MTR Corporation Ltd

Environmental Consultancy No. C1202 Environmental Impact Assessment Study for Tung Chung Line Extension

Environmental Monitoring and Audit Manual

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1 Introduction

1.1 Background

1.1.1.1 The Railway Development Strategy 2014 (RDS-2014) announced by the Government of the Hong Kong Special Administrative Region included the conceptual scheme of Tung Chung West (TCW) Extension and a possible Tung Chung East (TCE) Station.

1.1.1.2 This new railway system has been included in the approved Schedule 3 EIA for Tung Chung New Town Extension (TCNTE), which has included the new stations at TCE area and TCW area and the associated trackwork and tunnel. However, a separate Schedule 2 EIA study for this railway system is conducted to address the associated environmental impacts, taking into account of the latest design.

1.1.1.3 In July 2020, the Project Proponent commissioned Ove Arup & Partners Hong Kong Limited to provide consultancy services for the compilation and submission of an EIA Report to fulfil the relevant legislative requirements under the EIAO.

1.1.1.4 The Project is an approximately 1.3km extension of the existing Tung Chung Line (TCL) with two new stations namely TCE Station and TCW Station.

1.1.1.5 The at-grade TCE Station will be located approximately 2km east of the existing Tung Chung Station (TUC) at the south of the future TCNTE (East) new reclamation area. The station is bounded by the future roads in the reclamation area and the existing TCL and Airport Express Line (AEL).

1.1.1.6 The underground TCW Station and aboveground station facilities will be located at the existing rural area – west of Yat Tung Estate. The area is an open space and currently occupied by orchids and some temporary structures.

1.1.1.7 The Emergency Access Point (EAP)/ Emergency Egress Point (EEP) building will be located at an artificial slope near Shun Tung Road.

1.2 Purpose of the Manual

1.2.1.1 The purposes of this Environmental Monitoring and Audit (EM&A) Manual are to:

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

1.2.1.2 This Manual outlines the monitoring and audit programme for the construction and operation of the Project and provides systematic procedures for monitoring, auditing and minimizing environmental impacts.

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

1.2.1.4 This Manual contains the following information:

- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET), and the Independent Environmental Checker (IEC) under the context of EM&A;
- Project organization for the EM&A works;
- The basis for, and description of the broad approach underlying the EM&A programme;
- Details of the methodologies to be adopted, including all laboratories and analytical procedures, and details on quality assurance and quality control programme;
- The rationale on which the environmental monitoring data will be evaluated and interpreted;
- Definition of Action and Limit Levels;
- Establishment of Event and Action Plans;
- Requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints; and
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures.

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

2 Project Description

2.1 General Description of the Project

2.1.1.1 Section 2 of the EIA Report has described the approaches adopted to avoid and minimize various environmental impacts throughout the design process. The design has therefore been taken forward as the basis for this EIA to demonstrate that all statutory requirements under the EIA Study Brief (No.: ESB-329/2020) and the EIAO are complied with. A brief summary of the key elements of the Project is given below:

- A new TCE Station (at-grade) and diversion of a section of existing TCL;
- Railway alignment (in the form of a tunnel) extending from existing overrun of TUC to the new TCW Station;
- A new TCW Station (underground) and overrun tunnel;
- EAP/ EEP building;
- Station associated facilities (entrances, vent shaft structures, etc.); and
- Work sites / works areas, barging facility, etc.

2.1.1.2 The location of the Project is shown in **Figure 2.1**.

2.2 Designated Project

2.2.1.1 The Project comprises the construction and operation of a new railway extension and the associated railway stations. The Project is a Designated Project (DP) under Schedule 2, Part I of the EIAO.

- Item A.2 – A railway and its associated stations; and
- Item A.7 – A road or railway tunnel more than 800m in length between portals.

2.3 Implementation Programme

2.3.1.1 According to the latest programme, the construction of the Project is scheduled to commence in the second quarter of Year 2023. The construction works would take about 7 years and the construction works are targeted to be completed in Year 2029. This would however be subject to change during the on-going design process.

3 Project Organization

3.1 Project Organization

3.1.1.1 The proposed project organization and lines of communication with respect to environmental protection works are shown in **Appendix 3.1**.

3.1.1.2 The responsibilities of respective parties are:

Engineer or Engineer's Representative (ER) or Project Proponent

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Comply with the agreed Event Contingency Plan in the event of any exceedance;
- Participate in joint site inspections and audits undertaken by the ET; and
- Adhere to the procedures for carrying out complaint investigations.

The Contractor

- Implement the EIA recommendations and requirements;
- Provide assistance to ET in carrying out monitoring and auditing;
- Submit proposals on mitigation measures in case of exceedances of Action and Limit Levels in accordance with the Event and Action Plans;
- Implement measures to reduce impact where Action and Limit Levels are exceeded; and
- Adhere to the agreed procedures for carrying out compliant investigation.

Environmental Team (ET)

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyse the environmental monitoring and audit data, review the success of EM&A programme, confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions, and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation measures, and take proactive actions to pre-empt problems;

- Prepare reports on the environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to the IEC, Contractor, the ER and EPD or its delegated representative;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit Levels in accordance with the Event and Action Plans;
- Undertake regular on-site audits / inspections and report to the Contractor and the ER of any potential non-compliance;
- Follow up and close out non-compliance actions;
- Advise the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- Adhere to the procedures for carrying out environmental complaint investigation;
- Liaison with Independent Environmental Checker (IEC) on all the performance matters, and timely submission of all the EM&A performa for IEC's approval;
- On as-needed basis, verify and certify the environmental acceptability of the Environmental Permit (EP) holder's construction methodology (both temporary and permanent works), relevant design plans and submissions under the EP; and
- Timely submission of the EM&A report to the Director of Environmental Protection.

Independent Environmental Checker (IEC)

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and location of sensitive receivers;
- Report the audit results to the ER and EPD;
- Review and verify the EM&A reports (monthly and quarterly summary reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;

- Check the mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary;
- Report the findings of site inspections and other environmental performance reviews to ER and EPD;
- Carry out random sample check and audit on monitoring data and sampling procedures, etc.;
- Conduct random site inspection;
- On as-needed basis, verify and certify the environmental acceptability of the Environmental Permit (EP) holder's construction methodology (both temporary and permanent works), relevant design plans and submissions under the EP; and
- Verify the investigation results of the environmental complaint cases and the effectiveness of corrective measures.

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

4 Air Quality Impact

4.1 Introduction

4.1.1.1 The EIA has considered the potential air quality impacts during construction phase of the Project. Based on the assessment results, adverse construction dust impact is not anticipated with the implementation of mitigation measures. Construction dust monitoring and regular site environmental audit are recommended to check the implementation of mitigation measures and good site practices. The EIA has also concluded that there will be no adverse air quality impacts during operational phase and hence, mitigation measures, environmental monitoring and site inspections during operational phase are not required.

4.2 Mitigation Measures

4.2.1.1 In order to reduce the construction dust emission from the Project, regular watering and other good site practices should be implemented. In addition, mitigation measures to control the exhaust emissions from construction plant and equipment are also required. All the recommended good practices are summarised in the Environmental Mitigation Implementation Schedule (EMIS) in **Appendix 4.1**.

4.3 Air Quality Monitoring Parameters

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

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

4.3.1.3 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and any other local atmospheric factors affecting or affected by site conditions, etc., shall be recorded down in detail. A sample data sheet is shown in **Appendix 4.2**.

4.4 Monitoring Equipment

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

- 0.6 – 1.7 m^3 per minute adjustable flow range;
- Equipped with a timing / control device with +/– 5 minutes accuracy for 24 hours operations;
- Installed with elapsed-time meter with +/– 2 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406 cm^2;
- Flow control accuracy: +/– 2.5% deviation over 24-hour sampling period;
- Equipped with a shelter to protect the filter and sampler;
- Incorporated with an electronic mass flow rate controller or other equivalent devices;
- Equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet;
- Incorporated with a manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easily changeable filter; and
- Capable of operating continuously for a 24-hour period.

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

4.4.1.3 Initial calibration of HVSs with mass flow controller shall be conducted upon installation and thereafter every six months. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data should be properly documented for future reference by IEC. All the data should be converted into standard temperature and pressure condition.

4.4.1.4 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded in the data sheet as mentioned in **Appendix 4.2.**

4.4.1.5 If the ET proposes to use a direct reading dust meter with using handheld dust particle measuring device to measure 1-hour TSP levels, they shall submit sufficient information to the IEC and EPD to prove that the instrument is capable of achieving a comparable result to the HVS. The instrument should also be calibrated regularly following the requirements specified by the equipment

manufacturers, and the 1-hour sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.

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

- The wind sensors should be installed at an elevated level 10 meters above ground so that they are clear of obstructions or turbulence caused by buildings;
- The wind data should be captured by a data logger, the data recorded in the data logger shall be downloaded periodically for analysis at least once a month;
- The wind data monitoring equipment should be re-calibrated at least once every six months; and
- Wind direction should be divided into 16 sectors of 22.5 degrees each.

4.4.1.7 If the ET proposes alternative dust monitoring equipment / methodology after the approval of this Manual, agreement from the IEC and EPD should be sought. The instrument should also conduct necessary quality assurance (QA) / quality control (QC) and be calibrated regularly following the requirements specified by the equipment manufacturers.

4.5 Laboratory Measurement / Analysis

4.5.1.1 A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited or other internationally accredited laboratory.

4.5.1.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be verified by IEC. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IEC.

4.5.1.3 IEC shall conduct regular audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his / her reference.

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

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

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

4.6 Monitoring Locations

4.6.1 Construction Phase

4.6.1.1 **Figure 4.1** shows the locations of the proposed construction dust monitoring stations. The status and location of ASRs may change after issuing this Manual. If such cases exist, the ET shall propose alternative monitoring locations and seek approval from ER and agreement from the IEC and EPD.

Table 4.1 Proposed construction dust monitoring locations and monitoring periods

Monitoring Station ID	ASR ID	Location	Construction Activity	Approximate Horizontal Distance from the nearest Construction Activities (m)	Monitoring Period [1]
DM-1	A05	Rosita Yuen Kindergarten	TCE Station and TCL realignment	~70	Throughout the construction period of corresponding activity
DM-1a [2]	P21a	TCNTE East - Planned Commercial Development (COM-1/Area 57)	TCE Station and TCL realignment	~40	
DM-2	A11a	Sheraton Hong Kong Tung Chung Hotel Shopping Mall (Fresh Air Intake)	Barging point operation	~80	
DM-3	A37	Shops at Tung Chung Crescent	TBM launching/ retrieval shaft	~10	
DM-4	A85	Yat Tung Shopping Centre	TCW Station	~10	
DM-5	A95	Ma Wan Chung Village	TCW Station	<10	

Note:
[1] The monitoring period is subject to the construction programme of the relevant contracts in the construction phase.
[2] Monitoring location DM-1a shall supersede DM-1 once the planned development at DM-1a commences operation during the corresponding construction activity.

4.6.1.2 When alternative monitoring locations are proposed, the proposed locations should, as far as practicable:

- Monitoring at site boundary or at ASRs close to the major site activities which are likely to have air quality impacts;
- Monitoring as close as possible to the ASRs as defined in the EIAO-TM;
- Assurance of the minimal disturbance to the occupants and working under a safe condition during monitoring; and
- take into account the prevailing meteorological conditions.

4.6.1.3 The ET shall agree with IEC on the position of the HVS for the installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

- a horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- no two samplers should be placed less than 2 meters apart;
- the distance between the sampler and an obstacle, such as buildings, should be at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;
- a minimum of 2 meters separation from any supporting structure, measured horizontally is required;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 meters from the dripline;
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

4.6.1.4 The ET may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed / relocated during any stage of the construction phase, upon the agreement from the IEC and EPD.

4.7 Baseline Monitoring

4.7.1.1 Baseline monitoring shall be carried out at all of the designated monitoring locations (see **Table 4.1**) for at least two weeks prior to the commissioning of major construction works to obtain ambient 1-hour TSP samples. Ambient 1-hour sampling should also be done at least 3 times per day at each monitoring station.

4.7.1.2 During the baseline monitoring, the monitoring locations should consider locations without any major construction or dust generation activities in the vicinity as far as practicable. As some of the monitoring locations listed in **Table 4.1** is planned development and may be located within construction sites during the baseline monitoring period, the baseline monitoring at the planned development shall refer to the nearby baseline monitoring location at the existing development. Before commencing baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.

4.7.1.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations, the ET shall carry out the monitoring at alternative locations that can effectively represent the baseline conditions at the impact monitoring location. The alternative baseline monitoring locations shall be agreed with the IEC and EPD prior to commencement of baseline monitoring.

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

4.7.1.5 General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources should also be recorded throughout the baseline monitoring period. If the ET Leader considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring may be carried out to update the baseline levels and air quality criteria, after consultation and agreement with the ER, IEC and EPD.

4.8 Impact Monitoring

4.8.1.1 The ET shall carry out impact monitoring during major construction activities for the Project as specified in **Table 4.1**. For 1-hour TSP monitoring, the sampling frequency of at least 3 times in every 6 days should be undertaken when the highest dust impact occurs.

4.8.1.2 The monthly schedule of the impact monitoring programme should be drawn up by the ET one month prior to the commencement of the scheduled construction period. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit.

4.9 Action and Limit Levels

4.9.1.1 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring during the construction phase. The ET shall compare the impact monitoring results with air quality criteria set up for 1-hour TSP. **Table 4.2** shows the air quality criteria, namely Action and Limit Levels to be used.

Table 4.2 Action Level and Limit Level for air quality

Parameter	Action Level	Limit Level
1-hour TSP Level in $\mu g/m^3$	For baseline level ≤ 384 $\mu g/m^3$, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 384 $\mu g/m^3$, Action level = Limit level	500$\mu g/m^3$

4.9.1.2 The Event and Action Plan prescribes procedures and actions associated with the outcome of the comparison of air quality monitoring data recorded and the agreed Action and Limit levels. In the cases where exceedances of these Action and Limit levels occur, the ET, the IEC, the ER and the Contractor should strictly observe the relevant actions of the respective Event and Action Plan listed in **Table 4.3**.

4.10 Event and Action Plan

4.10.1.1 Should non-compliance of the air quality criteria occur, actions in accordance with the Event and Action Plan in **Table 4.3** shall be carried out.

Table 4.3 Event and Action Plan for air quality

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action level exceedance for one sample	1. Repeat measurement to confirm finding; 2. If exceedance is confirmed, inform Contractor, IEC and ER; 3. Identify source, investigate the causes of exceedance and propose remedial measures; 4. Discuss with the Contractor, IEC and ER on the remedial measures required; 5. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Implement remedial measures; 3. Amend working methods agreed with the ER as appropriate.
Action level exceedance for two or more consecutive samples	1. Repeat measurement to confirm finding; 2. If exceedance is confirmed, inform Contractor, IEC and ER; 3. Identify source, investigate the causes of exceedance and propose remedial measures; 4. Advise the Contractor and ER on the effectiveness of the proposed remedial measures; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER to discuss the remedial measures to be taken; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC agree with the Contractor on the remedial measures to be implemented; 3. Supervise implementation of remedial measures.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Submit proposals for remedial measures to the ER, ET and IEC within three working days of notification for agreement; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Limit level exceedance for one sample	1. Repeat measurement to confirm finding; 2. If exceedance is confirmed, inform IEC, ER, Contractor and EPD; 3. Increase monitoring frequency to daily; 4. Discuss with the ER, IEC and Contractor on the remedial measures and assess effectiveness; 5. Keep ER, IEC and EPD informed of the results of the effectiveness of remedial measures.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Review and agree on the remedial measures proposed by the Contractor; 3. Ensure remedial measures properly implemented; 4. Supervise implementation of remedial measures.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER, ET and IEC within three working days of notification for agreement; 4. Implement the agreed proposals; 5. Amend proposal if appropriate.
Limit level exceedance for two or more consecutive samples	1. Repeat measurement to confirm finding; 2. If exceedance is confirmed, inform IEC, ER, Contractor and EPD; 3. Increase monitoring frequency; 4. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 5. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 6. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET 2. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented; 3. Supervise the implementation of remedial measures; 4. 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. Identify source(s), investigate the causes of exceedance and propose remedial measures 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER, IEC and ET within three working days of notification for agreement; 4. Implement the agreed proposals; 5. Review and resubmit proposals if problem still not under control; 6. Stop the relevant portion of works as determined by

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
				the ER until the exceedance is abated.

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

5 Noise Impact

5.1 Introduction

5.1.1.1 The EIA Report has considered the potential noise impacts associated with the construction and operation of the Project. Airborne construction noise arising from the construction activities, would be the major potential noise impacts during the construction phase. With the implementation of mitigation measures, adverse airborne construction noise is not anticipated. Airborne construction noise monitoring, regular site environmental inspection during the construction phase is required. During the operational phase, adverse airborne noise impact from rail and fixed noise sources is not anticipated with the implementation of mitigation measures. Thus, airborne rail noise commissioning test and monitoring as well as fixed plant noise audit for planned fixed noise sources shall be conducted prior to the operation of the Project to confirm that the relevant standards stipulated in EIAO-TM and Noise Control Ordinance (NCO) would be complied with. As exceedance of noise criteria from groundborne construction noise and groundborne rail noise under unmitigated scenario of the Project is not anticipated, mitigation measure is not required. Nonetheless, groundborne rail noise commissioning test is recommended.

5.2 Mitigation Measures

5.2.1 Construction Phase

5.2.1.1 Adverse airborne construction noise impact is not anticipated with the implementation of mitigation measures such as good site practices, use of quality powered mechanical equipment (QPME) and use of temporary noise barriers and noise enclosures to screen noise from relatively static PMEs etc. All the recommended mitigation measures and good site practices are summarised in the EMIS given in **Appendix 4.1**.

5.2.1.2 Adverse groundborne construction noise impact is not anticipated in the unmitigated scenario. Hence, no mitigation measure is recommended.

5.2.2 Operational Phase

5.2.2.1 With the implementation of mitigation measures such as speed reduction and noise barrier, adverse rail noise impact is not anticipated. For the proposed fixed noise sources, no adverse impact is expected with the properly selection of the equipment and installation of acoustic attenuators such as enclosure and silencer. All of the noise mitigation measures during operational phase are summarised in the EMIS given in **Appendix 4.1**.

5.2.2.2 Adverse groundborne rail noise impact is not anticipated in the unmitigated scenario. Hence, no mitigation measure is recommended.

5.3 Noise Monitoring Parameters

5.3.1 Construction Phase

5.3.1.1 Airborne construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ (30min)}$ shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq\ (5min)}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria. A sample data sheet is shown in **Appendix 5.1**.

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

5.3.2 Operational Phase

5.3.2.1 As adverse groundborne rail noise and fixed noise sources impacts during the operational phase is not anticipated, noise monitoring of groundborne rail noise and fixed plant noise is not required. Nevertheless, fixed plant noise, groundborne and airborne rail noise commissioning test should be conducted prior to the operation of the Project and noise monitoring for the airborne rail noise is recommended to verify the prediction.

5.4 Monitoring Equipment for Construction and Operational Phases

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

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

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

5.5 Construction Noise Monitoring

5.5.1 Monitoring Locations and Methodology

Airborne Construction Noise

5.5.1.1 The locations of airborne construction noise monitoring stations are summarised in **Table 5.1** and shown in **Figure 5.1**.

Table 5.1 Proposed airborne construction noise monitoring locations

Monitoring Station ID	NAP	Location	Construction Activity	Monitoring Period[1]
Existing Noise Sensitive Receivers				
NM1	YTT-02f	Ying Tung Estate	TCE Station and TCL realignment	Throughout the construction period of corresponding activity
NM2	TCC-09a	Tung Chung Crescent	TBM launching/ retrieval shaft	
NM3	YTE-01a	Yat Tung Estate	TCW Station	
Planned Noise Sensitive Receiver				
NM4	A113-01e	Tung Chung Area 113	TCE Station and TCL realignment	Upon the intake of the population and throughout the construction period of the corresponding activity
NM6	A100-02j	Tung Chung Area 100	TCE Station and TCL realignment	Upon the intake of the population and throughout the construction period of the corresponding activity

Note:
[1] The monitoring period is subject to the construction programme of the relevant contracts in the construction phase.

5.5.1.2 When alternative monitoring locations are proposed, the monitoring locations should be chosen based on the following criteria:

- At locations close to the major site activities which are likely to have noise impacts;
- Close to the most affected existing noise sensitive receivers; and

- For monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring.

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

5.5.1.4 The status and locations of the NSRs may change after issuing this EM&A Manual. In such case, the ET shall propose updated monitoring locations and seek approval from the ER and agreement from the IEC and EPD on the proposal.

5.5.2 Baseline Monitoring

5.5.2.1 The ET shall carry out baseline noise monitoring in all identified monitoring stations prior to the commencement of the construction works. There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. As some of the monitoring locations listed in **Table 5.1** is planned development and may be located within construction sites during the baseline monitoring period, the baseline monitoring at the planned development shall refer to the nearby baseline monitoring location at the existing development. Continuous baseline noise monitoring for the A-weighted levels L_{eq}, L_{10} and L_{90} shall be carried out daily for a period of at least two weeks in a sample period of 30 minutes between 0700 and 1900, and 5 minutes between 1900 and 0700 as well as all time at general holidays including Sundays. A schedule on the baseline monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

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

5.5.3 Impact Monitoring

5.5.3.1 During normal construction working hours (0700-1900 Monday to Saturday), monitoring of $L_{eq,\ (30min)}$ noise levels shall be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM issued under NCO.

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

5.5.3.3 The monthly schedule of the impact monitoring programme should be drawn up by the ET at least 2 weeks prior to the commencement of the scheduled construction period. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit.

5.5.4 Action and Limit Levels

Airborne Construction Noise

5.5.4.1 The ET shall compare the airborne construction noise monitoring results with noise criteria. **Table 5.3** shows the noise criteria, namely Action and Limit Levels to be used.

Table 5.3 Action and Limit Levels for airborne construction noise

Time Period	Action Level	Limit Level
0700 - 1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) *

Notes:
If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.
*Reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

5.5.4.2 To account for cases in which ambient noise levels, as identified by baseline monitoring, approach or exceed the stipulated Limit Levels prior to the commencement of construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise levels and the identified construction noise Limit Level, may be defined and agreed with the EPD. The amended level will be greater than 75 dB(A) and will represent the maximum acceptable noise level at a specific monitoring station. Correction factors for the effects of acoustic screening and/or architectural features of NSRs may also be applied as specified in the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM).

5.5.5 Event and Action Plan

5.5.5.1 Should non-compliance of the noise criteria occur, actions in accordance with the Event and Action Plan in **Table 5.5** shall be carried out.

Table 5.5 Event and Action Plan for construction noise

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action Level Exceedance	1. Notify IEC, ER and Contractor; 2. Identify source and carry out investigation; 3. Discuss with the Contractor and formulate remedial measures; 4. 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.	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. Identify source, and carry out investigation and report the investigation to the ET, IEC and ER; 2. Submit noise mitigation proposals to IEC and ER; 3. Implement noise mitigation proposals.
Limit Level Exceedance	1. Inform IEC, ER, EPD and Contractor; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 5. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 6. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 7. If exceedance stops, cease additional monitoring.	1. Check monitoring results and discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Ensure remedial measures properly implemented; and 3. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.	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 properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of	1. Identify source and carry out investigation and report the investigation to the ET, IEC and ER; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER, ET and IEC within 3 working days of notification; 4. Implement the agreed proposals; 5. Resubmit proposals if problem still not under control;

Event	Action			
	ET	IEC	ER	Contractor
			work until the exceedance is abated.	6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

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

5.6 Rail Noise Commissioning Test and Operational Monitoring

Airborne Rail Noise

5.6.1.1 Before the Project is in operation, a commissioning test will be conducted by the ET for verification of EIA predictions and checking compliance of the airborne noise levels within the NCO noise criteria. Measurement of train noise levels will be carried out in the commissioning test at the proposed monitoring locations during night-time period, i.e. 2300-0700 before the Project is in operation. Background noise levels shall also be measured.

5.6.1.2 Monitoring of $L_{eq\ (30mins)}$ train noise levels will be carried out at the proposed monitoring locations during night-time period, i.e. 2300-0700 on a monthly basis after the Project is in operation (i.e. after the commencement of the operation of the TCE Station). Background noise levels shall also be measured. It is recommended to conduct the monitoring for the initial start-up for 3 months to verify the prediction. With compliance of the noise limit and agreement from IEC, the 3-month monitoring will be terminated.

Groundborne Rail Noise

5.6.1.3 Before the Project is in operation, a commissioning test will be conducted for checking the compliance of the groundborne noise levels within the NCO noise criteria. Measurement of train noise levels will be carried out in the commissioning test at the proposed monitoring locations during night-time period, i.e. 2300-0700 before the Project is in operation (i.e. before the commencement of the operation of TCW Station). Background noise levels shall also be measured.

5.6.2 Monitoring Equipment and Methodology

5.6.2.1 The monitoring equipment and methodology for rail noise commissioning test and operational monitoring should be the same as those recommended for construction noise monitoring.

5.6.3 Monitoring Locations

Airborne Rail Noise

5.6.3.1 The most representative and affected Noise Sensitive Receiver (NSR) was selected as monitoring stations and details could be referred to EIA Report. The location of rail noise monitoring station is summarised in **Table 5.6** and shown in **Figure 5.2**.

Table 5.6 Proposed airborne rail noise monitoring station

Monitoring Station ID	**NAP**	**Location**	**Applicable Scenario**
Existing Noise Sensitive Receiver			
NM1	YTT-02f	Ying Tung Estate	Completion of realignment for both up track and down track
Planned Noise Sensitive Receiver			
NM5	A113-11a	Residential Premises in Tung Chung East – Area 113	Upon the intake of the population and completion of realignment for both up track and down track
NM7	A100-02n	Tung Chung Area 100	Upon the intake of the population and completion of realignment for both up track and down track
NM8	A133a-01s	Tung Chung Area 133	Upon the intake of the population and completion of realignment for both up track and down track

Groundborne Rail Noise

5.6.3.2 The most representative and affected Noise Sensitive Receiver (NSR) was selected as monitoring station and details could be referred to EIA Report. The location of rail noise monitoring station is summarised in **Table 5.7** and shown in **Figure 5.3**.

Table 5.7 Proposed groundborne rail noise monitoring station

Monitoring Station ID	**NAP**	**Location**
Existing Noise Sensitive Receivers		
NM6	MWC-03a	Ma Wan Chung

5.6.4 Background Noise Monitoring

5.6.4.1 Existing $L_{eq\ (30mins)}$ levels should be monitored at the monitoring locations without trains running to obtain the ambient noise levels. After the train noise levels are measured (if measured directly), these ambient levels should be deducted from the measured $L_{eq\ (30mins)}$ levels to obtain the operational noise levels in the absence of ambient noise.

5.7 Fixed Plant Noise Audit

5.7.1.1 The maximum allowable sound power levels of the identified fixed noise sources have been established in the EIA Report. The Contractor should implement and refine the specified sound power levels as appropriate to ensure compliances with the noise standards stipulated in the EIAO-TM and NCO for the fixed plant operations.

5.7.1.2 The Contractor should also carry out a noise audit for all fixed noise sources before the operation of the Project, in order to ensure compliance of the noise levels with the stipulated noise standards in the EIAO-TM and NCO.

6 Water Quality Impact

6.1 Introduction

6.1.1.1 The EIA Report has assessed the potential water quality impacts associated with the construction and operation of the Project. According to the EIA Report, adverse environmental impact is not anticipated during the construction and operational phases with proper implementation of the recommended mitigation measures and good site practices.

6.2 Mitigation Measures

6.2.1 Construction Phase

6.2.1.1 During the construction phase, recommended mitigation measures such as good site practices to control construction site runoff, providing perimeter drains, on-site treatment of tunnelling wastewater prior to discharge, etc., should be implemented. In addition, enhancement measures including provision of barrier such as sheet piles or hoarding with concrete footing along the western boundary of the construction site/works areas for TCW Station should be also implemented. All the recommended mitigation measures are summarised in the EMIS in **Appendix 4.1**.

6.2.2 Operational Phase

6.2.2.1 With proper connection to the public drainage and sewage systems and mitigation measure in place such as stormwater surface runoff discharged to the nearby government drainage system with provision of silt trap, standard oil interceptors and the practices outlined in ProPECC PN 5/93, application of a discharge licence for the discharge of commercial and industrial effluent, adverse impact is not anticipated during the operational phase.

6.3 Environmental Monitoring and Site Audit Requirements

6.3.1 Construction Phase

6.3.1.1 Apart from the water quality measurement specified in the discharge licence under the WPCO, no additional water quality monitoring is considered necessary. The necessary water quality measurements under the WPCO shall be conducted at the discharge location(s) specified in the licence conditions.

6.3.1.2 Weekly environmental site inspection shall be carried out by the ET during the construction phase to ensure that the recommended good site practices and other mitigation measures are implemented by the Contractor. Apart from the environmental site inspections, documents including discharge licenses shall be

reviewed and audited for the compliance with the legislation and contract requirements.

6.3.2 Operational Phase

6.3.2.1 No water quality monitoring and site audit are required. Nevertheless, the conditions specified in the discharge licence for the discharge of commercial and industrial effluent shall be followed.

7 Waste Management Implications

7.1 Introduction

7.1.1.1 The quantity and timing for the generation of waste during construction phase have been estimated in the EIA Report. Measures including the opportunity for on-site sorting, reusing Construction and Demolition (C&D) materials etc., are devised in the construction methodology to minimise the surplus materials to be disposed. Chemical waste should be collected by licensed chemical waste collectors for proper disposal.

7.1.1.2 During the operational phase, the major types of waste to be generated are municipal solid waste from the public, station employees and commercial operators within the stations and chemical waste from the maintenance of the stations, tracks and EAP/EEP.

7.2 Mitigation Measures

7.2.1 Construction Phase

7.2.1.1 All the proposed mitigation measures during construction phase are stipulated in the EIA Report and summarised in **Appendix 4.1**.

7.2.1.2 Waste will be handled in accordance with the relevant legislation and guidelines and with the implementation of the proposed mitigation measures, no adverse environmental impacts from waste management are anticipated. EM&A is required for waste management during the construction phase only and the effective management of waste arising during the construction phase will be monitored through the site audit programme. The aims of the waste audit are:

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

7.2.1.3 A trip-ticket system should be operated to monitor all movements of both inert and non-inert C&D materials for disposal at landfill and chemical wastes which will be collected by licensed chemical waste collectors to licensed facilities for final treatment and disposal. Land-based sediment will be handled, stored and disposed of in accordance with good waste management practices, relevant legislation and waste management guidelines. All dump trucks engaged on site for delivery of inert C&D materials from the site to Pubic Fill Reception Facilities (PFRFs) should be equipped with GPS or equivalent system for tracking and monitoring of their travel routings and parking locations to prohibit illegal dumping and landfilling of C&D materials. Record and analysis of data collected by the mentioned GPS or equivalent system should be kept. Recommendations have been made in the EIA

Report to ensure proper treatment and proper disposal of these wastes and summarised in **Appendix 4.1**.

7.2.2 Operational Phase

7.2.2.1 For the municipal solid waste generated from the public, station employees and commercial operators within the stations, it should be separated from chemical waste by providing separated bins for storage to maximize the recyclable volume as far as practicable. A reputable waste collector should be employed to remove municipal solid waste regularly to minimize odour, pest and litter impacts. Other than municipal solid waste, opportunities for the use and recycling of chemical wastes where possible. As chemical waste is expected to be generated, a trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical wastes which will be collected by a licensed collector to a licensed facility for final treatment and disposal. With proper management, adverse waste management implications are not anticipated.

7.3 Environmental Monitoring and Site Audit Requirements

7.3.1 Construction Phase

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

- Chemical Waste Disposal License under the Waste Disposal Ordinance (Cap 354);
- Dumping at Sea Ordinance (DASO) (Cap. 466) if marine disposal of land-based sediment is unavoidable;
- Dumping License under the Land (Miscellaneous Provisions) Ordinance (Cap 28); and
- Water Pollution Control Ordinance License under the Water Pollution Control Ordinance

7.3.1.2 The Contractor shall refer to EPD's Guidance Notes for License Application when applying for the license/ permit and the ET shall refer to these Guidance Notes for auditing purposes.

7.3.1.3 Regular audits and site inspections should be carried out during the construction phase by the ET to ensure that the recommended good site practices and other mitigation measures recommended in the EIA Report and in **Appendix 4.1** are properly implemented by the Contractor. The audits should concern all aspects of on-site waste management practices including waste generation, storage, recycling,

transport and disposal. Apart from site inspection, a Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) shall be prepared. Documents including licenses, permits, disposal and recycling records should be reviewed and audited for compliance with the legislation and contract requirements.

7.3.1.4 The requirements of the environmental audit programme are set out in **Section 14** of this Manual. The audit programme will verify the implementation status and evaluate the effectiveness of the mitigation measures.

7.3.2 Operational Phase

7.3.2.1 As it is anticipated that there would not be any insurmountable impacts during the operational phase, monitoring and audit requirements are not required.

8 Land Contamination Impact

8.1 Introduction

8.1.1.1 As outlined in Section 7 of the EIA Report, based on the desktop review findings of selected aerial photos, the information collected during site surveys, as well as from EPD and Fire Services Department (FSD), there are no signs of land contamination in the Project Site. In addition, potentially contaminating activities or land use under the Project are not anticipated.

8.2 Mitigation Measures

8.2.1.1 Potential land contamination issue within the Project Site were not identified and hence mitigation measures are not required for both construction and operational phases. Nevertheless, since major construction works for the Project are anticipated to commence in 2023, site re-appraisal would be recommended by the Project Proponent to assess the latest site situation prior to the commencement of the construction. The objective of re-appraisal is to ensure any new changes in land use activities that might cause land contamination issue after the agreement of the Land Contamination Review but before commencement of the construction could be addressed.

8.3 Environmental Monitoring and Site Audit Requirements

8.3.1.1 Environmental monitoring and site audit are not required for both construction and operational phases.

9 Ecology

9.1 Introduction

9.1.1.1 The EIA Report has evaluated the ecological impacts associated with the construction and operation of the Project and recommended ecological mitigation measures to avoid, minimise and compensate the impact arising from the Project.

1.1.1.1 The required mitigation measures adopted to avoid, minimise and mitigate for the ecological impacts arising from the Project were identified in **Section 8** of the EIA Report and are described in the following sections. The proposed ecological mitigation measures should be checked as an element of the environmental audit programme under the Project.

9.2 Mitigation Measures

9.2.1 Construction Phase

9.2.1.1 The proposed mitigation measures for ecological impacts are summarised in the EMIS in **Appendix 4.1**.

9.2.1.2 The following key considerations throughout the entire project development and design have been duly considered to avoid/ minimise the impacts.

- Avoidance of marine works;
- Avoidance of Tung Chung River and its estuary, and Tai Ho Wan;
- Avoidance of works within the intertidal zone;
- Avoidance of country parks, SSSI, CA and CPA;
- Avoidance of mature woodland;
- Avoidance of re-diversion of Wong Lung Hang nullah;
- Avoidance of Flora of Conservation Importance by protection zone;
- Minimisation of surface runoff and provision of necessary treatment facilities;
- Minimisation of noise disturbance during construction;
- Minimisation of air quality impact during construction; and
- Minimisation of human disturbance during construction.

9.2.2 Operational Phase

9.2.2.1 Since both direct and indirect ecological impacts are considered insignificant, no mitigation measures are required.

9.3 Environmental Monitoring and Site Audit Requirements

9.3.1 Construction Phase

9.3.1.1 Site inspections once per week should be undertaken to inspect the construction activities and works areas to ensure the recommended mitigation measures are properly implemented.

9.3.2 Operational Phase

9.3.2.1 Since both direct and indirect ecological impacts are considered insignificant, no environmental monitoring and site audit are required during operational phase.

10 Fisheries

10.1 Introduction

10.1.1.1 The EIA Report concluded that there is no direct impact to fisheries resources as no marine works nor marine dredging would be required in the Project and the TCL realignment works at TCE is land-based. Potential fisheries resources would be affected by indirect water quality impact which would be controlled by construction site best practices. Hence, adverse fisheries impacts are not anticipated in both construction and operational phases.

10.2 Mitigation Measures

10.2.1.1 No specific fisheries mitigation measures and monitoring would be required during both construction and operational phases. Mitigation measures recommended in the water quality impact assessment will also minimise any adverse impacts on fisheries.

10.3 Environmental Monitoring and Site Audit Requirement

1.1.1.2 No specific fisheries monitoring and audit is required for both construction and operational phases.

11 Landscape and Visual

11.1 Introduction

1.1.1.1 The EIA has recommended that EM&A for landscape and visual resources is undertaken during the design, construction and operational phases of the project. The design, implementation and maintenance of landscape mitigation measures should be checked to ensure that any potential conflicts between the proposed landscape measures and any other works of the Project would be resolved at early as practical without affecting the implementation of the mitigation measures.

11.2 Mitigation Measures

11.2.1.1 The landscape and visual impact assessment of the EIA Report proposes a number of mitigation measures to ameliorate the landscape and visual impacts of the Project. These measures are listed in **Table 11.1** below and the implementation is summarised in the EMIS in **Appendix 4.1**.

Table 11.1 Mitigation measures for the construction and operational phases

Mitigation Measure Code	Summary Description	Mitigate Landscape Impacts	Mitigate Visual Impacts
Construction Phase			
CM1	Tree Preservation	Y	-
CM2	Tree Transplanting	Y	-
CM3	Landscape Reinstatement	Y	Y
CM4	Lighting Control	-	Y
CM5	Erection of Screen Hoarding	-	Y
CM6	Optimization of Construction Areas	Y	Y
Operational Phase			
OM1	Compensatory Tree Planting	Y	-
OM2	Optimised Greening Provision on Structure	Y	Y
OM3	Landscape Integration and Screen Planting	Y	Y
OM4	Architectural Aesthetic Design of Built Structure	-	Y
OM5	Implement Aesthetic Design on Noise Barrier	-	Y

11.2.1.2 Mitigation measures to be implemented during construction should be adopted from the start of construction and be in place throughout the entire construction period. Mitigation measures to be implemented during operation should be integrated into the detailed design and built as part of the construction works so that they are in place on commissioning of the Project as far as practical.

11.3 Environmental Monitoring and Audit Requirement

11.3.1.1 Site audit should be undertaken during the construction phase of the Project to check that the proposed landscape and visual mitigation measures are properly implemented and maintained as per their intended objectives. Site inspections should be undertaken by the ET at least twice a month during the construction period.

11.4 Event and Action Plan

11.4.1.1 In the event of non-compliance, the responsibilities of the relevant parties are detailed in the Event/Action plan provided in **Table 11.2**.

Table 11.2 Event/Action plan for landscape and visual

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Non-conformity on one occasion	1. Inform the IEC, ER and the Contractor 2. Discuss remedial actions with IEC, ER and Contractor. 3. Monitor remedial actions until rectification has been completed.	1. Check report. 2. Check Contractor's working method. 3. Discuss with ET, ER and Contractor on possible remedial measures. 4. Advise ER on effective of proposed remedial measures. 5. Check implementation of remedial measures.	1. Confirm receipt of notification of non-conformity in writing. 2. Review and agree on the remedial measures proposed by the Contractor. 3. Supervise remedial measures are properly implemented.	1. Identify source and investigate the non-conformity. 2. Implement remedial measures 3. Amend working methods agreed with ER as appropriate. 4. Rectify damage and undertake any necessary replacement.
Repeated Non-conformity	1. Identify sources. 2. Inform the Contractor, IEC and ER. 3. Discuss inspection frequency. 4. Discuss remedial actions with IEC, ER and Contractor. 5. Monitor remedial actions until rectification has been completed. 6. If non-conformity stops, cease additional monitoring.	1. Check inspection report. 2. Check Contractor's working method. 3. Discuss with ET, ER and Contractor on possible remedial measures. 4. Advise ER on effectiveness of proposed remedial measures.	1. Notify the Contractor. 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented. 3. Supervise implementation of remedial measures.	1. Identify source and investigate the non-conformity. 2. Implement remedial measures 3. Amend working methods agreed with ER as appropriate. 4. Rectify damage and undertake any necessary replacement. Stop relevant portion of works as determined by ER until the non-conformity is abated.

Notes:

ET – Environmental Team

IEC – Independent Environmental Checker
ER – Engineer/ Engineer's Representative

12 Cultural Heritage

12.1 Introduction

12.1.1.1 The graded, non-graded built heritage and declared monuments identified within the assessment area will not be affected by the Project. In addition, the sites of archaeological interest and an archaeological potential area are identified within or near the Project. No major archaeological impacts are expected within the whole project area during the construction and operational phases. At the extreme northern end of the TCW Station area and above and adjacent to the tunnel alignment is an area of unexplored archaeological interest, further archaeological survey including field scan, six auger tests and two test pit excavations are recommended to be conducted by a qualified archaeologist who obtains a licence under the Antiquities and Monuments Ordinance (Cap. 53) to verify presence of any archaeological remains. Locations and scope should be agreed with AMO prior to implementation. The exact locations of the auger tests and test pits would be subject to site circumstances and constraints. Subject to the findings of the further archaeological testing, options for mitigation measures such as in-situ preservation, relocation and preservation by record etc would be fully investigated and agreed with AMO.

12.1.1.2 AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of the project works in accordance with the Antiquities and Monuments Ordinance (Cap. 53), so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.

12.2 Mitigation Measures

12.2.1 Archaeology

Construction Phase

12.2.1.1 The area at the northern end of the TCW Station will be subject to further archaeological survey after land resumption. The area can be referred to Figure 11.7 of the EIA Report. Subject to the findings of archaeological work, appropriate mitigation measures would be proposed by the project proponent in prior agreement with Antiquities and Monuments Office before the construction phase of the proposed development. The implementation of the above mitigation measure is summarised in the EMIS in **Appendix 4.1**.

Operational Phase

12.2.1.2 The vibration level of the train during operation within Ma Wan Chung Site of Archaeological Interest (SAI) and area of archaeological interest will be an

acceptable impact on the structural remains of the SAI. No mitigation measures will be required.

12.2.2 Built Heritage

12.2.2.1 As no direct impact to built heritage is anticipated, mitigation measures are not required for both construction and operational phases.

12.3 Environmental Monitoring and Site Audit Requirements

12.3.1 Archaeology

12.3.1.1 As no archaeological impact is expected during both construction and operational phases of the Project, monitoring and audit are considered not necessary.

12.3.2 Cultural Heritage

12.3.2.1 As the Project would not generate or induce any additional cultural heritage impact during both construction and operational phases of the Project, monitoring and audit are considered not necessary.

13 Hazard to Life

13.1 Introduction

13.1.1.1 The EIA Report concluded that with the implementation of proposed mitigation measures, no insurmountable potential risk arising from the transport and use of explosives is anticipated. In addition, The Project does not fall into consultation zone of any Potentially Hazardous Installations (PHIs). Therefore, potential risk relating PHI is not anticipated. The operation of the Project does not involve any use of explosives, potential risk during operational phase is not envisaged.

13.2 Mitigation Measures

13.2.1 Construction Phase

13.2.1.1 No potential risk would be anticipated with the implementation of good site practices and design measures for the potential use of explosives. Hence, mitigation measures are not required.

13.2.2 Operational Phase

13.2.2.1 No specific mitigation measures are required as no potential risk during operational phase is envisaged.

13.3 Environmental Monitoring and Site Audit

13.3.1 Construction Phase

13.3.1.1 No potential risk would be anticipated with the implementation of good site practices and design measures for the potential use of explosives. Hence, environmental monitoring and site audit are not required.

13.3.2 Operational Phase

13.3.2.1 No specific mitigation measures are required as no potential risk during operational phase is envisaged. Hence, environmental monitoring and site audit are not required.

14 Site Environmental Audit

14.1 Site Inspection

14.1.1.1 Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. These shall be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

14.1.1.2 The ET shall be responsible for formulating the environmental site inspection programme as well as the deficiency and action reporting system, and for carrying out the site inspections. The proposal for rectification, if any, should be prepared and submitted to the ET Leader and IEC by the Contractor.

14.1.1.3 Regular site inspections shall be carried out and led by the ER and attended by the Contractor and ET at least once per week during the construction phase. The IEC shall undertake regular site audit at least once per month to assess the performance of the Contractor(s). The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site. It should also review the environmental conditions of locations outside the works area which is likely to be affected, directly or indirectly, by the construction site activities of the Project. The ET shall make reference to the following information in conducting the inspection. During the inspection, the following information should be referred to:

(i) EIA Report and EM&A Manual recommendations on environmental protection and pollution control mitigation measures;

(ii) ongoing results of the EM&A programme;

(iii) works progress and programme;

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

(v) contract specifications on environmental protection;

(vi) relevant environmental protection and pollution control legislations; and

(vii) previous site inspection results undertaken by the ET and others.

14.1.1.4 The Contractor shall keep the ER and ET Leader updated with all the relevant environmental related information on the construction contract necessary for him to carry out the site inspections. Site inspection results and associated recommendations for improvements to the environmental protection and pollution control efforts should be recorded and followed up by the Contractor in an agreed time-frame. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, and the deficiency and action

reporting system formulated by the ET, to report on any remedial measures subsequent to the site inspections.

14.1.1.5 The ER, ET and the Contractor should also carry out ad-hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of a valid environmental complaint, or as part of the investigation work, as specified in the Event and Action Plans for the EM&A programme.

14.2 Environmental Compliance

14.2.1.1 There are statutory requirements on environmental protection and pollution control requirements with which construction activities must comply.

14.2.1.2 In order to ensure the works comply with statutory requirements, all method statements of works should be submitted by the Contractor to the ER for approval and to the ET Leader to ensure sufficient environmental protection and pollution control measures have been included. EMIS is summarised in **Appendix 4.1**. 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.

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

14.2.1.4 The Contractor should provide the update of the relevant documents to the ET Leader so that checking can be carried out. The document shall at least include the updated Works Progress Reports, updated Works Programme, method statements, any application letters for different licenses / permits under the environmental protection laws, and copies of all valid licenses / permits. The site diary and environmental records shall also be available for inspection by the relevant parties.

14.2.1.5 After reviewing the document, the ET shall advise the IEC and the Contractor of any non-compliance with legislative requirements on environmental protection and pollution control so that they can timely take follow-up actions as appropriate. If the follow-up actions still result in potential violation of environmental protection and pollution control requirements, the ER and ET should provide further advice to the Contractor to take remedial action to resolve the problem.

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

14.3 Choice of Construction Method

14.3.1.1 At times during the construction phase, the Contractor may submit method statements for various aspects of construction. This state of affairs would only apply to those construction methods that the EIA has not imposed conditions while for construction methods that have been assessed in the EIA, the Contractor is bound to follow the requirements and recommendations in the EIA study. The Contractor's options for alternative construction methods may introduce adverse environmental impacts into the Project. It is the responsibility of the Contractor and ET, in accordance with established standards, guidelines and EIA study recommendations and requirements, to review and determine the adequacy of the environmental protection and pollution control measures in the Contractor's proposal in order to ensure no unacceptable impacts would result. To achieve this end, the ET shall provide a copy of the Proactive Environmental Protection Proforma as shown in **Appendix 14.1** to the IEC for approval before commencement of work. The IEC should audit the review of the construction method and endorse the proposal on the basis of no adverse environmental impacts.

14.4 Environment Complaints

14.4.1.1 The following procedures should be undertaken upon receipt of any environmental complaint:

- The Contractor to log complaint and date of receipt onto the complaint database and inform the ER, ET and IEC immediately;
- The Contractor to investigate, with the ER and ET, the complaint to determine its validity, and assess whether the source of the problem is due to construction works of the Project with the support of additional monitoring frequency and stations, if necessary;
- The Contractor to identify remedial measures in consultation with the IEC, ET and ER if a complaint is valid and due to the construction works of the Project;
- The Contractor to implement the remedial measures as required by the ER and to agree with the ET and IEC any additional monitoring frequency and stations, where necessary, for checking the effectiveness of the remedial measures;
- The ER, ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;
- The ET/Contractor to undertake monitoring and audit to verify the situation if necessary, and oversee that circumstances leading to the complaint do not recur;
- If the complaint is referred by the EPD, the Contractor to prepare interim report on the status of the complaint investigation and follow-up actions stipulated

above, including the details of the remedial measures and monitoring identified or already taken, for submission to EPD within the time frame assigned by the EPD; and

- The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and additional monitoring results in the monthly EM&A reports.

15 Reporting

15.1 General

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

1.1.1.4 Types of reports that the ET shall prepare and submit include monthly EM&A report and final EM&A report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly and final EM&A reports shall be made available to the Director of Environmental Protection.

15.2 Baseline Monitoring Report

15.2.1.1 The baseline monitoring report shall include at least the following:

(i) up to half a page executive summary;

(ii) brief project background information;

(iii) drawings showing locations of the baseline monitoring stations;

(iv) monitoring results (in both hard and diskette copies) together with the following information:

- monitoring methodology;
- name of laboratory and types of equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency and duration; and
- QA /QC results and detection limits;

(v) details of influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period; and
- other factors which might affect monitoring results;

(vi) determination of the Action and Limit levels for each monitoring parameter and statistical analysis of the baseline data;

(vii) revisions for inclusion in the EM&A Manual; and

(viii) comments, recommendations and conclusions.

15.2.1.2 The ET should prepare and submit a baseline monitoring report at least two weeks before commencement of construction of the Project. Copies of the baseline

monitoring report should be submitted to the IEC, the ER and EPD. The ET should liaise with the relevant parties on the exact number of copies required.

15.3 Monthly Monitoring Reports

15.3.1.1 The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET and endorsed by the IEC. The EM&A report shall be prepared and submitted to EPD within 10 working days of the end of each reporting month, with the first report within the month after major construction works commences. Copies of each monthly EM&A report shall be submitted to the following parties: the IEC, the ER and EPD. Before submission of the first EM&A report, the ET shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

15.3.1.2 The ET shall review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

First Monthly EM&A Report

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

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

- breaches of Action and Limit levels;
- compliant log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) Basic project information:

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

(iii) Environmental status:

- advice on the status of statutory environmental compliance such as the status of compliance with the environmental permit (EP) conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
- works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and

- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring stations (with co-ordinates of the monitoring locations).

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

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

(v) Implementation status

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

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

- monitoring methodology;
- name of laboratory and types of equipment used and calibration details;
- monitoring parameters;
- monitoring locations;
- monitoring date, time, frequency, and duration;
- weather conditions during the period;
- any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

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

- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- record of all complaints received for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- review of the reasons for and the implications of non-compliances, complaints, summons and prosecutions including review of pollution sources and working procedures; and

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

(viii) Others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status;
- record of any project changes from the originally proposed as described in the EIA Report (e.g. construction methods, mitigation proposals, design changes, etc.); and
- comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent Monthly EM&A Reports

15.3.1.4 Subsequent monthly EM&A reports shall include at least the following:

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

- breaches of Action and Limit levels;
- compliant log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) Basic project information:

- project organisation including key personnel contact names and telephone numbers;
- programme;
- management structure; and
- the work undertaken during the month; and
- any updates as needed to the scope of works and construction methodologies.

(iii) Environmental status:

- advice on the status of statutory environmental compliance such as the status of compliance with the EP conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
- works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and

- drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring stations (with co-ordinates of the monitoring locations).

(iv) Implementation status

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

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

- monitoring methodology;
- name of laboratory and types of equipment used and calibration details;
- monitoring parameters;
- monitoring locations;
- monitoring date, time, frequency, and duration;
- weather conditions during the period;
- any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

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

- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- record of all complaints received for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- review of the reasons for and the implications of non-compliances, 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.

(vi) Others

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

- record of any project changes from the originally proposed as described in the EIA (e.g. construction methods, mitigation proposals, design changes, etc.); and
- comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

(vii) Appendices

- Action and Limit levels;
- graphical plots of trends of the monitoring parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
  a) major activities being carried out on site during the period;
  b) weather conditions during the period; and
  c) any other factors that might affect the monitoring results.
- monitoring schedule for the present and next reporting period;
- cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- outstanding issues and deficiencies.

15.4 Final EM&A Review Report

15.4.1.1 The EM&A program should be terminated upon completion of the construction activities that have the potential to result in a significant environmental impact.

15.4.1.2 The proposed termination should only be implemented after the proposal has been endorsed by the IEC, the ER and the Project Proponent followed by approval from the Director of Environmental Protection.

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

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

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

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

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

- environmental mitigation measure, as recommended in the EIA Report;
- environmental impact hypotheses tested;
- environmental quality performance limits (Action and Limit levels);
- all monitoring parameters; and

- Event and Action Plans.

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

(vi) Graphical plots and the statistical analysis of the trends of monitoring parameters over the course of the Project, including:

- the major activities being carried out on site during the period;
- weather conditions during the period; and
- any other factors which might affect the monitoring results;

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

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

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

(x) A summary record of all complaints received for each media, liaison and consultation undertaken, actions and follow-up actions taken and results;

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

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

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

15.5 Data Keeping

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

15.6 Interim Notifications of Environmental Quality Limit Exceedances

15.6.1.1 With reference to the Event and Action Plans, when the environmental quality performance limits are exceeded and if they are proven to be valid, the ET should

immediately notify the IEC and EPD, as appropriate. The notification should be followed up with advice to the IEC and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notification is presented in **Appendix 15.1**.