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1. INTRODUCTION

Project Description

Project Background

- 1.1 In 2000, the Northshore Lantau Development Feasibility Study (NLDFS) recommended that northeast Lantau Island (Sunny Bay) be developed as a tourism and recreation development theme with scope for international standard tourism facilities. The NLDFS also recommended that construction of a parallel route to North Lantau Highway (NLH) extending from the Airport to Sunny Bay providing regional access to North Lantau New Town and the airport and local access to Sunny Bay and Penny's Bay is necessary.
- 1.2 Route 10 – North Lantau to Yuen Long Highway forms an integral part of the strategic Western Highway between North Lantau and Shenzhen. The Route 10 alignment is divided into two parts, Southern and Northern Sections. The construction of Route 10 Southern Section, which was formerly known as the Route 10 Lantau East Coastal Section (hereinafter referred to as "Route 10 Southern Section"), extending from North Lantau to So Kwun Wat, aims to support the developments in Lantau and provide the security of a second strategic road link to Lantau and the airport.
- 1.3 Based on the latest development schedule, the construction of Road P1 and Route 10 would be deferred. In early 2002, Civil Engineering Department (CED) carried out a study on the implication of the deferment of the construction of Route 10 Southern Section and the Pa Tau Kwu Section of Chok Ko Wan Link Road (hereinafter referred to as "CKWLR") to beyond 2016 on the proposed Penny's Bay development including Hong Kong Disneyland Development. The study report concluded that it was acceptable from the point of view of road capacity, and recommended that the construction of a part of the Road P1 between Sham Shui Kok and Sunny Bay (part of Slip Roads 5 and 6) would need to be advanced to ensure that a second entrance/exit is provided to and from the proposed theme park in Penny's Bay for relieving large number of park visitors during emergency situation. **Figure 1.1** shows the location of the proposed Project.
- 1.4 In April 2000, Maunsell Consultants Asia Limited (MCAL) was commissioned by CED as the consultant to undertake the design and construction assignment for the Infrastructure for Penny's Bay Development (Agreement No. CE 68/99). The services have subsequently extended to cover the Road P1 Advance Works at Sunny Bay on Lantau Island (hereinafter referred to as "the Project"). Maunsell Environmental Management Consultants Limited (MEMCL) is responsible for the Environmental Impact Assessment (EIA) study.
- 1.5 Under Item A.1 and Item C.2 of Schedule 2 of the Environmental Impact Assessment Ordinance (Cap.499), the Project is a designated project and therefore will require an environmental permit.

Project Location and Scope

- 1.6 The purpose of the proposed Project is to advance the construction of a part of the Road P1 works at Sunny Bay to provide a second entrance/exit to and from the proposed theme park and other developments in Penny's Bay to relieve large number of park visitors, in case of emergency situation. **Figure 1.1** shows the location of the Project site.
- 1.7 The scope of works for the proposed Road P1 Advance Works at Sunny Bay includes the following:
 - (i) construction of about 1,000m of 2-lanes single carriageway road, namely Slip Road 5, including about 650m on elevated concrete structures, about 200m on elevated steel structures and the remaining section on reclamation;

- (ii) construction of about 1,000m of 2-lanes carriageway road, namely Slip Road 6, including about 650m on elevated concrete structures, about 200m on elevated steel structures and the remaining section on reclamation;
 - (iii) construction of an at-grade roundabout, namely at-grade Road P1 Roundabout, to the west of Sunny Bay reclamation area formed under the Infrastructure for Penny's Bay Development, Contract 1;
 - (iv) construction of about 150m of dual-2 and two 350m single two-lane at-grade road, namely Road A, connecting from the at-grade Road P1 Roundabout to Sunny Bay Road Roundabout north of Sunny Bay Public Transport Interchange and the associated retaining wall;
 - (v) reclamation works (about 3 ha.) and construction of seawall for forming the road embankment;
 - (vi) other associated works including traffic control and surveillance system and CCTV facilities in connection with the roads construction of at-grade road connections from the at-grade Road P1 Roundabout to Sunny Bay Road Roundabout north of the proposed Sunny Bay Public Transport Interchange;
 - (vii) provision of environmental mitigation measures during construction and operational stage, including but not limited to landscape and visual remedies to be recommended in the approved EIA study to be carried out in this Supplementary Assignment; and
 - (viii) provision of future construction of the Road P1 works at Sunny Bay.
- 1.8 The main objectives of the EIA Study are to identify and quantify various potential environmental impacts associated with the construction and operation of the Project and recommend effective mitigation measures to ameliorate any potentially negative impacts on the environment.

Preliminary Construction Programme

- 1.9 **Appendix A** shows the preliminary construction program of the project. According to the program, construction is scheduled to commence in April 2006 for completion in December 2006.

Concurrent Projects

- 1.10 Based on the Theme Park EIA, NLDFS-EIA along with the information available at the time, the construction of the current projects in Sunny Bay including MTRC Disneyland Resort Line and CEDD Infrastructure for Penny's Bay Development would be completed in Quarter 3 of 2005. Therefore, there would be no interfaced key project to be carried out concurrently with the Project.

Purpose of the Manual

- 1.11 The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the set up of an EM&A programme to ensure compliance with the Environmental Impact Assessment (EIA) study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme for the construction phase of the proposed project, namely "Road P1 Advance Works at Sunny Bay on Lantau Island" (hereinafter referred to as "the Project"). It aims to provide systematic procedures for monitoring, auditing and minimising environmental impacts associated with construction works and operational activities.
- 1.12 Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines have served as environmental standards and guidelines in the preparation of this Manual. In addition, the 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).

1.13 This Manual contains the following information:

- responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), and Environmental Team (ET), Independent Checker (Environment) (IC(E)) and Environmental Project Office (ENPO) with respect to the environmental monitoring and audit requirements during the course of the project;
- project organisation for the project;
- the basis for, and description of the broad approach underlying the EM&A programme;
- requirements with respect to the construction programme schedule and the necessary environmental monitoring and audit programme to track the varying environmental impact;
- details of the methodologies to be adopted, including all field laboratories and analytical procedures, and details on quality assurance and quality control programme;
- 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;
- requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures;
- requirements for review of EIA predictions and the effectiveness of the mitigation measures / environmental management systems and the EM&A programme.

1.14 For the purpose of this manual, 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 EM&A requirements.

Project Organisation

1.15 The roles and responsibilities of the various parties involved in the construction phase EM&A process and the organisational structure of the organisations responsible for implementing the EM&A programme are outlined below. The proposed project organisation and lines of communication with respect to environmental protection works are shown in [Figure 1.2](#).

The Contractor

1.16 The Contractor shall report to the Engineer. The duties and responsibilities of the Contractor are:

- employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of environmental monitoring and audit;
- provide assistance to ET in carrying out monitoring;
- submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;
- implement measures to reduce impact where Action and Limit levels are exceeded;
- implement the corrective actions instructed by the Engineer;
- accompany joint site inspection undertaken by the ET; and
- adhere to the procedures for carrying out complaint investigation.

Environmental Team (ET)

1.17 The ET shall report to the Contractor. The ET Leader and the ET shall be employed to conduct the EM&A programme and ensure the Contractor's compliance with the project's environmental

performance requirements during construction. The ET Leader shall be an independent party from the Contractor and have relevant professional qualifications, or have sufficient EM&A experience subject to approval of the Engineer and the EPD. The duties and responsibilities of the ET are:

- monitor various environmental parameters as required in this EM&A Manual;
- analyse the environmental monitoring and audit data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- carry out regular site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems;
- audit and prepare audit reports on the environmental monitoring data and site environmental conditions;
- report on the environmental monitoring and audit results to the IC(E), 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;
- adhere to the procedures for carrying out complaint investigation .

1.18 The ET shall be led and managed by the ET leader. The ET leader should possess at least 7 years experience in EM&A and/or environmental management.

Engineer or Engineer's Representative (ER)

1.19 The Engineer is responsible for overseeing the construction works and for ensuring that they are undertaken by the Contractor in Accordance with the specification and contractual requirements. The duties and responsibilities of the Engineer are:

- 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;
- employ an IC(E) to audit the results of the EM&A works carried out by the ET;
- participate joint site inspection undertaken by the ET;
- adhere to the procedures for carrying out complaint investigation.

Independent Checker (Environment)(IC(E))

1.20 The Independent Checker (Environment) shall advise the Engineer's Representative on environmental issues related to the project. The duties and responsibilities of the IC(E) are:

- review the EM&A works performed by the ET;
- audit the monitoring activities and results;
- review the EM&A reports submitted by the ET;
- review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans; and
- adhere to the procedures for carrying out complaint investigation.

1.21 The IC(E) shall have project management experience in addition to the requirements of the ET leader stated above.

- 1.22 Sufficient and suitably qualified professional and technical staff should 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.

Environmental Project Office (ENPO)

- 1.23 The Environmental Project Office is responsible to:

- oversee the cumulative environmental impacts arising from the developments in Penny's Bay and Northeast Lantau to investigate, identify and advise on the probable sources and significant contributors of pollution and make recommendations for remedial/mitigation measures, when necessary, bearing in mind the complex nature of the various working areas having more than one contractor operating in the environs during any period;
- work closely with the Project Manager(s)/Engineer/Architect(s) (PM/E/A) to effect remedial measures, if necessary, to mitigate adverse environmental effects, assessing and reporting on any recommended remedial measures that may require changes in the engineering programme and contracts.

- 1.24 The duties of the ENPO are to:

- evaluate the cumulative environmental impact arising from the concurrent construction activities and in the event of exceedance, identify the source of the problem and devise appropriate mitigation scheme to rectify the situation;
- conduct ad-hoc monitoring works when necessary;
- check and monitor that environmental mitigation and EM&A works are implemented in accordance with the EPs and the approved EM&A Manual;
- audit the overall EM&A programme including the implementation of all environmental mitigation measures, submissions relating to EM&A, and any other submissions required under the EPs;
- conduct regular "independent" site inspections of the works and report the findings of the site inspections and other environmental performance reviews to CED;
- monitor and audit all monitoring data, analyze these data, compare them with the relevant Action/Limit levels, identify the possible causes of pollution including the undertaking of any necessary modelling and make recommendations for remedial measures and implementation strategies;
- check and monitor that the mitigation measures are implemented promptly and correctly and assess and review the effectiveness of the mitigation;
- provide specialist advice on environmental matters;
- continually review the operations and EM&A programme and make timely and cost-effective recommendations for changes to the operation and EM&A programme that will rectify any potential environmental problems or unacceptable environmental impacts; and
- prepare and submit regular monitoring and audit reports summarizing the findings of site inspections and other environmental performance reviews.

2. NOISE

Introduction

- 2.1 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of noise impacts during the construction phase of the Project are presented.

Methodology and Criteria

- 2.2 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{eq} (30 minutes) shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, L_{eq} (5 minutes) shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.
- 2.3 Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet is shown in [Appendix C](#) for reference.
- 2.4 Whilst the Noise Control Ordinance (NCO) does not provide for the statutory control of construction activities occurring on weekdays during normal working hours (i.e. Monday to Saturday inclusive 0700-1900 hours), a daytime standard of $L_{Aeq}(30 \text{ minute})$ 75dB stipulated in *Annex 5 of the Technical Memorandum on Environmental Impact Assessment Process* is used as the appropriate criterion for all residential dwellings; while a daytime standard of $L_{Aeq}(30 \text{ minute})$ 70dB was adopted for all educational institutions during normal school days and L_{Aeq} (30 minute) 65dB during examination periods.
- 2.5 The NCO provides statutory controls on general construction works during restricted hours (i.e. 1900-0700 hours Monday to Saturday and at any time on Sundays and public holidays). The ANLs for evenings and holidays and for night-time are dependent on the Area Sensitivity Rating at the NSR. The relevant ANLs are provided in Table 2.1.

Table 2.1 Acceptable Noise Levels (ANLs)

Time Period	Area Sensitivity Rating		
	A	B	C
All days during the evening (1900-2300 hours) and general holidays (including Sundays) during the day and evening (0700-2300 hours)	60	65	70
All days during the night-time (2300-0700)	45	50	55

- 2.6 The locations of noise sensitive receivers (NSRs) within and adjacent to the project area are shown in [Figure 2.1](#).

Monitoring Equipment

- 2.7 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB.
- 2.8 Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5ms^{-1} or wind with gusts exceeding 10ms^{-1} . The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

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

Monitoring Locations

- 2.10 Based on the EIA Report, one worst affected location is designated for construction noise monitoring as listed in Table 2.2 and illustrated in [Figure 2.1](#). The status and location of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from ER and agreement from the IC(E) and EPD on the proposal.

Table 2.2 Noise Monitoring Stations during Construction Phase

Identification No.	Noise Monitoring Location
NM1	Luk Keng Tsuen

- 2.11 When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:
- Monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts;
 - Monitoring at the noise sensitive receivers as defined in the Technical Memorandum;
 - Assurance of minimal disturbance to the occupants during monitoring.
- 2.12 The monitoring station shall normally be at a point 1 m from the exterior of the noise sensitive facade and be at a position 1.2 m above ground. If there is a problem with access to the normal monitoring position, an alternative position should 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 IC(E) and EPD 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.

Baseline Monitoring

- 2.13 The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring shall be measured for a continuous period of at least 14 consecutive days at a minimum logging interval of 30 minutes (as six consecutive $L_{Aeq, 5min}$ readings) for daytime and 15 minutes (as three consecutive $L_{Aeq, 5min}$ readings) for evening time and night time. The L_{eq} , L_{10} and L_{90} shall be recorded at the specified interval. A schedule on the baseline monitoring shall be submitted to the IC(E) and EPD for approval before the monitoring starts.
- 2.14 There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. Any non-project related construction activities in the vicinity of the stations during the baseline monitoring shall be noted and the source and location recorded.
- 2.15 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with the EPD to agree on an appropriate set of data to be used as a baseline reference and submit to the ER for approval.

Impact Monitoring

- 2.16 Noise monitoring shall be carried out at all the designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station at a frequency of once every six days when noise generating activities are underway:

- one set of measurements between 0700 and 1900 hours on normal weekdays.
- 2.17 If construction works are extended to include works during the hours of 1900 - 0700, additional impact monitoring at a frequency of once every six days shall be carried out during evening and night-time works. Applicable permits under NCO shall be obtained by the Contractor.
- 2.18 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Appendix B**, 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.

Event and Action Plan

- 2.19 The Action and Limit levels for construction noise are defined in Table 2.3. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 2.4 shall be carried out. If exceedances were resulted from cumulative impact, all steps stipulated in the Event and Action Plan should be carried out.

Table 2.3 Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)
1900-2300 on all days and 0700-2300 on general holidays (including Sundays)	When one documented complaint is received from any one of the sensitive receivers	60/65/70 dB(A)*
2300-0700 on all days	When one documented complaint is received from any one of the sensitive receivers	45/50/55 dB(A)*

*Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. NM1 has been assigned an ASR of 'B'.

Table 2.4 Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
Action Level	<ol style="list-style-type: none"> 1. Identify source 2. Repeat measurement to confirm findings 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Carry out investigation 5. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 6. Discuss with the Contractor and formulate remedial measures if IC(E) or ER considered that exceedance is related to the works 7. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Notify IC(E) and ER in writing within 24 hours of identification of the exceedance 2. Submit investigation report to IC(E) and ER within 3 working days of the identification of an exceedance 3. Submit noise mitigation proposals to IC(E) and ER if IC(E) or ER considered that exceedance is related to the construction works 4. Implement noise mitigation proposals within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance 2. Require Contractor to propose remedial measures for the analysed noise problem if related to the construction works 3. Ensure remedial measures are properly implemented 4. Assess the effectiveness of the mitigation measure 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures 4. Review the proposed remedial measures by the Contractor and advise the ER accordingly 5. Supervise the implementation of remedial measures

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
Limit Level	<ol style="list-style-type: none"> 1. Identify source 2. Repeat measurement to confirm findings 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Carry out investigation 5. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 6. Increase monitoring frequency if IC(E) or ER considered that exceedance is due to the construction works 7. Discuss with the Contractor and formulate remedial measures if IC(E) or ER considered that exceedance is related to the works 8. Assess effectiveness of Contractor's remedial actions and keep contractor informed of the results 9. If exceedance due to the construction works stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Notify ER and IC(E) in writing within 24 hours of identification of exceedance 2. Take immediate action to avoid further exceedance if exceedance is due to the construction works 3. Submit within 3 working days the investigation report concerning the exceedance to IC(E) and ER 4. Submit proposals for remedial actions to IC(E) and ER if IC(E) or ER considered that exceedance is due to contractor's construction works 5. Implement the agreed proposals within reasonable time scale 6. Keep ER and IC(E) informed on the effectiveness of the results 7. Resubmit proposals if problem still not under control 8. Stop the relevant portion of works as determined by the ER until the exceedance is abated 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of exceedance 2. Require Contractor to propose mitigation measures for the analysed noise problem 3. Ensure mitigation measures are properly implemented 4. If exceedance continues, arrange meeting with ET, Contractor, IC(E) and ER to determine what portion of the work is responsible for the exceedance 5. Instruct the Contractor to stop that portion of work if no other mitigation measures can be implemented until the exceedance is abated 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss amongst ER, ET and Contractor on the mitigation measures 4. Review Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the ER accordingly 5. Supervise the implementation of mitigation measures

Mitigation Measures

Construction Phase

2.20 The mitigation measures recommended in the EIA report are summarised below:

- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
- Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program;
- Mobile plant, if any, should be sited as far from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs;
- Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities and;
- Use of quieter plant for dump trucks and generators for the following reclamation tasks:
 - ♣ Dredging;
 - ♣ Filling behind seawall;
 - ♣ Surcharging; and
 - ♣ Remove surcharge

2.21 The implementation for the recommended mitigation measures is presented in [Appendix B](#).

Operation Phase

2.22 As the EIA concluded that the Project would not incur insurmountable traffic noise impact on all NSRs. No noise mitigation measure would be required. Hence, there would be no EM&A requirement for the operation phase of the Project.

3. AIR QUALITY

Introduction

3.1 This section presents the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impacts during the construction and operational phase of the Project.

3.2 The objectives of the air quality monitoring shall be:

- to identify the extent of construction dust impacts on sensitive receivers;
- to determine the effectiveness of mitigation measures to control fugitive dust emission from activities during construction phase;
- to audit the compliance of the Contractor with regard to dust control, contract conditions and the relevant dust impact criteria;
- to recommend further mitigation measures if found to be necessary;
- to comply with Action and Limit (A/L) Levels for air quality as defined in this Manual.

Methodology and Criteria

3.3 The criteria against which ambient air quality monitoring shall be assessed are:

- The Hong Kong Air Quality Objectives (AQOs) for TSP, 24-hour TSP levels of 260 $\mu\text{g m}^{-3}$;
- The statutory 1-hour TSP limit of 500 $\mu\text{g m}^{-3}$; and

3.4 These levels are not to be exceeded at Air Sensitive Receivers (ASRs).

Monitoring Equipment

3.5 1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust. The TSP levels shall be measured by following the standard method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 [Appendix B](#), Title 40 of the Code of Federal Regulations of the USEPA.

3.6 Dust laden air shall be drawn through a high volume sampler (HVS) fitted with a conditioned, pre-weighed filter paper, at a controlled rate. After sampling for 24-hours, the filter paper with retained particles is collected and returned to the laboratory for drying in a desiccator followed by accurate weighing. 24-hour average TSP levels are calculated from the ratio of the mass of particulates retained on the filter paper to the total volume of air sampled.

3.7 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site, etc, shall be recorded down in detail. A sample data sheet is shown in [Appendix C](#).

3.8 HVS in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

- 0.6 - 1.7 m³ per minute (20 - 60 standard cubic feet per minute) adjustable flow range;
- equipped with a timing / control device with ± 5 minutes accuracy for 24 hours operation;
- installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm² (63 in²);

- flow control accuracy: $\pm 2.5\%$ deviation over 24-hour sampling period;
 - 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;
 - easy to change the filter;
 - capable of operating continuously for 24-hour period.
- 3.9 The ET shall be responsible for the provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with appropriate calibration kit is available for carrying out the baseline, regular impacts 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 and as described below. All the equipment, calibration kit, filter papers, etc, shall be clearly labelled.
- 3.10 The flow rate of each HVS with mass flow controller shall be calibrated using an orifice calibrator. Initial calibration of the dust monitoring equipment shall be conducted upon installation and prior to commissioning. One point flow rate calibration shall be carried out every two months. Five-point calibration shall be carried out every six months.
- 3.11 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 down on the data sheet as mentioned in [Appendix C](#).

Monitoring Locations

- 3.12 One worst affected location have been identified for TSP dust monitoring as shown in Table 3.1 and illustrated in [Figure 3.2](#). Prior to the commencement of the EM&A programme, the proposed air quality monitoring stations shall be discussed and agreed with the Engineer, the ET, IC(E) and EPD.

Table 3.1 Air Monitoring Stations during Construction Phase

Identification No.	Air Monitoring Location
AM1	Luk Keng Tsuen

- 3.13 When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:
- monitoring at sensitive receivers close to the major site activities which are likely to have air quality impacts;
 - monitoring at the air sensitive receivers as defined in the Technical Memorandum;
 - assurance of minimal disturbance to the occupants during monitoring.
- 3.14 When positioning the HVS samplers, the following points shall be noted:
- a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
 - no two sampler shall be placed less than 2 m apart;
 - the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
 - a minimum of 2 m separation from walls, parapets and penthouses is required for rooftops samplers;

- a minimum of 2 m separation from any supporting structure, measures horizontally is required;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 m from the dripline;
- any wire fence and gate to protect the sampler, shall 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.

Baseline Monitoring

- 3.15 Baseline monitoring shall be carried out to determine the ambient 1-hour and 24-hour TSP levels at the monitoring locations prior to the commencement of the Project works. During the baseline monitoring, there shall not be any construction or dust generating activities in the vicinity of the monitoring stations.
- 3.16 TSP baseline monitoring shall be carried out for a continuous period of at least two weeks under typical weather conditions with the 24-hour and three 1-hour ambient measurements taken daily at each monitoring location. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources shall also be recorded throughout the baseline monitoring period.
- 3.17 The baseline monitoring will provide data for the determination of the appropriate Action levels with the Limit levels set against statutory or otherwise agreed limits.
- 3.18 Baseline checking of ambient TSP levels shall be carried out every six months at each monitoring location, when no dusty works activities are in operation. If the ET 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, the IC(E) and the EPD.

Impact Monitoring

- 3.19 The monthly schedule of the compliance and impact monitoring programme shall be drawn up by the ET one month prior to the commencement of the scheduled construction period. For regular impact monitoring, a sampling frequency of at least once in every six-days shall be strictly observed at all of the monitoring stations for 24-hour TSP monitoring. In case of complaints, 1-hour TSP monitoring shall be conducted at least three times in every six days when the highest dust impacts are likely to occur. The impact monitoring programme is summarised in Table 3.2.

Table 3.2 Impact Monitoring Programme (TSP)

Sampling duration	Frequency
1 hour	<ul style="list-style-type: none"> • 3 times every 6 days (as required in case of complaints)
24 hours	<ul style="list-style-type: none"> • Once every 6 days

- 3.20 Before commencing the monitoring, the ET shall inform the IC(E) of the impact monitoring programme such that the IC(E) can conduct an on-site audit to ensure the accuracy of the impact monitoring results.

Compliance Assessment

- 3.21 Action and Limit levels that provide an appropriate framework for the interpretation of monitoring results have to be agreed between ET, IC(E), EPD and the Engineer before commencement of the air monitoring. The air quality monitoring data shall be checked against the agreed A/L levels. Recommended A/L levels are listed in Table 3.4.

Table 3.3 Proposed Action and Limit Levels for Impact Monitoring

Parameter	Action Level ⁽¹⁾	Limit Level
TSP (24 hour average)	<ul style="list-style-type: none"> • $BL \leq 200 \mu\text{g m}^{-3}$, $AL = (BL * 1.3 + LL)/2$ • $BL > 200 \mu\text{g m}^{-3}$, $AL = LL$ 	$260 \mu\text{g m}^{-3}$
TSP (1 hour average)	<ul style="list-style-type: none"> • $BL \leq 384 \mu\text{g m}^{-3}$, $AL = (BL * 1.3 + LL)/2$ • $BL > 384 \mu\text{g m}^{-3}$, $AL = LL$ 	$500 \mu\text{g m}^{-3}$

(1) BL = Baseline level, AL = Action level, LL = Limit level.

Event and Action Plan (EAP)

- 3.22 The principle upon which the EAP is based on the prescription of procedures and actions associated with the measurement of certain defined levels of air pollution recorded by the environmental monitoring process and the agreed A/L levels. In cases where exceedance of these A/L levels occurs, the ET, the IC(E), the Engineer and the Contractor shall strictly observe the relevant actions of the respective EAP listed in Table 3.5.

Table 3.4 Event / Action Plan for Ambient Air Quality

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
ACTION LEVEL				
Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source 2. Repeat measurement to confirm findings 3. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works 4. Carry out investigation 5. Report the results of investigation to the Contractor within 3 working days of identification of exceedance 6. Increase monitoring frequency to daily if ET assessment indicates that exceedance is due to contractor's construction works. 	<ol style="list-style-type: none"> 1. Notify IC(E) and ER in writing within 24 hours of identification of the exceedance 2. Rectify any unacceptable practice 3. Submit investigation report to IC(E) and ER within 3 working days of the identification of an exceedance 4. Submit air mitigation proposals to IC(E) and ER if IC(E) or ER considered that exceedance is related to the construction works 5. Amend work method if appropriate and within reasonable time scale 	<ol style="list-style-type: none"> 1. Inform EPD and other relevant Governmental Agencies within 24 hours of identification of the exceedance 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Check contractor's working method

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
ACTION LEVEL				
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source 2. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works 3. Repeat measurement to confirm findings 4. Carry out investigation, report the results of investigation to the Contractor within 3 working days of identification of exceedance 5. Increase monitoring frequency to daily if ET assessment indicates that exceedance is due to contractor's construction works. 6. Discuss with the IC(E) contractor, IC(E) and ER and formulate remedial actions if IC(E) or ER considered that exceedance is related to the works 7. If exceedance continues, arrange meeting with IC(E), ER and contractor 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Notify IC(E) and ER in writing within 24 hours of identification of the exceedance 2. Submit investigation report to IC(E) and ER within 3 working days of the identification of an exceedance 3. Submit proposals for remedial actions to ER and IC(E) if IC(E) or ER considered that exceedance is related to construction works 4. Implement agreed proposals within reasonable time scale 5. Amend proposal if appropriate 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance 2. Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> 1. Check monitor data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Check contractor's working method 4. Discuss with ET and Contractor remedial actions 5. Advise the ER on the effectiveness of the proposed remedial measures 6. Supervise implementation of remedial measures

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
ACTION LEVEL				
Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source 2. Repeat measurement to confirm findings 3. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works 9. Carry out investigation, report the results of investigation to the Contractor within 3 working days of identification of exceedance 4. Increase monitoring frequency to daily if ET assessment indicates that exceedance is due to contractor's construction works. 5. Discuss with the contractor, IC(E) and ERIC(E) and formulate remedial actions if IC(E) or ER considered that exceedance is related to the works 6. Assess the effectiveness of the remedial actions 	<ol style="list-style-type: none"> 1. Notify within 24 hours of identification of the exceedance IC(E) and ER in writing 2. Rectify any unacceptable practice immediately 3. Amend work method if appropriate if ET assessment indicates that exceedance is due to the works 4. Submit investigation report to IC(E) and ER within 3 working days of the identification of an exceedance 5. Submit proposal for remedial action to IC(E) and ER if IC(E) or ER considered that exceedance is related to construction works 6. Implement the agreed proposals within reasonable time scale 7. Amend proposal if required 8. Inform IC(E) and ER on the effectiveness of the remedial actions 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance 2. Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Check contractor's working method 4. Discuss with contractor and ET remedial actions if exceedance is due to the construction works within 3 working days 5. Review the remedial actions whenever necessary to assure their effectiveness and advise ER accordingly 6. Supervise the implementation of the remedial actions

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
ACTION LEVEL				
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source 2. Repeat measurement to confirm findings 3. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works 4. Increase monitoring frequency to daily if ET assessment indicates that exceedance is due to contractor's construction works. 5. Carry out analysis of contractor's working procedures to determine possible remedial actions 6. Discuss with contractor, ER and IC(E) and formulate remedial actions if IC(E) or ER considered that exceedance is related to the works within 3 working days 7. Assess the effectiveness of the remedial actions 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Notify IC(E) and ER in writing within 24 hours of identification of the exceedance 2. Rectify any unacceptable practice immediately 3. Submit investigation report to IC(E) and ER within 3 working days of the identification of an exceedance 4. Submit proposal for remedial action to IC(E) and ER if IC(E) or ER considered that exceedance is related to the construction works 5. Implement the agreed proposals within reasonable time scale 6. Amend proposal if required 7. Inform IC(E) and ER on the effectiveness of the remedial actions 8. Resubmit proposals if problem still not under control 9. Stop the relevant portions of the works until the exceedance is abated 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance 2. Ensure remedial measures properly implemented 3. If exceedance continues arrange meeting with ET, Contractor and IC(E) to determine which portion of the works is responsible for the exceedance 4. Instruct the contractor to stop that portion of the work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Check contractor's working method 4. Discuss with contractor and ET remedial actions if exceedance is due to the construction works within 3 working days 5. Review the remedial actions whenever necessary to assure their effectiveness and advise ER accordingly 6. Supervise the implementation of the remedial actions

Mitigation Measures

- 3.23 The EIA Report recommended air quality control and mitigation measures during the construction phase of the Project. The mitigation measures are summarised below.
- skip hoist for material transport should be totally enclosed by impervious sheeting;
 - all dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet;
 - stockpiles of aggregate or spoil should be covered and water applied;
 - the height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading;
 - every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites; and
 - The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle.
- 3.24 The implementation for the recommended mitigation measures is presented in [Appendix B](#).

4. WATER QUALITY

Introduction

- 4.1 In this section, the requirements, methodology, equipment, monitoring locations and mitigation measures for the monitoring and audit of water quality impacts from the construction of the Project are presented.

Methodology and Criteria

- 4.2 As identified in the EIA Report, a key water quality issue of the construction phase would be dredging works for the seawall foundation. Marine water quality monitoring shall be carried out during the dredging and filling works to ensure that any unacceptable increase in suspended solids/turbidity and decrease in dissolved oxygen due to dredging or filling activities could be readily detected and timely action be taken to rectify the situation.
- 4.3 Dissolved oxygen (DO), turbidity and suspended solids (SS) levels shall be monitored at designated marine water quality monitoring stations during the dredging and filling works. DO and turbidity should be measured *in situ* whereas SS should be determined by laboratory.
- 4.4 Other relevant data shall also be recorded, including monitoring location / position, time, water depth, pH value, salinity, temperature, tidal stages, weather conditions and any special phenomena or work underway at the construction site.
- 4.5 The proposed water quality monitoring schedule shall be faxed to EPD and AFCD on or before the first day of the monitoring month. EPD and AFCD shall also be notified immediately for any changes in schedule by fax.

Monitoring Equipment

Dissolved Oxygen and Temperature Measuring Equipment

- 4.6 The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring:
- a DO level in the range of 0 - 20 mg L⁻¹ and 0 - 200% saturation; and
 - a temperature of 0 - 45 degree Celsius.
- 4.7 It should have a membrane electrode with automatic temperature compensation complete with a cable. Should salinity compensation not be built-in to the DO equipment, *in-situ* salinity should be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

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

Sampler

- 4.9 A water sampler is required. It should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (for example, Kahlsico Water Sampler or an approved similar instrument).

Water Depth Detector

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

Salinity

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

Sample Containers and Storage

- 4.12 Water samples for SS determination should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples should be collected to achieve the detection limit stated in Section 4.15.

Monitoring Position Equipment

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

Calibration of In-Situ Instruments

- 4.14 The pH meter, DO meter and turbidimeter shall be checked and calibrated before use. DO meter and turbidimeter shall be certified by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.
- 4.15 Sufficient stocks of spare parts shall be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.

Laboratory Measurement/Analysis

- 4.16 Duplicate samples from each independent sampling event are required by EPD for all parameters. Analysis of suspended solids shall be carried out in a HOKLAS or other international accredited laboratory. Sufficient water samples shall be collected at the monitoring stations for carrying out the laboratory SS determinations. The detection limit shall be 0.1 mg/L or better. The SS determination work shall start within 24 hours after collection of the water samples. The analyses shall follow the American Public Health Association (APHA) Standard Methods for the Examination of Water and Wastewater, 19th edition, 2540D or an equivalent method subject to the approval of EPD.
- 4.17 Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis shall be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to EPD. In any circumstance, the sample testing shall have comprehensive quality assurance and quality control programmes. The laboratory shall prepare to demonstrate the programme to EPD or his representatives when requested.

Monitoring Locations

- 4.18 The proposed marine water quality monitoring stations during the dredging and filling works are shown in **Figure 4.1**. These stations are chosen based on the following criteria:
- To monitor the off-site dispersion of the sediment plume generated during dredging and filling works; and
 - Two control stations that shall be at locations representative of the project site in its undisturbed condition. Control stations should be located, as far as is practicable, both upstream and downstream of the works area.
- 4.19 The co-ordinates of the proposed monitoring stations are listed in Table 4.1.

Table 4.1 Proposed Marine Water Quality Monitoring Stations

Station	Easting	Northing
M1	820 441	821 583
M2	820 931	821 778
C1	820 085	822 096
C2	820 980	822 414

- 4.20 Control stations are necessary to compare the water quality from potentially impacted sites with the ambient water quality. Control stations shall be located within the same body of water as the impact monitoring stations but should be outside the area of influence of the works and, as far as practicable, not affected by any other works. Two monitoring stations are proposed to monitor off-site sediment dispersion. Station M1 is located close to the boundary of the mixing zone as indicated in the EIA Report.
- 4.21 If necessary, reference should be made to the water quality monitoring data collected at the Ma Wan Fish Culture Zone under the Penny's Bay Reclamation Stage 2 EM&A Programme. The water quality monitoring stations of relevance include stations SR4, SR5 and SR7.
- 4.22 Measurements shall be taken at 3 water depths, namely, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted. Should the water depth be less than 3 m, only the mid-depth station will be monitored.
- 4.23 The status and locations of water sensitive receivers and the marine activities may change after issuing this Manual. If such cases exist, the ET Leader shall propose with justification for changes to monitoring locations or other requirements of the EM&A programme, and seek approval from IC(E) and EPD.

Baseline Monitoring

- 4.24 Baseline conditions for marine water quality shall be established and agreed with EPD prior to the commencement of works. The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the works and to demonstrate the suitability of the proposed impact and control monitoring stations. The baseline conditions shall normally be established by measuring the water quality parameters specified in Section 4.1. The measurements shall be taken at all designated monitoring stations including control stations, three days per week, at mid-flood and mid-ebb tides, for at least four weeks prior to the commencement of marine works.
- 4.25 Other relevant data shall also be recorded, such as: monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena underway near the monitoring station. There shall not be any marine construction activities in the vicinity of the stations during the baseline monitoring.

- 4.26 In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from the IC(E) and EPD on an appropriate set of data to be used as baseline reference.
- 4.27 Baseline monitoring schedule shall be faxed to EPD two weeks prior to the commencement of baseline monitoring. The interval between two sets of monitoring shall not be less than thirty-six hours.

Impact Monitoring

- 4.28 During the dredging works for the seawall foundation and filling works, monitoring shall be undertaken three days per week, at mid-flood and mid-ebb tides, with sampling/measurement at the designated monitoring stations. The interval between two sets of monitoring shall not be less than thirty-six hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency will be increased.
- 4.29 Two consecutive measures of DO concentration, DO saturation and turbidity will be taken *in-situ* at 1 m below the surface, mid-depth and 1 m above the seabed at each location. If the water depth is less than 6 m, the mid-depth measurement may be omitted subject to the approval of the ER. If the depth is less than 3 m, only the mid-depth measurements need to be taken subject to the approval of the ER. The monitoring probes shall be retrieved out of water after the first measurement and then redeployed for the second measurement. Where the difference in value between the first and second readings of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings shall be taken. Water samples for SS measurements shall be collected at the same three depths.
- 4.30 If the impact monitoring results indicate that dredging or filling works have caused adverse impacts on water quality at the monitoring stations, appropriate actions including the lowering of the production rate for dredging, or restriction of dredging works to certain tidal conditions, should be taken and additional mitigation measures should be implemented as necessary.

Post-construction Monitoring

- 4.31 Upon completion of all marine-based construction activities, a post-project monitoring exercise on water quality shall be carried out for four weeks in the same manner as the impact monitoring.

Event and Action Plan for Water Quality

- 4.32 Marine water quality criteria, namely Action and Limit levels, are shown in Table 4.2. These criteria should be applied to ensure that any deteriorating water quality could be readily detected. When the monitoring results of the water quality parameters at any designated monitoring stations exceed the water quality criteria, the actions in accordance with the Event and Action Plan in Table 4.3 shall be carried out.
- 4.33 It is recommended that if the monitoring results indicate that the dredging or filling works have caused an adverse impact on water quality, additional mitigation measures should be recommended to rectify the non-compliance or the construction programme should be carefully reviewed to slow down the rate of dredging or filling. The working schedule and the mitigation measures should be reviewed by the Contractor, the ET Leader and the ER, and if necessary, works should be slowed down or suspended until such impact is reduced to an acceptable level.
- 4.34 The ET Leader should assess the effectiveness and efficiency of the proposed mitigation measures and/or remedial actions for the on-going construction activities. The performance of the environmental management system (that is, of the overall EM&A programme) should be reviewed by the ET Leader on a quarterly basis. The findings of this review should be included in the quarterly EM&A summary reports, together with any recommendations to improve the performance of the EM&A programme.

Table 4.2 Action and Limit Levels for Marine Water Quality

Parameters	Action	Limit
DO in mg/L (Surface, Middle & Bottom)	<p><u>Surface and Middle</u> 5 percentile of baseline data; or midway between 5 percentile of baseline data and limit level</p> <p><u>Bottom</u> 5 percentile of baseline data or midway between 5 percentile of baseline data and limit level</p>	<p><u>Surface and Middle</u> 4 mg/L</p> <p><u>Bottom</u> 2 mg/L</p>
SS in mg/L (depth-averaged)	95 percentile of baseline data or 120% of upstream control station' s SS at the same tide of the same day	99 percentile of baseline or 130% of upstream control station' s SS at the same tide of the same day
Turbidity in NTU (depth-averaged)	95 percentile of baseline data or 120% of upstream control station' s Turbidity at the same tide of the same day	99 percentile of baseline or 130% of upstream control station' s Turbidity at the same tide of the same day

- Notes:
1. "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
 2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
 3. For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
 4. All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

Table 4.3 Event / Action Plan for Marine Water Quality

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Identify source(s) of impact; 2. Repeat in-situ measurement to confirm findings; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with Contractor if IC(E) or ER considered that exceedance is related to the works 8. Repeat measurement on next day of exceedance if exceedance is due to the construction works 	<ol style="list-style-type: none"> 1. Notify the ER and IC(E) in writing within 24 hours of identification of exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Submit investigation report to IC(E) and ER within 3 working days of the identification of an exceedance 5. Consider changes of working method if exceedance is due to the construction works 6. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER if IC(E) or ER considered that exceedance is related to the works 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 3. Require contractor to propose remedial measures for the analysed problem if related to the construction works 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measure 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures 4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly 5. Supervise the implementation of mitigation measures

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
Action level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Identify source(s) of impact; 2. Repeat in-situ measurement to confirm findings 3. Notify Contractor in writing within 24 hours of identification 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IC(E) Contractor, IC(E) and ER and formulate remedial actions if IC(E) or ER considered that exceedance is related to the works 8. Ensure mitigation measures are implemented; 9. Prepare to increase the monitoring frequency to daily; 10. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 1. Notify IC(E) and ER in writing within 24 hours of identification of exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Submit the results of the investigation to IC(E) and ER within 3 working days of the identification of an exceedance 6. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER if IC(E) or ER considered that exceedance is related to construction works 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 3. Require contractor to propose remedial measures for the analysed problem if related to the construction works 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measure 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures. 4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly 5. Assess the effectiveness of the implemented mitigation measures.

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IC(E) Contractor, IC(E) and ER and formulate remedial actions if IC(E) or ER considered that exceedance is related to the works 8. Ensure mitigation measures are implemented; 9. Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Notify IC(E) and ER in writing; within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Submit the results of the investigation to IC(E) and ER within 3 working days of the identification of an exceedance 6. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER if IC(E) or ER considered that exceedance is related to construction works 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance 2. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures. 4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 5. Assess the effectiveness of the implemented mitigation measures

EVENT	ACTION			
	ET	Contractor	ER	IC(E)
Limit Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IC(E) Contractor, IC(E) and ER and formulate remedial actions if IC(E) or ER considered that exceedance is related to the works; 8. Ensure mitigation measures are implemented; 9. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. 	<ol style="list-style-type: none"> 1. Notify ER and IC(E) in writing within 24 hours of the identification of the exceedance and 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 8. Submit the results of the investigation to IC(E) and ER within 3 working days of the identification of an exceedance 5. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER if IC(E) or ER considered that exceedance is related to construction works; 6. Implement the agreed mitigation measures within reasonable time scale 7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities. 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance 2. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 6. Ensure remedial measures are properly implemented 4. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ER, ET and Contractor on the mitigation measures. 4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 5. Assess the effectiveness of the implemented mitigation measures.

Water Quality Mitigation Measures

- 4.35 The mitigation measures recommended for the construction and operation phases of the Project are summarized below. The implementation schedule of the recommended water quality mitigation measures is presented in [Appendix A](#).

Construction Phase

- 4.36 In order to minimize potential impacts on marine water quality due to dredging and filling works for the reclamation formation, the implementation of the following measures is recommended:

- Dredging should be undertaken using two grab dredgers with a maximum total production rate of 8,000 m³/day.
- Deployment of frame type silt curtain to fully enclose the grab while dredging works are in progress. The frame type silt curtain should be designed to enclose local pollution caused by the grab dredger and hung from a frame mounted on the dredger. This frame type silt curtain shall cover the entire water column from water surface down to the seabed, with ballast at the bottom. Mid-ballast may be added as necessary. The frame type silt curtain should be capable of reducing sediment loss to outside by at least 80%.
- To provide additional protection from sediment loss to outside of Sunny Bay area and to any seagrass bed that may be present to the west of reclamation area, an additional floated type silt curtain would be deployed at the eastern and western ends of the reclamation area. This layer of silt curtain should be formed from tough, abrasion-resistant permeable membranes, supported on floated booms in such a way as to ensure that egress of turbid waters from the enclosed dredging area shall be restricted. The design and location of the floated type silt curtains should not affect the normal operation of the log pond in Sunny Bay.
- The Contractor should submit detailed proposal of the design and arrangement of the frame type and floated type silt curtains prior to installation for approval from the Engineer. To demonstrate the capability of reducing sediment loss to outside by 80% by the frame type silt curtain, a pilot test shall be conducted. Prior to commencing the pilot test, the details of it shall be submitted to the Director of Environmental Protection Department for agreement. After consent is given, the Contractor should install the silt curtains prior to dredging and remove them upon completion of dredging. Should a suspended solids removal efficiency less than 80% be demonstrated in the pilot test, an additional floated type silt curtain would be deployed near the eastern end of the bay and adjoining Cheung Sok.
- All filling activities for the reclamation should be carried out behind seawalls which have been constructed to above the high water level and at least 100 metres in advance of the filling point. In the event that the 100 metres lead of seawall construction is not practicable, other suitable barriers shall be implemented to provide an effective lead of 100 metres.
- If the seawall trenches are to be backfilled with sandfill, then the fill should be placed by pumping down the arm of a trailing suction hopper dredger, which is positioned within the trench below the level of the surrounding seabed.

- 4.37 The following general working methods should be adopted to supplement the measures described above for dredging and filling works to further minimize potential impacts on water quality:

- tight-closing grabs should be used to minimize the loss of sediment to suspension during dredging works;
- all vessels should be sized such that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;
- all pipe leakages shall be repaired promptly and plant shall not be operated with leaking pipes;

- the decks of all vessels should be kept tidy and free of oil or other substances that might be accidentally or otherwise washed overboard;
- adequate freeboard shall be maintained on barges to ensure that decks are not washed by wave action;
- all barges used for the transport of dredged materials should be fitted with tight bottom seals to prevent leakage of material during loading and transport;
- construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present in the water within and adjacent to the reclamation site;
- loading of barges should be controlled to prevent splashing of material into the surrounding waters. Barges should not be filled to a level that will cause the overflow of materials or sediment laden water during loading or transportation;
- the speed of vessels should be controlled within the works area to prevent propeller wash from stirring up the seabed sediments; and
- “rainbowing” sand fill will not be permitted.

Construction Run-off and Drainage

4.38 The site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” should be followed as far as practicable in order to minimise surface runoff and the chance of erosion, and also to retain and reduce any suspended solids prior to discharge. These practices include the following items :

- Before commencing any site formation work, all sewer and drainage connections should be sealed to prevent debris, soil, sand etc. from entering public sewers/drains.
- Provision of perimeter channels to intercept storm-runoff from outside the site. These should be constructed in advance of site formation works and earthworks.
- Sand/silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures should be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.
- Water pumped out from foundation excavations should be discharged into silt removal facilities.
- Careful programming of the works to minimise surface excavation works during the wet season. If excavation of soil cannot be avoided during the wet season, exposed slope surfaces should be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms are summarized in ProPECC PN 1/94.
- Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce the potential of soil erosion.
- Open stockpiles of construction materials or construction wastes on-site of more than 50m³ should be covered with tarpaulin or similar fabric during rainstorms.

General Construction Activities

4.39 Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the nearby coastal waters and storm water drains. Stockpiles of cement and other construction materials should be kept covered when not being used.

4.40 Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.

Sewage Effluent from Construction Workforce

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

Operation Phase

- 4.42 The NLDFS-EIA recommended on a precautionary principle that silt traps be installed on all storm drains serving developed and landscaped/managed areas. This would serve to ensure that the pollutants in the stormwater discharges are minimised as far as is practicable.

5. WASTE MANAGEMENT

Introduction

- 5.1 Waste management will be the contractor's responsibility to ensure that all wastes produced during the construction phase of the Road P1 Advance Works are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements. The contractor will be required to ensure that loss of dredged material does not take place during transportation of the material in barges to the designated marine disposal ground.
- 5.2 Other waste materials generated during construction activities, such as construction and demolition (C&D) materials and general refuse, are recommended to be audited at regular intervals (at least monthly) to ensure that proper storage, transportation and disposal practices are being implemented. This monitoring of waste management practices will ensure that these solid wastes generated during construction are not disposed of into the adjacent coastal waters. The Contractor will be responsible for the implementation of any mitigation measures to minimise waste or redress problems arising from the waste materials.

Mitigation Measures

- 5.3 Mitigation measures for waste management are summarised below. With the appropriate handling, storage and removal of waste arisings during the construction works as defined below, the potential to cause adverse environmental impacts will be minimised. The implementation schedule of the recommended mitigation measures is presented in [Appendix A](#). During the site inspections, the ET shall pay special attention to the issues relating to waste management and check whether the Contractor has implemented the recommended good site practices and other mitigation measures.

Dredged Marine Sediments

- 5.4 The basic requirements and procedures for dredged mud disposal are specified under the ETWB TCW No. 34/2002. The management of the dredging, use and disposal of marine mud is monitored by the MFC, while the licensing of marine dumping is the responsibility of the Director of Environmental Protection (DEP).
- 5.5 The dredged marine sediments would be loaded onto barges and transported to designated disposal sites depending on their level of contamination. Based on the chemical and biological screening results, it was estimated that some 692,000 m³ of sediments would be suitable for open sea disposal and 8,000 m³ of sediments would require confined marine disposal. In accordance with the ETWB TCW No. 34/2002, the contaminated material must be dredged and transported with great care. Furthermore, the dredged contaminated sediment must be effectively isolated from the environment upon final disposal and shall be disposed of at the East Sha Chau Contaminated Mud Pits that is designated for the disposal of contaminated mud in Hong Kong.
- 5.6 During transportation and disposal of the dredged marine sediments, the following measures should be taken to minimise potential impacts on water quality:
- Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.
 - Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the DEP.
 - Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.

Good Site Practices

5.7 It is not anticipated that adverse waste management related impacts would arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:

- nomination of an approved personnel, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site;
- training of site personnel in proper waste management and chemical handling procedures;
- provision of sufficient waste disposal points and regular collection for disposal;
- appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; and
- regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.

Waste Reduction Measures

5.8 Good management and control can prevent the generation of significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:

- segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- to encourage collection of aluminium cans by individual collectors, separate labelled bins shall be provided to segregate this waste from other general refuse generated by the work force;
- proper storage and site practices to minimise the potential for damage or contamination of construction materials;
- plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste; and
- a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed.

5.9 In addition to the above good site practices and waste reduction measures, specific mitigation measures are recommended below for the identified waste arisings to minimise environmental impacts during handling, transportation and disposal of these wastes.

General Refuse

5.10 General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.

Construction and Demolition Material

5.11 In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material comprising reclamation fill material from the excavation works for the road formation should be reused on-site as backfilling material as far as practicable.

5.12 In order to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be included. One may make reference to ETWB TCW No. 31/2004 for details.

Chemical Wastes

- 5.13 If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes generated at the Chemical Waste Treatment Centre at Tsing Yi, or other licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

6. TERRESTRIAL AND MARINE ECOLOGY

Introduction

- 6.1 The *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) (Annex 16) require that mitigation of ecological impacts be sought in the following order of priority: (1) avoid, (2) minimise, (3) compensate on-site and (4) compensate off-site. At each stage, residual impacts should be re-assessed to determine whether there is a need to proceed to the next stage of mitigation.

Terrestrial Ecology

General

- 6.2 As presented in the EIA report, the major habitat types within or adjacent to the Project Area comprised grass/low shrub mosaic, tall shrubland, secondary woodland, brackish wetland, wasteland, plantation and backshore vegetation. Direct impacts to terrestrial habitats and species resulting from the Project would be limited to the loss of very small areas of very low-value habitats. Limited indirect impacts to wildlife resulting from construction and operation phase disturbance have been predicted. Terrestrial ecological impacts associated with the Project would therefore be extremely limited and minor. Nevertheless, certain mitigation measures should be implemented to ensure potential adverse impacts are avoided, minimised and/or compensated for.
- 6.3 In order to ensure that terrestrial ecological resources are adequately protected, audits are recommended to be undertaken on a regular basis to ensure the effective implementation of the recommended mitigation measures. Section 10 of this EM&A Manual sets out the requirements of the auditing program.

Mitigation Measures

- 6.4 The mitigation measures recommended in the EIA report include:
- Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimise disturbance to natural habitats.
 - Construction activities should be restricted to the work areas that should be clearly demarcated.
 - The work areas should be reinstated immediately after completion of the works.
 - Waste skips should be provided to collect general refuse and construction wastes. The wastes should be disposed of timely and properly off-site.
 - Drainage arrangements should include sediment traps to collect and control construction run-off.
 - Open burning on works sites is illegal, and should be strictly prohibited.
 - Landscaping works on newly reclaimed land should make use of native plant species.
- 6.5 The implementation for the recommended mitigation measures is presented in [Appendix B](#).

Marine Ecology

General

- 6.6 As presented in the EIA report, the marine ecological impacts during construction and operation of the Project are anticipated to be minor and environmentally acceptable. Mitigation measures for dredging operations as described in the water quality section also serve as mitigation measures for protecting marine ecological resources. Environmental monitoring and audit program designed for protection against unacceptable water quality impacts will also serve to protect against unacceptable

impacts to marine ecological resources. The control of water quality to within acceptable levels was expected to also control impacts to the Sunny Bay mudflat, which has the potential to support seagrasses. other marine ecology. Assessment suggested that mitigation measures should be implemented to ensure potential adverse impacts on dolphins are avoided, minimised and/or compensated for.

- 6.7 In order to ensure that marine ecological resources are adequately protected, audits are recommended to be undertaken on a regular basis to ensure the effective implementation of the recommended mitigation measures. Section 10 of this EM&A Manual sets out the requirements of the auditing program.

Mitigation Measures

- 6.8 The control of water quality to within acceptable levels would be expected to also control impacts on marine ecology.

- 6.9 The following mitigation measures recommended in the EIA report should be considered, if potential construction phase impacts on dolphins are to be minimised:

- All vessel operators working on the project should be given a briefing, alerting them to the possible presence of dolphins in the area, and setting out guidelines for safe operations around cetaceans.
- All vessels will be subject to a speed limit of 10 knots within the Project Site Boundary.
- The vessel operators should be required to use predefined and regular routes. As far as possible operators should follow the same routes used for the existing/ongoing Sunny Bay reclamation, as these may become known to the dolphins using North Lantau waters.
- A policy of no dumping of rubbish, food, oil or chemicals should be strictly enforced. This should also be covered in the contractors' briefing.
- Every attempt should be made to minimise the effects of the construction of the Project on the water quality.

- 6.10 The implementation for the recommended mitigation measures is presented in [Appendix B](#).

7. FISHERIES

Introduction

- 7.1 The *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) (Annex 17) require that mitigation of impacts on fisheries be sought in the following order of priority: (1) avoid, (2) minimise, (3) compensate on-site and (4) compensate off-site. At each stage, residual impacts should be re-assessed to determine whether there is a need to proceed to the next stage of mitigation.
- 7.2 As presented in the EIA report, the proposed reclamation would result in the direct loss of a small portion (3ha) of fishing grounds in the Assessment Area. It was considered that this loss would exert relatively low impact on the Hong Kong fishery as a whole. Sediment levels in the water would not be elevated to levels that would impact fisheries of the fisheries area or impact cultured fish at the Ma Wan fish culture zone.
- 7.3 Environmental monitoring and audit program designed for protection against unacceptable water quality impacts will also serve to protect against unacceptable impacts to fisheries. Environmental monitoring and audit to assess the impacts of the Project on commercial fisheries resources is not deemed necessary.

Mitigation Measures

- 7.4 Mitigation measures for dredging operations as described in the water quality section and the marine ecology section also serve as mitigation measures for protecting fisheries from indirect impacts and ensure no unacceptable impact on fisheries resources and operations. As no unacceptable adverse impacts on fisheries are predicted in the EIA report, no fisheries-specific mitigation measures was identified nor recommended.
- 7.5 The implementation for the recommended water quality and marine ecology mitigation measures is presented in [Appendix B](#).

8. LANDSCAPE AND VISUAL

Introduction

- 8.1 The primary landscape impact in association with Road P1 Advance Works will result in a net of about 3 hectare in area of Sunny Bay by reclamation. The provision of an international quality soft landscape treatment would reduce this negative landscape impact from substantial in the construction stage to very slight negative in the operational stage. Whilst the loss of Sunny Bay will remain as a residual impact due to the adjacent construction site, the impact is considered acceptable as a result of the future landscape mitigation measures implement by others within the study area.
- 8.2 The primary visual impacts will be the obstruction to the views of Sunny Bay and woodlands. The majority of visual obstruction will be caused by the elevated Slip Roads 5 and 6. However, landscape treatment at lower level of the superstructure can provide visual-relief effect for travellers, the majority of visual impacts are expected to be minimize.

Mitigation Measures

Construction Phase

- 8.3 The EIA Report recommended visual mitigation measures during the construction phase of the Project. The mitigation measures are summarised below.
- provide advance screen planting, if possible subject to detailed design stage and minimize felling of existing road side trees;
 - sensitively designed site hoarding in both colour and form to help screen views of construction works;
 - operational time restrictions to limit after-dark welding and lighting; and
 - minimize night time blaze, only applied for safety, limit light intensity on site

Design Phase

- 8.4 The EIA Report recommended visual mitigation measures during the design phase of the Project. The mitigation measures are summarised below.
- Trees such as Casuarinas equisetifolia and Hibiscus tiliaceus with broad canopy, salt/wind tolerated species and fast growing type to secure the survival rate along coastal line;
 - At the lower level when concrete columns/abutments are located, tall evergreen trees are proposed to soften the vertical element. Planting should also be provided along the coastal line of the reclamation to soften the man-made structures viewed from marine traffic at Sunny Bay;
 - Edge parapets and columns of bridge structures should adopt similar colour and shape as the existing the existing Link Roads 1 to 4 located at the Sunny Bay interchange area;
 - Select finish pattern of concrete columns of similar to the existing bridge columns at Sunny Bay interchange area, i.e. rib pattern finish. The rib pattern finish at concrete columns would enhance the overall appearance of the bridge; and
 - Glass fibre reinforced concrete (GFRC) cladding panels with rubble stone patterns are recommended to apply on columns and abutment supporting the steel bridge in order to enhance the visual appearance of the steel decking. The rubble stonewall pattern can provide a nature setting in relationships among the sea and distant hillsides. At lower portion of the ramp and surrounding the abutment, screen planting with broad canopy tree and lower story shrub planting will help to reduce the visual intrusions as well.

Operation Phase

- 8.5 The EIA Report recommended visual mitigation measures during the operation phase of the Project. The mitigation measures are summarised below.
- provide regular maintenance of the landscape planting along roadside
 - careful planning and design of Sunny Bay Tourism Area Gateway during implementation of this tourism node are necessary to minimize further cumulative impacts upon landscape character and resources
- 8.6 The implementation for the recommended visual impact mitigation measures is presented in [Appendix B](#).

9. ENVIRONMENTAL AUDITING

Site Inspections

- 9.1 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. The site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.
- 9.2 The ET Leader shall be responsible for formulating the environmental site inspection, the deficiency and action reporting system, and for carrying out the site inspection works. He shall submit a proposal for site inspection and deficiency and action reporting procedures to the Contractor for agreement, and to the ER for approval. The ET's proposal for rectification would be made known to the IC(E).
- 9.3 Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site; it should also review the environmental situation outside the works area which is likely to be affected, directly or indirectly, by the site activities. The ET shall make reference to the following information in conducting the inspection:
- (i) the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
 - (ii) ongoing results of the EM&A program;
 - (iii) works progress and programme;
 - (iv) individual works methodology proposals (which shall include proposal on associated pollution control measures);
 - (v) contract specifications on environmental protection;
 - (vi) relevant environmental protection and pollution control laws;
 - (vii) previous site inspection results undertaken by the ET and others.
- 9.4 The Contractor shall keep the ET Leader updated with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works shall be submitted to the IC(E) and the Contractor within 24 hours for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.
- 9.5 The ET shall also carry out ad hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work.

Compliance with Legal and Contractual Requirements

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

- 9.7 In order that the works are in compliance with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval shall be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarised in [Appendix B](#).
- 9.8 The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating laws can be prevented.
- 9.9 The Contractor shall regularly copy relevant documents to the ET Leader so that works checking can be carried out. The document shall at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences / permits. The site diary shall also be available for the ET Leader' s inspection upon his request.
- 9.10 After reviewing the documentation, the ET Leader shall advise the Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader' s review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he shall also advise the Contractor accordingly.
- 9.11 Upon receipt of the advice, the Contractor shall undertake immediate action to correct the situation. The ER shall follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

Environmental Complaints

- 9.12 Handling of environmental complaints should follow the environmental complaint flow diagram and reporting channel as presented in [Figure 9.1](#).
- 9.13 During the complaint investigation work, the Contractor and Engineer shall cooperate with the ENPO in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation works. The Engineer shall ensure that the measures have been carried out by the Contractor.

10. REPORTING

General

- 10.1 Reports can be provided in an electronic medium upon agreeing the format with the ER and EPD. This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach. All the monitoring data (baseline and impact) shall also be submitted on diskettes. The formats for noise and water quality monitoring data to be submitted on diskette are shown in [Appendix C](#).
- 10.2 Types of reports that the ET Leader shall prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports shall be made available to the Director of Environmental Protection. The exact details of the frequency, distribution and time frame for submission shall be agreed with EPD prior to commencement of works.

Baseline Monitoring Report

- 10.3 The ET Leader shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report shall be submitted to the Contractor, the IC(E), the ER and the EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format shall be agreed with the EPD prior to submission.
- 10.4 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 (and depth);
 - monitoring date, time, frequency and duration; and
 - quality assurance (QA) / quality control (QC) results and detection limits;
 - (v) details of influencing factors, including:
 - major activities, if any, being carried out on the site during the period;
 - weather conditions during the period; and
 - other factors which might affect results;
 - (vi) determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data, the analysis shall conclude if there is any significant difference between control and impact stations for the parameters monitored;
 - (vii) revisions for inclusion in the EM&A Manual; and
 - (viii) comments, recommendations and conclusions.

Monthly EM&A Reports

- 10.5 The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report shall be prepared and submitted within 10 working days of the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report shall be submitted to the following parties: the Contractor, the IC(E), the ER and the EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.
- 10.6 The ET leader shall review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

First Monthly EM&A Report

- 10.7 The first monthly EM&A report shall include at least but not limited to the following:
- (i) executive summary (1-2 pages):
 - breaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
 - (ii) basic project information:
 - project organisation including key personnel contact names and telephone numbers;
 - construction programme;
 - management structure, and
 - works undertaken during the month;
 - (iii) environmental status:
 - works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates etc);
 - drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring locations); and
 - advice on status of compliance with environmental permit including the status of submissions under the environmental permit
 - (iv) a brief summary of EM&A requirements including:
 - all monitoring parameters;
 - environmental quality performance limits (Action and Limit levels);
 - Event-Action Plans;
 - environmental mitigation measures, as recommended in the project EIA study final report; and
 - environmental requirements in contract documents;
 - (v) implementation status:
 - advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA, summarised in the updated Implementation Schedule;
 - (vi) monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;

- monitoring locations;
 - monitoring date, time, frequency, and duration;
 - weather conditions during the period;
 - graphical plots of the monitored parameters in the month annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions that may affect the monitoring results; and
 - any other factors which might affect the monitoring results
 - any other factors which might affect the monitoring results; and
 - QA/QC results and detection limits;
- (vii) report on change, non-compliance, complaints, and notifications of summons and successful prosecutions:
- record of change established from the organisation and interpretation of monitoring results in the month
 - record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance;
- (viii) others
- compare and contrast the EM&A data in the month with the EIA predictions and annotate with explanation for any discrepancies;
 - 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 during the month including waste generation and disposal records; and
 - comments including effectiveness of the environmental management systems, practices, procedures and mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent Monthly EM&A Reports

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

- (i) executive summary (1 - 2 pages):
- breaches of Action and Limit levels;
 - complaints log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
- (ii) environmental status:
- construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
 - works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.) including key personnel contact names and telephone numbers;
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations; and

- advice on status of compliance with environmental permit including the status of submissions under the environmental permit
- (iii) implementation status:
- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA, summarised in the updated implementation schedule;
- (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;
 - weather conditions during the period;
 - graphical plots of the monitored parameters in the month annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions that may affect the monitoring results; and
 - any other factors which might affect the monitoring results
 - any other factors which might affect the monitoring results; and
 - QA / QC results and detection limits.
- (v) report on change, non-compliance, complaints, and notifications of summons and successful prosecutions:
- record of change established from the organisation and interpretation of monitoring results in the month
 - record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (vi) others
- compare and contrast the EM&A data in the month with the EIA predictions and annotate with explanation for any discrepancies;
 - 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 during the month including waste generation and disposal records; and
 - comments including effectiveness of the environmental management systems, practices, procedures and mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.
- (vii) appendix
- Action and Limit levels;
 - graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - major activities being carried out on site during the period;
 - weather conditions during the period; and

- any other factors that might affect the monitoring results.
- monitoring schedule for the present and next reporting period;
- cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- outstanding issues and deficiencies.

Quarterly EM&A Summary Reports

10.9 A quarterly EM&A summary report of around five pages shall be produced and shall contain at least the following information. Apart from these, the first quarterly summary report should also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

- (i) up to half a page executive summary;
- (ii) basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of works undertaken during the quarter;
- (iii) a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (Action and Limit levels); and
 - environmental mitigation measures, as recommended in the project EIA Final Report;
- (iv) advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Final Report, summarised in the updated implementation schedule;
- (v) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (vi) graphical plots of any trends in monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
 - 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) advice on the solid and liquid waste management status during the quarter including waste generation and disposal records;
- (viii) a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (ix) a brief review of the reasons for and the implications of any non-compliance, including a review of pollution sources and working procedures;
- (x) a summary description of actions taken in the event of non-compliance and any follow-up procedures related to any earlier non-compliance;
- (xi) a summarised record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xii) comments (for examples, a review of the effectiveness and efficiency of the mitigation measures); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and
- (xiii) proponents' contacts and any hotline telephone number for the public to make enquiries.

Final EM&A Review Report

- 10.10 The EM&A program shall be terminated upon completion of those construction activities that have the potential to result in a significant environmental impact.
- 10.11 Prior to the proposed termination, it may be advisable to consult relevant local communities (such as village representatives/communities and/or District Boards). The proposed termination should only be implemented after the proposal has been endorsed by the IC(E), the Engineer and the Project proponent followed by final approval from the Director of Environmental Protection.
- 10.12 The final EM&A summary report should include, *inter alia*, the following information:
- (i) an executive summary;
 - (ii) basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period;
 - (iii) a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (Action and Limit levels); and
 - environmental mitigation measures, as recommended in the project EIA study final report;
 - (iv) advice on the implementation status of environmental and pollution control/mitigation measures, as recommended in the project EIA study final report, summarised in the updated implementation status proformas;
 - (v) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - (vi) graphical plots of the trends of monitored parameters over the construction period for representative monitoring stations, including the post-project monitoring annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period;
 - any other factors which might affect the monitoring results; and
 - the return of ambient environmental conditions in comparison with baseline data;
 - (vii) compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies;
 - (viii) provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
 - (viii) advice on the solid and liquid waste management status;
 - (ix) a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - (x) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
 - (xi) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - (xii) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

- (xiii) review the monitoring methodology adopted and with the benefit of hindsight, comment and its effectiveness (including cost effectiveness);
- (xiv) a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
- (xv) review the practicality and effectiveness of the EIA process and EM&A programme (e.g. effectiveness and efficiency of the mitigation measures), recommend any improvement in the EM&A programme; and
- (xvi) a conclusion to state the return of ambient and/or the predicted scenario as per EIA findings.

Data Keeping

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

Interim Notifications of Environmental Quality Limit Exceedances

- 10.14 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader shall immediately notify the IC(E) and EPD, as appropriate. The notification shall be followed up with advice to IC(E) and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in [Appendix D](#).