

CWE-ZHEC Joint Venture


**Maintenance and Repairs to Franchised and
Licensed Ferry Piers (2005 – 2008)**

*Construction of Yung Shue Wan Helipad – Works
order No. YSWH/01/03*

**Updated Environmental Monitoring and Audit
Manual (Version 2)**

August 2007

Approved By


(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

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1 INTRODUCTION

Background

- 1.1 Construction of Yung Shue Wan Helipad (the Project) involves the construction and operation of a permanent helipad at Yung Shue Wan, Lamma Island. The Project has been planned and managed in-house by the Land Works Division of Civil Engineering and Development Department (CEDD) on behalf of the Home Affairs Department (HAD). Construction works are to be completed by contractors under CEDD's supervision. CEDD will hand over the helipad to the management department (yet to be determined) upon its commissioning.
- 1.2 The helipad is solely required for transporting residents in areas of North Lamma to urban areas for medical treatment in emergency situations, and is not for commercial use. The previous Yung Shue Wan helipad – located on a soccer pitch outside the North Lamma Clinic – ceased operation in May 1998 when the Government Flying Service (GFS) classified the Site to a Category 1 Landing Site.
- 1.3 Since this time there has been no permanent, dedicated helipad serving the local community. The community was until recently using the helipad at The Hongkong Electric Co. (HEC) Ltd's Lamma Power Station – a distance of 2.75 km and a typical trip time of around 20 minutes by mini-ambulance from the North Lamma Clinic. As a more acceptable interim measure, HAD commissioned the development of a temporary helipad that has been in operation at Yung Shue Wan since October 2003 pending the construction of a permanent helipad to serve the local community
- 1.4 The Project is a 'designated project' under Item B.2, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) by virtue of being: "*A helipad within 300m of existing or planned residential development*". An environmental impact assessment (EIA) report has been prepared in 2005 for the Project to consider the key issues of noise, air quality, water quality, construction waste, ecological and cultural impacts, and identify possible mitigation measures. The EIA report was included in the EIA register under the EIAO as report number AEIAR-094/2006. EM&A Manual for the Project was also included as part of the EIA report in the register.
- 1.5 An Environmental Permit No. EP-242/2006 was issued on 13 March 2006 for this Project (EP) to the CEDD as Permit Holder. Condition 2.3 of the EP requires an updated Environmental Monitoring and Audit Manual (Updated EM&A manual) to be prepared to include the updated details of the EM&A programme for coral and water quality monitoring to check, review, verify and validate the environmental performance and the Event/Actions Plans to describe the remedial actions to be carried out in the case of deteriorating environmental performance during construction of the Project.

Cinotech Consultants Limited was commissioned by the CWE-ZHEC Joint Venture (the Contractor) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project. This Updated EM&A Manual was prepared by Cinotech to fulfill the requirements of the EP.

Purpose of this Manual

- 1.6 The purpose of this Updated Environmental Monitoring and Audit (EM&A) Manual is to guide the setup of an EM&A programme to ensure compliance with the Environmental Impact Assessment (EIA) and Environmental Review Report (ERR) studies recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action.
- 1.7 This Manual outlines the monitoring and audit programme to be undertaken for the construction of Yung Shue Wan Helipad. It aims to provide systematic procedures for monitoring, auditing and minimizing the environmental impacts associated with the construction works.
- 1.8 Hong Kong environmental regulations for noise, air quality, water quality and waste, the Hong Kong Planning Standards and Guidelines, and the recommendations in the EIA have served as environmental standards and guidelines in the preparation of this Manual.

Objectives of this EM&A Programme

- 1.9 The main objectives of this EM&A programme are:
- To provide a database of baseline environmental quality for subsequent checking during the construction phase of the works;
 - To provide information at an early stage for identification of potential problem areas and formulation of additional environmental mitigation measures where necessary should any of the environmental control measures or practices fail to achieve the target standards;
 - To verify the environmental impacts predicted in the EIA Study for the Project;
 - To determine project compliance with relevant regulatory standards, requirements and guidelines;
 - To outline remedial measures to be undertaken if unexpected problems or unacceptable impacts arise; and
 - To provide data against which environmental audits may be undertaken effectively.

Content of this EM&A Manual

- 1.10 The recommended EM&A programme in this Manual contains the following information:
- Duties of the various project staff and their respective responsibilities with regards to the EM&A requirements during construction;
 - Information on project organisation, work schedule and activities;
 - Requirements with respect to the work schedule and the necessary EM&A programme to detect the various possible environmental impacts;

- Definition of Action Limit Levels and the establishment of Event/Action Plans;
 - Requirements for reviewing potential sources of pollution and assessing working procedures in the event of non-compliance with the environmental criteria;
 - Requirements for the presentation of EM&A data and appropriate reporting procedures; and
 - Proposed field data forms to be adopted during the various phases of the works.
- 1.11 For the purpose of this Manual, the “Engineer” will refer to the Engineer as defined in the Contract and the Engineer’s Representative (ER), in cases where the Engineer’s powers have been delegated to the ER, in accordance with the Contract. The ET Leader, who will be responsible for and in charge of the ET of the construction and operational Phases of the Project, will refer to the person delegated the role of executing the environmental monitoring and audit requirements. IEC will undertake the auditing role.

Description of the Works and the environs of the site

- 1.12 The general layout of the proposed Yung Shue Wan Helipad under current scheme is shown in **Figure 1.1**.
- 1.13 The Project involves the construction of a helipad by mini-bored piling in coastal waters at Kam Lo Hom (North), Yung Shue Wan. No dredging or reclamation works are required for the construction.
- 1.14 The helipad deck will be located approximately 25 metres from the existing formed land, and an access road will be constructed to link the proposed helipad with the existing Emergency Vehicular Access (EVA) which is shown in **Figure 1.1**.
- 1.15 The majority of the developments along the coast of Yung Shue Wan are residential village houses, varying from single to 3 storeys high. Some of these buildings are used for commercial purpose on the ground floor (e.g., grocery store and restaurant), which are not considered noise sensitive. There are isolated and abandoned village houses located to the north of Kam Lo Hom (currently zoned “Green Belt”). There is line of sight between developments and proposed helipad site/EVA works area.
- 1.16 In addition, the proposed helipad is bound by the Hongkong Electric Co. Ltd.’s Lamma Power Station, which is approximately 800 m due south west to Yung Shue Wan and a refuse transfer station (RTS) immediately adjacent to the proposed site (to the southeast). There are no major road networks within Lamma Island.

Environmental Monitoring and Audit Requirements

- 1.17 The EIA identified the likely environmental impacts during construction and operational phases of the current development scheme, including: air quality, noise, water quality, ecology, waste management and culture heritage. These impacts can be minimized to acceptable levels with the implementation of environmental mitigation measures. In order to ensure compliance with relevant environmental standards, baseline and compliance monitoring for noise, water quality and corals is required and is described in details in the subsequent sections. The proposed schedule for the

implementation of recommended mitigation measures is shown in **Appendix A**.

Environmental Management Plans

- 1.18 Upon the commencement of the Project, the Contractor shall prepare an Environmental Management Plan (EMP) that shall form the framework within which the implementation of mitigation measures and good site practices are to be managed.
- 1.19 The EMP shall provide details of the means by which the Contractor (and their sub-contractors) shall implement the recommended mitigation measures and achieve the environmental performance standards defined in the relevant Hong Kong environmental legislation, the Contract and in the EIA. The EMP shall be prepared by the Contractor and submitted to the IEC for verification and the ER for approval.
- 1.20 An environmental performance review programme, including a regular assessment of the effectiveness of the EMP, site practices and procedures shall be established prior to the commencement of construction works. The ET Leader shall prepare review protocols that shall include inspection and auditing requirements.

Project Organizations

- 1.21 Involvement of relevant parties in a collaborative and interactive manner is essential for the implementation of the recommended EM&A programme. The key parties in an EM&A programme include:
 - Civil Engineering and Development Department (CEDD) (Project Proponent);
 - Environmental Protection Department (EPD) (Environmental Regulations Enforcer);
 - The Engineer of the Engineer's Representative (ER) (e.g. Engineers from CED);
 - The Contractor;
 - The Environmental Team (ET); and
 - The Independent Environmental Checker (IEC).

Environmental Team

- 1.22 An Environmental Team (ET) shall be appointed to carry out the recommended EM&A works for the helipad project. The ET shall not be an associated company of the Contractor. The ET Leader shall plan, organise and manage the implementation of the EM&A programme, and ensure that the EM&A works are undertaken to the required standards. The ET Leader shall have relevant professional qualifications in Environmental Sciences or Environmental Engineering, and possess at least 7 years experience in EM&A and/or environmental management. An organisation chart that shows the relationships of different stakeholders under the EM&A framework is presented in **Figure 1.2**.
- 1.23 The ET Leader shall be responsible for the implementation of the EM&A programme in accordance with the EM&A requirements specified in this Manual. The ET Leader shall keep a contemporaneous logbook of each and every instance or circumstance or change of circumstances that may affect the EIA and each and every non-compliance

with the Environmental Permit or the recommendations in the EIA report. This logbook shall be kept readily available for inspection by the IEC, and Director of Environmental Protection (DEP) or his authorised officers. The ET shall not be an associated body of the IEC in the Project.

1.24 Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibility, as required under the EM&A programme for the duration of the Project. The ET shall not be in any way an associated body of the Contractor. The ET shall be under the supervision of the ET Leader in fulfilling the EM&A duties specified in this Manual. The broad categories of works of the ET comprise the following:

- Sampling, analysis and statistical evaluation of monitoring parameters with reference to the EIA study recommendations and requirements;
- Environmental site surveillance (Section 7 refers);
- Inspection and audit of compliance with environmental protection, and pollution prevention and control regulations;
- Inspection and audit of compliance with procedures established to enable an effective response to environmental incidents, exceedances or non-compliance;
- Assess the effectiveness of the environmental mitigation measures implemented;
- Monitor the implementation of environmental mitigation measures;
- Monitor compliance with the environmental protection clauses/specifications in the Contract;
- Review the construction schedule and provide comments as necessary;
- Review work methodologies which may affect the extent of environmental impact during the construction phase and comment as necessary;
- Complaint investigation, evaluation and identification of corrective measures;
- Liaison with the Project IEC on all environmental performance matters, and timely submission of all relevant EM&A proforma for IEC's approval;
- Advice to the Contractor on environmental improvement, awareness, enhancement matters, etc., on site; and
- Timely submission of the EM&A report to the Project Proponent and the DEP.

1.25 In the event of any exceedance in Action/Limit levels, the ET shall inform the IEC, ER and the Contractor within one working day of the occurrence of each and every occurrence, change of circumstances or non-compliance with the EIA Report or the Environmental Permit (EP) so that appropriate remedial action can be undertaken by the Contractor promptly.

1.26 The ET is also responsible for the preparation of the monthly EM&A reports for submission to IEC, the Contractor and the ER, and through the ER, to EPD. The ET shall assist the Contractor and the ER in formulating any necessary corrective actions and/or additional mitigation measures, and liaising with relevant Government Departments where necessary.

Independent Environmental Checker

- 1.27 The Independent Environmental Checker (IEC) shall advise the ER on environmental issues related to the Project. The IEC shall not be in any way an associated body of the Contractor or the ET for the Project. IEC shall be empowered to audit from an independent viewpoint the environmental performance during the construction of the helipad. The IEC shall be a person who has at least 7 years experience in EM&A or environmental management.
- 1.28 The IEC shall be responsible for the duties defined in the Environmental Permit (EP) and this EM&A Manual, and shall audit the overall EM&A programme, including the implementation of all environmental mitigation measures, submissions required in this EM&A Manual, and any other submissions required under the Environmental Permit. The IEC shall be responsible for verifying the environmental acceptability of permanent and temporary works, relevant design plans and submissions under the Environmental Permits. The IEC shall verify the logbook prepared and kept by the ET Leader. The IEC shall notify DEP by fax, within 24 hours of receipt of notification from the ET Leader of any such instance or circumstance or change of circumstances or non-compliance with the EIA Report or the EP, which might affect the monitoring or control of adverse environmental impact.
- 1.29 The main duty of the IEC is to carry out independent environmental audit of the Project. This shall include, inter alia, the following:
1. Review and audit in an independent, objective and professional manner in all aspects of the EM&A programme;
 2. Validate and confirm the accuracy of monitoring results, appropriateness of monitoring equipment, monitoring locations with reference to the locations of the nearby sensitive receivers, and monitoring procedures;
 3. Carry out random sample check and audit on monitoring data and sampling procedures, etc;
 4. Conduct random site inspection;
 5. Audit the EIA recommendations and requirements against the status of implementation of environmental protection measures on site;
 6. Review the effectiveness of environmental mitigation measures and project environmental performance;
 7. On an as needed basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions under the environmental permit. Where necessary, the IEC shall agree in consultation with the ET Leader and the Contractor the least impact alternative;
 8. Verify investigation results of complaint cases and the effectiveness of corrective measures;
 9. Verify EM&A report submitted and certified by the ET Leader; and
 10. Feedback audit results to ET/CED/ER by signing according to the Event/Action Plans specified in this EM&A Manual.

The Contractor

- 1.30 Upon the commencement of the Project, the Contractor shall prepare and submit an EMP for the Engineer's approval, further to the IEC's verification. The EMP shall comprise of the appropriate extracts from (and references to) the Project EIA report and EM&A Manual, and include such elements as the relevant statutory environmental standards, general environmental control clauses and specific environmental management clauses as well as an outline of the scope and content of the EMP. Consideration shall be given to the predictive nature of the EIA process and the consequent need to manage and accommodate the actual impacts arising from the construction process. Any changes in the construction method, progress rates and other estimates made in the preliminary design stage to carry out the EIA and the implications of such changes shall be identified and controlled under the EMP.
- 1.31 The Contractor is responsible for providing requested information to the ET in the event of any exceedance in the environmental criteria (Action/Limit levels) specified in this Manual or other current environmental standards and to rectify unacceptable practices. The Contractor shall discuss with the ET, IEC and ER on any additional mitigation measures identified to be required by the ET and implement the agreed measures to alleviate any identified environmental impact to acceptable levels. The design and implementation of the control and mitigation measures shall be the responsibility of the Contractor.
- 1.32 In the event that the ET needs to undertake complaint investigation work, the Contractor and the Engineer shall co-operate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are required following the investigation, the Contractor shall promptly carry out these measures.
- 1.33 The Contractor shall report to the ET on the action(s) taken targeting at environmental protection for inclusion in the monthly report to be prepared by the ET.

Civil Engineering and Development Department

- 1.34 Civil Engineering and Development Department (CEDD) is the Project Proponent in this project and shall hold ultimate responsibility for the Project. CEDD shall liaise with EPD on environmental issues associated with the Project.

Environmental Protection Department

- 1.35 Environmental Protection Department (EPD) is the statutory enforcement body for environmental protection matters in Hong Kong. Apart from the provision of mandatory environmental standards, EPD also forms the consultation board for environmental issues arising from the Project.

Engineer/Engineer's Representative

- 1.36 The Engineer or Engineer's Representative (ER) shall be responsible for overseeing the operations of the Contractor and the ET. He shall advise, co-ordinate and give instruction when appropriate for efficient implementation of any specific environmental mitigation measures identified to be required by the contractor, and/or outstanding EM&A works required to be carried out by ET in consultation with the IEC. The ER shall supervise the Contractor's activities and ensure that the requirements in the EIA

Report and EM&A Manual are fully complied with. He shall inform the Contractor when action is required to reduce impacts in accordance with the Event/Action Plans. He shall review the EM&A Reports submitted by the ET and follow up the recommendations. He shall ensure that the Contractor is implementing the environmental controls and mitigation measures as set out in the EIA report and EM&A Manual, as well as additional measures necessary for compliance with the relevant environmental standards.

- 1.37 In the event that the ET needs to undertake complaint investigation work, the Engineer (and the Contractor) shall co-operate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are required following the investigation, the ER shall ensure that the Contractor has carried them out.
- 1.38 CEDD will play the role of the ER should the detailed design and oversight of the construction of the helipad be carried out in-house by staff of CEDD.

Construction Programme

- 1.39 The tentative works programme for the Project is presented in **Appendix B**.
- 1.40 The project programme is indicative only and is provided for information of the ET Leader to get an initial idea of the sequence of the works. The ET Leader will make reference to the actual works programme and progress during the construction stages to schedule the EM&A works, and the Contractor will provide the respective information to the ET Leader for formulating the EM&A schedule.

2 AIR QUALITY

Introduction

- 2.1 Based on the air quality impact assessment of the EIA report, it has been identified that no significant impact will arise from the construction and operation of the helipad through the proper implementation of dust control measures as required under the Air Pollution Control (Construction Dust) Regulation. While no specific control measures have been recommended, general air quality control measures are recommended for implementation as good site practices.
- 2.2 The ET shall check the Contractor's implementation of air quality control measures during the regular site environmental audit.

Environmental Audit

- 2.3 As described in Section 7 of this Manual, the ET Leader is responsible for formulating an environmental site inspection, deficiency and action reporting system, and for carrying out site inspections under the EM&A programme.
- 2.4 In order to check that the air quality control measures have been implemented by the Contractor as good site practices, the ET shall include the following items as part of their site inspections:
 - Heights from which materials are dropped should be restricted as far as practicable to minimise the fugitive dust arising from unloading/loading.
 - All spraying of materials and surfaces should avoid excessive water usage;
 - Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels.
 - Erection of hoarding of not less than 2.4 m high from ground level along the site boundary;
 - Vehicles that have the potential to create dust while transporting materials should be covered, with the cover properly secured and extended over the edges of the side and tail boards;
 - Travelling speeds should be controlled to reduce traffic induced dust dispersion and re-suspension within the site from the operating haul trucks.
 - Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.
 - Any stockpile of dusty materials shall be either: (a) covered entirely by impervious sheeting; (b) placed in an area sheltered on the top and the 3 sides; or (c) sprayed with water or a dust suppression chemical so as to maintain the entire surface wet.
 - All dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
- 2.5 All the dust control measures as recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, should also be implemented.

3 NOISE

3.1 During the construction phase of the helipad, power mechanical equipment (PME) used for the helipad construction will be the primary noise sources. The key noise generating activities include:

- Site clearance for the erection of site office, hoarding and fencing;
- Temporary staging construction and demolition;
- Pile installation; and
- Deck and EVA construction.

3.2 Noise sensitive receivers (NSRs) have been identified in accordance with Annex 13 of the EIAO TM. As required under *Clause 3.4.2.2 (iii) (b)* of the EIA Study Brief, the selection of representative NSRs has been presented to and agreed by the Authority. Noise monitoring will be conducted at representative sensitive receivers to ensure that the works proceed in manner will not result in unacceptable noise levels.

Noise Monitoring Parameters

3.3 Monitoring of noise levels at the proposed sensitive receiver locations shall be undertaken by the ET during the baseline and construction phases of the Project to ensure that any increase in noise levels as a result of the construction works are readily detected and rectified in a timely fashion.

3.4 The construction noise level will be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). Noise measurements will be carried out with an integrating sound level meter using the ‘fast’ response mode. $L_{eq(30\text{ min})}$ will be used as the monitoring parameter for the time period between 07:00-19:00 hours on normal weekdays. For all other time periods, $L_{eq(5\text{ min})}$ will be employed for comparison with the Noise Control Ordinance criteria.

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

3.6 In addition to carrying out noise monitoring, control and mitigation measures are recommended for implementation by the Contractor. The ET shall check the implementation of these measures during the regular site environmental audits. As described in Section 7 of this Manual, the ET Leader is responsible for formulating an environmental site inspection, deficiency and action reporting system, and for carrying out site inspections under the EM&A programme.

Monitoring Equipment

3.7 As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications will be used for carrying out the noise monitoring.

3.8 Immediately prior to and following each noise measurement the accuracy of the sound

level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0dB. Calibration equipment to be used should meet IEC 942, Type 1 specifications, and succeeding standard specifications for sound level meters applicable in Hong Kong. Annual calibration of the noise monitoring equipment by an accredited laboratory will be carried out for compliance with IEC publications 651 and 804 and any other relevant standards.

- 3.9 Noise measurements shall not be made if the wind speed exceeds 5ms^{-1} or if gusts exceed 10ms^{-1} . The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1} . Measurements shall not be made while air temperatures are outside the manufacturer's specified range or when other intrusive noise sources (other than influencing factors) are apparent at the assessment point.
- 3.10 Sufficient noise measuring equipment and associated instrumentation should be available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation will be clearly labelled, stored and maintained according to the manufacturer's instructions. The ET Leader will also liaise with the concerned parties for gaining access to the monitoring stations for the installation of the monitoring equipment and carrying out monitoring.

Monitoring Procedure

- 3.11 Monitoring will be carried out with reference to the following documents:
- *Technical Memorandum on the Assessment of Noise from Construction Work other than Percussive Piling, Hong Kong Government;*
 - *Technical Memorandum on the Assessment of Noise from Construction Works in Designated Areas, Hong Kong Government*
 - *Technical Memorandum for the Assessment of Noise from places other than Domestic Premises, Public Places or Construction Sites, Hong Kong Government;*
 - or succeeding standards and guidelines.
- 3.12 The monitoring stations will normally be at a point 1 m from the exterior of the sensitive receivers building facade and be at a position 1.2 m above the ground. When a measurement is to be made of noise being received at a place other than a building, the assessment point will be at least 1.2 m above ground level, at an appropriate point. The appropriate measurement positions should be at least 3.5 m from any reflecting surface other than the ground and have an unobstructed view of the Site. In such instances where free-field measurements are conducted, a positive correction of 3dB(A) will be applied to the relevant target limits.
- 3.13 The microphone of the sound level meter will be so orientated that it is pointing in the direction of the Site and at the source of noise being monitored such that the microphone is perpendicular to the plane of the incident sound-waves. It will be protected using an appropriate windshield. To avoid reflections from the operator's body, the microphone will be mounted on a tripod, whether attached to the sound level meter or not. Noise measurements will be rounded to the nearest whole dB, with values of 0.5 dB or more being rounded upwards.

- 3.14 Noise will not be monitored in the presence of mist, fog or rain, when wind is at a steady speed exceeding 5 m/s, or when gusts exceed 10m/s.
- 3.15 For monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- 3.16 Noise measurements shall be recorded on a field data sheet together with relevant information including project name, date and time of sampling, monitoring location and parameters, site observations and remarks. A sample field data sheet is attached in **Appendix C** to this Manual for reference.

Proposed Monitoring Locations

- 3.17 The noise impact assessment presented in the EIA report indicated that the unmitigated construction noise levels at all NSRs are found to comply with the daytime noise standards stated in Table 1B, Annex 5 of EIAO TM. Noise mitigation measures have been recommended in the EIA report and shall be implemented by the Contractor in accordance with the requirements under the Noise Control Ordinance. The Contractor shall be responsible for the design and implementation of the noise mitigation measures.
- 3.18 Proposed noise monitoring stations are shown in **Figure 3.1** and detailed in Table 3.1. The proposed noise monitoring location N3 corresponds to the NSR3 (North Lamma Clinic) as referred in the EIA report, while N4 and N5 are the baseline and impact monitoring stations respectively corresponding to the NSR4 (No. 105 Yung Shue Wan Main Street). The location of N4 (Yung Shue Wan Playground) is near to the corresponding impact monitoring station N5 (No. 105 Yung Shue Wan Main Street) and they are exposed to similar noise background in the vicinity.

Table 3.1 Locations for Proposed Noise Monitoring Stations

Monitoring Stations	Representative Noise Sensitive Receivers	Locations
N3	NSR3	North Lamma Clinic
N4 (for baseline monitoring period)	NSR4	Yung Shue Wan Playground (rooftop of public toilet)
N5 (for impact monitoring period)	NSR4	No. 105 Yung Shue Wan Main Street

- 3.19 The status and locations of noise sensitive receivers may change after issuing this Manual. If such case exists, the ET Leader shall propose updated monitoring locations and seek approval from ER and agreement from the IEC and EPD of the proposal.
- 3.20 When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:
- At locations close to the major site activities which are likely to have noise impacts;
 - Close to the noise sensitive receivers (as defined by the EIAO TM); and
 - For monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to occupants during monitoring.

Baseline Monitoring for Construction Noise

- 3.21 Daily noise monitoring shall be carried out by the ET at all designated monitoring locations for a period of at least two weeks prior to the commencement of the Work to establish the baseline noise conditions. There will not be any construction activities in the vicinity of the stations during the baseline monitoring.
- 3.22 The frequency of monitoring for each station will include at least:
- One set of measurements between 07:00-19:00 hours on normal weekdays;
 - One set of measurements between 19:00-23:00 hours on normal weekdays;
 - One set of measurements between 23:00-07:00 hours of next day; and
 - One set of measurements between 07:00-19:00 hours on holidays.

Impact Monitoring for Construction Noise

- 3.23 The ET shall conduct noise monitoring at all designated monitoring stations. Noise monitoring shall be conducted on a weekly basis when noise-generating activities are underway. One set of measurements shall be taken between 07:00-19:00 hours on normal working days.
- 3.24 General construction works carried out during restricted hours are controlled by the Construction Noise Permit System, under the NCO. The Contractor shall apply for a Construction Noise Permit (CNP) and abide by the requirements of the permit should works be necessary in the restricted hours.
- 3.25 In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Event/Action Plans in Table 3.3 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 for Construction Noise

- 3.26 The Action Limit levels for construction noise are defined in Table 3.2. Should non-compliance of the noise criteria occur, actions in accordance with the Event/Action Plan in Table 3.3 shall be carried out.

Table 3.2 Action and Limit Levels for Construction Noise

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

Table 3.3 Event / Action Plan for Construction Noise

Event	ACTION			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IC(E) and Contractor 2. Carry out investigation 3. Report the results of investigation to the IC(E) and Contractor 4. Discuss with the Contractor and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposal to IC(E) 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 1. Notify IC(E), ER, EPD and Contractor 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IE(E), ER and EPD the causes & actions taken for the exceedances 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposal for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

	monitoring			
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Noise Mitigation Measures

- 3.27 While no adverse noise impacts have been identified through the noise impact assessment, the EIA report has nevertheless recommended construction noise control and mitigation measures to be implemented by the Contractor as good site practice. The implementation schedule for recommended mitigation measures is presented in **Appendix A**.
- 3.28 As described in Section 7 of the Manual, the ET Leader is responsible for formulating an environmental site inspection, deficiency and action reporting system, and for carrying out site inspections under the EM&A programme.
- 3.29 In order to check that the noise control measures have been implemented by the Contractor as good site practices, the ET shall include the following items as part of their site inspections:
- Noisy equipment and noisy activities should be located as far away from the NSRs as is practical;
 - Use of silence equipment and installation of temporary and movable noise barriers. Movable barriers shall be positioned as close as possible to powered mechanical equipment so that they are not visible to sensitive receivers;
 - Unused equipment should be turned off;
 - Powered mechanical equipment should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided; and
 - Regular maintenance of all plant and equipment.
- 3.30 The Contractor shall observe and comply with the relevant statutory requirements and guidelines.
- 3.31 Operational noise monitoring is impracticable as there are no scheduled helicopter flights, and so operational phase noise monitoring is not recommended.
- 3.32 Should the need arise, the local community may lodge noise complaints with the Islands District Office by the following means:
- Fax: 2815 2291
 - Email: dois@had.gov.hk
 - Address: Islands District Office, Harbour Building, 20th Floor, 38 Pier road, Central.

4 WASTE MANAGEMENT

Introduction

- 4.1 Based on the initial waste generation assessment, it has been identified that minimal volumes of C&D materials (including inert and non-inert materials), chemical waste and general refuse will be generated from the construction activities.
- 4.2 Through proper on-site handling and storage (covered containers), reuse (of inert C&D materials) and off-site disposal (via approved waste collectors to approved waste facilities and/or disposal grounds) the generation, handling and disposal of these wastes will not give rise to any adverse environmental impacts. However, given the potential for environmental impacts to arise from improper waste management (e.g. visual impact, nuisance, etc.), it is recommended that control and mitigation measures be implemented as part of general good site practices.

Environmental Audit

- 4.3 As described in Section 7 of the Manual, the ET Leader is responsible for formulating an environmental site inspection, deficiency and action reporting system, and for carrying out site inspections under the EM&A programme.
- 4.4 In order to check that the waste control and mitigation measures have been implemented by the Contractor as good site practices, the ET shall include the following items as part of their site inspections and audit:
- Spoil generated from the piling activities needs to be properly handled to minimise contamination to the marine water and any exposed ground areas due to leakage or improper storage (i.e. onto bare ground instead of into tanks). Any dredged sediments generated from the site works shall be handled in accordance with ETWB TCW No. 34/2002;
 - The reuse/recycling of all materials on site shall be investigated prior to treatment/disposal off site;
 - Good site practices shall be adopted from the commencement of works to avoid the generation of waste, reduce cross contamination of waste and to promote waste minimisation practices;
 - All waste materials shall be sorted on site into inert and non-inert C&D materials, and where the materials will be recycled or reused these shall be further segregated. The Contractor shall be responsible for identifying which materials can be recycled/reused, whether on site or off site. In the event of the latter, the Contractor shall make arrangements for the collection of the recyclable materials. Any remaining non-inert waste shall be collected and disposed of to the refuse transfer station whilst any inert C&D material shall be re-used on site as far as possible. Alternatively, if no use of the inert material can be found on site, the material should be delivered to a public filling area or a public fill bank after obtaining the appropriate licence;
 - With reference to ETWBTC (W) No.31/2004, Trip-ticket System for Disposal of Construction and Demolition Material, a trip ticket system should be established at

the outset of the construction of the helipad to monitor the disposal of C&D and solid wastes from the site to public filling facilities and landfills;

- Under the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall register with EPD as a Chemical Waste Producer if there is any use of chemicals on site including lubricants, paints, diesel fuel, etc. Only licensed chemical waste collectors shall be employed to collect any chemical waste generated at site. The handling, storage, transportation and disposal of chemical wastes shall be conducted in accordance with the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* and *A Guide to the Chemical Waste Control Scheme* both published by EPD;
 - Stockpiling is not envisaged, however if it becomes unavoidable, stockpiling in any vegetated areas shall be avoided (as far as possible) and shall be covered with tarpaulin and/or watered to prevent windblown dust and/or surface runoff;
 - A sufficient number of covered bins shall be provided on site for the containment of general refuse to prevent visual impacts and nuisance to sensitive receivers. These bins shall be cleared daily and the collected waste disposed of to the refuse transfer station. Further to the issue of ETWBTC (Works) No. 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness, the Contractor is required to maintain a clean and hygienic site throughout the project works;
 - All chemical toilets shall be regularly cleaned and the nightsoil collected and transported by a licensed contractor to a Government Sewage Treatment Works facility for disposal;
 - Tool-box talks should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; and
 - The contractor shall propose a recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites), and the ET Leader shall include a summary of such information in each monthly EM&A Report.
- 4.5 The Contractor shall also observe and comply with the relevant statutory requirements and guidelines and their updated versions.

5 WATER QUALITY

Introduction

- 5.1 Given the scale and nature of the Project, and given that there will be no dredging or reclamation works involved, the initial water quality assessment conducted under the EIA study indicates that minimal disturbances will be generated and thus no unacceptable water quality impacts are foreseen.
- 5.2 However, the following general control and mitigation measures are recommended for implementation by the works Contractor as good site practices.

Water Quality Requirements

- 5.3 The Contractor shall minimise adverse impact resulting from the Contractor's operations on the water quality. To achieve these requirements the Contractor shall design and implement methods of working that:
- Prevent spillage and leakage of concrete during transporting, handling and placing processes when constructing concrete marine structures;
 - Prevent the unacceptable reduction, due to the Works, of the dissolved oxygen content of the water adjacent to the Works;
 - Prevent excess suspended solids from being present in the water within and adjacent to the Works; and
 - Prevent avoidable deterioration in the water quality causing adverse effects on the marine life.

Water Quality Monitoring

- 5.4 The ET shall collect water samples at the designated Monitoring and Control Stations and send to approved laboratory accredited by HOKLAS for determining the Suspended Solids content.
- 5.5 The Contractor shall provide approved assistants, together with a suitable motorised sampan for carrying out the monitoring within 6 weeks prior to the commencement of any marine works within the Site. The motorised sampan shall be readily available for water quality monitoring purposes. The provision of motorised sampan and approved assistants are deemed to be included in the Contract rates.
- 5.6 Monitoring shall be carried out *in situ* and in accordance with the following:
- Baseline conditions for the various water quality parameters are to be established immediately after the commencement of the Contract and at the latest within 4 weeks prior to the commencement of the marine works under the Contract. The Contractor shall make sure that there is no marine works carried out in vicinity of the water body being measured.
 - The ET shall establish the baseline conditions by measuring the following water quality parameters: dissolved oxygen (DO concentration in mg/l and DO saturation

in percentage), turbidity (Tby in NTU), suspended solids (SS in mg/l), pH, salinity and both water and ambient temperature. Monitoring shall be conducted at all designated Monitoring and Control Stations, and on 3 sampling days per week at mid-flood and mid-ebb for 4 consecutive weeks before the marine works start. Water samples and measurements shall be taken at three water depths, namely, 1m below water surface, mid-depth and 1m above seabed. If the water depth is less than 6m, samples shall be taken at 1 m below water surface and 1m above seabed. If the water depth is less than 3m, samples shall be taken at mid-depth only.

- Other relevant data shall also be recorded. They include 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.
- In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, the ET shall seek approval from the Engineer on an appropriate set of data to be used as baseline reference.
- During the course of the piling works, impact monitoring shall be undertaken three days a week, particularly on the days that actual drilling and piling works take place, each day at mid-flood and mid-ebb, with sampling/measurement at the designated Monitoring and Control Stations. During the course of other marine works, monitoring shall be undertaken one day per week at mid-flood and mid-ebb, with sampling/measurement at the designated Monitoring and Control Stations. Monitoring at each designated Monitoring and Control Station shall be undertaken on a working day. The interval between each series (mid-ebb and mid-flood) of samplings shall not be less than 36 hours unless otherwise agreed by the Engineer's Representative or where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency will be increased.
- The values of DO, Tby and SS shall be determined at all designated Monitoring and Control Stations. Two replicate consecutive measurements of turbidity, salinity, DO, DO saturation and temperature at each depth of each station shall be taken. The monitoring probes shall be relieved out of water after the first measurement and then re-deployed for the second measurement. Where the difference in value between the first and second readings of the parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings shall be taken. Two samples for SS measurements shall be collected at the same three depths and at each designated Monitoring and Control Station. The samples shall be stored at 4°C during delivery to laboratory and before commencement of the analysis. The SS determination work shall start within 24 hours after collection of the water samples. For the purpose of evaluating the water quality, all values for Tby and SS shall be depth averaged.
- If any monitoring data exceeds the specified limits and are, in the opinion of the Engineer, indicative of a deteriorating situation, then the Engineer may direct daily monitoring at each designated Monitoring and Control Station until the recorded values of these parameters indicate to the satisfaction of the Engineer an improving

and acceptable level of water quality.

- As an audit stage, on completion of all marine works, the ET shall further measure the water quality parameters at the designated Monitoring/Control stations for four consecutive weeks, 3 days per week, at mid-flood and mid-ebb in the same manner as the impact monitoring.
- 5.7 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 are required to be submitted for the approval of the Engineer. In any circumstance, the sample testing shall have comprehensive quality assurance and quality control programmes. The laboratory shall prepare to demonstrate the programme to the Engineer or his representatives when requested.
- 5.8 The Action and Limit (AL) levels for water quality monitoring shall be formulated based on baseline monitoring. A framework of AL levels is shown in Table 5.2.
- 5.9 Water quality monitoring schedules should be submitted to the Engineer for information and/or necessary action at least 2 weeks before commencement of the respective baseline, impact and post-project monitoring works. For the selection of tide for monitoring, tidal range of less than 0.5 m should be avoided for both flood and ebb tides.

Water Quality Monitoring Stations and Equipment

- 5.10 Locations of designated Water Quality Monitoring Stations are shown in **Figure 3.1** and described in Table 5.1. Samples shall be taken at all designated Monitoring and Control Stations. In case the locations of the Monitoring and Control Stations are revised, the revised locations shall be approved by the ET.

Table 5.1 Water Quality Monitoring Locations

Monitoring Stations	Coordinates	
	Northing (m)	Easting (m)
<i>Control Station</i>		
C1	809 608.0	829 207.7
<i>Impact Stations</i>		
M1	809 544.0	829 213.0
M2	809 559.2	829 243.0

- 5.11 The following equipments will be supplied by the ET and approved by the ER.

Dissolved Oxygen and Temperature Measuring Equipment

- 5.12 The instrument for measuring dissolved oxygen and temperature will be portable and weatherproof complete with cable, sensor, comprehensive operation manuals and use DC power source. It will be capable of measuring a dissolved oxygen level in the range of 0-20 mg/L and 0-200% saturation; and a temperature of 0-45 degree Celsius.
- 5.13 It will have a membrane electrode with automatic compensation complete with a cable.

- 5.14 Sufficient stocks of spare electrodes and cables will be available for replacement where necessary (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).
- 5.15 *In situ* salinity will be measured to calibrate the DO equipment prior to each DO measurement if salinity compensation is not built-in in the DO equipment.

Turbidity Measurement Instrument

- 5.16 Turbidity will be measured *in situ* by the nephelometric method. The instrument will be portable and weatherproof using a DC power source complete with cable, sensor and comprehensive operation manuals. The equipment will be capable of measuring turbidity between 0-1000 NTU. The probe cable will not be less than 25m in length. The meter will be calibrated in order to establish the relationship between NTU units and the levels of SS.

Suspended Solids/Water Sampler

- 5.17 A water sampler, consisting of a transparent PVC or glass cylinder of a capacity of not less than two litres which can be effectively sealed with cups at both ends will be used (Kahlsico Water Sampler 13SWB203 or an approved similar instrument). The water sampler will 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.
- 5.18 Water samples for SS will be collected in high density polythene bottles, packed in ice and delivered to HOKLAS accredited laboratory for analysis as soon as possible after collection.
- 5.19 Upon arrival at the laboratory, the suspended solid shall be determined in accordance with the 2540D of Standard Methods for the Examination of Water and Wastewater (APHA, 18th edition, 1989). The detection limit shall be 1 mg/L or better. An accurate electronic balance with precision level not less than 0.1 mg (i.e. 0.0001 g) shall be used.

Positioning Device

- 5.20 A hand-held or boat-fixed type digital Global Position 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 equivalent position instrument of similar accuracy, shall be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct position before taking measurements. The DGPS should be calibrated at appropriate checkpoint (e.g. Quarry Bay Survey Nail at Easting 840683.49, Northing 816709.55) to ensure the monitoring station is at the correct position before taking measurement and water samples.

Water Depth Detector

- 5.21 A portable, battery-operated echo sounder (Seafarer 700 or a similar approved instrument) will be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the underside of the survey boat, if the same vessel is to be used throughout the monitoring programme.

Salinometer

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

pH Measuring Equipment

5.23 A portable pH meter readable to 0.1 pH in a range of 0 to 14 shall be provided to measure pH at each monitoring location.

Calibration of In Situ Instruments

5.24 All *in situ* monitoring instruments shall be checked, calibrated and certified by an approved laboratory accredited by HOKLAS before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes shall be checked within certified standard solutions before each use. Wet bulb calibration for DO meter shall be carried out before measurement at each monitoring location.

5.25 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.

Reporting of Water Quality Monitoring Data

5.26 The Contractor shall provide the results of all *in situ* Water Quality Monitoring to the Engineers in an agreed format no later than 24 hours after sampling. All other parameters shall be reported no later than 2 weeks after sampling.

5.27 Baseline monitoring report shall be submitted to EPD for review on Action and Limit levels. The ET should provide detailed analysis and interpretation on the baseline data gathered for setting Action/Limit levels for subsequent use. The Action/Limit levels will be derived as outlined in Table 5.2.

Table 5.2 Action / Limit Levels for Water Quality

Parameter (unit)	Action	Limit
DO (mg/L) (surface, middle, bottom)	<i>Surface and middle</i> 5%-ile of baseline for surface and middle layers <i>Bottom</i> 5%-ile of baseline for bottom layer	<i>Surface and middle</i> 4 mg/L or 1%-ile of baseline for surface and middle layers <i>Bottom</i> 2 mg/L or 1%-ile of baseline for bottom layer
SS (mg/L) Depth average	95%-ile of baseline data or 120% of upstream control station's SS at the same tide of the same day	99%-ile of baseline or 130% of SS readings at the upstream control station at the same tide of same day and specific sensitive receiver water quality requirements
Turbidity (NTU)	95%-ile of baseline data or 120	99%-ile of baseline or 130%

(depth average)	% of upstream control station's turbidity at the same tide of the same day	of turbidity at the upstream control station at the same tide of same day
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Notes:

- For DO, non-compliance of the water quality limit occurs when monitoring result is lower than the limit.
- For SS & turbidity non-compliance of the water quality limits occur when monitoring result is higher than the limits.
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary

- 5.28 Monthly reports should be prepared on each month during the works and submitted to the Engineer for comments. The reports should contain a summary of the activities, exceedance of AL levels, causes of exceedance and mitigation measures being taken; all monitoring data with the information indicating the sampling/measurement location, time and weather conditions; detailed description of the findings from auditing of monitoring data, exceedances and actions taken.
- 5.29 The raw data sheets of the monitoring data should be maintained properly and to be accessible when it is requested. Moreover, the monitoring data should be stored in a floppy disk with the format agreed with the Engineer. The disk should be submitted to the Engineer together with the monthly report.
- 5.30 A report should be made to the Engineer, following exceedance of the Limit level by any parameter for more than two consecutive days giving details of raw monitoring data, mitigation measures implemented so far and the proposed actions to ensure that recurrence will be prevented.

Actions on Exceedance of Action and Limit Levels

- 5.31 Where monitoring results of any water quality parameter exceed the AL levels, the actions in accordance with the Action Plan in Table 5.3 will be carried out.
- 5.32 The Contractor shall take all necessary steps to ensure that their actions are not contributing to the deterioration. These steps shall include, but not be limited to the following:
- Checking of all marine plant and equipment;
 - Maintenance or replacement of any marine plant or equipment contributing to the deterioration;
 - Checking and maintenance of silt curtains;
 - Review of all working methods; and
 - Slow down the construction rate.
- 5.33 The Engineer shall be kept informed of all steps taken; and written reports and proposals for action shall be passed to the Engineer by the Contractor whenever monitoring shows any adverse impact upon the environment.
- 5.34 After the Contractor have implemented the mitigating measures according to the Action Plan while the compliance monitoring record levels of suspended solids levels still indicate an environmentally unacceptable situation, additional mitigation measures should be recommended by the Contractor for the approval of the Engineer to rectify

the non-compliance or the construction programme shall be carefully reviewed. The Engineer can temporarily suspend the site activities until the problem is under control and an acceptable water quality is restored.

- 5.35 In case the Contractor fails to implement mitigation measures as stated in the Action Plan or the Engineer finds that the environmental impact persists despite the mitigation measures, the Engineer can direct the Contractor to slow down or suspend his work until the Engineer is convinced that the mitigation measures have restored the water quality to an acceptable level.
- 5.36 The ET shall 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 Monitoring and Audit Programme shall be reviewed and audited by the ET on a quarterly basis. The findings of this review shall be included in the quarterly EM&A summary reports, together with any recommendations to improve the performance of the Environmental Monitoring and Audit Programme.

Environmental Audit

- 5.37 As described in Section 7 of the Manual, the ET Leader is responsible for formulating an environmental site inspection, deficiency and action reporting system, and for carrying out site inspections under the EM&A programme.
- 5.38 The ET shall include the measures referred above part of their site inspections to check that the Contractor has implemented the waste management and water quality control and mitigation measures as good site practices.
- 5.39 As a precautionary good site practice measure, it is recommended that a silt curtain be installed around the working area.
- 5.40 The following good site practices are also recommended to further minimise the potential water quality impacts in order to comply with ProPECC PN 1/94:
- The holding tank should be fitted with a tight fitting seal to prevent sediment leakage; and
 - The holding tank should not be filled to a level which will cause overflow of sediment during loading and transportation.
- 5.41 The Contractor shall at all times observe and comply with the relevant statutory requirements and guidelines.

Table 5.3 Event and Action Plan for Water Quality Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1.Exceedance for one sample	1. Identify source 2. Inform ER & IEC 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily	1. Check monitoring data submitted by ET	1.Notify Contractor 2.Check monitoring data and Contractor's working methods	1.Rectify any unacceptable practice 2.Amend working methods if appropriate
2.Exceedance for two or more consecutive samples	1. Identify source 2. Inform ER & IEC 3. Repeat measurements to confirm findings 4. Increase monitoring frequency to daily 5. Discuss with ER & IEC for remedial actions required 6. If exceedance continues, arrange meeting with ER & IEC 7. If exceedance stops, cease additional monitoring	1.Checking monitoring data submitted by ET 2.Advise the ER & ET on the effectiveness of the proposed remedial measures 3.Supervise the implementation of the remedial measures	1.Confirm receipt of notification of failure in writing 2.Notify Contractor 3.Check Contractor's working methods 4.Discuss with ET, IEC and Contractor on proposed remedial actions 5.Ensure remedial actions properly implemented	1.Submit proposals for remedial actions to ER within 3 working days of notification 2.Implement the agreed proposals 3.Amend proposal if appropriate
LIMIT LEVEL				
1.Exceedance for one sample	1. Identify source 2. Inform ER & IEC and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess effectiveness of Contractor's remedial actions and keep EPD and ER & IEC informed of the results	1.Check monitoring data submitted by ET 2.Advise the ER & ET on the effectiveness of the proposed remedial measures 3.Supervise the implementation of the remedial measures	1.Confirm receipt of notification of failure in writing 2.Notify Contractor 3.Check monitoring data and Contractor's working methods 4.Discuss with ET, IEC and Contractor on proposed remedial actions 5.Ensure remedial actions properly implemented	1.Take immediate action to avoid further exceedance 2.Submit proposals for remedial actions to ER within 3 working days of notification 3.Implement the agreed proposals 4.Amend proposal if appropriate
2.Exceedance for two or more consecutive samples	1. Identify source 2. Inform ER, IEC and EPD the causes & actions taken for the exceedances 3. Repeat measurement to confirm	1.Check monitoring data submitted by ET 2.Review Contractor's remedial actions to assure their effectiveness and	1.Confirm receipt of notification of failure in writing 2.Notify Contractor 3.Carry out analysis of Contractor's	1.Take immediate action to avoid further exceedance 2.Submit proposals for remedial actions to ER within 3 working

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	findings 4. Increase monitoring frequency to daily 5. Investigate the causes of exceedance 6. Arrange meeting with & IEC and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep ER, IEC and EPD informed of the results 8. If exceedance stops, cease additional monitoring	advise the ER accordingly 3. Supervise the implementation of the remedial measures	working procedures to determine possible mitigation to be implemented 4. Discuss amongst ET, IEC and the Contractor on proposed remedial actions 5. Ensure remedial measure are properly implemented 6. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

6 ECOLOGY

Introduction

- 6.1 Based on the ecological impact assessment of the EIA report, it was identified that the Project will not result in any significant sub-tidal habitat loss and adverse impacts upon the hard coral community from pile installation are not anticipated so long as good working practices are followed.
- 6.2 While no specific mitigation measures are considered necessary, the following general control and mitigation measures are recommended for implementation by the Contractor as good site practices. The ET should check the implementation of these measures during the regular site environmental audit.

General Requirements

- 6.3 The Contractor shall minimise adverse impacts resulting from the Contractor's operations on the coral colonies. To achieve these requirements, the Contractor shall carry out the following:
- The Contractor shall ensure no overloading of the working barges during operation and shall avoid movement of the working barges, particularly close to the rubble mound seawall and shallow areas, during low tide.
 - The Contractor shall conduct an initial coral survey to ascertain the location, sizes, species and condition of the corals prior to installation of silt curtain.
 - The Contractor shall ensure the installation and decommissioning of the silt curtain will not have any physical conflict with the corals present along the adjacent boulder seawall.
 - The coral survey shall be carried out by a qualified person with relevant ecology degree and at least three years of relevant experience in such works. They may be carried out by the ET or other specialists as approved by the Engineer in agreement with the Agriculture, Fisheries and Conservation Department (AFCD). No matter which case, the Independent Environmental Checker shall check the coral survey.

Coral Monitoring Stations

- 6.4 The Contractor shall identify at least 10 closest coral colonies to the works site located on or immediately adjacent to the rubble mound seawall as impact monitoring stations. A further 10 coral colonies of similar species of that selected at impact monitoring stations as far as possible and located outside the works boundary shall be selected as control monitoring stations for monitoring during works affecting seabed. **Figure 6.1** indicates the coral-monitoring sites, with exact monitoring locations to be determined through the dive surveys.
- 6.5 Priority shall be given to tag large and undamaged corals, as these colonies are likely to be more susceptible to the impacts of sedimentation. The ET and AFCD shall agree the proposed survey method and corals to be tagged at IMS and CMS before proceeding to tag the corals.
- 6.6 All tags at Impact and Control Monitoring Stations should be removed following

completion of the final coral survey report and acceptance of the results.

Initial Coral Survey

- 6.7 The Contractor shall conduct an initial coral survey at least three weeks before commencement of marine works to ascertain the existence, types, species, size, condition and location of coral colonies, at the coral survey and mapping area as shown in **Figure 6.1**, as well as at the coral control monitoring site.
- 6.8 Information shall be recorded by observers experienced in field identification of sessile benthic taxa, swimming down current at each location using SCUBA gear.
- 6.9 The initial coral survey involves a Rapid Ecological Assessment (REA) bio-inventory survey, which shall cover the coral survey and mapping area as shown in **Figure 6.1**, as well as at the coral control monitoring site.
- 6.10 The REA involves identification of starting points by experienced observers to lay standardised transects along the identified section requiring detailed assessment. Adequate belt transects shall be surveyed to cover such identified sensitive coral sites and areas that are likely to cause direct impact on corals.
- 6.11 The exact locations and sizes of any coral colonies identified within the belt transects with respect to the position along the transect line under the REA shall be recorded.
- 6.12 Coral colonies shall be recorded to species level.
- 6.13 The size, coverage and species of the corals, health conditions, associated substratum of individual coral colonies and their translocation feasibility shall be recorded.
- 6.14 For positioning, the exact locations of the coral colonies identified in the REA bio-inventory survey shall be determined, with a portable Global Positioning System (GPS) unit or by other appropriate means, and shall be mapped on hardcopy against the general layout plan.
- 6.15 All field surveys must not cause any unnecessary stress or damage to the existing habitats or wildlife.
- 6.16 The Contractor shall submit a coral survey report with photos in both hard copy and electronic medium requirement, which has been checked by the Independent Environmental Checker, within 10 working days of completion of the coral survey. Six hard copies and one electronic copy of the coral survey report shall be submitted to the Engineer. The Contractor shall liaise with the relevant parties on the exact number of copies they want. The form and content of the report and the representation of the coral survey report shall be in a format to the satisfaction of the Engineer and AFCD. The coral survey report shall include, but not limited to, the following:
 - Mapping of the location, size and species of corals with appropriate colour code or symbol code at 1:200 and 1:500 scales;
 - Proposed location of silt curtain(s);

- Identification of affected corals if any outside proposed silt curtain(s) with photo records; and
- Mitigation measures suggested to avoid / minimise the adverse impact identified

Measures to Minimise Ecological Impacts

- 6.17 A silt curtain shall be properly installed, checked and maintained throughout the construction period to minimise water quality impacts. The indicative location of the silt curtain is displayed by **Figure 6.2**, noting it should be secured to the *vertical* seawall at both points of contact.
- 6.18 Divers with knowledge about corals should be present underwater during installation of the silt curtain to ensure no corals would be hit or enclosed.
- 6.19 Decommissioning of silt curtain shall be properly controlled to avoid sudden dispersion of large quantity of muddy waters.

Reporting of Coral Condition

- 6.20 Monthly coral survey reports should be prepared on each month during works affecting the seabed and submitted to the Engineer and AFCD for comments. The reports should contain a summary of the activities, monitoring data of the health conditions of the corals with photos, exceedance of Action and Limit (AL) levels as indicated in Table 6.1, causes of exceedance and mitigation measures being taken; time and weather conditions; detailed description of the findings from auditing of the coral survey, exceedances and actions taken.
- 6.21 Six hard copies and one electronic copy of the monthly coral report should be made to the Engineer, following exceedance of the Limit level by any parameter giving details of current coral condition, mitigation measures implemented so far and the proposed actions to ensure that recurrence will be prevented.
- 6.22 The report shall be vetted by the ET.

Frequency of Coral Survey

- 6.23 Monitoring on the tagged corals for degree of sedimentation and area of bleaching shall be conducted at the frequencies indicated below during works affecting the seabed.
- During the first two weeks of works affecting seabed: twice a week.
 - If no exceedance detected for the first 2 weeks of monitoring: once a week for the following 2 weeks.
 - If no exceedance detected for the first 4 weeks of monitoring: once every two weeks for the 2nd and 3rd months (5th to 12th weeks).
 - If no exceedance in the 3rd month of monitoring, coral monitoring shall be conducted once per month until completion of the construction works.

Final Coral Survey

- 6.24 Upon completion of all works the Contractor shall conduct a final survey to assess the health condition of the corals. The methodology of coral survey specified for initial

coral survey shall in general be applied to the final coral survey.

- 6.25 The Contractor shall submit the final coral survey reports with photos in both hard copy and electronic medium requirement, which has been checked by the Independent Environmental Checker, within 10 working days of completion of the final coral survey. Six hard copies and one electronic copy of the coral survey report shall be submitted to the Engineer. The Contractor shall liaise with the relevant parties on the exact number of copies they want. The form and content of the report and the representation of the coral survey report shall be in a format to the satisfaction of the Engineer and AFCD. The coral survey report shall include, but not limited to, the following:
- Assessment on the health condition of the corals on the rubble mound seawall
 - Assessment on the effectiveness of the mitigation measures implemented

Actions on Exceedance of Action & Limit Levels

- 6.26 Where the coral survey indicates the health conditions of the corals exceed the AL levels, the Engineer may direct more frequent monitoring to be carried out until exceedance stops.
- 6.27 The Contractor shall take all necessary steps to ensure that the actions of the Contractor are not contributing to the deterioration. These steps shall include, but not be limited to the following:
- Checking of water quality monitoring data;
 - Checking of all marine plant and equipment; maintenance or replacement of any marine plant or equipment contributing to the deterioration;
 - Checking and maintenance of silt curtains;
 - Review of all working methods; and
 - Reduced construction rate.
- 6.28 Upon action level being exceeded and after agreement from the ET and AFCD has been obtained regarding the most appropriate method for reducing the adverse impacts during works affecting the seabed, this mitigated method should then be enacted on the next working day.
- 6.29 Upon limit level being exceeded, the Contractor shall suspend all works affecting the seabed until an effective solution is identified. Once the solution has been identified and agreed with the ET and AFCD, construction works affecting seabed may recommence.
- 6.30 The Engineer and AFCD shall be kept informed of all steps taken; and written reports and proposals for action shall be passed to the Engineer and AFCD by the Contractor whenever the coral survey shows any adverse impact upon the corals.
- 6.31 After the Contractor have implemented the agreed mitigating measures, if the coral surveys indicate the coral condition is unacceptable, additional mitigation measures should be recommended by the Contractor after consulting the ET for the approval of the Engineer and AFCD to rectify the situation. The Engineer can temporarily suspend the site activities until the problem is under control and an acceptable coral condition is restored.

- 6.32 In case the Contractor fails to implement the agreed mitigation measures, the Engineer

can direct the Contractor to slow down or suspend his work until the Engineer and AFCD is convinced that the mitigation measures have restored the corals to an acceptable condition.

- 6.33 The ET shall assess the effectiveness and efficiency of the proposed mitigation measures and/or remedial actions for construction activities affecting the seabed. The performance of the Environmental Monitoring and Audit Programme shall be reviewed and audited by the ET on a quarterly basis. The findings of this review shall be included in the quarterly EM&A summary reports, together with any recommendations to improve the performance of the Environmental Monitoring and Audit Programme.

Table 6.1 Action and Limit Levels for Health of Corals

Parameters	Action	Limit
Sedimentation on the corals	15% increase in the percentage of sedimentation on the corals occurs at more than 20% of the tagged coral colonies at one or more Impact Monitoring Stations that is not reported at the Control Monitoring Station	25% increase in the percentage of sedimentation on the hard corals occurs at more than 20% of the tagged coral colonies at one or more Impact Monitoring Stations that is not reported at the Control Monitoring Station
Bleaching of corals	15% increase in the percentage of bleaching of corals occurs at more than 20% of the tagged coral colonies at one or more Impact Monitoring Stations which is not recorded at the Control Monitoring Station	25% increase in the percentage of bleaching of hard corals occurs at more than 20% of the tagged coral colonies at one or more Impact Monitoring Stations which is not recorded at the Control Monitoring Station

Environmental Audit

- 6.34 As described in *Section 7* of the Manual, the ET Leader is responsible for formulating an environmental site inspection, deficiency and action reporting system, and for carrying out site inspections under the EM&A programme.
- 6.35 The ET shall include the measures referred above and in *Section 7* as part of their site inspections to check that the Contractor has implemented all appropriate waste management and water quality control and mitigation measures. These measures shall apply to the control of both water quality and sub-tidal and inter-tidal life around the helipad site.
- 6.36 As a precautionary good site practice measure, it is recommended that a silt curtain be installed around the working area.
- 6.37 In addition to the good site practices recommended to further minimise the potential water quality impacts the following measures are also recommended to be implemented to reduce impacts on the sub-tidal ecology:
- Particular care should be taken when demolishing the existing concrete planter to ensure no waste enters the water column;
 - Particular care should be taken when decommissioning the silt curtain to avoid sudden dispersion of muddy water which may cause adverse impact to the nearby marine life; and
 - Materials storage areas should be located well away from the seawall, and any such areas should be covered during the works.

- 6.38 The measures outlined in the relevant statutory requirements and guidelines should also be observed and complied with.

7 SITE ENVIRONMENTAL AUDIT

Site Surveillance

- 7.1 Site surveillance provides a direct means to trigger and enforce the specified environmental protection and pollution control measures are in compliance with the contract specifications. They shall be undertaken regularly and routinely by ET to inspect the activities at the works site in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented by the Contractor in accordance with the EM&A recommendations. With well-defined pollution control and mitigation specifications and a well-established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the site.
- 7.2 The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspections under the EM&A works. He shall prepare and submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER and IEC for approval.
- 7.3 The ET shall conduct a site inspection at least once per week during helipad construction. The areas of inspection shall include, but are not limited to, the environmental situation, and pollution control and mitigation measures within the site. It should also review the environmental situation outside the site area that is likely to be affected, directly or indirectly, by the site activities. The ET Leader shall make reference to the following information in conducting the inspection:
- The EIA recommendations on environmental protection and pollution control mitigation measures with regard to air quality, noise, waste management, water quality, and ecological impacts;
 - On-going results of the EM&A programme;
 - Works progress and programme;
 - Individual works methodology proposals (which shall include proposals on associated pollution control measures);
 - The contract specifications on environmental protection and pollution prevention;
 - The relevant environmental protection and pollution control laws, ProPECC Notes; and
 - Previous site inspection results.
- 7.4 The Contractor shall update with the ET on all relevant information of the contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor in a site inspection proforma within 24 hours, for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET to report on any remedial measures subsequent to the site inspections.
- 7.5 The ET shall conduct *ad hoc* site inspections if significant environmental problems are identified. The IEC shall also conduct independent site audits. Inspections may also

be required subsequent to receipt of any environmental complaints, or as part of the investigation work, as specified in the Event/Action Plan for environmental monitoring and audit.

Compliance with Legal and Contractual Requirements

- 7.6 There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong, with which the activities associated with the construction of the helipad shall comply.
- 7.7 The ET shall review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.
- 7.8 The Contractor shall regularly copy relevant documents to the ET so that the checking work can be carried out. The documents shall at least include the updated Work Progress Reports, the updated Works Programme, application letters for different license/permits under the environmental protection laws, and all valid licence(s)/permit(s). The site diary shall also be available for the ET's inspection upon his request.
- 7.9 After reviewing the document, the ET shall advise the ER and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractor and the ER accordingly. The review shall be copied to IEC for any follow-up action.
- 7.10 Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ER shall check that the Contractor has taken appropriate action in order that the environmental protection and pollution control requirements are fulfilled.

Environmental Complaints

- 7.11 Complaints reviewed on environmental issues shall be referred to the ET Leader for carrying out complaint investigation procedures. Upon receipt of complaints the ET shall undertake the tasks outlined in the following points.
- Log complaint and date of receipt onto the complaint database and inform the IEC immediately;
 - Investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
 - If a complaint is valid and due to works, identify mitigation measures in consultations with the IEC;
 - If mitigation measures are required, advise the Contractor accordingly;
 - Review the Contractor's implementation of the identified mitigation measures, and the concurrent situation;

- If the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;
 - Undertake additional monitoring and audit to verify the complaint if necessary, and ensure that any valid reason for complaint does not recur through proposed amendments to work methods, procedures, machines and/or equipment, etc;
 - Report the investigation results and the subsequent actions to the source of complaint. (If the source of complaint is identified through EPD, the results should be reported within the time frame assigned by EPD); and
 - Log a record on the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.
- 7.12 The ER shall immediately notify the Contractor, ER, Project Proponent and EPD (Local Control Office) of any complaints received and keep him well informed of the actions being taken to settle these complaints.
- 7.13 During the complaint investigation work, the Contractor and ER shall co-operate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified to be required in the investigation in consultation with the IEC, the Contractor shall promptly carry out the measures. The ER shall ensure that the Contractor has implemented the mitigation measures.
- 7.14 A flow chart of the complaint response procedures is shown in **Figure 7.1**. A sample of complaint log sheet is provided in **Appendix F**.

Documentation

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

8 REPORTING

General

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

Baseline Monitoring Report

8.2 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 each of the four parties: the Contractor, the IEC, the ER and EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies needed.

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

- Up to half a page executive summary;
- Brief project background information;
- drawings showing locations of the baseline monitoring stations;
- monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth); and
 - monitoring date, time, frequency and duration;
- details on 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 the results.
- determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data, the analysis will conclude if there is any significant different between control and impact stations for the parameters monitored;
- revisions for inclusion in the EM&A Manual, and
- comments and conclusions.

8.4 It is necessary to characterise the deployment site in respect of the local hydrodynamic regime, water depth and bottom sediment types prior to the deployment of the silt curtain. Findings from the site investigation for determining the deployment configuration and anchor points of the silt curtain shall also be included in the Baseline Monitoring Report.

EM&A Reports

- 8.5 The results and findings of all EM&A work required in the Manual shall be presented in a monthly EM&A report that shall be prepared by the ET Leader. The EM&A report shall be endorsed by IEC, and then submitted to EPD within 10 working days of the end of each reporting month. The first report is due in the month after the establishment phase commences. A maximum of 4 copies of each monthly EM&A report shall be submitted to each of the four parties: the Contractor, the IEC, the ER and EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium required.
- 8.6 The ET Leader shall review the number and location of monitoring stations and parameters to be monitored every 6 months or on a needed basis in order to cater for the changes in surrounding environment and nature works in progress.
- 8.7 The condition of the silt curtain shall be checked and reported in all monthly EM&A reports to ensure its proper functioning in respect of retaining silt dispersion during the marine works.

First Monthly EM&A Report

- 8.8 The first monthly EM&A report shall include at least the following:
- Executive Summary (1-2 pages);
 - Breaches of Action Limit levels;
 - Complaint Log;
 - Notifications of any summons and successful prosecutions;
 - Reporting Changes; and
 - Future key issues.
 - Basic Project Information
 - Project organisation including key personnel contact names and telephone numbers;
 - Programme with fine tuning of activities showing the inter-relationship with environmental protection/mitigation measures for the month;
 - Management structure; and
 - Work undertaken during the month.
 - Environmental Status
 - Works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates, etc.); and
 - Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
 - Summary of EM&A requirements including:
 - All monitoring parameters;
 - Environmental quality performance limits (Action Limit levels);
 - Event/Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA study final report;
 - Environmental requirements in contract documents;
 - Implementation Status
 - Advice on the implementation status of environmental protection and pollution

- control/mitigation measures as recommended in the project EIA study report, summarised in the updated implementation schedule.
- Monitoring Results (in both hard and electronic copies) together with the following information;
 - Monitoring methodology;
 - Types of equipment used and calibration details;
 - Parameters monitored;
 - Monitoring locations;
 - Monitoring date, time, frequency, and duration;
 - Weather conditions during the period;
 - Graphical plots of the monitored parameters in the month annotated against;
 - a) Major activities being carried out on site during the period;
 - b) Weather conditions that may affect the results; and
 - c) Any other factors which might affect the monitoring results;
 - QA/QC results and detection limits;
 - Waste generation and disposal records;
 - All monitoring results should be tabulated with exceedances highlighted for ease of reference; and
 - Compare/contrast and assess the EM&A data with the EIA predictions and provide discussion for any discrepancies.
 - Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
 - Compliance status with the EP under the EIAO and any EP submissions;
 - Record of all non-compliance (exceedances) of the environmental quality performance limits (Action Limit levels);
 - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, result and summary;
 - Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
 - Comments, Recommendations and Conclusions
 - An account of the future key issues reviewed from the works programme and work method statements;
 - Advice on the solid and liquid waste management status; and
 - Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarising the EM&A of the period.

Subsequent Monthly EM&A Reports

8.9 The subsequent monthly EM&A reports shall including the following:

- Executive Summary (1-2 pages)
 - Breaches of Action Limit levels;
 - Complaint log;
 - Notifications of any summons and successful prosecutions;
 - Reporting changes;
 - Future key issues.
- Environmental Status
 - Programme with fine tuning of activities showing the inter-relationship with environmental protection/mitigation measures for the month;
 - Work undertaken during the month with illustrations included (such as location of works, daily, dredging/filling rates, etc); and
 - Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- Monitoring Results to provide monitoring results (in both hard and electronic copies) together with the following information.
 - Monitoring methodology;
 - Types of equipment used and calibration details;
 - Parameters monitored;
 - Monitoring locations;
 - Monitoring date, time, frequency, and duration;
 - Weather conditions during the period;
 - Graphical plots of the monitored parameters in the month annotated against;
 - a) Major activities being carried out on site during the period;
 - b) Weather conditions that may affect the results; and
 - c) Any other factors which might affect the monitoring results;
 - QA/QC results and detection limits;
 - Waste generation and disposal records;
 - All monitoring results should be tabulated with exceedances highlighted for ease of reference; and
 - Compare/contrast and assess the EM&A data with the EIA predictions and provide discussion for any discrepancies.
- Implementation Status
 - Advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report, summarised in the updated implementation schedule.
- Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
 - Compliance status with the EP under the EIAO and any EP submissions;
 - Record of all non-compliance (exceedances) of the environmental quality performance limits (Action Limit levels);
 - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation, including

- locations and nature of the breaches, investigation, follow-up actions taken, result and summary;
- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- Comments, Recommendations and Conclusions
 - An account of the future key issues reviewed from the works programme and work method statements;
 - Advice on the solid and liquid waste management status; and
 - Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarising the EM&A of the period.
- Appendix
 - Action Limit Levels;
 - Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - a) Major activities being carried out on Site during the periods;
 - b) Weather conditions during the period; and
 - c) Any other factors which might affect the monitoring results
- Monitoring schedule for the present and next reporting period;
- Cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- Outstanding issues and deficiencies.

Quarterly EM&A Summary Reports

- 8.10 The quarterly EM&A summary report, which should generally be around 5 pages (including about 3 of text and tables and 2 of figures), should contain at least the following listed information. Apart from these, the first quarterly summary report should also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.
- Up to half a page executive summary;
 - Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
 - A brief summary of EM&A requirements including:
 - Monitoring parameters;
 - Environmental quality performance limits (Action Limit levels); and
 - Environmental mitigation measures, as recommended in the project EIA study final report;
 - Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule, including waste generation and disposal records;

- Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - Compliance status with the EP under the EIAO and any EP submissions;
 - Graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
 - The major activities being carried out on site during the period;
 - Weather conditions during the period; and
 - Any other factors that might affect the monitoring results.
 - Compare/contrast and assess the EM&A data with the EIA predictions and provide discussion for any discrepancies;
 - Comments, Recommendations and Conclusions
 - Advice on the solid and liquid waste management status;
 - A summary of non-compliance (exceedances) of the environmental quality performance limits (Action Limit levels);
 - A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
 - A summary description of the action taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
 - A summary record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation, locations and nature of the breaches, investigation, follow-up actions taken and results; and
 - Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter.
- 8.11 Apart from the above, the first quarterly summary report should also confirm that the monitoring works are proven to be effective, and the monitoring works are generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

Final EM&A Summary Report

- 8.12 Timing for completion of the EM&A Programme shall be confirmed by ER in liaison with the IEC. Impact monitoring shall continue until the completion of all construction works as approved by the ER.
- 8.13 The final EM&A summary report shall include the following:
- An executive summary;
 - Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the entire construction phase, including baseline phase activities, of the works;
 - A brief summary of EM&A requirements including:
 - Monitoring parameters;
 - Environmental quality performance limits (Action Limit levels); and
 - Environmental mitigation measures, as recommended in the project EIA study final report.

- Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation status proformas, including waste generation and disposal records;;
- Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- Compliance status with the EP under the EIAO and any EP submissions;
- Graphical plots of the trends of monitored parameters over the period of construction (of the helipad) for representative monitoring stations annotated against;
 - The major activities being carried out on site during the period;
 - Weather conditions during the period;
 - Any other factors which might affect the monitoring results; and
 - The return of ambient environmental conditions in comparison with baseline data.
- Compare/contrast and assess the EM&A data with the EIA predictions and provide discussion for any discrepancies;
- Provide clear-cut decisions on the environmental acceptability of the Project with reference to the specific impact hypothesis;
- Advice on the solid and liquid waste management status;
- Comments, Recommendations and Conclusions
 - A summary of non-compliance (exceedances) of the environmental quality performance limits (Action Limit levels);
 - A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
 - A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
 - Review the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
 - A summary record of all notification of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation, locations and nature of the breaches, investigation, follow-up actions taken and results;
 - 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
 - A conclusion to state the return of ambient and/or the predicted scenario as per EIA findings.

8.14 Upon its decommissioning, the condition of the silt curtain and its overall effectiveness in retaining silt dispersion during the marine works shall also be reported in the Final EM&A summary report.

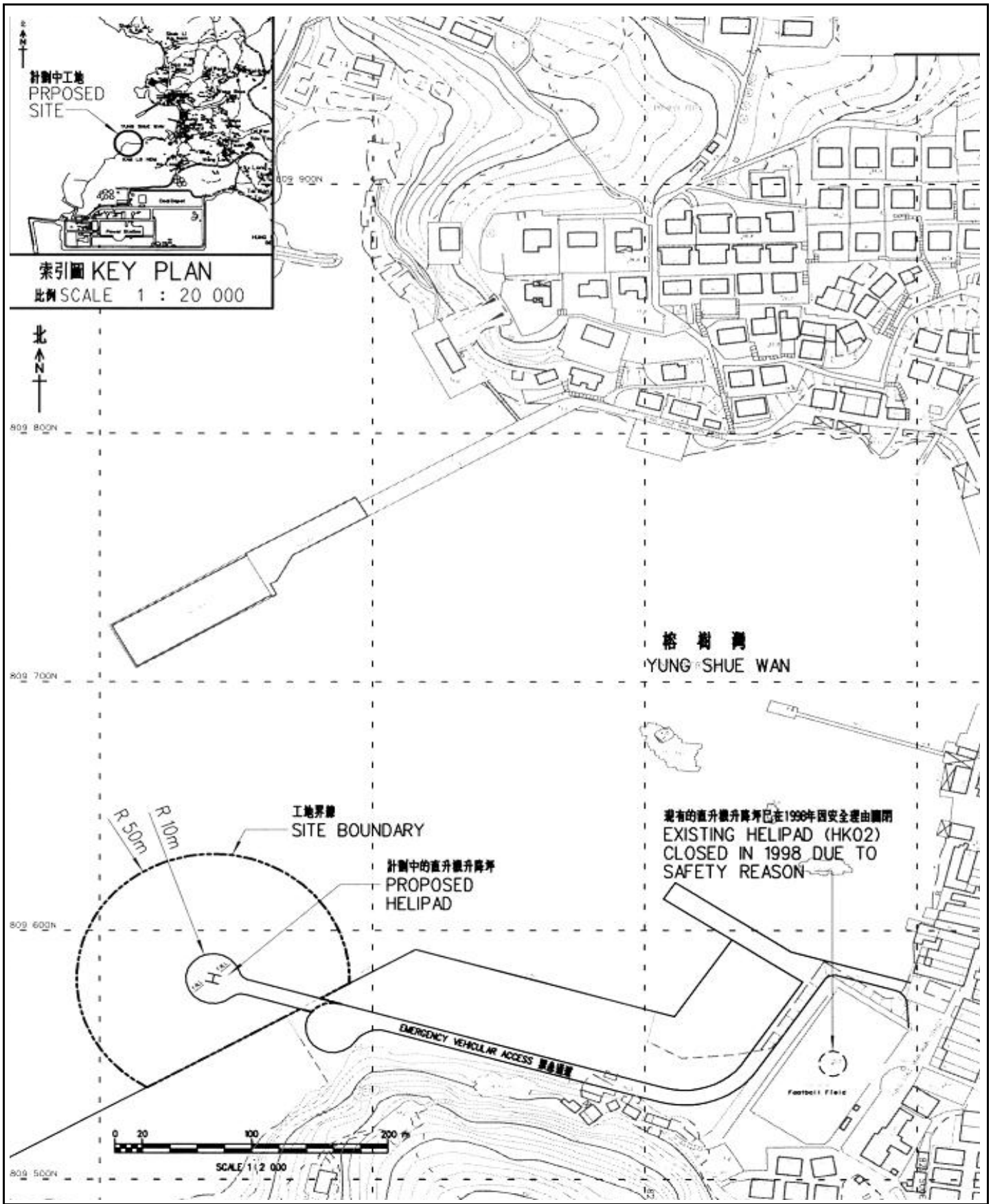
Data Keeping

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

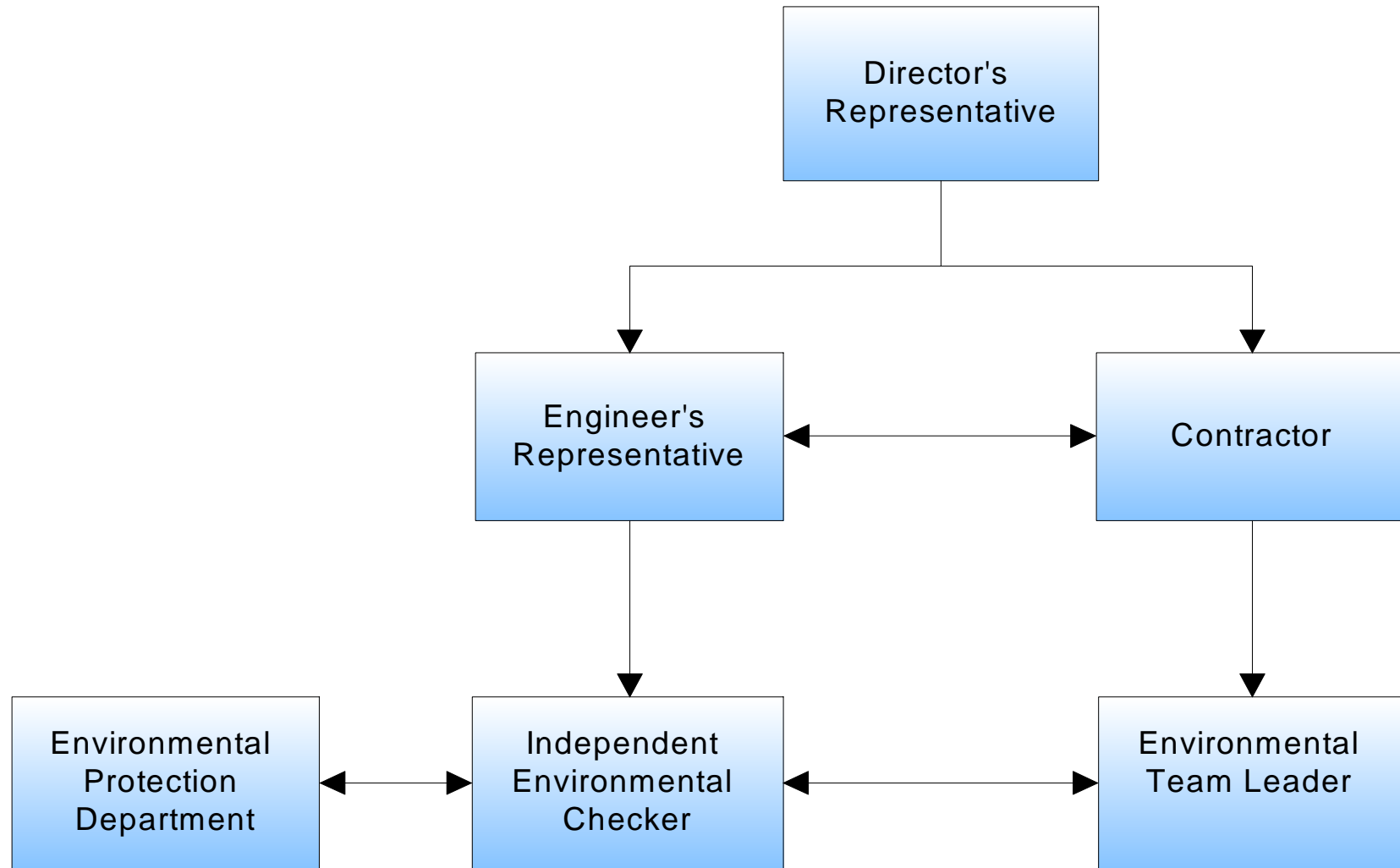
Interim Notifications of Environmental Quality Limit Exceedances

- 8.16 With reference to Event/Action Plans in previous sections, when the environmental quality limits are exceeded, the ET shall immediately notify the IEC, ER and EPD, as appropriate. The notification shall be followed up with advice to EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in **Appendix E**.

FIGURES



Title Contract No. CV/2004/03 Maintenance and Repairs to Franchised and Licensed Ferry Piers (2005 – 2008) Construction of Yung Shue Wan Helipad – Works Order No. YSWH/01/03 Site Layout Plan	Scale N.T.S	Project No. MA7018	CINOTECH
	Date Jul 07	Figure 1.1	

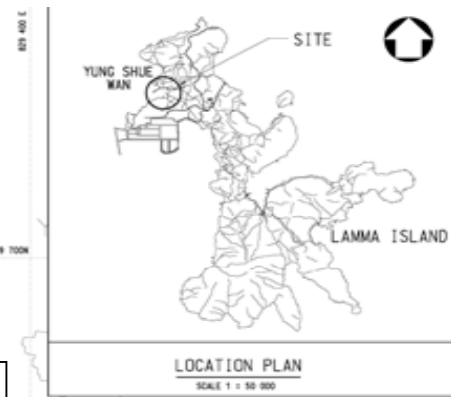


Title Contract No. CV/2004/03
 Maintenance and Repairs to Franchised and Licensed Ferry Piers (2005 – 2008)
 Construction of Yung Shue Wan Helipad – Works Order No. YSWH/01/03

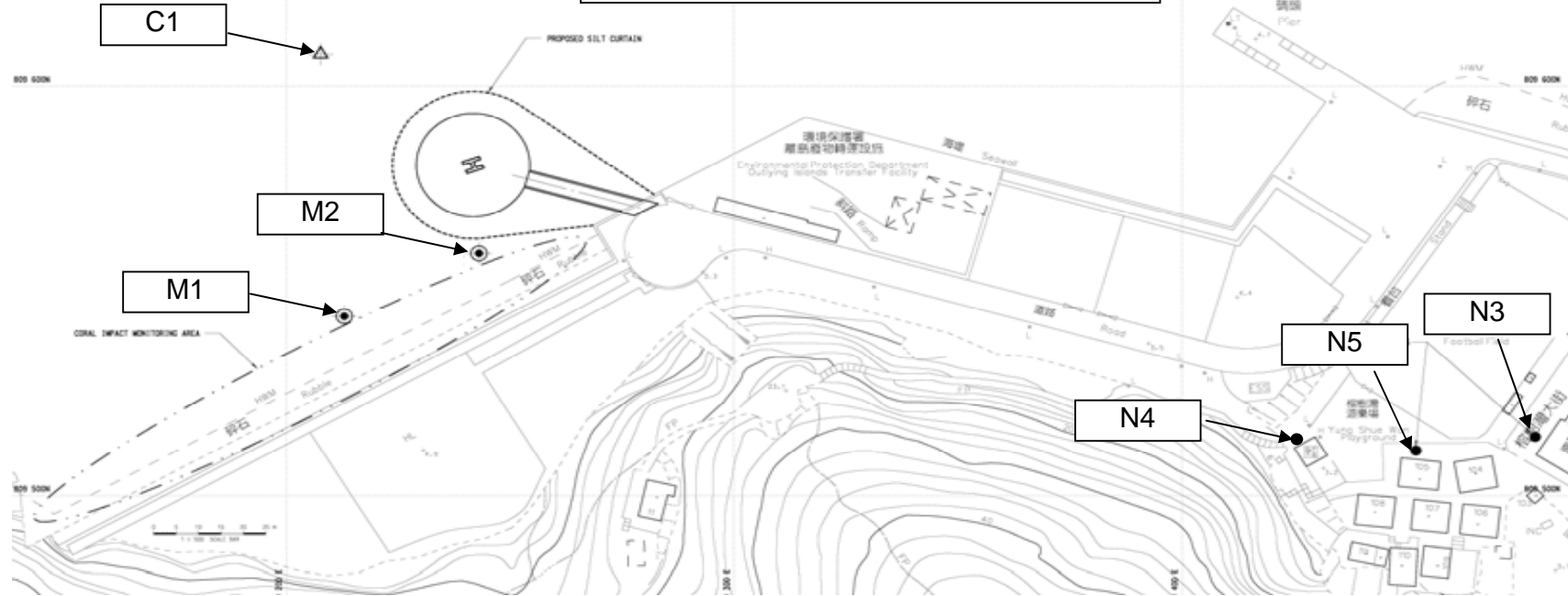
Project Organization Chart

Scale	N.T.S	Propos No.	MA7018
Date	Jul 07	Figure	1.2





Water Quality Monitoring Stations
 - C1, M1 & M2
Noise Monitoring Stations (Baseline)
 - N3 & N4
Noise Monitoring Stations (Impact)
 - N3 & N5

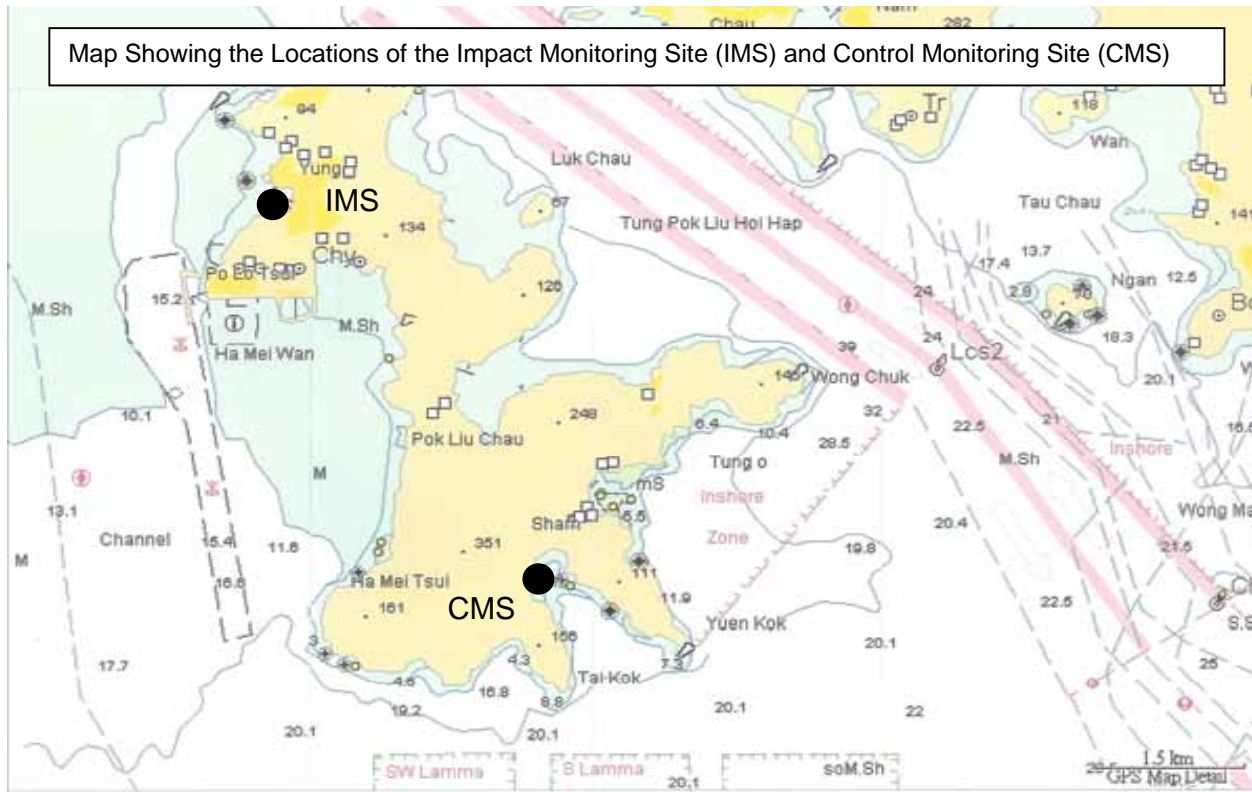


Title Contract No. CV/2004/03
 Maintenance and Repairs to Franchised and Licensed Ferry Piers (2005 – 2008)
 Construction of Yung Shue Wan Helipad – Works Order No. YSWH/01/03
 Location of Noise and Water Quality Monitoring Stations

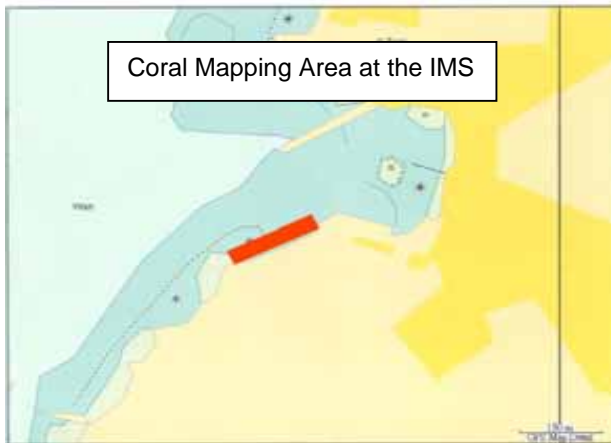
Scale	N.T.S	Project No.	MA7018
Date	Aug-07	Figure	3.1



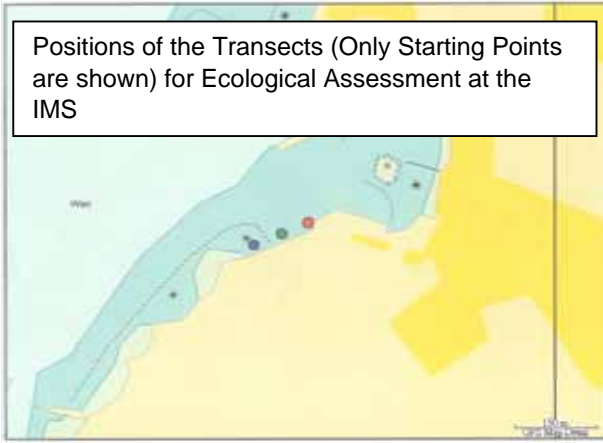
Map Showing the Locations of the Impact Monitoring Site (IMS) and Control Monitoring Site (CMS)



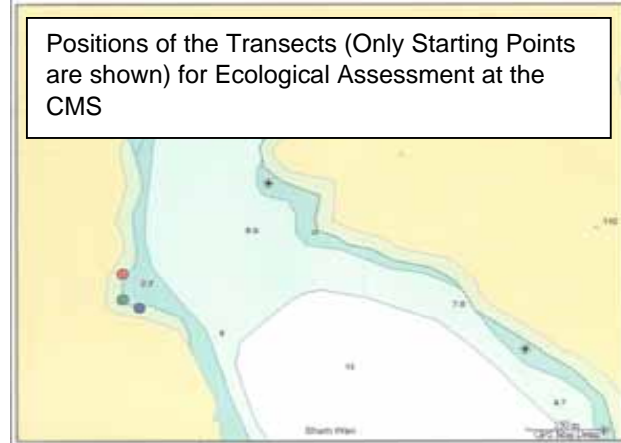
Coral Mapping Area at the IMS



Positions of the Transects (Only Starting Points are shown) for Ecological Assessment at the IMS



Positions of the Transects (Only Starting Points are shown) for Ecological Assessment at the CMS

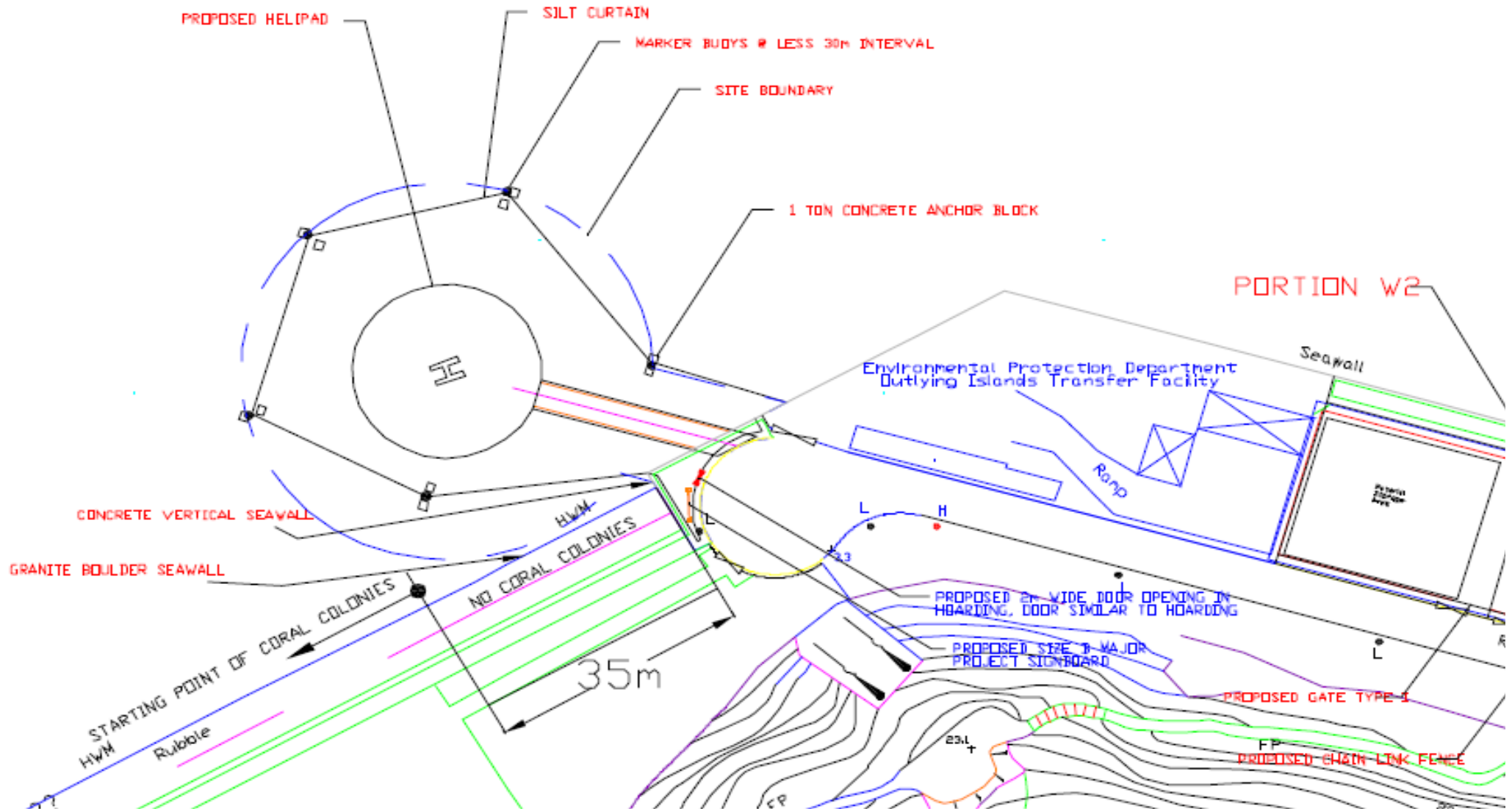


Title
 Contract No. CV/2004/03
 Maintenance and Repairs to Franchised and Licensed Ferry Piers (2005 – 2008)
 Construction of Yung Shue Wan Helipad – Works Order No. YSWH/01/03

Locations of the Impact Monitoring Site (IMS) & Control Monitoring Site (CMS) for Coral Survey

Scale	N.T.S	Project No.	MA7018
Date	Aug-07	Figure	6.1

CINOTECH

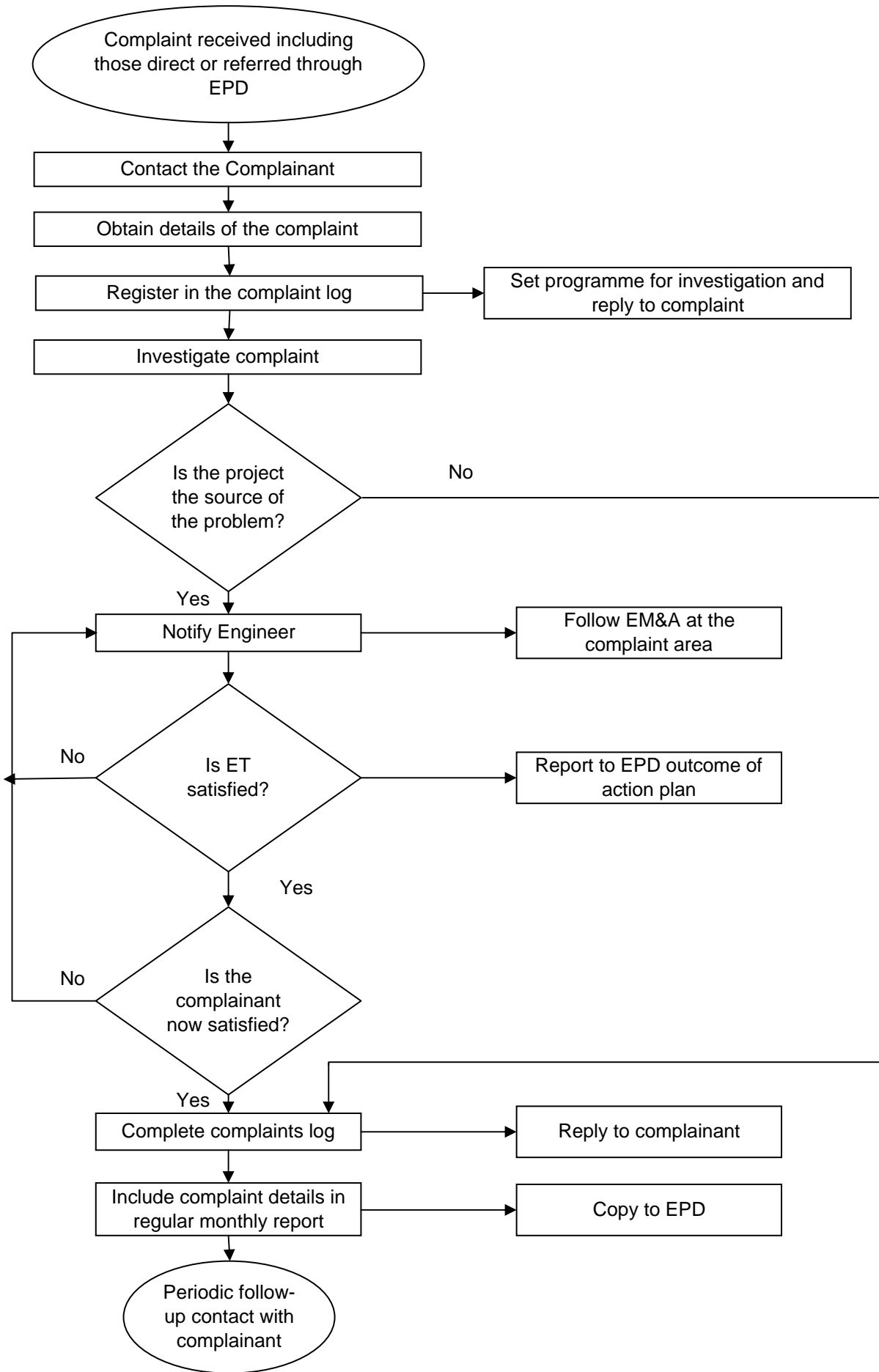


Title Contract No. CV/2004/03
 Maintenance and Repairs to Franchised and Licensed Ferry Piers (2005 – 2008)
 Construction of Yung Shue Wan Helipad – Works Order No. YSWH/01/03

Location of Silt Curtain

Scale	N.T.S	Project No.	MA7018
Date	Aug-07	Figure	6.2

CINOTECH



Title Contract No. CV/2004/03
 Maintenance and Repairs to Franchised and Licensed Ferry Piers (2005 – 2008)
 Construction of Yung Shue Wan Helipad – Works Order No. YSWH/01/03
 Flow Chart of the Complaint Response Procedures

Scale	N.T.S	Project No.	MA7018
Date	Jul 07	Figure	7.1



**APPENDIX A
IMPLEMENTATION SCHEDULE OF
RECOMMENDED MITIGATION
MEASURES**

Appendix A - Implementation Schedule of Recommended Mitigation Measures – Construction of Yung Shue Wan Helipad*Air Quality Mitigation Measures*

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.3.5.1	S.2.5	All the dust control measures as recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, should be implemented.	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	Typical dust control measures include: <ul style="list-style-type: none"> Restricting heights from which materials are dropped, as far as practicable to minimise the fugitive dust arising from unloading / loading. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> All stockpiles of excavated materials or spoil of more than 50 m³ should be enclosed, covered or dampened during dry or windy conditions. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> Effective water sprays should be used to control potential dust emission sources such as unpaved haul roads and active construction areas. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.3.5.1	S.2.4	<ul style="list-style-type: none"> All spraying of materials and surfaces should avoid excessive water usage. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> Vehicles that have the potential to create dust while transporting materials should be covered, with the cover properly secured and extended over the edges of the side and tail boards. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> Materials should be dampened, if necessary, before transportation. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> Travelling speeds should be controlled to reduce traffic induced dust dispersion and re-suspension from the operating haul trucks. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> Vehicle washing facilities will be provided to minimise the quantity of material deposited on public roads. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust)

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
						Regulation
S.3.5.1	S.2.4	<ul style="list-style-type: none"> Erection of hoarding not less than 2.4m high from ground level along the site boundary. 	Air Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	EIAO-TM, Air Pollution Control (Construction Dust) Regulation

Noise Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
-	S.3.29	Use of silenced plant, or plant equipped with mufflers or dampers in substitute of ordinary plant.	Noise During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period.	Annex 5 of EIAO-TM
-	S.3.29	Movable noise barriers positioned as close as possible to PMEs such that none of the PMEs will be visible when viewed from any noise sensitive façades.	Noise During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period.	Annex 5 of EIAO-TM
S.4.5.7	S.3.29	Adopt good working practices in order to minimise construction noise as far as possible: <ul style="list-style-type: none"> Noisy equipment and noisy activities should be located as far away from the NSRs as is practical. 	Noise control during construction	Contractors	At all construction work sites, throughout the whole duration of the construction period.	Annex 5 of EIAO-TM
S.4.5.7	S.3.29	<ul style="list-style-type: none"> Unused equipment should be turned off. 	Noise control during construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Annex 5 of EIAO-TM
S.4.5.7	S.3.29	<ul style="list-style-type: none"> Number of powered mechanical equipment (PME) should be kept to minimum and the parallel use of noisy equipment / machinery should be 	Noise control during construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Annex 5 of EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		avoided.				
S.4.5.7	S.3.29	<ul style="list-style-type: none"> Regular maintenance of all plant and equipment. 	Noise control during construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Annex 5 of EIAO-TM
S.4.5.7	S.3.30	<ul style="list-style-type: none"> Observe and comply with the statutory requirements and guidelines. 	Noise control during construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Annex 5 of EIAO-TM
S.4.6.33	-	<ul style="list-style-type: none"> Use of quieter helicopter type EC155 B1 in priority. 	Noise control during operation	GFS	At all time during operations	-
S.4.6.34	-	<ul style="list-style-type: none"> Reduce the angle of the helicopter flight path from the standard 150 degrees to 80 degrees for the 'EC155 B1' and to 70 degrees for the 'Super Puma AS332 L2' helicopter 	Noise control during operation	GFS	At all time during operations	-
S.1.2.3	-	<ul style="list-style-type: none"> The helipad will be solely for emergency use. 	Noise control during operation	GFS/HAD	At all time during operations	-

Waste Management Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.5.8.1	S.4.2	Ensure that proper handling, storage, transportation and disposal of materials is implemented at the outset and throughout the construction phase of the helipad.	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period.	Annex 7 of EIAO-TM
S.5.8.1	S.4.4	In line with Government's position on waste minimization, the practice of avoiding and minimizing waste generation and waste recycling should be adopted as far as practicable.	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period.	Annex 7 of EIAO-TM
S.5.8.2	-	Recommended mitigation measures to be implemented include: <ul style="list-style-type: none"> An on-site environmental co-ordinator should be identified at the outset of the works. The co-ordinator shall prepare a Waste Management Plan. 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Environmental, Transport and Works Bureau Technical Circular (ETWBTC) No. 15/2003
S.5.8.2	S.4.4	<ul style="list-style-type: none"> Spoil generated from the piling activities will need to be properly handled to minimize contamination to the marine water and any exposed ground areas due to leakage or improper storage (i.e. onto bare ground instead of into tanks). 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Environment, Transport and Works Bureau Technical Circular (Works) (ETWBTCW) No. 34/2002

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.5.8.2	S.4.4	<ul style="list-style-type: none"> The reuse/recycling of all materials on site shall be investigated prior to treatment/disposal off site. 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	ETWBTCW No. 33/2002, ETWBTC No. 15/2003
S.5.8.2	S.4.4	<ul style="list-style-type: none"> Good site practices shall be adopted from the commencement of works to avoid the generation of waste and to promote waste minimization practices. 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	ETWBTCW No. 33/2002
S.5.8.2	S.4.4	<ul style="list-style-type: none"> All waste materials shall be sorted on site into inert and non-inert C&D materials, and where the materials will be recycled or reused, these shall be further segregated. The Contractor shall be responsible for identifying which materials can be recycled/reused, whether on site or off site. In the event of the latter, the Contractor shall make arrangements for the collection of the recyclable materials. Any remaining non-inert waste shall be collected and disposed of to the refuse transfer station whilst any non-inert C&D material shall be re-used on site as far as possible. If no use of the material can be found on site, the inert C&D material can be delivered to a public filling area, 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	ETWBTCW No. 33/2002, ETWBTCW No. 34/2002

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		public barging point or public stockpile area after obtaining the appropriate licence.				
S.5.8.2	S.4.4	<ul style="list-style-type: none"> A trip ticket system should be established at the outset of the construction of the helipad to monitor the disposal of C&D and solid wastes from the site to public filling facilities and landfills. 	Monitor the disposal of C&D and solid wastes from the site	Contractors	At the outset of the construction of the helipad	ETWBTC (W) No.31/2004
S.5.8.2	S.4.4	<ul style="list-style-type: none"> The Contractor shall register with EPD as a Chemical Waste Producer if there is any use of chemicals on site including lubricants, paints, diesel fuel, etc. Only licensed chemical waste collectors shall be employed to collect any chemical waste generated at site. The handling, storage, transportation and disposal of chemical wastes shall be conducted in accordance with the relevant guidelines as published by Government. 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, Guide to the Chemical Waste Control Scheme
S.5.8.2	S.4.4	<ul style="list-style-type: none"> A sufficient number of covered bins shall be provided on site for the containment of general refuse to prevent visual impacts and nuisance to sensitive receivers. These bins shall be cleared daily and the collected waste disposed of to the 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	ETWBTCW No. 6/2002A, ETWBTC No. 15/2003

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		refuse transfer station. Further to the issue of Environment, Transport and Works Bureau Technical Circular (Works) No. 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness, the Contractor is required to maintain a clean and hygienic site throughout the Project works.				
S.5.8.2	S.4.4	<ul style="list-style-type: none"> All chemical toilets shall be regularly cleaned and the nightsoil collected and transported by a licensed contractor to a Government Sewage Treatment Works facility for disposal. 	Waste Management During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	ETWBTCW No. 6/2002A, ETWBTC No. 15/2003
S.5.8.2	S.4.4	<ul style="list-style-type: none"> Tool box talks shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling. 	Waste Management During Construction	Contractors	Throughout construction period	ETWBTCW No. 15/2003
S.5.8.3	S.4.5	Contractor shall comply with all relevant statutory requirements and guidelines and their updated versions.	Waste Management During Construction	Contractors	Throughout construction period	EIAO - TM
S.2.2.33	-	The helipad shall be constructed by using small diameter pre-bored piling instead of dredging and reclamation.	Construction method	Contractors	At all construction work sites, throughout construction period	-
S.5.6.30	-	The helipad will only be used for emergency purposes. No equipment will be placed on the landing pad or along	Operation	GFS/HAD	At all time during operations	-

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		the EVA. Helicopters will not be parked at the landing pad and all repair and maintenance works (on the helicopters) will be conducted off site. As such the only source of waste generation during the operation of the helipad is anticipated to be from the long-term maintenance of the pad.				

Water Quality Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.6.7.2	S.5.39	Silt curtain to be installed surrounding the whole of the piling site.	Water Quality During Construction	Contractors	Around the whole works area , prior to commencement of the piling works.	Water Pollution Control Ordinance (Cap. 358), Water Quality Objectives for Southern WCZ if direct discharge to sea is adopted.
S.6.7.3	S.5.40	The following good site practices are recommended: <ul style="list-style-type: none"> The holding tank should be fitted with a tight fitting seal to prevent sediment leakage. 	Water Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period.	Not applicable (good practice only)
S.6.7.3	-	<ul style="list-style-type: none"> Ensure that excavator grab seal is tightly closed and the hoist speed is suitably low. 	Water Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Not applicable (good practice only)
S.6.7.3	S.5.40	<ul style="list-style-type: none"> The holding tank should not be filled to a level which will cause overflow of sediment during loading and transportation. 	Water Quality During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	Not applicable (good practice only)
S.6.7.3	-	<ul style="list-style-type: none"> Large objects should be removed from the excavator grab to avoid sediment spills. 	Water Quality During Construction	Contractors	At all construction work sites, throughout the whole duration	Not applicable

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
					of the construction period	(good practice only)
S.2.2.33	-	<ul style="list-style-type: none"> The helipad shall be constructed by using small diameter pre-bored piling instead of dredging and reclamation. 	Construction method	Contractors	At all construction work sites, throughout construction period	-

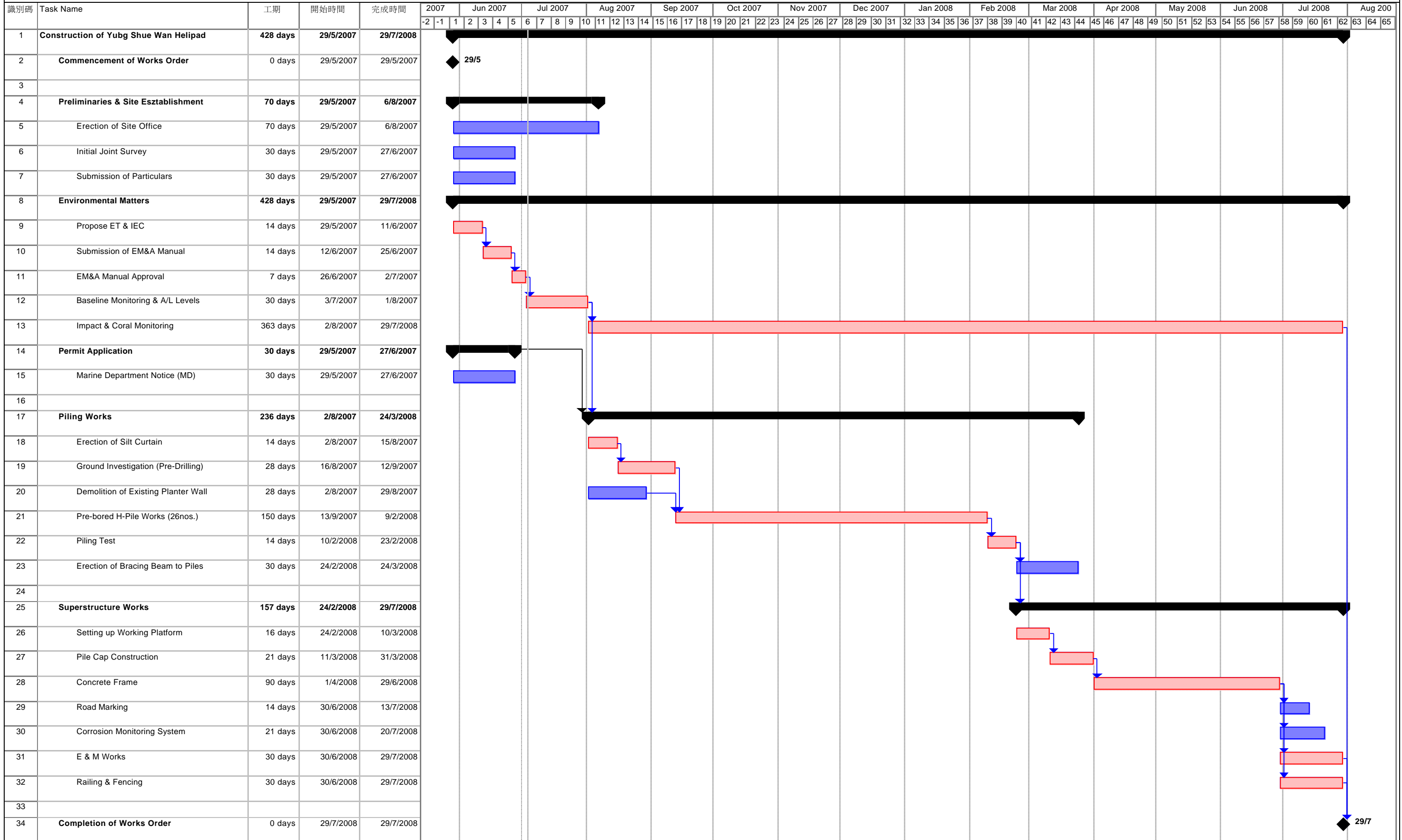
Ecology Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.7.6.1	S.6.36	Sub-tidal Ecology Silt curtain to be installed surrounding the whole of the piling site.	Ecology During Construction	Contractors	Around the whole works area prior to commencement of the piling works.	Animals & Plants Ordinance (Protection of Endangered Species) (Cap. 187)
S.7.6.2	S.6.37	Good practice measures to control water quality-induced ecological impacts: <ul style="list-style-type: none"> Particular care should be taken when demolishing the existing concrete planter to ensure no waste enters the water column. 	Ecology During Construction	Contractors	At the existing concrete planter, throughout the whole duration of the construction period.	Not applicable (good practice only)
S.7.6.2	S.6.37	<ul style="list-style-type: none"> Particular care should be taken when decommissioning the silt curtain to avoid sudden dispersion of muddy water which may cause adverse impact to the nearby marine life; 	Ecology During Construction	Contractors	Along the western side of the Project boundary, on the completion of piling.	Not applicable (good practice only)
S.7.6.2	S.6.37	<ul style="list-style-type: none"> Materials storage areas should be located well away from the seawall, and any such areas should be covered during the works. 	Ecology During Construction	Contractors	At all construction work sites, throughout the whole duration of the construction period	ProPECC Note PN 1/94 on <i>Construction Site Drainage</i>
S.7.6.2	S.5.40	<ul style="list-style-type: none"> The holding tank for sediment excavated from within 	Ecology During	Contractors	At the piling areas, throughout	Not applicable

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		the pile casing should be fitted with a tight fitting seal to prevent leakage.	Construction		the whole duration of the piling period	(good practice only)
S.7.6.2	-	<ul style="list-style-type: none"> Ensure that excavator seal is tightly closed and the hoist speed is suitably low. 	Ecology During Construction	Contractors	At the marine areas, throughout the whole duration of the construction period	Not applicable (good practice only)
S.7.6.2	S.5.40	<ul style="list-style-type: none"> The holding tank should not be filled to a level that will cause overflow of sediment during loading and transportation. 	Ecology During Construction	Contractors	At the marine areas, throughout the whole duration of the construction period	Not applicable (good practice only)
S.7.6.2	-	<ul style="list-style-type: none"> Large objects should be removed from the excavator grab to avoid sediment spills. 	Ecology During Construction	Contractors	At all construction work areas, throughout the whole duration of the construction period	Not applicable (good practice only)
S.2.2.33	-	<ul style="list-style-type: none"> The helipad shall be constructed by using small diameter pre-bored piling instead of dredging and reclamation. 	Construction method	Contractors	At all construction work sites, throughout construction period	-

APPENDIX B
CONSTRUCTION PROGRAMME

Works Order No. YSWH/01/03
 Programme of Yung Shue Wan Helipad



**APPENDIX C
SAMPLE OF CONSTRUCTION NOISE
MONITORING FIELD DATA SHEET**

Contract No. CV/2004/03
Construction of Yung Shue Wan Helipad
- Works order No. YSWH/01/03



Noise Monitoring (Project no.: MA7018)
 Field Record Sheet

Equipment	Model	Equipment No.	Last Calibration/Due Date
Integrating Sound Level Meter			/
Sound Pressure Calibrator			/

Noise Monitoring Period (Delete the inappropriate)	Before Calibration			After Calibration		
	Noise Level (dB)	Freq. of Signal (KHz)	Display (dB)	Noise Level (dB)	Freq. of Signal (KHz)	Display (dB)
07:00 – 19:00	94.0	1		94.0	1	
19:00 – 23:00	94.0	1		94.0	1	
23:00 – 07:00	94.0	1		94.0	1	

Monitoring Location						
Description of Location						
Date of Monitoring						
Weather Condition		Sunny / Cloudy / Rainy				
Measurement Start Time (hh:mm)						
Measurement Time Length (min/hr)						
Measurement	Parameter	1st	2nd	3rd	Ave.	
Results	L _{eq} dB(A)					
	L ₁₀ dB(A)					
	L ₉₀ dB(A)					
Major Construction Noise Source(s)	Excavator / backhoe			Bulldozer		
During Measurement	Dump truck / lorry			Roller		
	Others, pls specify					
Other Noise Source(s)	Road traffic noise			Air traffic noise		
During Measurement	Construction noise from other sites (e.g. piling) pls specify:					
Remarks						

Note:
 During daytime (0700-1900): 1 no. of Leq(30-min)
 Evening-time (1900-2300): 3 nos. of Leq(5-min)
 Night-time (2300-0700): 3 nos. of Leq(5-min)

	Name	Signature	Date
Recorded By			
Checked By			

Remarks: Monitoring should be cancelled if steady wind speed exceeds 5m/s or with gusts exceeding 10m/s.

**APPENDIX D
SAMPLE OF CONSTRUCTION STAGE
WATER QUALITY MONITORING FIELD
DATA SHEET**

Contract No. CV/2004/03
Construction of Yung Shue Wan Helipad
– Works Order No. YSWH/01/03



Water Quality Monitoring
 Data Record Sheet

Date of Monitoring: _____ Tide Condition: Mid-Flood / Mid-Ebb

Weather: Sunny / Fine / Cloudy / Rainy Vessel No: _____ Sea Condition: Calm / Moderate / Rough

Equipment	Model	Equipment No.	Remarks
YSI 6820 Multi-Parameter	6820	<input type="checkbox"/> W-03-01 <input type="checkbox"/> W-03-02	
YSI 650-MDS Handheld Display	650-MDS	<input type="checkbox"/> W-04-01 <input type="checkbox"/> W-04-02	

Location	Login I.D.	Sampling Start Time	Water Depth (m)	Sampling Depth		Appearance of Water	Observation			Coordinate	Remark
							<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed			
M1	W6SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°13.4738 114°06.5068 or		
	W6MF			M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					
	W6BF			B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					
M2	W7SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°13.4821 114°06.5243 Or		
	W7MF			M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					
	W7BF			B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					
C1	W8SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°13.5085 114°06.5037 or		
	W8MF			M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					
	W8BF			B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					

Note: If water depth is 3m-6m, omit the mid-depth measurement. If water depth is less than 3m, only mid-water depth is required.

Any dumping barge nearby? Y / N If yes, mark location on map on reverse side and indicate whether working or not.

Name of barge: _____ (Please numbers and shows the number on the map).

Any visible discoloration of the water? Y / N If yes, please mark on map with remarks on appearance.

Any red tide? Y / N If yes, please mark on map with remarks on appearance.

Any fish killed? Y / N If yes, please mark on map with remarks on appearance.

Remark : _____

Conducted by : _____ Checked by : _____

Date : _____ Date : _____

Contract No. CV/2004/03

Construction of Yung Shue Wan Helipad

– Works Order No. YSWH/01/03

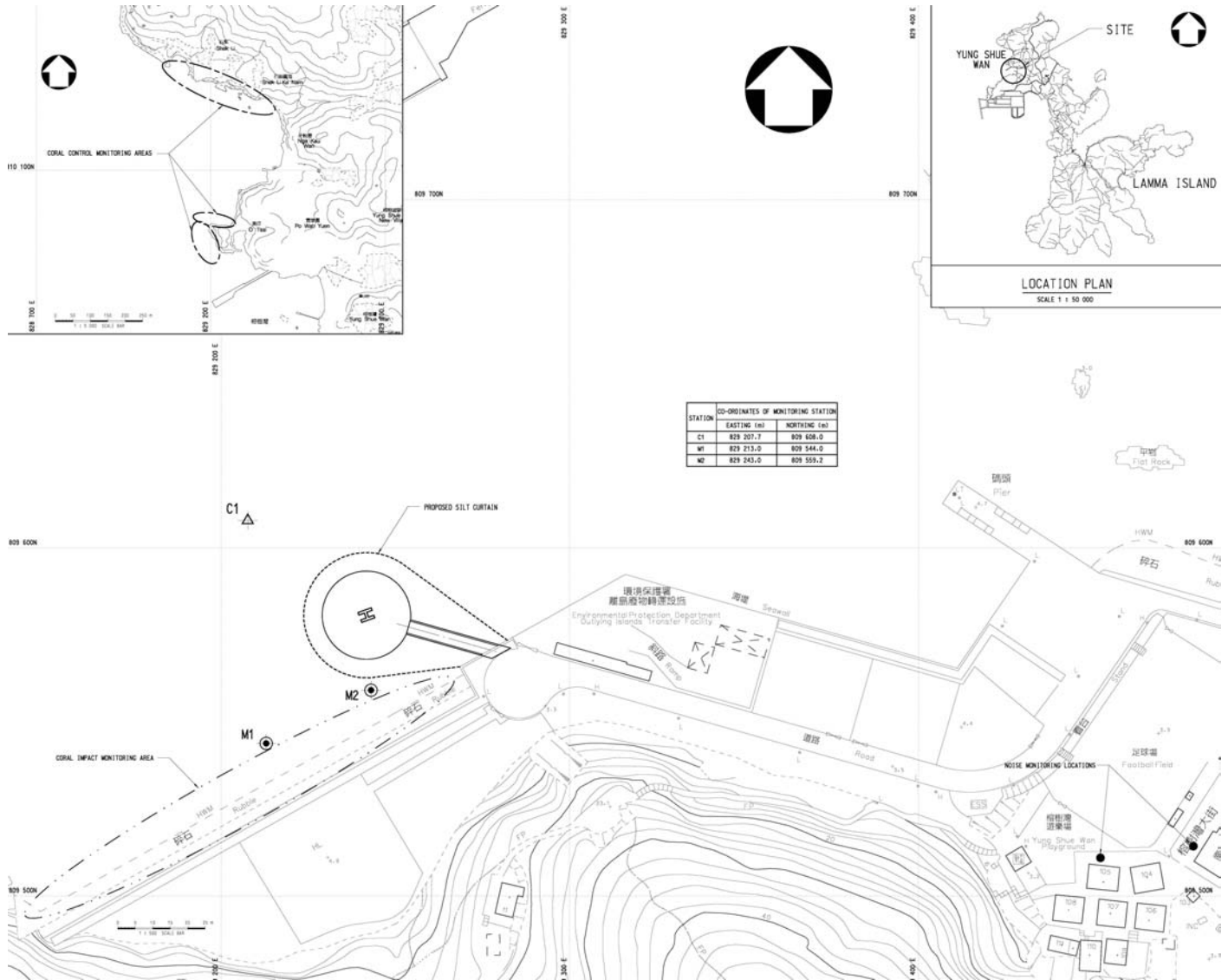


Water Quality Monitoring

Data Record Sheet

Date of Monitoring: _____ Tide Condition: Mid-Flood / Mid-Ebb

Weather: Sunny / Fine / Cloudy / Rainy Vessel No: _____ Sea Condition: Calm / Moderate / Rough



Remark : _____

Conducted by : _____

Checked by : _____

Date : _____

Date : _____

Project No. MA7018

F:\Projects\MA7018 - Construction of Yung Shue Wan Helipad\Report\Updated EM&A Manual\App\App D - water log_construction.doc

**APPENDIX E
SAMPLE OF THE INTERIM
NOTIFICATIONS OF EXCEEDANCES**

**Appendix E - Sample of Template for Interim Notifications of Environmental Quality Limits Exceedances
 (Water Quality Monitoring)**

Report No.

Monitoring Date

Monitoring Parameter

Station No.	Time of Measurement	Tide	Baseline Action Level (mg/l)	Baseline Limit Level (mg/l)	Measured value (mg/l)	Control Station(s)	Measured Value at Control Stations (mg/l)	Control Station Action Level (mg/l)	Control Station Limit Level (mg/l)	Level Exceeded

Remarks

(a) cause of exceedances
(b) action required under the action plan
(c) action taken under the action plan
(d) ET's conclusions and recommendations for mitigation
(e) Contractor's actions to implement the mitigation
(f) Contractor's comment

ETL Signature: _____

Date: _____

Reviewed by

IEC Signature: _____

Date: _____

**Appendix E - Sample of Template for Interim Notifications of Environmental Quality Limits Exceedances
 (Noise Monitoring)**

Report No.

Monitoring Date

Monitoring Parameter

Station No.	Measurement Results (Leq dB(A))	Action Level	Limit Level (dB(A))	Level exceeded
		-		

Remarks

(a) cause of exceedances
(b) action required under the action plan
(c) action taken under the action plan
(d) ET's conclusions and recommendations for mitigation
(e) Contractor's actions to implement the mitigation
(f) Contractor's comment

ETL Signature: _____

Date: _____

Reviewed by

IEC Signature: _____

Date: _____

APPENDIX F
SAMPLE OF COMPLAINT LOG

Appendix F - Sample of Complaint Log

Log Ref.	Date/Location	Complainant/ Date of Contact	Details of Complaint	Investigation/ Mitigation Action	File Closed

Filled by Environmental Team Leader: _____

Date: _____