Noise Monitoring Station ID	Description
NM1	Crossroads Foundation
NM2	Seacoast Royale Tower 3
NM3	TMTL 518 Tower 8
NM4	Blessing Villa Block F
NM5	Villa La Plage House 8
NM6	Boulder Lodge Staff Quarter
NM7	Castle Peak Sam Chau Ma Temple
NM8	The Salvation Army Sam Shing Nursery School
NM9	Fu Hong Society Yau Chong Home

4.2.2. Should the status and location of NSRs be changed after issuing this Manual, the ET Leader shall propose updated monitoring location(s) and seek approval from IEC and agreement from EPD of the proposal. When proposing alternative monitoring location, it should be chosen based on the following criteria:

- Locations that are close to the major site activities which are likely to have noise impacts;
- Close to the 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.

4.2.3. The monitoring location shall normally be at a point 1 m from the exterior of the building facade and be at a position 1.2 m above the ground.

4.2.4. If there is a problem with access to the normal monitoring position, an alternative position may be chosen, and appropriate 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 Leader shall agree with the IEC on the monitoring position and the corrections adopted.

4.2.5. Noise measurements shall be recorded on a field data sheet together with relevant information including project name, date and time of sampling, monitoring location and parameters, site observations and remarks. Sample noise field data sheets are shown in **Appendix A** of this Manual for reference. The ET Leader may modify the data record sheet for this EM&A programme but the format of which should be agreed by the IEC.

Noise Parameters

4.2.6. Construction noise level at the proposed noise monitoring stations shall be measured by the ET in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). Noise measurements shall be carried out with an integrating sound level meter using the 'fast' response mode. L_{eq}(30 min) shall be used as the monitoring parameter for the time period between 07:00-19:00 hours on normal weekdays. For all other time periods, L_{eq}(5 min) will be employed for comparison with the Noise Control Ordinance (NCO) criteria.

4.2.7. Supplementary information for data auditing statistical results such as L_{10} and L_{90} shall also be obtained for reference. Sample noise field data sheets are shown in **Appendix A** of this Manual for reference. The ET Leader may modify the data record sheet for this EM&A programme but the format of which should be agreed by the IEC.

Monitoring Equipment

4.2.8. As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications should be used for carrying out the noise monitoring. Immediately prior to, and following, each noise measurement the accuracy of the sound level meter should 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. Noise measurements shall not be made in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

4.2.9. Annual calibration of all sound level meters and acoustic calibrators shall be conducted by a laboratory in Hong Kong or the manufacturer in compliance with national standards as recommended by the manufacturer of the sound level meter and acoustic calibrator.

4.2.10. The ET Leader shall be responsible for the provision of the monitoring equipment and associated accessories and power supply. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

Impact Monitoring

4.2.11. The ET shall conduct noise monitoring at the designated monitoring station. Noise monitoring shall be conducted on a weekly basis when construction activities are underway within 300 m of the proposed monitoring station. Before the monitoring starts, a schedule of noise monitoring should be submitted to the IEC for approval and onsite audit of the accuracy of the monitoring result where necessary. As it is expected that no construction works can be conducted during the restricted hours defined under the Noise Control Ordinance (NCO) while meeting the noise criteria, one set of measurement shall be taken between 07:00-19:00 hours normal weekdays when construction works are underway.

Action Level and Limit Level

4.2.12. The Action and Limit Levels for construction noise monitoring are defined in **Table 4.2**.

Table 4.2 Action and Limit Levels for Construction Noise Monitoring

Noise Sensitive Uses	0700 to 1900 hours on any day not being a Sunday or general holiday, $L_{eq\ (30\ min)}$, dB(A)	
	Action	Limit
Domestic Premise	When one documented complaint is received	75
Hostel		75
Place of Public Worship		70
Education Institution		70 during normal teaching period / 65 during examination period

Event and Action Plan

4.2.13. The Action and Limit levels for construction noise monitoring are defined in **Table 4.2**. Should non-compliance of the noise criteria occur, actions in accordance with the Event and Action Plan given in **Table 4.3** should be carried out.

Table 4.3 Event and Action Plan for Construction Noise Monitoring

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

Event	Action			
	ET Leader	IEC	ER	Contractor
	8. If exceedance stops, cease additional monitoring			

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

4.3. Noise Mitigation Measures

4.3.1. Mitigation measures to reduce the construction noise impacts, which involves the adoption of quality PME, provision of temporary noise barrier and noise enclosure for PME, use of quieter equipment or construction method (e.g. non-explosive chemical expansion agent and hydraulic crusher), and good scheduling of works to avoid concurrent construction activities, have been recommended in Section 4.8 to 4.10 of the EIA Report. All the recommended mitigation measures are detailed in the implementation schedule in **Table 14.2**.

Special Arrangement of Use of PME

4.3.2. In general, to reduce the noise impact on Crossroads Foundation, Starfront Royale Tower 1 and 2, Seacoast Royale Tower 3, TMTL 518 Tower 8, Blessing Villa Block F, Surfside, Villa La Plage, Boulder Lodge Staff Quarter, Castle Peak Sam Chau Ma Temple and Fu Hong Society Yau Chong Home, non-explosive chemical expansion agent and a concrete pump instead of circular wood saw and concrete lorry mixer, respectively, will be used during the construction of drainage and utilities, while the hand-held jigsaw will replace the circular wood saw for site clearance works.

4.3.3. Due to site constraints, dump truck, lorry and concrete lorry mixer would not be able to access the site at workfronts 008 and 009. Similarly, as an additional mitigation measures to reduce the noise impact on Crossroads Foundation, Starfront Royale Tower 1 and 2, Seacoast Royale Tower 3, TMTL 518 Tower 8 and Villa La Plage, dump truck and lorry will be restricted from accessing workfronts 003, 004, 005, 006, 010, 011 and 012. Considering the inaccessible/restricted distance to the above workfronts is relatively short, only a concrete pump with noise enclosure will be required to replace the concrete lorry mixer. All transportation of materials, including the concrete, will be carried out by trolley with manpower.

4.3.4. Based on site survey, the G/F of Blessing Villa Block F will be completely blocked by boundary walls and will not have direct line-of-sight to the nearby Project workfronts (i.e. workfronts 008 and 009). Nevertheless, additional temporary noise barrier will be provided in front of the NSR so as to offer protection to the upper floors. Cross-sectional drawing to demonstrate the provision of the boundary wall and temporary noise barriers is provided in **Figure 4.4.1** of the EIA Report for reference. To further reduce the noise impact on Blessing Villa Block F, the concrete pump will be placed at least 11.5m away.

4.3.5. For Seacoast Royale Tower 3 and Villa La Plage, Contractor shall erect substantial fixed barriers with a minimum surface density of 10 kg/m^2 and constructed with sufficient height and length to completely screen the PME to be used on the construction site such that none of the PME will be visible when viewed from any openings of the NSRs. The fixed noise barriers shall also be constructed with no openings and gaps at joints to avoid noise leakage. A plant inventory for N016A Villa La Plage House 15 and N017A Villa La Plage House 25 is shown in **Appendix 4-4F** of the EIA Report and the cross-sectional drawings to demonstrate the provision of substantial fixed barriers in front of Seacoast Royale Tower 3 and Villa La Plage are provided in **Figures 4.4.2** to **4.4.5** of the EIA Report for reference. To further reduce the noise impact, the concrete pump will be placed at least 7.5m away from Seacoast Royale Tower 3 and 26m away from Villa La Plage.

4.3.6. Additional temporary noise barriers shall be provided in front of Castle Peak Sam Chau Ma Temple to block the sightline to the adjacent workfront to alleviate the potential noise impact.

Recommendation to further reduce the construction noise impact to Castle Peak Sam Chau Ma Temple is summarised in **Table 4.4** below. In any case, the Contractor shall establish a communication channel with the operator of Castle Peak Sam Chau Ma Temple and maintain liaison with the temple on the works schedule, in particular when the PMEs are unavoidably close to the temple, e.g. when the asphalt paver is operating at 30m or less away from the temple, the Contractor shall re-schedule the works when no ritual services are held in the temple, in collaboration with the temple operator. Nevertheless, the works near Castle Peak Sam Chau Ma Temple are expected to last only for a short period (~ 1 week). With continuous liaison, construction noise impacts on the temple are expected to be controlled to acceptable level.

Table 4.4 Recommendation for Works near Castle Peak Sam Chau Ma Temple

Recommendation	PME
Operate the PME at least 30m away from the NSR and provided with movable noise barrier in between.	- Dump Truck (5.5 tonne < gross vehicle weight ≤ 38 tonne)
Place the PME at least 30m away from the NSR and provided with noise enclosure.	- Air Compressor, air flow > 10m^3/min and ≤ 30m^3/min - Generator, super silenced - Concrete Pump, stationary
Maintain liaison with the temple operator on works schedule; Provided with movable noise barrier in between.	- Asphalt Paver - Drill/grinder, hand-held (electric) - Jig-saw, hand-held, wood (electric) - Excavator, mini-robot mounted - Mobile Crane - Lorry, with crane/grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne - Road Roller - Poker, vibratory, hand-held (electric)
Maintain liaison with the temple operator on works schedule; Provided with noise enclosure.	- Breaker, hand-held, mass >10kg and < 20kg
Maintain liaison with the temple operator on works schedule; Use of quieter construction method	- Non-explosive Chemical Expansion Agent

4.3.7. For the Salvation Army Sam Shing Nursery School, the prediction result indicated that no exceedance is anticipated during non-examination period, while up to 2 dB(A) noise exceedance is expected to occur if works are to be conducted during the examination period for the Salvation Army Sam Shing Nursery School. As precautionary measures, terms will be specified in the contractual documents requiring Contractor to liaise with the school's management for the schedule of construction works, to avoid carrying out noisy construction activities during examination period.

Cumulative Impacts from Concurrent Projects

4.3.8. Concurrent projects located within the 300m of the Project have been identified. The key concurrent projects include HyD's Widening of Castle Peak Road – Castle Peak Bay, Traffic Improvement Scheme in Tuen Mun; ASD's District Open Space in Area 27 (Sam Shing), Tuen Mun; HKHA's Construction of Public Housing Development at Hin Fat Lane, Tuen Mun; MTRC's Tuen Mun South Extension; HyD's Tuen Mun Bypass and, CEDD's Site Formation and Infrastructure Works for Public Housing Developments at Tuen Mun Central. According to the information available at the time of preparing the EIA report, the construction period for the concurrent projects mentioned above is between 2020 and 2036, whilst for the Traffic Improvement Scheme in Tuen Mun, there is no scheduled start date for the works as it is still at early feasibility study stage. Tentative completion of this Traffic Improvement Scheme in Tuen Mun is 2031.

4.3.9. Given the long project extent, the Project will be constructed in phases, and the construction activities of the cycle tracks Project will be implemented in separated sections (e.g. 300m between two active working sections) to avoid cumulative impacts due to concurrent works of this Project. The Contractor of this Project will liaise with the corresponding parties of the concurrent projects to schedule their works avoiding concurrent works in 300m of these other projects as far as possible. Given that there will be no complicated and large-scale civil works to be carried out under this Project, it will take relatively short time to complete corresponding construction works for a workfront. Scheduling of works to avoid cumulative construction noise impacts with other projects having less than 300m separation distance is considered feasible. Considering that careful scheduling of the construction works will have taken place, cumulative construction noise impacts are not expected to occur. The above arrangement shall be included in the work contracts to ensure proper implementation and execution by the future Contractor.

Construction Noise Management Plan (CNMP)

4.3.10. In view of the works areas being located in close proximity to the densely populated areas, the Contractor will be required to submit a Construction Noise Management Plan (CNMP) to EPD for approval prior to the commencement of construction of the Project. The CNMP shall be prepared with reference to Section 8 and Annex 21 of the EIAO-TM as well as EIA report and this EM&A manual during the design, tendering and implementation stage. The CNMP shall be checked independently and endorsed by the Project Engineer and CEDD to ensure that the proposals are practicable and could be effectively implemented on site, before submission of the CNMP to EPD. Details on the use of plants and equipment, their on-time percentages and the adoption of noise mitigation measures for the construction phase shall be clearly provided in the CNMP, demonstrating that the construction works to be undertaken will comply with all prevailing environmental standards and requirements. All noise mitigation measures implemented shall be properly maintained during construction of the Project.

4.3.11. With the adequate use of mitigation measures and construction works arrangement, adverse noise impacts are expected to be alleviated. All of the proposed mitigation measures discussed in Section 4.3 have been confirmed with the Project Engineer to be practicable and feasible for the proposed construction works within the intended construction programme. It will also be stipulated in the Work Contract requiring the Contractor to implement the above recommendation appropriately.

4.4. EM&A Requirements During Operational Phase

4.4.1. No specific monitoring during the operational phase of the Project is required.

5. Water Quality

5.1. Introduction

5.1.1. The water quality impact assessment in the EIA Report identified that the key issue of water quality would be related to marine viaduct piling works during construction phase. Site runoff, general construction activities, sewage arising from the workforce, and spillage of chemicals are not expected to cause adverse impacts to the water environment, provided that proper mitigation measures are implemented.

5.1.2. In addition to the recommended mitigation measures, water quality monitoring should be undertaken of the Project to determine the environmental performance of the Project in terms of its water quality impacts. A monitoring programme is recommended for both baseline conditions and during the construction phase to detect any deterioration of water quality, as well as to ensure the performance of the proposed mitigation measures.

5.2. Water Quality Parameters

5.2.1. The water quality parameters, as presented in **Table 5.1** shall be monitored to ensure the water quality and to detect any water quality deterioration situations and to take actions on time.

Table 5.1 Water Quality Parameters

Parameters	Type of Analysis
Dissolved Oxygen (DO) (mg/L and % saturation)	*In situ* measurement
Temperature (degree Celsius)	*In situ* measurement
pH value	*In situ* measurement
Turbidity (NTU)	*In situ* measurement
Salinity (ppt)	*In situ* measurement
Water depth (m)	*In situ* measurement
Suspended solids (SS) (mg/L)	Laboratory analysis

5.2.2. In addition to the water quality parameters specified above, relevant data shall also be measured, such as monitoring location / position, time, saturation, weather conditions and any special phenomena and works underway at the construction site.

5.3. Monitoring Equipment

5.3.1. Water quality monitoring equipment with the following specifications shall be supplied and maintained by the ET.

Dissolved Oxygen and Temperature

5.3.2. The instrument should be portable, weatherproof dissolved oxygen measuring with cable, sensor, comprehensive operation manuals, and use a DC power source. It should be capable of measuring:

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

5.3.3. It should have a membrane electrode with automatic temperature compensation connected with a cable. Sufficient stocks of spare electrodes and cables should be available for replacement where necessary. (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

pH

5.3.4. pH meter should be used to measure pH value of water samples *in situ*. It should be readable to 0.1 pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 to pH 10 shall be used for calibration of the instrument before and after use.

Turbidity

5.3.5. The instrument should be a portable, weatherproof turbidity-measuring instrument with a comprehensive operation manual. The equipment should use a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU and be equipped with a cable (e.g. Hach model 2100P or an approved similar instrument).

Suspended Solids

5.3.6. A water sampler should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, and 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 (e.g. Kahlsico Water Sampler or an approved similar instrument).

5.3.7. Water samples for suspended solids measurement shall be collected in high density polythene bottles, packed in ice (chilled to 4°C without being frozen), and delivered to the laboratory as soon as possible after collection.

Water Depth detector

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

Salinity

5.3.9. A portable salinometer capable of measuring salinity in the range of 0–40 ppt shall be provided for measuring salinity of the water at each monitoring location.

Monitoring Position Equipment

5.3.10. A hand-held or boat-fixed digital Global Positioning System (GPS) or other equivalent instrument of similar accuracy shall be provided and used during water monitoring to ensure the water sampling locations are correct during water quality monitoring work.

Water Sampling Equipment

5.3.11. A transparent PVC or glass cylinder, which has a volume of not less than 2 litres and can be sealed at both ends with cups, should be equipped with a positive latching system. During the water sampling, a messenger is released to trigger the closure of the water sampler at suitable water depth.

5.3.12. All *in-situ* monitoring instruments should be checked, calibrated and certified by a laboratory accredited under HOKLAS or another international accreditation scheme before use, 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 should be carried out before measurement at each monitoring location.

5.3.13. For the on-site calibration of field equipment, the BS 127:1993, Guide to Field and On-Site Test Methods for the Analysis of Water should be observed.

5.3.14. Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterruptedly even when some equipment is under maintenance, calibration, etc.

5.4. Measurement and Laboratory Analysis

5.4.1. Analysis of suspended solids shall be carried out in a HOKLAS or another international accredited laboratory. Water samples of about 1,000 ml shall be collected at the monitoring stations for carrying out the laboratory SS determination. The detection limit shall be 1 mg/L or better. The SS determination shall follow APHA 17ed 2540D or equivalent methods subject to approval of EPD.

5.4.2. 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. The ET Leader shall provide the ER with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" updated edition and any other relevant document for his reference.

5.4.3. For the testing methods of other parameters as recommended by EIA or required by EPD, detailed testing methods, pre-treatment procedures, instrument use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per batch, etc.), detection limits and accuracy shall be submitted to EPD for approval prior to the commencement of monitoring programme. The QA/QC shall be in accordance with the requirement of HOKLAS or international accredited scheme. The QA/QC results shall be reported. EPD may also request the laboratory to carry out analysis of known standards provided by EPD for quality assurance. Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis shall be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to EPD. In any circumstance, the sample testing shall have comprehensive quality assurance and quality control programmes. The laboratory shall prepare to demonstrate the programmes to EPD or his representatives when requested.

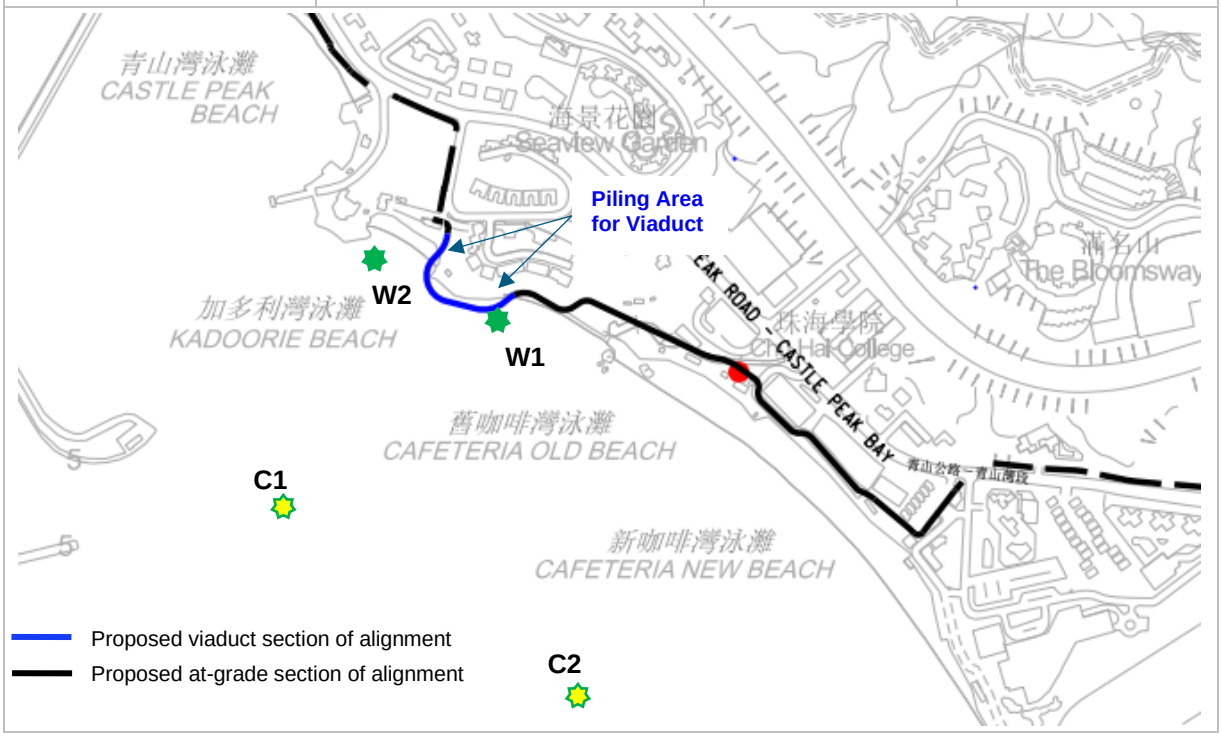
5.5. Monitoring Locations

5.5.1. Water quality monitoring will be carried out in the proximity of the marine piling areas. The proposed monitoring locations are provided in **Table 5.2**.

5.5.2. The ET could review the monitoring locations and the monitoring period in light of the actual construction activities. However, the ET Leader should report and seek approval from IEC and EPD for any alteration of the monitoring stations.

Table 5.2 - Proposed Water Quality Monitoring Locations

Monitoring Location ID	Description	Easting	Northing
W1	Impact Monitoring Station	816239	826294
W2	Impact Monitoring Station	816088	826380
C1	Control Station 1	815929	826060
C2	Control Station 2	816348	825812



5.6. Baseline Water Quality Monitoring

5.6.1. Baseline conditions of water quality shall be established and agreed with EPD prior to the commencement of works especially the piling works at the marine viaduct sections. The baseline conditions should be established by measuring the water quality parameters specified in **Table 5.1**.

5.6.2. The baseline monitoring shall be conducted for at least 4 weeks prior to the commencement of marine piling works with a frequency of 3 days in a week, at mid-flood and mid-ebb tides. The interval between two sets of monitoring shall not be less than 36 hours. EPD shall also be notified immediately for any changes in schedule.

5.6.3. There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. In the exceptional case when insufficient baseline monitoring data or questionable results are obtained, the ET Leader should seek approval from EPD for an appropriate set of data to be used as baseline reference. Baseline monitoring schedule shall be sent to EPD 2 weeks prior to the commencement of baseline monitoring.

5.6.4. 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. Duplicate in-situ measurements and samples shall be collected for each independent sampling event to ensure a robust statistically interpretable database.

5.7. Impact Water Quality Monitoring

5.7.1. During the construction at marine viaduct sections, impact monitoring shall be carried out 3 days in a week, at mid-flood and mid-ebb tides. If no exceedances are recorded during the three-month's period, the monitoring frequency can then be reduced to once per week, with sampling /measurement

at the designated monitoring stations. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances. However, the ET Leader should report and seek agreement form IEC, ER and approval then from EPD before changing the monitoring frequency.

5.7.2. All monitoring information including date and time, weather conditions, operator, identification and description of monitoring locations, works, progress and construction activities, method, analytical data and calculation etc., shall be recorded in the monitoring data sheet. The water quality monitoring schedule shall be sent to EPD on or before the first day of the monitoring month, EPD shall be notified immediately of any changes in schedule in written format.

5.8. Action and Limit Levels

5.8.1. The Action and Limit levels for the water quality monitoring are shown in **Table 5.3**. These thresholds shall be applied to ensure that any water quality deterioration can be readily detected.

Table 5.3 Action Level and Limit Level for Water Quality Monitoring

Parameter	Action Level	Limit Level
DO in mg/L	< 5%-ile of baseline data	< 4mg/L or < 1%-ile of baseline data
SS in mg/L	> 95%-ile of baseline data or >120% of upstream control station of the same day	> 99%-ile of baseline data or 130% of upstream control station of the same day
Turbidity in NTU	> 95%-ile of baseline data or >120% of upstream control station of the same day	> 99%-ile of baseline data or > 130% of upstream control station of the same day

Note:
1. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
2. For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits
3. 3. 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

5.9. Event and Action Plan

5.9.1. If the monitoring results at any designated monitoring stations indicate that the water quality thresholds are exceeded, appropriate actions in accordance with the Event and Action Plan in **Table 5.4** shall be carried out.

Table 5.4 Event and Action Plan for Water Quality Monitoring

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC and the Contractor; 4. Check monitoring data, all plant, equipment and the Contractor's working methods; 5. Discuss mitigation measures with the IEC and the Contractor; 6. Repeat measurement on next day of exceedance.	1. Discuss with the ET and the Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor and advise the ER accordingly; 3. Access the effectiveness of the implemented mitigation measures.	1. Discuss with the IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET, ER and the IEC and propose mitigation measures to the IEC and the ER; 6. Implement the agreed mitigation measures.
Action Level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC and the Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with the IEC and the Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance.	1. Discuss with the ET and the Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor and advise the ER accordingly; 3. Access the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Access the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET, ER and the IEC and propose mitigation measures to the IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.

Event	Action			
	ET Leader	IEC	ER	Contractor
Limit Level being exceeded by one consecutive sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC, the Contractor and the DEP; 4. Check monitoring data, all plant, equipment and the Contractor's working methods; 5. Discuss mitigation measures with the IEC, the ER and the Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level.	1. Discuss with the ET and the Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor and advise the ER accordingly; 3. Access the effectiveness of the implemented mitigation measures.	1. Discuss with the IEC, the ET and the Contractor on the proposed mitigation measures; 2. Request the Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Access the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET, ER, the IEC and the ER and propose mitigation measures to the IEC and the ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC, the Contractor and DEP; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with the IEC, the ER and the Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor and advise the ER accordingly; 3. Access the effectiveness of the implemented mitigation measures.	1. Discuss with the IEC, the ET and the Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Access the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the works until no exceedance of Limit Level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET, the IEC and the ER and propose mitigation measures to the IEC and the ER within 3 working days; 6. Implement the agreed mitigation measures; 7. As directed by the ER, slow down or stop all or part of the construction activities.
Notes: ET – Environmental Team IEC – Independent Environmental Checker ER – Engineer's Representative				

5.10. Construction Site Audit and Inspection

5.10.1. Regular weekly site audit should be carried out to ensure that the recommended mitigation measures are properly implemented during the construction phase, especially the piling works at marine viaduct sections. It can also provide an effective control of any improper malpractices and therefore achieve continual improvement in environmental performance on site. Site audit shall include site inspections and compliance audits.

5.10.2. Site inspection shall be carried out by the ET and attentions shall be paid to the mitigation measures recommended for water pollution control. In the event that the recommended mitigation measures are not fully or properly implemented, deficiencies shall be recorded and reported to the site management and suitable actions shall be taken, which may include:

- Record the problems and investigate the cause;
- Issue action notes to the Contractor who is responsible for the works;
- Implement remedial and corrective actions immediately;
- Re-inspect the site condition upon completion of the remedial and corrective actions; and
- Record the event and discuss with the Contractor for preventive actions.

5.11. Mitigation Measures

Construction Phase

Piling Works at Marine Viaduct Section

5.11.1. In order to alleviate potential water quality impacts from the construction of marine viaduct section, the following mitigation measures are recommended:

- The rate of constructing a pile is 15 m/day and 2 piles will be constructed per day; the diameter of pile is 600mm; the working hour shall be 12 hour per day from 07:00 to 19:00.
- Cage type silt curtains (i.e. size adjustable to suit environmental condition) must be deployed with an efficiency of 75% or higher for reduction of sediment release from the bored pile installation. The engineer will review using higher efficiency silt curtain in later stage.
- Restrict beach users from entering the piling works area.
- Maintain close liaison with LCSD on construction works schedule of marine viaduct during swimming season from March to October.
- No more than 1/3 of the bathing area (for each beach) shall be closed and only one side of the beach (for each beach) shall be occupied during the construction.
- Contingency plan setup with LCSD on alert beach users if there are unpredicted sediment suspension.

Construction Site Runoff

5.11.2. The practices outlined in ProPECC PN 1/94 Construction Site Drainage are recommended to be adopted to minimize potential water quality impacts from construction site runoff and other construction activities. Design of mitigation measures should be submitted by the Contractor to the Engineer for approval. The contractor should obtain valid discharge license under the Water Pollution Control Ordinance and the discharge should comply with the terms and conditions stipulated in the license.

5.11.3. The mitigation measures should cover, but not limited to the following Best Management Practices:

- No construction site discharge will be allowed within 100m of the boundaries of a gazetted beach in any direction, including rivers, streams and storm drains.
- Sand/silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standards under the WPCO. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control

structures should be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.

- Work programmes should be designed to minimize the size of work areas to minimize the soil exposure soil and reduce the potential for increased siltation and runoff;
- Boundaries of earthworks should be marked and surrounded by dykes or embankments for flood protection, as necessary.
- Silt removal facilities, channels and manholes should be maintained and cleaned regularly to ensure the proper function;
- Water pumped out from excavations should be discharged into silt removal facilities;
- Careful programming of the works to minimize soil excavation during the rainy season; If excavation of soil cannot be avoided during the wet season (April to September), exposed slope surfaces should be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms are summarized in ProPECC PN 1/94.
- Earthwork surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed;
- Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric during rainstorms.
- Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. The discharge of wastewater should be kept to a minimum;
- To prevent pollution from wastewater overflow, the pump sump of any water recycling system should be provided with an on-line standby pump of adequate capacity and with automatic alternating devices;

Sewage Effluent from on-site Workforce

5.11.4. Portable chemical toilets and sewage holding tanks should be provided for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets to cater populations and be responsible for appropriate disposal and maintenance.

5.11.5. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project. Regular environmental audit on the construction site should be conducted to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the Project would not cause water quality impact after undertaking all required measures.

5.11.6. With good control of domestic sewage, unacceptable water quality impacts from the workforce sewage are not anticipated to occur.

General Construction Activities

5.11.7. Good site practices should be adopted to clean the rubbish and litter on construction sites to avoid the rubbish, debris and litter from entering to nearby water bodies. It is recommended to clean the construction sites on a regular basis.

5.11.8. Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. The discharge of wastewater should be kept to a minimum.

5.11.9. To prevent pollution from wastewater overflow, the pump sump of any water recycling system should be provided with an on-line standby pump of adequate capacity and with automatic alternating devices.

5.11.10. Under normal circumstances, surplus wastewater may be discharged into foul sewers after treatment in silt removal and pH adjustment facilities (to within the pH range of 6 to l0). Disposal of wastewater into storm drains will require more elaborate treatment. Surface run-off should be segregated from the concreting works area as much as possible, and diverted to the stormwater drainage system.

Surface run-off contaminated by materials during concreting works should be adequately treated before disposal into stormwater drains.

Accidental Spillage of Chemicals

5.11.11. Illegal disposal of chemicals should be strictly prohibited. Registration to EPD as a CWP (Chemical Waste Producers) is required if chemical wastes are generated and need to be disposed of. Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance (WDO). The Code of Practice on Packaging, Labelling and Storage of Chemical Wastes published under the WDO should be used as a guideline for handing chemical wastes.

5.11.12. Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drains, fall tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.

Operational Phase

5.11.13. The ProPECC PN 5/93 is applicable to the Project during the operational phase. Runoff from the cycle track will be conveyed into designated drainage systems. Silt trap/interceptor would be provided and maintained in the designated drainage systems to minimize water quality impact arising from surface runoff. The wastewater (i.e., sewage effluent from visitors) arising will be collected by existing sewerage pipeline. The administrative measures such as regular cleaning of cycle track surface, maintenance of silt trap, etc. would be in place.

6. Waste Management

6.1. Introduction

6.1.1. Based on the waste management implication assessed in the EIA report, it has concluded that some construction wastes (including inert and non-inert wastes), chemical waste and general refuse will be generated from the construction activities. Construction and demolition (C&D) waste will be reused on site as far as practicable.

6.1.2. Through proper on-site handling and storage (covered containers), reuse (of inert construction wastes) and off-site disposal (via approved waste collectors to approved waste facilities and/or disposal grounds) the generation, handling and disposal of these wastes are not expected to give rise to any adverse environmental impacts. The ET shall check the Contractor's implementation of waste management practices during the regular site environmental audits to ensure wastes are being managed properly.

6.1.3. Given the nature of use of the project, there is no EM&A requirement considered necessary during the operational phase.

6.2. Site Inspection

6.2.1. Regular site audit should be carried out to ensure that the recommended mitigation measures are properly implemented during the construction phase.

6.2.2. Site inspection shall be carried out by the ET on weekly basis and attentions shall be paid to the mitigation measures recommended for waste management. In the event that the recommended mitigation measures are not fully or properly implemented, deficiencies shall be recorded and reported to the site management and suitable actions shall be taken.

6.3. Mitigation Measures

Waste Management Practice during Construction Phase

6.3.1. The practice of avoiding and minimising waste generation and waste recycling should be adopted as far as practicable as below:

- An on-site environmental co-ordinator employed by the Contractor should be identified at the outset of the works. Prior to commencement of Project works, the co-ordinator shall prepare a WMP in accordance with the requirements set out in the ETWB TC(W) No. 19/2005, Waste Management on Construction Sites, for the Engineer Representative (ER) 's approval. The WMP shall include monthly and yearly Waste Flow Tables (WFT) that indicate the amounts of waste generated, recycled and disposed of (including final disposal site), and which should be regularly updated;
- The Contractor's waste management practices and effectiveness shall also be audited by the ER on regular basis;
- The reuse/ recycling of all materials on site shall be investigated and exhausted prior to treatment/ disposal off-site. Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Encourage collection of aluminium cans, paper and plastic bottles by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the workforce;
- Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste;
- Good site practices shall be adopted from the commencement of works to avoid the generation of waste, reduce cross contamination of waste and to promote waste minimisation;
- Toolbox talks should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; and

- The Contractor shall comply with all relevant statutory requirements and guidelines and their updated versions that may be issued during the course of project construction.

6.3.2. Recommended mitigation measures to be implemented throughout the course of the construction of the Project include:

C&D Materials

- All C&D materials shall be sorted on-site into inert and non-inert C&D materials, and where the materials can be recycled or reused, they shall be further segregated. Inert material, or public fill will comprise stone, rock, masonry, brick, concrete and soil which is suitable for land reclamation and site formation whilst non-inert C&D materials include all other wastes generated from the construction process such as plastic packaging and vegetation (from site clearance);
- The Contractor shall be responsible for identifying what materials can be recycled/ reused, whether on-site or off-site. In the event of the latter, the Contractor shall make arrangements for the collection of the recyclable materials. Any remaining non-inert C&D materials shall be collected and disposed of at landfills whilst any inert C&D materials shall be re-used on site as far as possible. Alternatively, if no use of the inert material can be found on-site, the materials can be delivered to a Public Fill Reception Facilities after obtaining the appropriate licence;
- In order to monitor the disposal of C&D materials and solid wastes at public filling facilities and landfills, and control fly-tipping, a trip-ticket system shall be implemented by the Contractor, in accordance with the contract and the requirements of DB TC (Works) No. 6/2010 Trip Ticket System for Disposal of Construction and Demolition Materials;
- Prior to disposal off-site, non-inert C&D materials will have to be temporarily put in a suitably covered storage area where it will have to be regularly cleaned and maintained to avoid attracting vermin and pests. With proper on-site handling and storage as well as regular disposal of these wastes, no adverse impacts will be envisaged; and
- Dump trucks with mechanical cover shall be used to minimise windblown litter and dust during transportation of waste.

Chemical Waste

- Under the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall register as a Chemical Waste Producer if chemical wastes such as spent lubricants and paints are generated on site. Only licensed chemical waste collectors shall be employed to collect chemical waste generated at site. The handling, storage, transportation and disposal of chemical wastes shall be conducted in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme both published by EPD.

General Refuse

- A sufficient number of covered bins shall be provided on site for the containment of general refuse to prevent visual impacts and nuisance to the sensitive surroundings. These bins shall be cleared daily and the collected waste disposed of to the refuse transfer stations or landfills. Further to the issue of DB TC (Works) No. 8/2010 Enhanced Specification for Site Cleanliness and Tidiness, the Contractor is required to maintain a clean and hygienic site throughout the project works.

Waste Management Practice During the Operational Phase

6.3.3. Waste collection facilities (e.g. litter bins) will be included in the design of the supporting facilities, and at regular intervals along the route. The Government Department responsible for managing the facilities will be responsible for arranging for regular collection of litter from these facilities. Separate collection bins shall be provided for aluminium cans, plastic drinks bottles and paper wastes, which will facilitate recycling of these waste streams.

6.3.4. General refuse should be removed on a daily basis to minimize potential odour, pest and litter impacts. General refuse will have to be temporarily put in a suitably covered refuse collection point where it will have to be regularly cleaned and maintained to avoid attracting vermin and pests.

7. Land Contamination

7.1. Introduction

7.1.1. The land contamination assessment has been carried out which included a review of historical / current land uses, desktop review and the site inspection. Other relevant information was also collected from related government departments. No potential land contamination issue is identified within the Project area. In addition, potentially contaminating activities or land uses under the Project are not anticipated

7.2. EM&A Requirements

7.2.1. Environmental monitoring and audit are not required for the Project on land contamination aspect.

8. Ecology

8.1. Introduction

8.1.1. The EIA has evaluated the ecological consequences of the Project and recommended measures to avoid and minimize the impacts arising from the Project.

8.1.2. Regular site audits will serve to inspect the implementation status of the mitigation measures and good practices recommended in the EIA report.

8.2. Mitigation Measures

Impact Avoidance

8.2.1. No site or habitat of conservation importance would be directly impacted. Direct impacts on the three plant species of conservation importance would be avoided.

Impact Minimisation

8.2.2. Most sections of alignments and facilities confined to developed area. Only a few sections would encroach mixed woodland, plantation woodland and grassland/shrubland due to site constraints. Even though, the alignments would only go through the fringe of woodland and plantation, and the actual loss of trees are expected to be much smaller.

8.2.3. During the construction phase, site runoff would need to pass through sedimentation tanks to reduce the concentration of SS. In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94), best management practices should be implemented on site as far as practicable to control site runoff and drainage at all work sites during construction, so that the treated runoff will be discharged to public drainage system in compliance with the WPCO. Construction effluent, site run-off and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed. Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/rivers should be identified. Effluent monitoring should be incorporated to make sure that the discharged effluent from construction sites meets the effluent discharge guidelines. The best practices are detailed in the water quality chapter.

Impact Mitigation

8.2.4. The temporary and permanent loss of fringe of woodland habitat, if any, does not require specific mitigations under EcoIA, as their ecological values are ranked as Low or Low to moderate. The loss of trees will be mitigated by the compensatory planting provided in landscape impact assessment.

8.2.5. Besides the adoption of the water quality measures, including but not limited to the deployment of cage type silt curtains for reduction of sediment release to marine habitat from the bored pile installation as stated in the water quality chapter, no other specific mitigation measures for marine ecology are required.

8.2.6. No specific mitigation measures would be required for the operational phase of present Project.

Precautionary Measures

8.2.7. There will be loss of small area (about 19 m^2) of seabed. Although there will be no direct encroachment of coral or gorgonian in the proposed viaduct, a low coverage (<5%) of common hard coral and common gorgonians was found in the vicinity of the proposed viaduct. As a precautionary approach, it is recommended that a coral survey should be conducted within the piling footprint prior to the commencement of piling works, to verify that there are no significant coral colonies within the footprint and confirm the corals are not feasible for translocation. Should coral colonies of significant sizes and feasible for translocation be identified, coral translocation should be conducted. A Coral Translocation Plan should be submitted to AFCD for approval before the coral translocation. The

plan should cover the pre-translocation survey findings (i.e. findings from the verification survey, including the number, locations, species, sizes, conditions and feasibility for translocations of coral colonies), identifications of coral recipient site, the translocation methodology and coral post-translocation monitoring and reporting requirements. The verification survey and all translocation activities should be carried out by experienced marine ecologists as agreed by AFCD.

Enhancement Measures

8.2.8. As there will be a vertical above-seabed substructure to support the marine viaduct, the subtidal portion of many man-made structures could provide hard substrates for colonization of corals or other epibenthos. The submerged structures in the future marine viaduct could also provide hard surface for colonization of marine sessile epibenthos. It is also known that by suitable design, the colonization of epibenthos would be faster and/or of higher abundance, and the ecological functions of epibenthic communities on the subtidal portions of these structures could be further enhanced.

8.2.9. One of the approaches is to provide uneven surface or selected patterns on the future substructure (either incorporating on the structures or installing additional panels/ tiles with such features). The enhanced surface could provide microhabitats for various marine organisms to colonise and grow, and develop into communities to provide feeding and hiding habitats for juveniles of marine fauna, and thereby effectively enhance biodiversity and ecosystem functions of the new man-made structures. A study would be conducted prior to commencement of the marine works for the marine viaduct section to explore if feasible and practical ecological enhancement measures could be adopted as trial.

9. Fisheries

9.1. Introduction

9.1.1. The EIA has evaluated the implications on fisheries and recommended water quality mitigation measures to avoid and minimise the impact arising from the Project.

9.2. EM&A for Fisheries

9.2.1. Site inspections during construction phase should be carried out to monitor any malpractice leading to deterioration of water quality of the surroundings.

9.3. Mitigation Measures

9.3.1. No fisheries specific mitigation measures and monitoring would be required, and mitigation measures recommended in the water quality impacts will minimise any adverse impacts on fisheries.

9.3.2. Precautionary practices to prevent fisheries impacts due to the deterioration of marine water quality should be implemented. Good site practices as listed in the water quality section should be maintained to mitigate the surface runoff generate from the construction works.

9.3.3. No specific mitigation measures would be required for the operational phase of the Project.

10. Landscape and Visual

10.1. Introduction

10.1.1. The EIA has recommended landscape and visual mitigation measures to be undertaken during construction and operation phases of the Project. The implementation of landscape mitigation measures should be checked to ensure that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest possible date and without compromise to the intention of the mitigation measures.

10.2. EM&A Requirements

10.2.1. The EM&A comprises monitoring and auditing of proper implementation of mitigation measures and site practices to reduce landscape and visual impacts. Site inspections should be undertaken by the ET at least twice a month during the construction period.

10.3. Mitigation Measures

10.3.1. Mitigation measures recommended in the EIA for construction and operational phase of the Project are provided **Table 10.1** and **Table 10.2**, respectively. Detailed requirements of the mitigation measures are provided in the Implementation Schedule in Section 14.

Table 10.1 Proposed Construction Phase Mitigation Measures

Mitigation Code	Mitigation Measure
CP1	Preservation of Existing Trees - Trees / woodland within the Works Area which are unaffected by the works shall be protected and preserved during the detailed design stage and construction phase. The tree preservation proposals shall be coordinated with the layout and design of the engineering and architectural works at the detailed design stage for further retention of individual trees. The preservation of existing tree shall provide instant greening and screening effect for proposed works. Tree protection works to be undertaken in accordance with DEVB TC(W) 4/2020 on “Tree Preservation” and tree risk assessment in accordance with “Guidelines for Tree Risk Assessment and Management Arrangement” by DEVB.
CP2	Preservation of Existing Topsoil - Topsoil disturbed during the construction phase will be tested using a standard soil testing methodology and where it is found to be worthy of retention stored for re-use. The soil will be stockpiled to a maximum height of 2 m and will be either temporarily vegetated with hydro-seeded grass during construction or covered with a waterproof covering to prevent erosion. The stockpile should be turned over on a regular basis to avoid acidification and the degradation of the organic material, and reused after completion. Alternatively, if this is not practicable, it should be considered for use elsewhere, including other projects. This is also considered a general measure for good site practice.
CP3	Works Area and Temporary Works Areas - The landscape of these works areas should be restored to their original status or redesigned as new amenity areas following the completion of the construction phase. Construction site controls shall be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities are minimized including the storage of materials, the location and appearance of site accommodation and the careful design of site lighting to prevent light spillage. Screen hoarding may not be practicable for several linear sections of this project due to the close viewing distances involved and spatial constraints of the works areas.

Mitigation Code	Mitigation Measure
CP4	Mitigation Planting - Replanting of existing / disturbed vegetation shall be undertaken as soon as technically feasible during the construction phase. The priority shall be areas at the periphery of the site to ensure that proposed planting fulfils its role in mitigating the predicted impacts including screening views of the Project as early as possible during the operational phase.
CP5	Transplantation of Existing Trees - Existing 147 trees recommended to be transplanted under the current proposal, final recipient site should be, as far as space allows, adjacent to their current locations alongside of the cycle track or within supporting facilities to retain their contribution to the local landscape context. The implementation programme of the proposed works should reserve enough time for advance tree transplanting preparation works to enhance the survival of these transplant trees. Transplanting proposals will subject to the findings of the detailed tree survey and felling application undertaken at the detailed design stage and upon to the approval by relevant departments.
CP6	Coordination with Concurrent Projects- Coordinated implementation program with concurrent projects such Castle Peak Road Widening in order to minimize cumulative landscape impact during the construction Phase.

Table 10.2 Proposed Operational Phase Mitigation Measures

Mitigation Code	Mitigation Measure
OP1	Design of Cycle Track and Associated Facilities - the cycle track will incorporate design features as part of design mitigation measures including: 1. Integrated design approach – the alignment of cycle track should integrate, as far as technically feasible, with existing built structures such as existing road, footpath and coastal walkways, shade structures and other open space facilities as part of design mitigation measures to reduce the potential cumulative impact of the proposed works. The location and orientation of the associated facilities should be away from landscape and visually sensitive areas such open coastal waterfronts. 2. Building and infrastructure massing – the proposed use of responsive design with cycle bridges and related structures to be low profile and as light weight as is structurally feasible in order to reduce the intrusion of built scale into the waterfront and roadside public realm. 3. Treatment of built structures - the architectural and engineering design should seek to reduce the apparent visual mass of the built facilities and infrastructure such as cycle bridges through the use of natural materials such as wooden frame, vertical greening or other sustainable materials such as recycle plastic. 4. Responsive building finishes - In terms of the building finishes natural tones should be considered for the colour palette with non-reflective finishes recommended on the outward facing building facades to reduce glare effect. 5. Responsive lighting design – Aesthetic design of architectural and track lighting with following glare design measures: • Directional and full cut off lighting is recommended particularly for recreation and roadside areas to minimize light spillage to the surrounding areas. • Minimize geographical spread of lighting, only applied for safety at the key access points and staircases; • Limited lighting intensity to meet the minimum safety and operation requirement; and • High-pressure sodium road lighting is recommended for more stringent light control reducing spillage and thus visual impacts.

Mitigation Code	Mitigation Measure
OP2	Roadside and Amenity Planting – This planting will utilise large ornamental trees, either with high canopy and thin foliage to allow visual access in the views from the adjacent neighbourhoods to the further roadside or leisure landscape or dense foliage at selected locations to provide shade environment for cyclist and to give accent to the existing roadside planting. Native species will be utilised on sloping or wooded areas thereby enriching the ecological connectivity between existing woodland habitats with the advantage of creating a more coherent landscape framework. Large Feature Trees will be utilised along the cycle track, where space allows, with the design intent to create shaded environment and instant greening effect at key sections of the route. Smaller ornamental and preferably native species will also be incorporated within the planting proposal to add to create visual interest for the public and to help create a comprehensive planting framework that could enhance both ecological and landscape value of the surroundings.
OP3	Compensatory Planting Proposals – The Project Proponent would implement the compensatory planting as proposed in the Tree Preservation and Removal Proposal (TPRP) to be submitted to relevant government departments for approval in accordance with DEVB TC(W) No. 4/2020 to compensate for the trees to be felled. As far as practicable, implementation of compensatory tree planting should be of a ratio not less than 1:1 in terms of number of trees removed including dead trees, but excluding trees of undesirable species. Based on the cycle track layout, approximately 207 nos. of trees within areas of the existing public realm are proposed to be compensated. However, there would be limited space available for new tree planting in the vicinity of the proposed cycle track. Given these constraints, space within the Project is available for the planting of approximately 50 nos. new trees on a sustainable basis. As for the remaining 157 nos. new trees to be planted offsite, the Project Proponent will actively liaise with all the relevant departments throughout the TPRP process to confirm their planting locations.
OP4	Treatment of Retaining Wall and Slopes- In accordance with GEO Publication No. 1/2011, these engineering structures will be aesthetically enhanced through the use of soft landscape works including tree and shrub planting to give man-made slopes a more natural appearance blending into the local rural landscape. Whip sized planting is preferred on the face of soil cut slopes and at the crest and toe of the slope, and within berm planters these smaller, younger plants adapt to their new growing conditions more quickly than larger sized stock and establish a naturalistic effect more rapidly.
OP5	Protection and reinstatement of rocky shore at headlands – The proposed cycle bridges will pass over an area of rocky shore, with various existing rock outcrops and features visible at low tide. The design shall aim to avoid impacting these rocky features and where unavoidably impacted shall remove elements for later reinstatement on completion of the works in order to help integrate the new structures with the natural shoreline context.
OP6	Design of an Elegant Bridge Structure and Crossings – The proposed cycle is potentially a visually prominent structure. As such it is important that careful attention is given to the design of the structure, the associated profile, arrangement of piers and the compatibility with its landscape context. The design of railing and parapets with sculptural and decorative forms shall be employed to lift the aesthetics of these structures beyond a purely functional / utilitarian appearance.

11. Cultural Heritage

11.1. Introduction

11.1.1. The EIA concluded that no adverse impacts on cultural heritage resources would be expected from the construction or operational phase of the Project. No specific monitoring is required during the construction phase. However, mitigation measures should be implemented to minimize potential impacts during the construction phase.

11.2. Mitigation Measures

11.2.1. There are no potential direct and indirect impacts arising from the construction of the cycle path on Sites of Archaeological Interest and Graded Historic Buildings. Some potential works impacts have been identified on eight other built heritage items during the construction phase and mitigation may include a range of measures. The descriptions below will provide the detailed requirements for each of the mitigation actions recommended. The descriptions are abbreviated in **Table 11.1** by the letters shown in brackets.

11.2.2. The Marine Archaeological Investigation did not locate any underwater cultural heritage resources so there is no need for any mitigation measures.

11.2.3. As a precautionary measure, AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO. If there are any buildings / structures both at grade level and underground which were built on or before 1969, the project proponent is required to alert AMO in an early stage or once identified.

Condition Survey (CS)

11.2.4. A condition survey will be carried out by qualified building surveyor or engineer in advance of works for other built heritage items that may be affected by ground-borne vibration. The Condition Survey Report should contain descriptions of the structure, identification of fragile elements, an appraisal of the condition and working methods for any proposed monitoring and precautionary measures that are recommended.

11.2.5. The condition survey report for the other built heritage items must be submitted to AMO for comment before construction activities commence. The location of proposed monitoring points in the building should avoid damaging the historic fabric and agreed by the owner. The contractor should implement the approved monitoring and precautionary measures.

Provision of Buffer Zones (BZ)

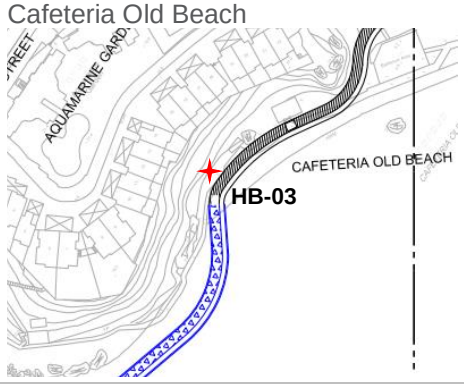
11.2.6. A buffer zone should be provided to separate the building or structure from the construction works. The buffer zone should be clearly marked out by temporary fencing. The buffer zone should be made at least 1m from the proposed works or if this is not possible as large as the site restrictions allow.

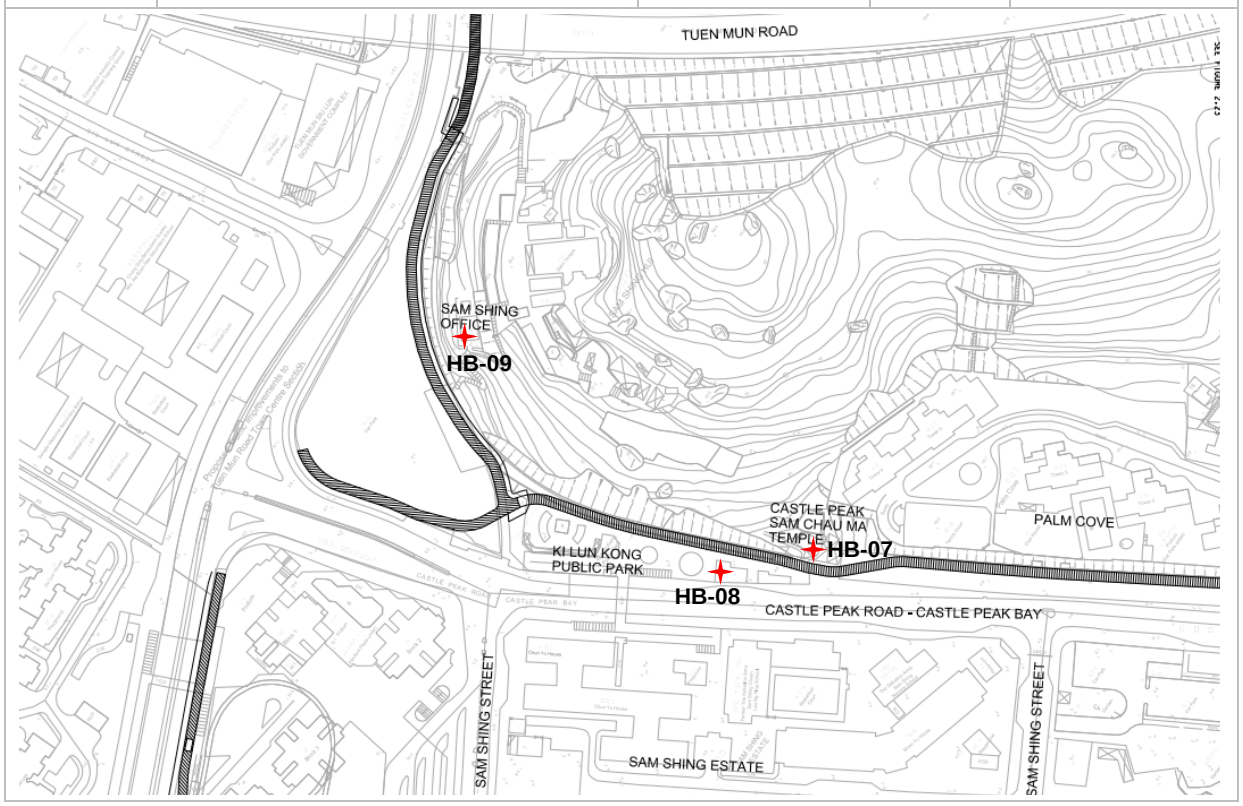
Provision of Safe Public Access (SPA)

11.2.7. Any proposed works in close proximity to buildings or structures used by the public have the potential to create an unsafe environment for members of the public.

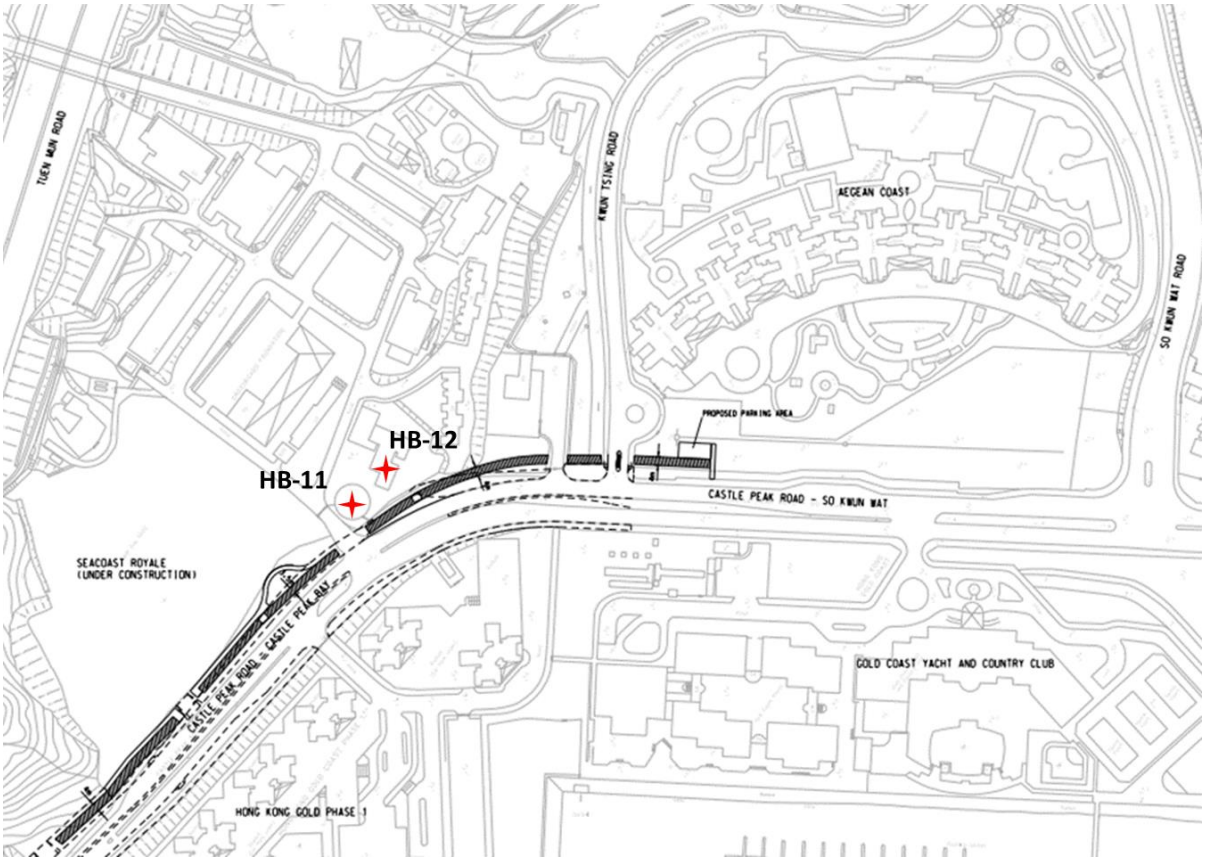
11.2.8. The contractor should ensure that safe public access if possible, through provision of clearly marked paths separated from the construction works areas is provided for any such affected cultural heritage structure.

Table 11.1 Proposed Mitigation during construction phase for other built heritage items identified as having potential impacts

Reference	Description	Proposed works	Distance to proposed works	Mitigation recommendation
Other built heritage items without grading				
HB-03	Tai Shan Shek Kam Dong Tablet, Cafeteria Old Beach 	Cycle track and footpath on viaduct	10m	BZ, SPA
		at-grade	7m	
HB-07	Tsing Shan Sam Chau Ma Miu, Sam Shing Hui	At-grade cycle track and footpath	2.5m	BZ, SPA
HB-08	Ki Lun Rock, Ki Lun Kong Public Park, Sam Shing Hui	At-grade cycle track and footpath	7m	BZ
HB-09	Tsing Shan Sam Shing Hui Rural Committee Building, Sam Shing Hui	At-grade cycle track	11m	CS, BZ, SPA



Reference	Description	Proposed works	Distance to proposed works	Mitigation recommendation
Other built heritage items without grading				
HB-11	Guard House, Former Perowne Barracks, No. 2 Castle Peak Road – Castle Peak Bay, Tuen Mun, New Territories	At-grade cycle track	4.3m	CS, BZ, SPA
HB-12	School Building, Former Perowne Barracks, No. 2 Castle Peak Road – Castle Peak Bay, Tuen Mun, New Territories	At-grade cycle track	5.8m	CS, BZ, SPA



Note:
Buffer Zones (BZ), Safe Public Access (SPA), Vibration Monitoring (VM), Condition Survey (CS)

11.2.9. Mitigation measures for cultural heritage will not be required during operational phases.

12. Site Environmental Audit

12.1. Site Inspection

12.1.1. Site inspection provides a direct means to trigger and enforce the specified environmental protection and pollution control measures necessary to comply with the contract specifications. They shall be undertaken regularly and routinely by the ET to inspect the activities at the works site in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented by the Contractor in accordance with the EM&A recommendations. With well-defined pollution control and mitigation specifications and a well-established site inspection, deficiency and action reporting system, site inspection is one of the most effective tools to enforce the environmental protection requirements on the site.

12.1.2. The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspections under the EM&A works. He/she shall prepare and submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER and IEC for approval. The ET's proposal for rectification would be made known to the IEC.

12.1.3. The ET shall conduct a site inspection at least once a week during the construction period of the Project. The areas of inspection shall include, but shall not be limited to, the environmental situation, and pollution control and mitigation measures within the site. It should also review the environmental situation outside the site area that 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:

- The EIA recommendations and requirements in this Manual on environmental protection and pollution control mitigation measures;
- On-going results of the EM&A programme;
- Works progress and programme;
- Individual works methodology proposals (which shall include proposals on associated pollution control measures);
- The contract specifications on environmental protection and pollution prevention;
- The relevant environmental protection and pollution control laws, ProPECC Notes; and
- Previous site inspection results undertaken by the ET.

12.1.4. The Contractor shall update the ET with all relevant information of the contract for him/ her to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor in a site inspection proforma within 24 hours, for reference and for taking immediate action.

12.1.5. The Contractor shall follow the procedures and time frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET to report on any remedial measures subsequent to the site inspections.

12.1.6. The ET shall conduct ad-hoc site inspections if significant environmental problems are identified. The IEC shall also conduct independent site audits. Inspections may also be required subsequent to receipt of any environmental complaints, or as part of the investigation work, as specified in the Event and Action Plan for environmental monitoring and audit programme.

12.2. Environmental Compliance

12.2.1. The ET Leader shall 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 the laws can be prevented.

12.2.2. The Contractor shall regularly copy relevant documents to the ET so that the checking work can be carried out. The documents shall at least include updated Work Progress Reports, the updated Works

Programme, application letters for different license/permits under the environmental protection laws, and all valid licence(s)/permit(s). The site diary shall also be available for the ET's inspection upon his request.

12.2.3. To ensure the works comply with statutory requirements, all method statements of works submitted by the Contractor to the ER for approval should be copied to the ET Leader for vetting to ensure sufficient environmental protection and pollution control measures have been included. Any proposed changes to the mitigation measures shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report.

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

12.2.5. Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ER shall check that the Contractor has taken appropriate action in order that the environmental protection and pollution control requirements are fulfilled.

12.3. Environmental Complaints

12.3.1. Complaints reviewed on environmental issues shall be referred to the ET Leader for carrying out complaint investigation procedures. Upon receipt of complaints the ET shall undertake the tasks outlined below.

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

12.3.2. The ET Leader shall immediately notify the ER, IEC, Contractor and EPD of any complaints received and keep him well informed of the actions being taken to settle these complaints.

12.3.3. During the complaint investigation work, the Contractor and ER shall co-operate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified to be required in the investigation in consultation with the IEC, the Contractor shall promptly carry out the measures. The ER shall ensure that the Contractor has implemented the mitigation measures.

12.4. Documentation

12.4.1. All documentation is required to be filed in a traceable and systematically manner and ready for inspection upon request. All EM&A results and findings shall be documented in the EM&A report prepared by the ET and endorsed by IEC prior to circulation to the Contractor, ER and EPD.

13. Reporting

13.1. General

13.1.1. The following reporting requirements are based upon a paper-documented approach. However, the same information shall be provided in an electronic medium upon agreeing the format with the ER, IEC and EPD. All the monitoring data shall also be submitted in an agreed electronic format in accordance with the requirements under Annex 21 of the EIAO TM. This would enable a transition from a paper/historic and reactive approach to an electronic/real time proactive approach.

13.2. Baseline Monitoring Report

13.2.1. The baseline monitoring report shall include at least the following:

1. Up to a half-page executive summary;
2. Brief project background information;
3. Drawings showing locations of the baseline monitoring stations;
4. Monitoring results (in both hard and soft copies) together with the following information:
   (i) Monitoring methodology;
   (ii) Name of laboratory and types of equipment used and calibration details;
   (iii) Parameters monitored;
   (iv) Monitoring locations (and depth);
   (v) Monitoring date, time, frequency and duration; and
   (vi) quality assurance (QA) / quality control (QC) results and detection limits.
5. Details of influencing factors, including:
   (i) Major activities, if any, being carried out on the site during the period;
   (ii) Weather conditions during the period; and
   (iii) Other factors which might affect the results.
6. Determination of the Action/ Limit levels for each monitoring parameter and statistical analysis of the baseline data, the analysis will conclude if there is any significant difference between control and impact stations for the parameters monitored;
7. Revisions for inclusion in the EM&A Manual; and
8. Comments and conclusions.

13.3. Monthly EM&A Report

13.3.1. The results and findings of all EM&A work required in this Manual shall be presented in a monthly EM&A report prepared and certified by the ET Leader. The monthly EM&A reports shall be verified by IEC and then submitted to EPD.

13.3.2. Each EM&A monthly report shall be submitted within 10 working days of the end of each reporting month. The first report is due in the month after the construction commences. The monthly EM&A report shall be submitted to the ER, the Contractor, the IEC and EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the exact number of copies needed and format of the monthly reports for both hard and soft copy.

13.3.3. The ET Leader shall review the number and location of monitoring stations and parameters to be monitored every six months or on a needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

First Monthly EM&A Report

13.3.4. The first monthly EM&A report shall include at least the following, where applicable:

1. Executive Summary (1-2 pages);

- Breaches of Action/ Limit levels;
- Complaint Log;
- Notifications of any summons and successful prosecutions;
- Reporting Changes; and
- Future key issues.

2. Basic Project Information
   - Project organisation including key personnel contact names and telephone numbers;
   - Programme with fine tuning of activities showing the inter-relationship with environmental protection/mitigation measures for the month;
   - Management structure; and
   - Work undertaken during the month.
3. Environmental Status
   - Works undertaken during the month with illustrations (such as location of works); and
   - Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
4. Summary of EM&A requirements including:
   - All monitoring parameters;
   - Environmental quality performance limits (Action/ Limit levels);
   - Event/Action Plans;
   - Environmental mitigation measures, as recommended in the project EIA study final report;
   - Environmental requirements in contract documents;
5. Implementation Status
   - Advice on the implementation status of environmental protection and pollution control/ mitigation measures as recommended in the project EIA report, summarised in the updated implementation schedule.
6. Monitoring Results (in both hard and soft 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 the monitored parameters in the month annotated against:
     i. Major activities being carried out on site during the period;
     ii. Weather conditions that may affect the results; and
     iii. Any other factors which might affect the monitoring results;
   - QA/QC results and detection limits;
   - Waste generation and disposal records;
   - All monitoring results should be tabulated with exceedances highlighted for ease of reference; and
   - Compare/contrast and assess the EM&A data with the EIA predictions and provide discussion for any discrepancies.
7. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
   - Compliance status with the EP under the EIAO and any EP submissions;
   - Record of all non-compliance (exceedances) of the environmental quality performance limits (Action/ Limit levels);
   - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and

follow-up procedures taken, results and summary;

- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/ pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, result 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.

8. Comments, Recommendations and Conclusions
   - An account of the future key issues reviewed from the works programme and work method statements;
   - Advice on the solid and liquid waste management status; and
   - Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarising the EM&A of the period.

Subsequent Monthly EM&A Reports

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

1. Executive Summary (1-2 pages)
   - Breaches of Action/ Limit levels;
   - Complaint log;
   - Notifications of any summons and successful prosecutions;
   - Reporting changes;
   - Future key issues.
2. Environmental Status
   - Programme with fine tuning of activities showing the inter-relationship with environmental protection/mitigation measures for the month;
   - Work undertaken during the month with illustrations including key personnel contact names and telephone numbers; and
   - Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
3. Monitoring Results (in both hard and electronic copies) together with the following information.
   - Monitoring methodology;
   - 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 the monitored parameters in the month annotated against:
     i. Major activities being carried out on site during the period;
     ii. Weather conditions that may affect the results; and
     iii. Any other factors which might affect the monitoring results;
   - QA/QC results and detection limits;
   - Waste generation and disposal records;
   - All monitoring results should be tabulated with exceedances highlighted for ease of reference; and
   - Compare/contrast and assess the EM&A data with the EIA predictions and provide discussion for any discrepancies.
4. Implementation Status

- Advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project EIA report, summarised in the updated implementation schedule.

5. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
   - Record of all non-compliance (exceedances) of the environmental quality performance limits (Action/ Limit levels);
   - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
   - Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, result 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
   - A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
6. Comments, Recommendations and Conclusions
   - An account of the future key issues reviewed from the works programme and work method statements;
   - Advice on the solid and liquid waste management status; and
   - Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarising the EM&A of the period.
7. Appendix
   - Action/ Limit Levels;
   - Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
     i. Major activities being carried out on Site during the periods;
     ii. Weather conditions during the period; and
     iii. Any other factors which might affect the monitoring results
   - Monitoring schedule for the present and next reporting period;
   - Cumulative statistics on complaints, notifications of summons and successful prosecutions; and
   - Outstanding issues and deficiencies.

13.4. Quarterly EM&A Summary Reports

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

1. Up to half a page executive summary;
2. Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
3. A brief summary of EM&A requirements including:
   - Monitoring parameters;
   - Environmental quality performance limits (Action/ Limit levels); and
   - Environmental mitigation measures, as recommended in the project EIA report;
4. Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule, including waste generation and disposal records;

5. Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
6. Graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against;
   - The major activities being carried out on site during the period;
   - Weather conditions during the period; and
   - Any other factors that might affect the monitoring results.
7. Advice on the solid and liquid waste management status;
8. A summary of non-compliance (exceedances) of the environmental quality performance limits (Action/ Limit levels);
9. A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
10. A summary description of the action taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
11. A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
12. A summary record of all 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;
13. Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
14. Proponent's contacts and any hotline telephone number for the public to make enquiries.

13.5. Final EM&A Summary Report

13.5.1. The final EM&A summary report shall include the following:

1. An executive summary;
2. Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the entire construction phase of the works;
3. A brief summary of EM&A requirements including:
   - Monitoring parameters;
   - Environmental quality performance limits (Action/ Limit levels); and
   - Environmental mitigation measures, as recommended in the project EIA study final report.
4. Advice on the implementation status of environmental protection and pollution control/ mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation status proformas, including waste generation and disposal records;
5. Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
6. Compliance status with the EP under the EIAO and any EP submissions;
7. Graphical plots of the trends of monitored parameters over the period of construction (of the project) for representative monitoring stations annotated against;
   - The major activities being carried out on site during the period;
   - Weather conditions during the period;
   - Any other factors which might affect the monitoring results; and
   - The return of ambient environmental conditions.
8. Compare/contrast and assess the EM&A data with the EIA predictions and annotate with explanation for any discrepancies;
9. Provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
10. Advice on the solid and liquid waste management status;
11. A summary of non-compliance (exceedances) of the environmental quality performance limits (Action/ Limit levels);
12. A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;

13. A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
14. A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
15. Review the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
16. A summary record of all notification 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;
17. Review the practicality and effectiveness of the EIA process and EM&A programme (e.g. effectiveness and efficiency of the mitigation measures);
18. Recommend any improvement in the EM&A programme; and
19. A conclusion to state the return of ambient and/or the predicted scenario as per EIA findings.

13.6. Termination of EM&A Programme

13.6.1. The EM&A program could be terminated upon completion of those construction activities that have the potential to cause significant environmental impacts. The proposed termination by the Contractor should only be implemented after the proposal has been endorsed by the IEC, the ER and the Project proponent followed by final approval from the Director of Environmental Protection.

13.7. Data Keeping

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

13.8. Electronic Reporting of EM&A Information

13.8.1. To facilitate public inspection of the Baseline Monitoring Report and regular EM&A Reports via the EIAO Internet Website and at the EIAO Register Office, electronic copies of these Reports shall be prepared in Hyper Text Markup Language (HTML) (latest version) and in Portable Document Format (PDF version 1.3 or later), unless otherwise agreed by the Director and. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these Reports will be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in these Reports will be provided in the main text from where the respective references are made. All graphics in these Reports will be in interlaced GIF format unless otherwise agreed by the Director. The content of the electronic copies of these Reports must be the same as the hardcopies

13.8.2. A dedicated web site will be set up with notification in writing to the Director of the Internet address where the environmental monitoring and project data is to be placed, within six weeks after the commencement of construction of the Project. All environmental monitoring and audit data and reports shall be made available to the public via a dedicated web site to be set up in the shortest practicable time and in no event later than two weeks after the relevant environmental monitoring data are collected or become available, unless otherwise agreed with the Director.

13.8.3. The internet website will enable user-friendly public access to the monitoring data and project data including the project profile of the Project, the EIA Report, the Environmental Permit(s), all environmental monitoring and audit data and reports, and all finalized submissions and plans required under the relevant environmental permit(s). The internet website shall have features capable of:

1. Providing access to all environmental monitoring data collected since the commencement of works
2. Searching by date
3. Searching by types of monitoring data
4. Hyperlinks to relevant monitoring data after searching; or otherwise as agreed by the Director

13.9. Interim Notifications of Environmental Quality Limit Exceedances

13.9.1. With reference to Event/Action Plans in previous sections, when the environmental quality limits are exceeded, the ET shall immediately notify the IEC, ER and EPD, as appropriate. The notification shall be followed up with advice to 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 shown in **Appendix B**.

14. Implementation Schedule of Mitigation Measures

14.1. Introduction

14.1.1. The implementation schedules for the recommended mitigation measures for each environmental aspect covered in this EIA are given in **Table 14.1** to **Table 14.7**.

Table 14.1 Implementation Schedule of Recommended Mitigation Measures – Air Quality

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
3.6.1	3.2.3	Dust control requirements stipulated in Air Pollution Control (Construction Dust) Regulation should be implemented:	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ The works area for site clearance shall be sprayed with water before, during and after the operation so as to maintain the entire surface wet	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ Restricting heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/ loading	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ Immediately before leaving a construction site, all vehicles shall be washed to remove any dusty materials from the bodies and wheels. However, all spraying of materials and surfaces should avoid excessive water usage	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ Travelling speeds should be controlled to reduce traffic induced dust dispersion and re-suspension within the site from the operating haul trucks	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ Erection of hoarding of not less than 2.4 m high from ground level, where appropriate	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
3.6.1	3.2.3	▪ Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 4 sides	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ All dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO-TM, Air Pollution Control (Construction Dust) Regulation
3.6.1	3.2.3	▪ Non-road Mobile Machinery should be approved or exempted with a label issued by EPD. The label should be displayed at a conspicuous position of the machine or vehicle	Air Quality (NRMM emissions)	Contractors	At all construction areas of the site during the entire construction period	Annex 4 of EIAO -TM, Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation
3.6.1	3.2.3	▪ The requirements stipulated in the Works Branch Development Bureau Technical Circular (Works) No. 8/2010 Enhanced Specification for Site Cleanliness and Tidiness should be followed as far as practicable to enhance the cleanliness and tidiness of construction sites	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Works Branch Development Bureau Technical Circular (Works)
Operational Phase						
N/A	N/A	None specific	N/A	N/A	N/A	N/A

Table 14.2 Implementation Schedule of Recommended Mitigation Measures – Noise

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
4.8.1	4.3	Good site practice and noise management should be followed: ▪ only well-maintained plants should be operated on-site and plants should be serviced regularly during the construction works; ▪ machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; ▪ plants known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs; ▪ mobile plant should be sited as far away from NSRs as possible; ▪ material stockpiles and other structures should be effectively utilized, where practicable, to screen noise from on-site construction activities; ▪ contractor shall prepare their own Construction Noise Management Plan before construction commencement; and ▪ silencers or mufflers on construction equipment should be utilized where appropriate and should be properly maintained during the construction periods.	Noise control	Contractors	At all construction areas of the site during the entire construction period	Annex 5 of EIAO-TM, contractual requirements
4.8.4, Table 4.5	4.3	Use of quieter PME.	Noise control	Contractors	At all construction areas of the site during the entire construction period	Annex 5 of EIAO-TM, contractual requirements

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
4.8.5, Table 4.6	4.3	Use of temporary noise barrier with a minimum surface density of 10 kg/m^2 and fitted with appropriate absorptive material to minimize multiple reflections of noise due to confined space of the surroundings and the proposed barriers for PME. The temporary noise barrier shall be constructed with sufficient length (e.g. at least five times greater than its height) or bent around the noise sources and shall have no opening or gaps at joints to avoid noise leakage. The use of cantilevered top cover to provide screening benefits at upper floors shall be considered when necessary.	Noise control	Contractors	At all construction areas of the site during the entire construction period	Annex 5 of EIAO-TM, contractual requirements
4.8.6, Table 4.6	4.3	Use of noise enclosure with a sufficient surface density of no less than 10 kg/m^2 is proposed to surround certain PMEs. The internal wall of the enclosure should be lined with 50 mm of sound-absorbent material, or with 25 mm of similar material if mounted on battens.	Noise control	Contractors	At all construction areas of the site during the entire construction period	Annex 5 of EIAO-TM, contractual requirements
4.8.8, 4.9.3, Table 4.7	4.3	To reduce the construction noise impact, quieter type wire saw and hydraulic crusher will be adopted by the Contractor for the demolition of boundary wall at workfront 020 as considered in the unmitigated scenario. Non-explosive chemical expansion agent and a concrete pump instead of circular wood saw and concrete lorry mixer, respectively, will be used during the construction of drainage and utilities, while the hand-held jigsaw will replace the circular wood saw for site clearance works. Other quieter equipment / construction methods not adopted in the assessment shall be considered during the design, tendering and implementation stage of the construction works as appropriate.	Noise control	Contractors	Works near Crossroads Foundation, Starfront Royale Tower 1 and 2, Seacoast Royale Tower 3, TMTL 518 Tower 8, Blessing Villa Block F, Surfside, Villa La Plage, Bayview Terrace, Boulder Lodge Staff Quarter, Castle Peak Sam Chau Ma Temple and Fu Hong Society Yau Chong Home.	Annex 5 of EIAO-TM, contractual requirements

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
4.9.4	4.3	Due to site constraints, dump truck, lorry and concrete lorry mixer would not be able to access the site at workfronts 008 and 009. Similarly, as an additional mitigation measures to reduce the noise impact on Crossroads Foundation, Starfront Royale Tower 1 and 2, Seacoast Royale Tower 3, TMTL 518 Tower 8 and Villa La Plage, dump truck, lorry and concrete lorry mixer will be restricted from accessing workfronts 003, 004, 005, 006, 010, 011 and 012. Considering the inaccessible/restricted distance to the above workfronts is relatively short, only a concrete pump with noise enclosure will be required to replace the concrete lorry mixer. All transportation of materials, including the concrete, will be carried out by trolley with manpower.	Noise Control	Contractors	Works near Crossroads Foundation, Starfront Royale Tower 1 and 2, Seacoast Royale Tower 3, TMTL 518 Tower 8, Blessing Villa, Surfside and Villa La Plage.	Annex 5 of EIAO-TM, contractual requirements
4.9.5	4.3	Additional temporary noise barrier will be provided in front of Blessing Villa Block F so as to offer protection to the upper floors. To further reduce the noise impact on Blessing Villa Block F, the concrete pump will be placed at least 11.5m away from the NSR.	Noise control	Contractors	Works near Blessing Villa Block F	Annex 5 of EIAO-TM, contractual requirements
4.9.6	4.3	Contractor shall erect substantial fixed barriers with a minimum surface density of 10 kg/m^2 and constructed with sufficient height and length to completely screen the PME to be used on the construction site such that none of the PME will be visible when viewed from any openings of the NSRs. The fixed noise barriers shall also be constructed with no openings and gaps at joints to avoid noise leakage. Cross-sectional drawings to demonstrate the provision of substantial fixed barriers in front of Seacoast Royale Tower 3 and Villa La Plage are provided in **Figures 4.4.2** to **4.4.5** of the EIA Report for reference. To further reduce the noise impact, the concrete pump will be placed at least 7.5m away from Seacoast Royale Tower 3 and 26m away from Villa La Plage.	Noise control	Contractors	Works near Seacoast Royale Tower 3 and Villa La Plage.	Annex 5 of EIAO-TM, contractual requirements

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
4.9.7, Table 4.9	4.3	Additional temporary noise barriers shall be provided in front of Castle Peak Sam Chau Ma Temple to block the sightline to the adjacent workfront to alleviate the potential noise impact. In any case, the Contractor shall establish a communication channel with the operator of Castle Peak Sam Chau Ma Temple and maintain liaison with the temple on the works schedule, in particular when the PMEs are unavoidably close to the temple, e.g. when the asphalt paver is operating at 30m or less away from the temple, the Contractor shall re-schedule the works when no ritual services are held in the temple, in collaboration with the temple operator. Table 4.7 summarises the recommendation on the use of PME.	Noise Control	Contractors	Works near Castle Peak Sam Chau Ma Temple	Annex 5 of EIAO-TM, contractual requirements
4.9.8	4.3	Contractor shall liaise with the school's management for the schedule of construction works to avoid carrying out noisy construction activities during examination period.	Noise Control	Contractors	Works near The Salvation Army Sam Shing Nursery School	Annex 5 of EIAO-TM, contractual requirements
4.9.9	4.3	The Contractor shall submit a Construction Noise Management Plan (CNMP) to EPD for approval prior to the commencement of construction of the Project. The CNMP shall be checked independently and endorsed by the Project Engineer and CEDD to ensure that the proposals are practicable and could be effectively implemented on site, before submission of the CNMP to EPD. Details on the use of plants and equipment, their on-time percentages and the adoption of noise mitigation measures for the construction phase shall be clearly provided in the CNMP, demonstrating that the construction works to be undertaken will comply with all prevailing environmental standards and requirements. All noise mitigation measures implemented shall be properly maintained during construction of the Project.	Noise Control	Contractors	Prior to the commencement of construction of the Project	Annex 5 of EIAO-TM, contractual requirements

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
4.10.2	4.3	Given the long project extent, the Project will be constructed in phases, and the construction activities of the cycle tracks Project will be implemented in separated sections (e.g. 300m between two active working sections) to avoid cumulative impacts due to concurrent works of this Project. The Contractor of this Project will liaise with the corresponding parties of the concurrent projects to schedule their works avoiding concurrent works within 300m of these other projects as far as possible.	Noise Control	Contractors	At all construction areas of the site during the entire construction period	Annex 5 of EIAO-TM, contractual requirements
Operational Phase						
N/A	N/A	None specific	N/A	N/A	N/A	N/A

Table 14.3 Implementation Schedule of Recommended Mitigation Measures – Water Quality

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
5.7.1	5.11.1	▪ The rate of constructing a pile is 15 m/day and 2 piles will be constructed per day; the diameter of pile is 600mm; the working hour shall be 12 hour per day from 07:00 to 19:00. ▪ Cage type silt curtains (i.e. size adjustable to suit environmental condition) must be deployed with an efficiency of 75% or higher for reduction of sediment release from the bored pile installation. The engineer will review using higher efficiency silt curtain in later stage. ▪ Restrict beach users entering the piling works area. ▪ Maintain close liaison with LCSD on construction works schedule of marine viaduct during swimming season from March to October. ▪ No more than 1/3 of the beach area (for each beach) shall be closed and only one side of the beach (for each beach) shall be occupied during the construction. ▪ Contingency plan setup with LCSD on alert beach users if there are unpredicted sediment suspension.	Water quality control	Contractors	Piling Works at Marine Viaduct Section during the entire construction period	Annex 6 of EIAO-TM, WPCO
5.7.3	5.11.3	▪ No construction site discharge will be allowed within 100m of the boundaries of a gazetted beach in any direction, including rivers, streams and storm drains. ▪ Sand/silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standards under the WPCO. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures should be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.	Control of site runoff	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		▪ Work programmes should be designed to minimize the size of work areas to minimize the soil exposure soil and reduce the potential for increased siltation and runoff;				
		▪ Boundaries of earthworks should be marked and surrounded by dykes or embankments for flood protection, as necessary. ▪ Silt removal facilities, channels and manholes should be maintained and cleaned regularly to ensure the proper function; ▪ Water pumped out from excavations should be discharged into silt removal facilities; ▪ Careful programming of the works to minimize soil excavation during the rainy season; If excavation of soil cannot be avoided during the wet season (April to September), exposed slope surfaces should be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms are summarized in ProPECC PN 1/94. ▪ Earthwork surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed; ▪ Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric during rainstorms. ▪ Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. The discharge of wastewater should be kept to a minimum; ▪ To prevent pollution from wastewater overflow, the pump sump of any water recycling system should be provided with an on-line standby pump of adequate capacity and with automatic alternating devices;				

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		Under normal circumstances, surplus wastewater may be discharged into foul sewers after treatment in silt removal and pH adjustment facilities (to within the pH range of 6 to l0). Disposal of wastewater into storm drains will require more elaborate treatment. Surface run-off should be segregated from the concreting works area as much as possible, and diverted to the stormwater drainage system. Surface run-off contaminated by materials during concreting works should be adequately treated before disposal into stormwater drains;				
5.7.4	5.11.4	Portable chemical toilets and sewage holding tanks should be provided for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets to cater populations and be responsible for appropriate disposal and maintenance	Control of Sewage Effluent from on-site Workforce	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
5.7.5	5.11.5	Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project. Regular environmental audit on the construction site should be conducted to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the Project would not cause water quality impact after undertaking all required measures.	Control of Sewage Effluent from on-site Workforce	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
5.7.7	5.11.7	Good site practices should be adopted to clean the rubbish and litter on construction sites to avoid the rubbish, debris and litter from entering to nearby water bodies. It is recommended to clean the construction sites on a regular basis.	Control for general activities	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
5.7.8	5.11.8	Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. The discharge of wastewater should be kept to a minimum	Control for general activities	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
5.7.9	5.11.9	To prevent pollution from wastewater overflow, the pump sump of any water recycling system should be provided with an on-line standby pump of adequate capacity and with automatic alternating devices	Control for general activities	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
5.7.10	5.11.10	Under normal circumstances, surplus wastewater may be discharged into foul sewers after treatment in silt removal and pH adjustment facilities (to within the pH range of 6 to l0). Disposal of wastewater into stormdrains will require more elaborate treatment. Surface run-off should be segregated from the concreting works area as much as possible, and diverted to the stormwater drainage system. Surface run-off contaminated by materials during concreting works should be adequately treated before disposal into stormwater drains	Control for general activities	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
5.7.11	5.11.11	Illegal disposal of chemicals should be strictly prohibited. Registration to EPD as a CWP (Chemical Waste Producers) is required if chemical wastes are generated and need to be disposed of. Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance (WDO). The Code of Practice on Packaging, Labelling and Storage of Chemical Wastes published under the WDO should be used as a guideline for handing chemical wastes	Control for accidental spillage	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
5.7.12	5.11.12	Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drains, fall tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event	Control for accidental spillage	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Operational Phase						
5.7.13	5.11.13	The ProPECC PN 5/93 is applicable to the Project during the operational phase. Runoff from the cycle track will be conveyed into designated drainage systems. Silt trap/interceptor would be provided and maintained in the designated drainage systems to minimize water quality impact arising from surface runoff. The wastewater (i.e., sewage effluent from visitors) arising will be collected by existing sewerage pipeline. The administrative measures such as regular cleaning of cycle track surface, maintenance of silt trap, etc. would be in place.	Control for runoff and sewerage	Operator	At the project site area during the operational period	ProPECC PN5/93,

Table 14.4 Implementation Schedule of Recommended Mitigation Measures - Waste Management Implications

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
6.4.2	6.3.2	C&D Materials ▪ All C&D materials shall be sorted on-site into inert and non-inert C&D materials, and where the materials can be recycled or reused, they shall be further segregated. Inert material, or public fill will comprise stone, rock, masonry, brick, concrete and soil which is suitable for land reclamation and site formation whilst non-inert C&D materials include all other wastes generated from the construction process such as plastic packaging and vegetation (from site clearance). ▪ The Contractor shall be responsible for identifying what materials can be recycled/ reused, whether on-site or off-site. In the event of the latter, the Contractor shall make arrangements for the collection of the recyclable materials. Any remaining non-inert C&D materials shall be collected and disposed of at landfills whilst any inert C&D materials shall be re-used on site as far as possible. Alternatively, if no use of the inert material can be found on-site, the materials can be delivered to a Public Fill Reception Facilities after obtaining the appropriate licence ▪ In order to monitor the disposal of C&D materials and solid wastes at public filling facilities and landfills, and control fly-tipping, a trip-ticket system shall be implemented by the Contractor, in accordance with the contract and the requirements of DB TC (Works) No. 6/2010 Trip Ticket System for Disposal of Construction and Demolition Materials.	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Annex 7 of EIAO-TM, Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
6.4.2	6.3.2	▪ Prior to disposal off-site, non-inert C&D materials will have to be temporarily put in a suitably covered storage area where it will have to be regularly cleaned and maintained to avoid attracting vermin and pests. With proper on-site handling and storage as well as regular disposal of these wastes, no adverse impacts will be envisaged. ▪ Dump trucks with mechanical cover shall be used to minimise windblown litter and dust during transportation of waste.	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Annex 7 of EIAO-TM, Waste Disposal Ordinance
6.4.2	6.3.2	Chemical Waste ▪ Under the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall register as a Chemical Waste Producer if chemical wastes such as spent lubricants and paints are generated on site. Only licensed chemical waste collectors shall be employed to collect chemical waste generated at site. The handling, storage, transportation and disposal of chemical wastes shall be conducted in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme both published by EPD.	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Annex 7 of EIAO-TM, Waste Disposal Ordinance
6.4.2	6.3.2	General Refuse ▪ A sufficient number of covered bins shall be provided on site for the containment of general refuse to prevent visual impacts and nuisance to the sensitive surroundings. These bins shall be cleared daily and the collected waste disposed of to the refuse transfer stations or landfills. Further to the issue of DB TC (Works) No. 8/2010 Enhanced Specification for Site Cleanliness and Tidiness, the Contractor is required to maintain a clean and hygienic site throughout the project works.	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Annex 7 of EIAO-TM, Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Operational Phase						
6.4.3	6.3.3	Waste collection facilities (e.g. litter bins) will be included in the design of the supporting facilities, and at regular intervals along the route. The Government Department responsible for managing the facilities will be responsible for arranging for regular collection of litter from these facilities. Separate collection bins shall be provided for aluminium cans, plastic drinks bottles and paper wastes, which will facilitate recycling of these waste streams.	Waste management during operation	Maintenance department	Operation	Annex 7 of EIAO-TM, Waste Disposal Ordinance
6.4.4	6.3.4	General refuse should be removed on a daily basis to minimize potential odour, pest and litter impacts. General refuse will have to be temporarily put in a suitably covered refuse collection point where it will have to be regularly cleaned and maintained to avoid attracting vermin and pests.	Waste management during operation	Maintenance department	Operation	Annex 7 of EIAO-TM, Waste Disposal Ordinance

Table 14.5 Implementation Schedule of Recommended Mitigation Measures – Ecology and Fisheries

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
8.9.4	8.2.3	In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94), best management practices should be implemented on site as far as practicable to control site runoff and drainage at all work sites during construction, so that the treated runoff will be discharged to public drainage system in compliance with the WPCO. Construction effluent, site run-off and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed. Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/rivers should be identified. Effluent monitoring should be incorporated to make sure that the discharged effluent from construction sites meets the effluent discharge guidelines.	Control for general activities	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO
Operational Phase						
N/A	N/A	None specific	N/A	N/A	N/A	N/A

Table 14.6 Implementation Schedule of Recommended Mitigation Measures – Landscape and Visual

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
10.10.8 Table 10.12 CP1	10.3.1 Table 10.1 CP1	CP1 - Preservation of Existing Trees - Trees / woodland within the Works Area which are unaffected by the works shall be protected and preserved during the detailed design stage and construction phase. The tree preservation proposals shall be coordinated with the layout and design of the engineering and architectural works at the detailed design stage for further retention of individual trees. The preservation of existing tree shall provide instant greening and screening effect for proposed works. Tree protection works to be undertaken in accordance with DEVB TC(W) 4/2020 on "Tree Preservation" and tree risk assessment in accordance with "Guidelines for Tree Risk Assessment and Management Arrangement" by DEVB.	Good site practices and to minimize landscape and visual impact	Project Proponent – CEDD (Via the ER / Contractor)	Work sites during construction	Annex 10 and Annex 18 of EIAO-TM, DEVB TC(W) No. 4/2020
10.10.8 Table 10.12 CP2	10.3.1 Table 10.1 CP2	CP2 - Preservation of Existing Topsoil - Topsoil disturbed during the construction phase will be tested using a standard soil testing methodology and where it is found to be worthy of retention stored for re-use. The soil will be stockpiled to a maximum height of 2 m and will be either temporarily vegetated with hydro-seeded grass during construction or covered with a waterproof covering to prevent erosion. The stockpile should be turned over on a regular basis to avoid acidification and the degradation of the organic material, and reused after completion. Alternatively, if this is not practicable, it should be considered for use elsewhere, including other projects. This is considered a general measure for good site practice	Good site practices and to minimize landscape and visual impact	Project Proponent – CEDD (Via the ER / Contractor)	Work sites during construction	Annex 10 and Annex 18 of EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
10.10.8 Table 10.12 CP3	10.3.1 Table 10.1 CP3	CP3 - Works Area and Temporary Works Areas - The landscape of these works areas should be restored to their original status or redesigned as new amenity areas following the completion of the construction phase. Construction site controls shall be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities are minimized including the storage of materials, the location and appearance of site accommodation and the careful design of site lighting to prevent light spillage. Screen hoarding may not be practicable for several linear sections of this project due to the close viewing distances involved and spatial constraints of the works areas	Good site practices and to minimize landscape and visual impact	Project Proponent – CEDD (Via the ER / Contractor)	Work sites during construction	Annex 10 and Annex 18 of EIAO-TM
10.10.8 Table 10.12 CP4	10.3.1 Table 10.1 CP4	CP4 - Mitigation Planting - Replanting of existing / disturbed vegetation shall be undertaken as soon as technically feasible during the construction phase. The priority shall be areas at the periphery of the site to ensure that proposed planting fulfils its role in mitigating the predicted impacts including screening views of the Project as early as possible during the operation phase	Good site practices and to minimize landscape and visual impact	Project Proponent – CEDD (Via the ER / Contractor)	Work sites during construction	Annex 10 and Annex 18 of EIAO-TM, DEVB TC(W) No. 4/2020
10.10.8 Table 10.12 CP5	10.3.1 Table 10.1 CP5	CP5 - Transplantation of Existing Trees - Existing 147 trees recommended to be transplanted under the current proposal, final recipient site should be, as far as space allows, adjacent to their current locations alongside of the cycle track or within supporting facilities to retain their contribution to the local landscape context. The implementation programme of the proposed works should reserve enough time for advance tree transplanting preparation works to enhance the survival of these transplant trees. Transplanting proposals will subject to the findings of the detailed tree survey and felling application undertaken at the detailed design stage and upon to the approval by relevant departments	Good site practices and to minimize landscape and visual impact	Project Proponent – CEDD (Via the ER / Contractor)	Work sites during construction	Annex 10 and Annex 18 of EIAO-TM, DEVB TC(W) No. 4/2020

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
10.10.8 Table 10.12 CP6	10.3.1 Table 10.1 CP6	CP6 - Coordination with Concurrent Projects- Coordinated implementation program with concurrent projects such Castle Peak Road Widening in order to minimize visual and cumulative landscape impact during the construction Phase	Good site practices and to minimize landscape and visual impact	Project Proponent – CEDD (Via the ER / Contractor)	Work sites during construction	Annex 10 and Annex 18 of EIAO-TM,
Operational Phase						
10.10.8 Table 10.13 OP1	10.3.1 Table 10.2 OP1	To incorporate design features considering: - Integrated design approach - Building and infrastructure massing - Treatment of built structures - Responsive building finishes - Responsive lighting design	To enhance the visual compatibility to the neighbouring environment	Project Proponent – CEDD (Via the detailed design consultant / Contractor)	Project sites during design	Annex 10 and Annex 18 of EIAO-TM,
10.10.8 Table 10.13 OP2	10.3.1 Table 10.2 OP2	Roadside and Amenity Planting – This planting will utilise large ornamental trees, either with high canopy and thin foliage to allow visual access in the views from the adjacent neighbourhoods to the further roadside or leisure landscape or dense foliage at selected locations to provide shade environment for cyclist and to give accent to the existing roadside planting. Native species will be utilises on sloping or wooded areas thereby enriching the ecological connectivity between existing woodland habitats with the advantage of creating a more coherent landscape framework. Large Feature Trees will be utilises along the cycle track where space allows, with the design intent to create shaded environment and instant greening effect at key sections of the route. Smaller ornamental and preferably native species will also be incorporated within the planting proposal to add to create visual interest for the public and to help create a comprehensive planting framework that could enhance both ecological and landscape value of the surroundings.	To enhance the visual compatibility to the neighbouring environment	Project Proponent – CEDD (Via the detailed design consultant / Contractor)	Project sites during design	Annex 10 and Annex 18 of EIAO-TM,

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
10.10.8 Table 10.13 OP3	10.3.1 Table 10.2 OP3	Compensatory Planting Proposals - The Project Proponent would implement the compensatory planting as proposed in the Tree Preservation and Removal Proposal (TPRP) to be submitted to relevant government departments for approval in accordance with DEVB TC(W) No. 4/2020 to compensate for the trees to be felled. As far as practicable, implementation of compensatory tree planting should be of a ratio not less than 1:1 in terms of number of trees removed including dead trees, but excluding trees of undesirable species. Based on the cycle track layout, approximately 207 nos. of trees within areas of the existing public realm are proposed to be compensated. However, there would be limited space available for new tree planting in the vicinity of the proposed cycle track. Given these constraints, space within the Project is available for the planting of approximately 50 nos. new trees on a sustainable basis. As for the remaining 157 nos. new trees to be planted offsite, the Project Proponent will actively liaise with all the relevant departments throughout the TPRP process to confirm their planting locations.	To enhance the visual compatibility to the neighbouring environment	Project Proponent – CEDD (Via the detailed design consultant / Contractor)	Project sites during design	Annex 10 and Annex 18 of EIAO-TM,
10.10.8 Table 10.13 OP4	10.3.1 Table 10.2 OP4	Treatment of Retaining Wall and Slopes- In accordance with GEO Publication No. 1/2011, these engineering structures will be aesthetically enhanced through the use of soft landscape works including tree and shrub planting to give man-made slopes a more natural appearance blending into the local rural landscape. Whip sized planting is preferred on the face of soil cut slopes and at the crest and toe of the slope, and within berm planters these smaller, younger plants adapt to their new growing conditions more quickly than larger sized stock and establish a naturalistic effect more rapidly.	To enhance the visual compatibility to the neighbouring environment	Project Proponent – CEDD (Via the detailed design consultant / Contractor)	Project sites during design	Annex 10 and Annex 18 of EIAO-TM,

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
10.10.8 Table 10.13 OP5	10.3.1 Table 10.2 OP5	Protection and reinstatement of rocky shore at headlands – The proposed cycle bridges will pass over an area of rocky shore, with various existing rock outcrops and features visible at low tide. The design shall aim to avoid impacting these rocky features and where unavoidably impacted shall remove elements for later reinstatement on completion of the works in order to help integrate the new structures with the natural shoreline context.	To enhance the visual compatibility to the neighbouring environment	Project Proponent – CEDD (Via the detailed design consultant / Contractor)	Project sites during design	Annex 10 and Annex 18 of EIAO-TM,
10.10.8 Table 10.13 OP6	10.3.1 Table 10.2 OP6	Design of an Elegant Bridge Structure and Crossings – The proposed cycle bridges is potentially a visually prominent structure. As such it is important that careful attention is given to the design of the structure, the associated profile, arrangement of piers and the compatibility with its landscape context. The design of railing and parapets with sculptural and decorative forms shall be employed to lift the aesthetics of these structures beyond a purely functional / utilitarian appearance.	To enhance the visual compatibility to the neighbouring environment	Project Proponent – CEDD (Via the detailed design consultant / Contractor)	Project sites during design	EIAO-TM

Table 14.7 Implementation Schedule of Recommended Mitigation Measures – Cultural Heritage

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
11.6.5, 11.6.6 Table 11.2	11.2.4, 11.2.5 Table 11.1	▪ A condition survey will be carried out by qualified building surveyor or engineer in advance of works for other built heritage items that may be affected by ground-borne vibration. The Condition Survey Report should contain descriptions of the structure, identification of fragile elements, an appraisal of the condition and working methods for any proposed monitoring and precautionary measures that are recommended. ▪ The condition survey report for the other built heritage items must be submitted to AMO for comment before construction activities commence. The location of proposed monitoring points in the building should avoid damaging the historic fabric and agreed by the owner. The contractor should implement the approved monitoring and precautionary measures	Condition Survey	Contractor	Works near HB-09, HB-11 and HB-12	Annex 10 of EIAO-TM
11.6.7 Table 11.2	11.2.6 Table 11.1	A buffer zone should be provided to separate the building or structure from the construction works. The buffer zone should be clearly marked out by temporary fencing. The buffer zone should be made at least 1m from the proposed works or if this is not possible as large as the site restrictions allow	Provision of Buffer Zones	Contractor	Works near HB-03, HB-07, HB-08, HB-09, HB-11, HB-12	Annex 10 of EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
11.6.8, 11.6.9, Table 11.2	11.2.7, 11.2.8, Table 11.1	▪ Any proposed works in close proximity to buildings or structures used by the public have the potential to create an unsafe environment for members of the public. ▪ The contractor should ensure that safe public access if possible, through provision of clearly marked paths separated from the construction works areas is provided for any such affected cultural heritage structure	Provision of Safe Public Access	Contractor	Works near HB-03, HB-07, HB-09, HB-11, HB-12	Annex 10 of EIAO-TM
Operational Phase						
N/A	N/A	▪ None specific	N/A	N/A	N/A	N/A