Environmental Monitoring &Audit Manual

Proposed Development at

Fung Lok Wai, Yuen Long

Lot 1457 R. P. in D.D. 123

Reference **R225-2.07**

Client **Mutual Luck Investment Limited**

Date **July 2008**

CH2M HILL Hong Kong Limited
in association with

RPS
ADI Ltd.
Archaeological Assessments
MVA Hong Kong Limited

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1. INTRODUCTION

1.1 Background

1.1.1 A residential development and a Wetland Nature Reserve ("WNR") (hereinafter collectively called the "Project") is proposed to be developed at existing fishponds at Lot 1457 R.P., D.D. 123 Fung Lok Wai, (the Subject site). The Project comprises the following main components: -

- approximately 4.0 ha of residential land for 148,000m^2 GFA residential development and a club house for residents;
- approximately 76.1 ha of enhanced and managed WNR, comprising enhanced fish ponds, marsh complex and alternative egretry;

1.1.2 According to Item P of Part I, Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance, the Project is classified as a Designated Project. Figure 1-1 shows the site boundary and the proposed access road.

1.1.3 As part of the Environmental Impact Assessment (EIA) study for the Project, a Manual for guiding the setup of an Environmental Monitoring and Audit (EM&A) programme to check the implementation of the relevant environmental mitigation measures recommended in the EIA is required. The EM&A programme will be useful in providing a means to verify the effectiveness and adequacy of the mitigation measures recommended in the EIA such that additional mitigation measures or remedial action, if deemed necessary, can be formulated.

1.1.4 As part of the EIA study for the Project, CH2M HILL Hong Kong Limited (the Consultant) has been commissioned as the lead consultant to prepare this EM&A manual in associated with RPS, Asia Ecological Consultant, ADI Ltd. and Archaeological Assessments.

1.1.5 Through the EIA study for the Project, a number of environmental mitigation measures are recommended to be implemented during the construction and operational phases of the Project. These mitigation measures and their implementation requirements are summarised in the Implementation Schedule contained in Appendix I of this EM&A Manual.

1.1.6 In order to ensure that these recommended environmental mitigation measures are fully and effectively implemented, the EIA Report for the Project recommended the following:

- Carrying out of EM&A works with respect to construction dust and noise during the construction phase of the Project;
- Carrying out water quality monitoring during the construction phase;
- Carrying out landscape and visual monitoring during the construction phase;
- Checking of construction waste management practices through an environmental audit process; and
- Carrying out ecological monitoring during the construction and operation phase.

1.1.7 These EM&A works are recommended to be carried out by an Environmental Team (ET) formed before the commencement of the construction works.

1.1.8 This Manual provide systematic procedures for the carrying out of recommended monitoring and auditing works for checking of potential environmental impacts which may arise from the project. Mitigation measures recommended in the EIA Report for each key environmental aspect are also summarised and presented.

1.1.9 Environmental regulations currently enforced in Hong Kong pertaining to air quality, noise and waste, etc. and the recommendations given in the EIA study report for the Project have been observed in the preparation of this Manual.

1.2 Objectives of this EM&A Programme

1.2.1 The main objectives of the EM&A programme include:

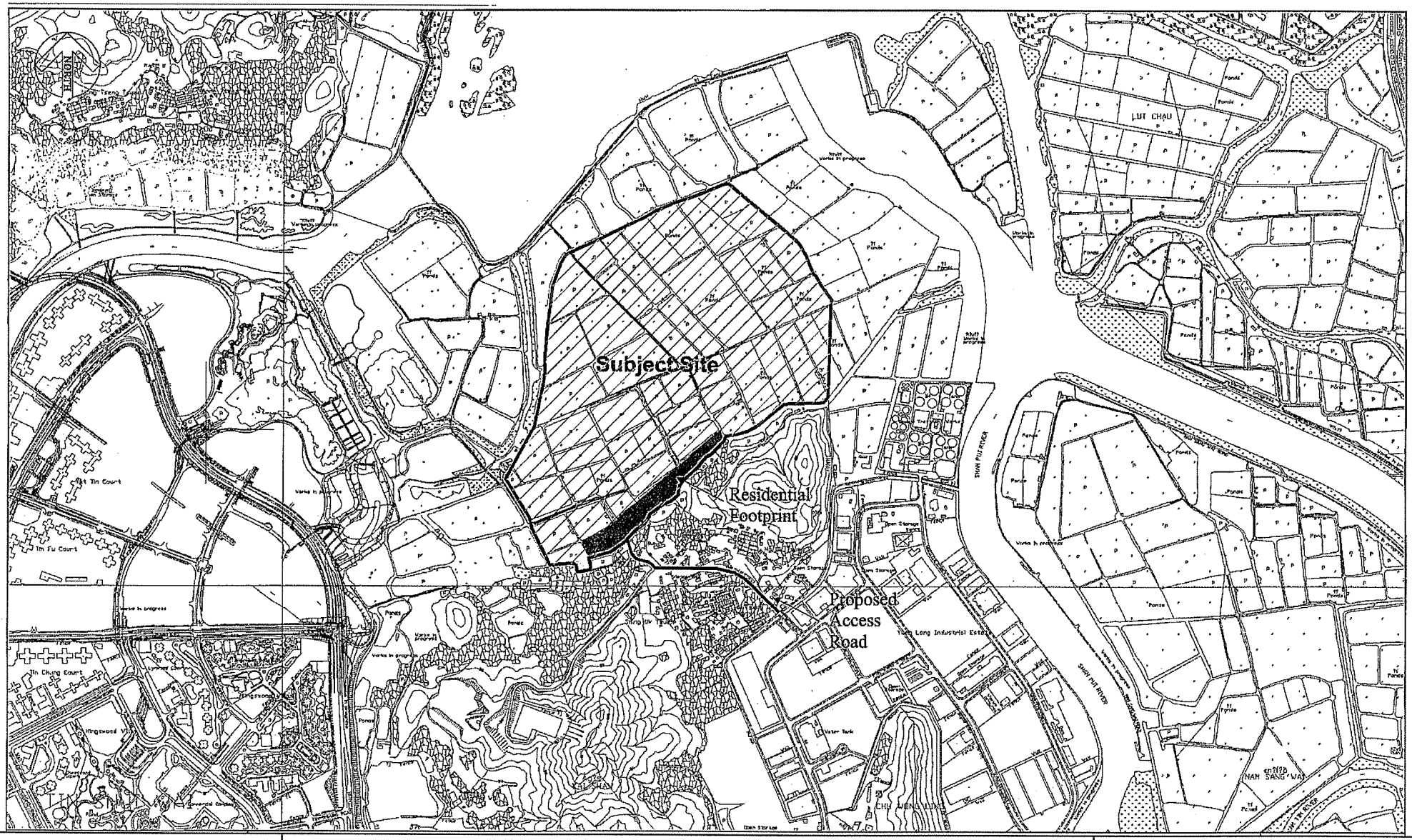
1. To provide a database on baseline environmental quality for subsequent checking of any short or long term environmental impacts arising from the Project;
2. To provide information at an early stage for identification of potential problem areas and formulation of additional environmental mitigation measures where necessary should any of the environmental control measures or practices fail to achieve the target standards;
3. To monitor the performance of the Project from an environmental viewpoint and the sufficiency and effectiveness of the implemented mitigation measures;
4. To verify the environmental impacts predicted in the EIA Study for the Project;
5. To determine compliance of the Project with relevant regulatory standards, requirements and guidelines;
6. To take remedial action should unexpected problems or unacceptable impacts are identified;
7. To provide baseline and compliance monitoring data to assist the carrying out of effective environmental audits.

1.3 Content of this EM&A Manual

1.3.1 The recommended EM&A programme in this Manual contains the following information:

1. Duties of the Environmental Team (ET) in the environmental monitoring and audit programme;
2. Information on project organisation, construction schedule and activities;
3. Information on the tentative construction programme and the necessary environmental monitoring and audit programme to track the varying environmental impacts;
4. Definition of Action and Limit levels, and establishment of Event and Action Plans;
5. Requirements of reviewing pollution sources and work procedures in the event of non-compliance of the environmental criteria;
6. Requirements of presentation of environmental monitoring and audit data and appropriate reporting procedures;
7. An Implementation Schedule (Appendix I) of the environmental mitigation measures recommended in the EIA report for the Project;
8. Record forms (Appendix II) to be adopted where applicable during the construction phase of the Project.

1.3.2 The EM&A Manual shall be regarded as an evolving document that should be updated when necessary in order to maintain its relevance during the detailed design stage and/or the construction phase (e.g. when alternative monitoring locations are proposed). The updated EM&A Manual shall be submitted to the ER and EPD for agreement.



CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	**Title:** The Site Boundary and the Proposed Access Road of the Project	**CH2M HILL Hong Kong Limited**	
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123	**Scale:** NTS	**Figure:** 1-1

2. PROJECT DESCRIPTION

2.1 The Subject Site and its Environs

2.1.1 The Subject Site is located at Lot 1457 R.P. in D.D. 123, Fung Lok Wai and the total site area is about 80.1 ha. The about 4 ha residential site will be formed by filling the fishponds at the southern part of the Subject Site with a WNR to be established to its north. The access road connects the Project to the Yuen Long Industrial Area through existing Fuk Shun Street. Approximately half of the proposed Fung Lok Wai Wetland Nature Reserve lies within the Mai Po Inner Deep Bay Ramsar Site (Buffer Zone 1), with the remaining area within Buffer Zone 2. The northern boundary adjoins the Inner Deep Bay Site of Special Scientific Interest (SSSI).

2.2 Implementation Schedule of the Project

2.2.1 Figure 2-1 shows the tentative construction programme of the Project. Construction activities are planned to commence in the 3rd quarter of 2010 for completion in the 3rd quarter of 2016. i.e. a total of about 6 years.

2.2.2 The construction programme consists of the following three main phases: -

1. First phase (3rd quarter of 2010 to 2nd quarter of 2013) - establishment of the Wetland Nature Reserve (WNR). Key construction activities to be carried out include:
    - Relocating water from Sector 1, Sector 2 and Sector 3 ponds at different phases;
    - Draining, removing bunds and installing water controls at Sector 1, Sector 2 and Sector 3 of the WNR at different phases;
    - Re-filling ponds at Sector 1, Sector 2 and Sector 3 of the WNR;
    - Selective felling and vegetation management at Sector 1, Sector 2 and Sector 3 of the WNR at different phases;
    - Land formation and water control structures construction of the Marshland area;
    - Habitat creation of the Marshland area;
    - Constructing facilities of the Marshland area, such as board walks, hides, toilets and shelters.
2. Second phase (2nd quarter of 2011 to 3rd quarter of 2016) - construction works for development area. Key construction activities to be carried out are listed below:
    - Site clearance for the construction works for development area;
    - Pond draining and dredging at built area;
    - Delivery of fill material by trucks to the site;
    - Spreading and compaction of fill material at built area;
    - Foundation and superstructure works for buildings;
    - Construction of sewage pump house;
    - Laying of drainage, sewerage and utilities;
    - Paving of internal access road.
3. Third phase (4th quarter of 2014 to 3rd quarter of 2016) – widening works of the access road leading to the Project site. Key construction activities include:
    - Site clearance and formation for the widening of the Access Road leading to the site;

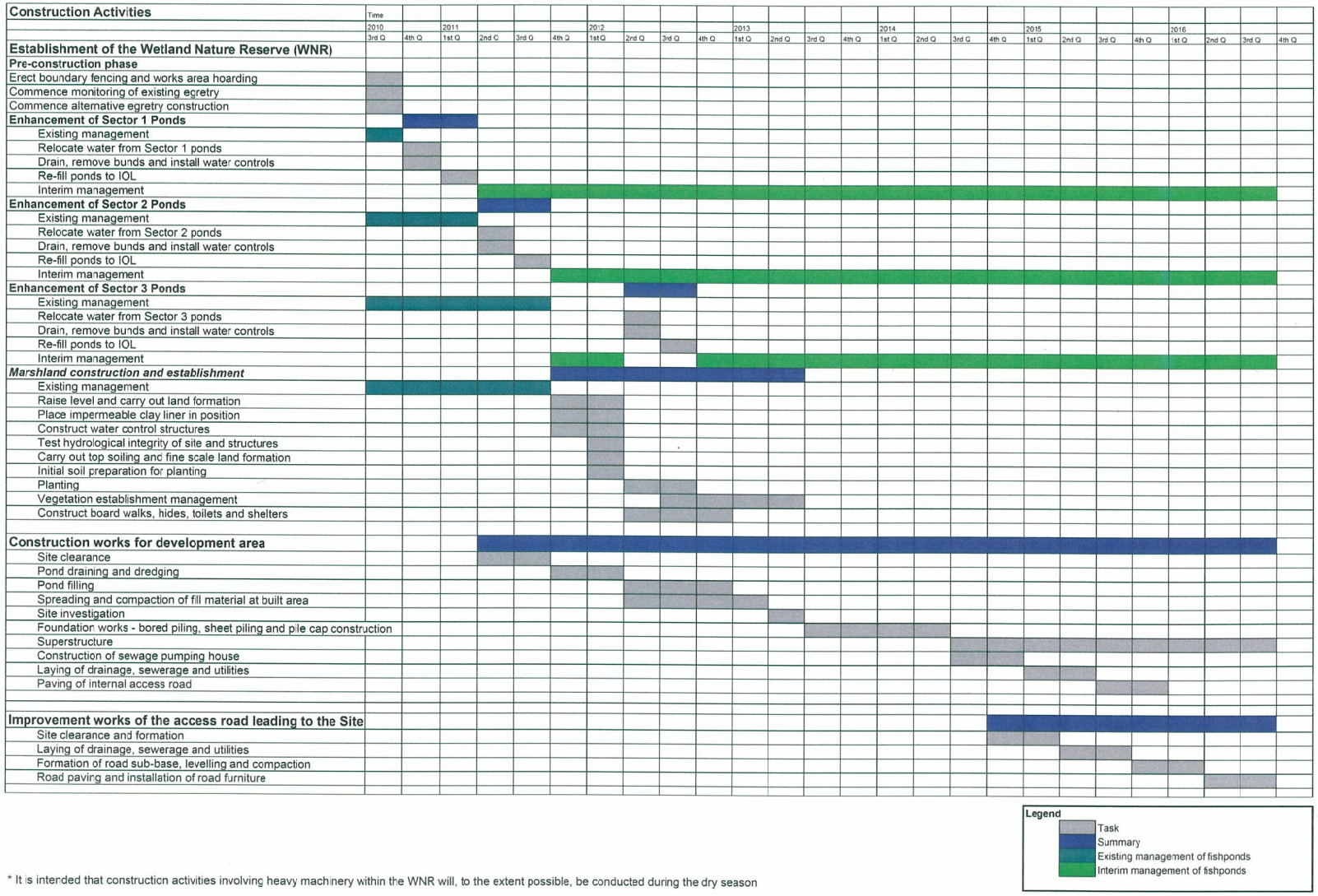
- Laying of drainage, sewerage and utilities;
- Formation of road sub-base, levelling and compaction;
- Road paving and installation of road furniture;
- Construction of landscape works;
- Soft landscape establishment works.

2.2.3 Figure 2-2 sets out the indicative boundary of the various site portions.

2.3 Environmental Monitoring and Audit Requirements

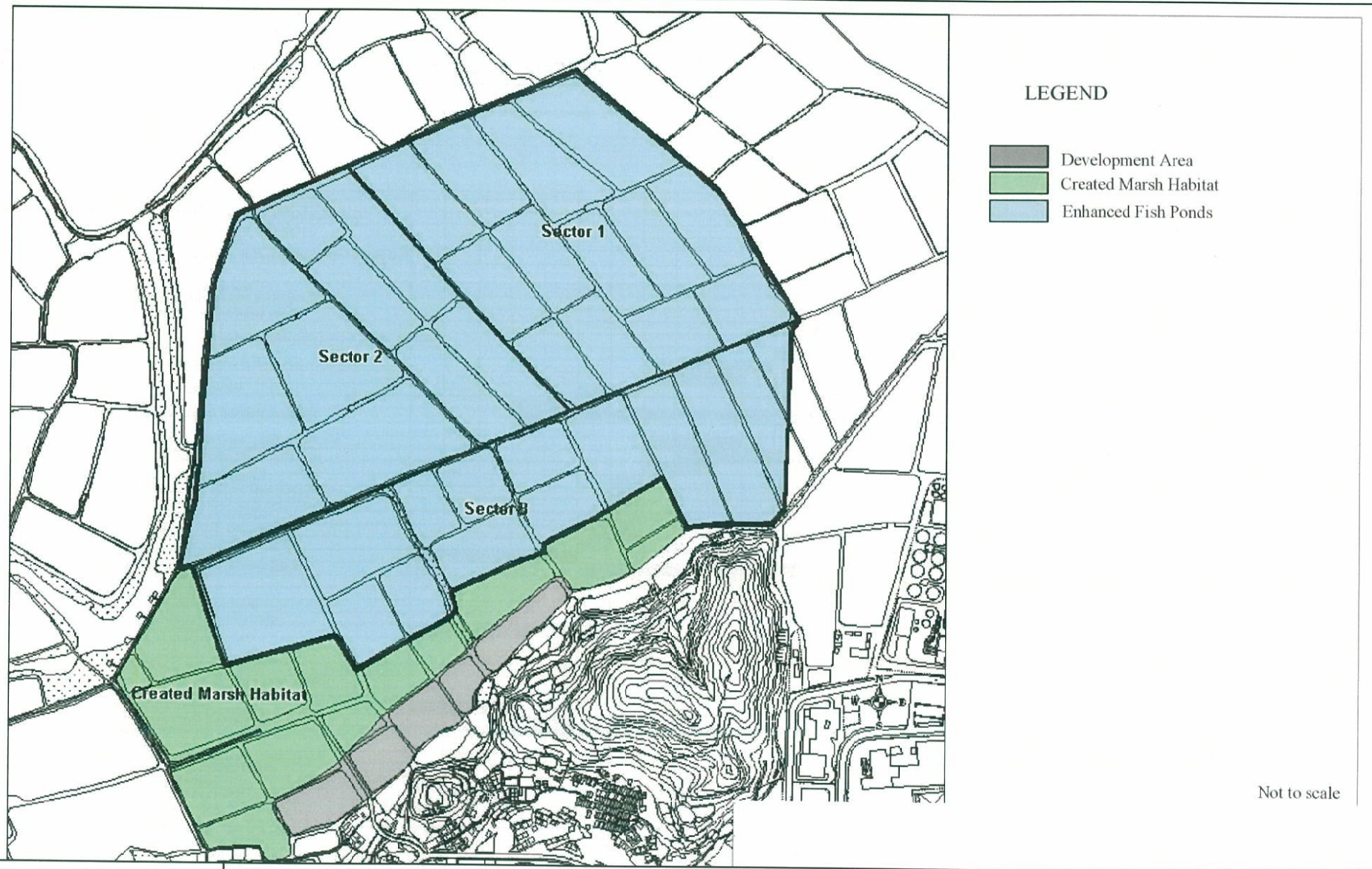
2.3.1 The following areas, identified in the EIA for this Project, will require EM&A during the construction or operational phase:

- Air Quality: construction dust
- Noise Impact: construction noise
- Water Quality
- Waste Management
- Ecology
- Landscape and Visual



* It is intended that construction activities involving heavy machinery within the WNR will, to the extent possible, be conducted during the dry season

CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	**Title:** Tentative Construction Programme for the Project	**CH2M HILL Hong Kong Limited**
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123	**Scale:** NTS **Figure:** 2-1



CH2M HILL Hong Kong Limited **In association with** **RPS** **ADI Ltd.** **Archaeological Assessments** **MVA Hong Kong Limited**	**Title: Indicative Boundary of Various Site Portions**	**CH2M HILL Hong Kong Limited**	
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123	**Scale: NTS**	**Figure: 2-2**

3. PROJECT ORGANISATION

3.1.1 The key parties in an EM&A programme include the Contractor, the Engineer[1] or the Engineer's representative (ER)[1], the Environmental Team (ET), the Independent Checker (Environment) (IC(E)) and the Environmental Protection Department (EPD). 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.

3.1.2 A typical construction phase environmental monitoring and audit procedure is enclosed in Appendix III for reference.

Environmental Team

3.1.3 An Environmental Team (ET) shall be appointed to carry out the recommended EM&A works for 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[2] in fulfilling the EM&A duties specified in this Manual. The ET Leader shall plan, organise and manage the implementation of the EM&A programme, and to 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 possesses at least 7 years experience in EM&A and/ or environmental management.

3.1.4 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 log-book of each and every instance or circumstance or change of circumstances which may affect the EIA and each and every non-compliance with the Environmental Permit or the recommendations in the EIA report. This log-book shall be kept readily available for inspection by the IC(E), and Director of Environmental Protection (DEP) or his authorized officers. The ET shall not be an associated body of the IC(E) in the project.

3.1.5 The board categories of woks of the ET comprise the followings:

1. Sampling, analysis and statistical evaluation of monitoring parameters with reference to the EIA study recommendations and requirements;
2. Environmental site surveillance;
3. Audit of compliance with environmental protection, and pollution prevention and control regulations;
4. Monitor the implementation of environmental mitigation measures;
5. Monitor compliance with the environmental protection clauses/specifications in the Contract;
6. Review establishment, construction and operation programmes of the Project and provide comments as necessary;

[1] For the purpose of this manual, the "Engineer" shall 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.

[2] The Environmental Team (ET) leader, who shall be responsible for and in charge of the ET, refers to the person delegated the role of executing the environmental monitoring and audit requirements.

7. Review work methodologies which may affect the extent of environmental impact during the establishment, construction and operation phases and comment as necessary;
8. Complaint investigation, evaluation and identification of corrective measures;
9. Liaison with the Project Independent Checker (Environmental) (IC(E)) on all environmental performance matters, and timely submission of all relevant EM&A proforma for IC(E)'s approval;
10. Advice to the Contractor on environmental improvement, awareness, enhancement matters, etc., on site; and
11. Timely submission of the EM&A report to the Project Proponent and the DEP.

3.1.6 In the event of any exceedance in action/ limit levels, the ET shall immediately inform the IC(E), Engineer/ ER and the Contractor so that appropriate remedial action can be undertaken by the Contractor promptly. The ET is also responsible for the preparation of the monthly EM&A reports for submission to IC(E), the Contractor and the Engineer/ ER, and through the Engineer/ ER to EPD. The ET shall assist the Contractor and the Engineer/ ER in formulating any necessary corrective actions and/ or additional mitigation measures, and liaising with relevant Government Departments where necessary.

Independent Checker (Environment)

3.1.7 The Independent Checker (Environment) (IC(E)) shall advise the ER on environmental issues related to the project. The IC(E) shall not be in any way an associated body of the Contractor or the ET for the Project. The IC(E) shall be empowered to audit from an independently viewpoint the environmental performance during the construction and operation of the Project. The IC(E) shall be a person who has at least 7 years' experience in EM&A or environmental management. The IC(E) shall be responsible for the duties defined in the Environmental Permit 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 IC(E) shall be responsible for verifying the environmental acceptability of permanent and temporary works, relevant design plans and submissions under the Environmental Permits. The IC(E) shall verify the log-book prepared and kept by the ET Leader. The IC(E) shall notify DEP by fax, within 24 hours of each and every occurrence, change of circumstances or non-compliance with the EIA Report or the Environmental Permit, which might affect the monitoring or control of adverse environmental impact.

3.1.8 The main duty of the IC(E) is to carry out independent environmental audit of the Project. This shall include, inter alias, the followings:

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 a need 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 IC(E) 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/ER by signing according to the Event/ Action Plans specified in this EM&A Manual.

The Contractor

3.1.9 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, IC(E) 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 Contractor shall report to the ET on the actions taken targeting at environmental protection for inclusion in the monthly report to be prepared by the ET.

The Engineer or the Engineer's Representative

3.1.10 The Engineer, or the ER shall be responsible for overseeing the operations of the Contractor, 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 IC(E). 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.

4. CONSTRUCTION DUST MONITORING

4.1 Air Quality Parameters

4.1.1 Monitoring and audit of Total Suspended Particulate (TSP) levels shall be carried out by the ET during the construction phase of Road A, which include site formation, slope construction and subsequent roadwork, to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

4.1.2 24-hour and 1-hour Total Suspended Particulate (TSP) levels shall be measured according to the recommended programme. 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*.

4.1.3 Upon approval of the ER on the advice of EPD, 1-hour TSP levels can alternatively be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts. However, the ET should submit sufficient information to the IC(E) and the ER to prove that the instrument is capable of achieving a comparable result as that a High Volume Sampler (HVS) and maybe used for 1-hr sampling.

4.1.4 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. shall be recorded down in details, where appropriate. A sample data sheet is shown in Figure 4-1.

4.2 Monitoring Equipment

4.2.1 Regarding the high volume sampling method, HVS in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

1. 0.6-1.7 m^3/min. (20-60 SCFM) adjustable flow range;
2. Equipped with a timing/control device with ±5 minutes accuracy for 24 hours operation;
3. Installed with elapsed-time meter with ±2 minutes accuracy for 24 hours operation;
4. Capable of providing a minimum exposed area of 406 cm^2 (63 in^2);
5. Flow control accuracy: ±2.5% deviation over 24-hr sampling period;
6. Equipped with a shelter to protect the filter and sampler;
7. Incorporated with an electronic mass flow rate controller or other equivalent devices;
8. Equipped with a flow recorder for continuous monitoring;
9. Provided with a peaked roof inlet;
10. Incorporated with a manometer;
11. Able to hold and seal the filter paper to the sampler housing at horizontal position;
12. Easy to change the filter; and
13. Capable of operating continuously for 24-hr period.

4.2.2 If the ET proposes to use a direct reading dust meter to measure 1-hr TSP levels, he shall submit sufficient information to the IC(E) to prove that the instruments is capable of achieving a comparable result as that the HVS and may be used for the 1-hr sampling. The instrument shall also be calibrated regularly, and the 1-hr sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.

4.2.3 During the course of the project, the ET is responsible for provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with an appropriate calibration kit, and direct reading dust meters are available for the carrying out of baseline monitoring, regular impact monitoring and ad hoc monitoring.

4.2.4 The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc. shall be clearly labelled.

4.2.5 Initial calibration of HVSs shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by the concerned parties such as the IC(E). All the data should be converted into standard temperature and pressure condition.

4.2.6 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down in the data sheet given in Figure 4-1.

4.2.7 Wind data monitoring equipment shall also be provided and set up at a conspicuous location for logging wind speed and wind direction near to the dust monitoring locations. The location for equipment installation shall be proposed by the ET and agreed with the ER and IC(E). For installation and operation of wind data monitoring equipment, the following points shall be observed:

1. The wind sensors should be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
2. The wind data should be captured by a data logger and to be downloaded for processing at least once a month;
3. The wind data monitoring equipment should be re-calibrated at least once every six months; and
4. Wind direction should be divided into 16 sectors of 22.5 degrees each.

4.2.8 In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IC(E).

4.3 Laboratory Measurement / Analysis

4.3.1 A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments, to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS accredited.

4.3.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER in consultation with the IC(E) and the measurement procedures shall be witnessed by the IC(E) and the ER. The ET shall provide the ER with one copy of the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B* for his reference.

4.3.3 Filter paper of size 8”x10” shall be labelled before sampling. It shall be a clean filter paper with no pinhole, and shall be conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

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

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

4.4 Proposed Monitoring Locations

4.4.1 The air quality impact assessment presented in the EIA report indicated that the nearby air sensitive receivers (ASRs) would not be subjected to adverse dust impact among all phases of the project when standard dust mitigation measures are properly applied onsite. The dust mitigation measures have been recommended and shall be implemented by the Contractor in accordance with the requirements under the *Air Pollution Control (Construction Dust) Regulation*. The Contractor shall be responsible for the design and implementation of the dust mitigation measures.

4.4.2 Figure 4-2 shows the locations of the proposed air quality monitoring locations (AM1 to AM 7) identified for the air quality monitoring for the three phases of the construction programme as mentioned in Section 2.2.2. Table 4-1 summarizes the locations of air quality monitoring stations. The appointed ET may like to propose alternative monitoring locations taking into consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. The alternative monitoring locations proposed by the ET shall be approved by the ER and agreed by IC(E).

Table 4-1 Locations of Air Quality Monitoring Stations

Monitoring Station ID	Category
AM1	Phase 1
AM2	Phase 1
AM3	Phase 1 & 2
AM4	Phase 2 & 3
AM5	Phase 2
AM6	Phase 3
AM7	Phase 3

4.4.3 When alternative monitoring locations are proposed, the following criteria should be followed as far as practicable:

- At the site boundary or such locations close to the major dust emission sources;
- Close to the sensitive receptors; and
- Take into account the prevailing meteorological conditions.

4.4.4 The ET Leader shall agree with the ER in consultation with the IC(E) on the position of the HVSs for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

- A horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- No two samplers should be placed less than 2 meter apart;
- The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- A minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;
- A minimum of 2 metre separation from any supporting structure, measured horizontally is required;
- No furnace or incinerator flue is nearby;
- Airflow around the sampler is unrestricted;
- The sampler is more than 20 metres from the dripline;

- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- A secured supply of electricity is needed to operate the samplers.

4.5 Baseline Monitoring

4.5.1 Baseline monitoring shall be carried out by the appointed ET Leader at all of the designated monitoring locations for at least 14 consecutive days to obtain daily 24-hr TSP samples. 1-hr sampling shall also be done at least 3 times per day during daytime when there are planned construction activities. The ET Leader should inform the IC(E) of the baseline monitoring programme before commencement such that the IC(E) can conduct on-site audit to ensure accuracy of the baseline monitoring results.

4.5.2 During the baseline monitoring, there should not be any dust generation construction activities in the vicinity of the monitoring stations arising from the subject site.

4.5.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with IC(E).

4.5.4 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IC(E) and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.

4.5.5 If the ET Leader considers that the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be carried out at times when the contractor's activities are not generating dust in the proximity of the monitoring station. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with the IC(E) and EPD.

4.6 Impact Monitoring

4.6.1 The ET Leader shall carry out impact monitoring during the course of the construction works at the recommended dust monitoring station. For regular impact monitoring, a sampling frequency of at least once in every six-days shall be followed at the selected monitoring stations for 24-hr TSP monitoring. The specific time to start and stop the 24-hr TSP monitoring shall be clearly defined and be strictly followed by the operator. Before commencement, the ET Leader shall inform the IC(E) of the impact monitoring programme such that the IC(E) can conduct on-site audit to ensure accuracy of the impact monitoring results.

4.6.2 For 1-hr TSP monitoring, a sampling frequency of at least three times in every six-days shall be undertaken during the hours when the highest dust impact is predicted to occur based on the nature of the construction works. The Contractor shall inform the ER, IC(E) and ET Leader in advice the time when blasting activities are planned for the team to formulate the dust monitoring programme accordingly. The 1-hr TSP monitoring can be undertaken on the same day as the 24-hr TSP monitoring.

4.6.3 In case of non-compliance with the air quality criteria, more frequent monitoring exercise, as specified in the following section, shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

4.7 Event and Action Plan for Air Quality

4.7.1 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. Table 4-2 shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occurs, the ET shall undertake the relevant action in accordance with the Action Plan in Table 4-3.

Table 4-2 Action and Limit Levels for Air Quality

Parameters	Action	Limit
24 Hour TSP Level in μg/m³	For baseline level ≤ 200 μg/m³, Action level = (Baseline level x 1.3 + Limit level) /2; For baseline level > 200 μg/m³, Action level = Limit level;	260 μg/m³
1 Hour TSP Level in μg/m³	For baseline level ≤ 384 μg/m³, Action level = (Baseline level x 1.3 + Limit level) /2; For baseline level > 384 μg/m³, Action level = Limit level;	500μg/m³

Table 4-3 Event/Action Plan for Air Quality

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

	ACTION			
EVENT	**ET Leader**	**IC(E)**	**ER**	**CONTRACTOR**
Exceedance for two or more consecutive samples	1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Notify ER, EPD, IC(E) and Contractor 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Arrange meeting with IC(E) and ER to discuss the remedial actions to be taken 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 monitoring	1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consultation with the IC(E), agree with the Contractor on the remedial measures to be implemented 4. Ensure remedial measures properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance 2. Submit proposals 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

4.8 Dust Mitigation Measures

4.8.1 The EIA report has recommended various dust control and mitigation measures. The following measures are specifically recommended for implementation together with those presented in the Air Pollution Control (Construction Dust) Regulation.

General Site Works

1. Use appropriate working methods to minimize dust emission;
2. Ensure all dust control system are properly functioning during construction operation;
3. Twice daily watering of all dust emission sources, adjust frequency depending on meteorological conditions;
4. Provide hard paved surface for site area with regular vehicular movements;
5. Impose a speed limit of 10km/hr for dump trucks and other vehicles traveling on unpaved site roads;
6. Cover side and tail boards of dusty trucks with tarpauline which extends at least 300m over edges of side and tail boards;
7. Provide wheel-wash troughs and hoses at exit points of site;
8. Arrange truck to unload filling material to drained ponds directly without stockpiling at site;
9. Keep filled ponds and stockpile wet by water spraying;
10. Side enclosure and covering, where practicable, of any aggregate or other dusty material storage piles to reduce emissions;
11. All dusty material should be sprayed with water immediately prior to any loading, unloading or transfer operation to minimise dust emission;
12. Instigation of a programme to monitor the construction process in order to enforce controls and modify methods of work if dusty conditions arise; and
13. Phasing of dusty construction activities to control dust generation during the construction period.

4.8.2 The effectiveness of these dust control measures shall be checked by the EM&A requirements recommended in the above section. If the measures adopted and implemented by the contractor are found not be sufficient to keep dust levels within acceptable levels, the Contractor shall liaise with the ET Leader on the implementation of some other mitigation measures. The additional dust mitigation measures shall be approved by the ER before implementation.

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Q_{si}	P_i (mmHg)	
	T_i (°C)	
	H_i (in.)	
	Q_{si} (Std. m^3)	
Final Flow Rate, Q_{sf}	P_f (mmHg)	
	T_f (°C)	
	H_f (in.)	
	Q_{sf} (Std. m^3)	
Average Flow Rate (Std. m^3)		
Total Volume (Std. m^3)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final Wt. of Filter (g)		
Measured TSP Level ($\mu g/m^3$)		

	Name & Designation	Signature	Date
Field Operator :			
Laboratory Staff :			
Checked by :			

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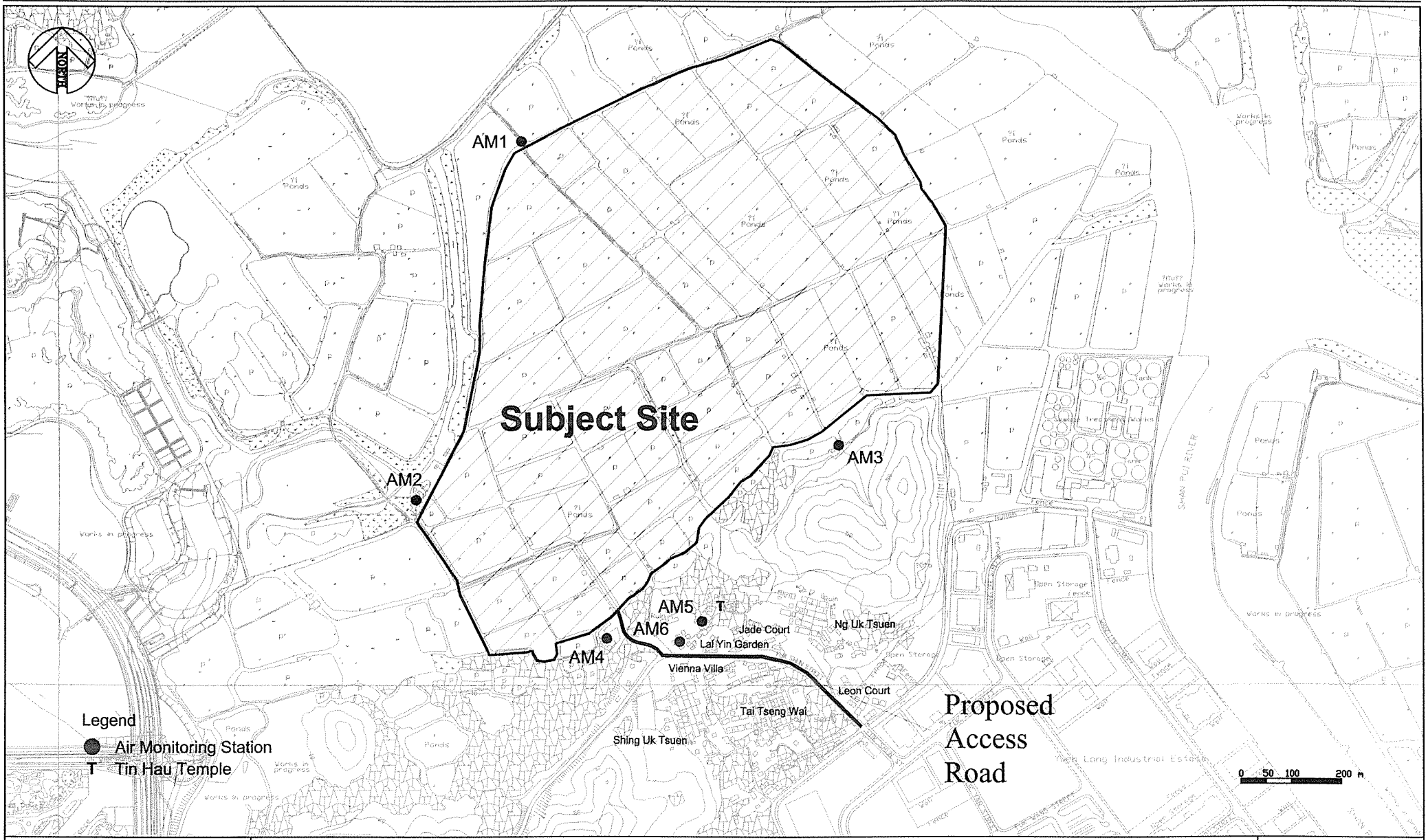
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D. D. 123		



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	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123	Figure: 4-2

5. CONSTRUCTION NOISE MONITORING

5.1 Noise Parameters

5.1.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{Aeq}). $L_{Aeq(30\ min.)}$ shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods, $L_{Aeq(5\ min)}$ shall be employed for comparison with the NCO criteria.

5.1.2 As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet is shown in Figure 5-1 for reference.

5.2 Monitoring Equipment

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

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

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

5.3 Monitoring Locations

5.3.1 The proposed locations for noise monitoring for the three phases of the construction programme as mentioned in Section 2.2.2, namely NM1 to NM7, are shown in Figure 5-2 and summarized in Table 5-1.

Table 5-1 Locations of Construction Noise Monitoring Stations

Monitoring Station ID	Category
NM1	Phase 1
NM2	Phase 1
NM3	Phase 1 & 2
NM4	Phase 2 & 3
NM5	Phase 2
NM6	Phase 3
NM7	Phase 3

5.3.2 The appointed ET Leader may like to propose alternative monitoring locations based on consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. Alternative monitoring locations proposed by the ET Leader shall be

approved by the ER and agreed by EPD and the IC(E).

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

- At locations close to the major site activities which are likely to have noise impacts;
- Close to the noise sensitive receivers; and
- For monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring.

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

5.4 Baseline Monitoring

5.4.1 Baseline monitoring shall be carried out by the ET prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least two weeks. A schedule on the baseline monitoring for construction noise shall be submitted to the ER for approval before the commencement of the monitoring.

5.4.2 There shall not be any construction activities in the vicinity of the stations during the baseline monitoring.

5.4.3 In exceptional cases, such as insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with IC(E) and EPD for agreement on an appropriate set of data to be used as the baseline reference and submit to the ER for approval.

5.5 Impact Monitoring

5.5.1 Noise monitoring shall be carried out by the ET at the selected representative noise monitoring stations. The following is an initial guide on the regular monitoring frequency for each station on a per week basis when noise generating activities are underway:-

(a) one set of measurement between 0700-1900 hours on normal weekdays (i.e. Monday to Saturday);

(b) one set of measurement between 1900-2300 hours;

(c) one set of measurement between 2300-0700 hours of next day; and

(d) one set of measurement between 0700-1900 hours on holidays.

5.5.2 For the measurements (b), (c) and (d) above, one set of measurement shall at least include 3 consecutive $L_{eq(5min)}$ results for construction works to be carried out during restricted hours. General construction work carrying out during restricted hours is controlled by construction noise permit (CNP) system under the NCO. Without a valid construction noise permit (CNP)

issued by EPD under Noise Control Ordinance (NCO), no construction work shall be carried out during restricted hours[3]. Once a valid CNP for the construction activities is issued by EPD, the ET Leader shall be appointed to carry out additional noise measurements and the IC(E) shall also be appointed to carry out additional site investigations and audits during the restricted hours specified in the CNP.

5.5.3 Moreover, the ET Leader shall propose an additional noise monitoring schedule certified by the IC(E) to the ER for approval before the commencement of the construction works during the restricted hours.

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

5.6 Event and Action Plan for Construction Noise

5.6.1 The Action and Limit Levels for construction noise are defined in . In case that a valid CNP is issued by EPD, the Action Level is the same as the non-restricted hours and the Limit Level shall be the same as the standard stated in the CNP.

5.6.2 Should non-compliance of the criteria occurs, actions in accordance with the Action Plan as shown in Table5-3 should be carried out.

Table 5-2 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)
Restricted hours		Same as CNP

* Reduce to 70dB(A) for schools and 65dB(A) during school examination periods.

Table 5-3 Event and Action Plan for Construction Noise Monitoring

	ACTION			
EVENT	**ET Leader**	**IC(E)**	**ER**	**CONTRACTOR**
ACTION LEVEL				
Action Level	1. Notify ER, IC(E) and Contractor 2. Carry out investigation 3. Report the results of investigation to the ER, IC(E) and Contractor 4. Discuss with the IC(E) and Contractor, and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness	1. Review the analysed results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures fro the analysed noise problem 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to IC(E) 2. Implement noise mitigation proposals

[3] All days during the evening 1900 to 2300 hours, and the night-time, 2300 to 0700 hours, and all hours of the general holidays including Sundays

	ACTION			
EVENT	**ET Leader**	**IC(E)**	**ER**	**CONTRACTOR**
Limit Level	1. Notify IC(E), ER, EPD and Contractor 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IC(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 monitoring	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to 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

5.7 Noise Mitigation Measures

5.7.1 The EIA report has recommended various construction noise control and mitigation measures. These are summarised below for easy reference. The Contractor shall be responsible for

5.7.2 Noise emissions from construction sites can be minimised by adopting a number of practicable noise mitigation options, such as:

- Use of quiet/silenced equipment;
- Erecting temporary noise barriers and Provision of Noise Enclosure;
- Phasing of the Construction Activities for the Blasting Restricted Area during Site Formation; and
- Good site practice and noise management.

Selecting Quiet/ Silenced PME

5.7.3 Quiet types of equipment for use in construction activities are available in Hong Kong. It is advised that the contractor should diligently seek equivalent models of quiet/ silenced PMEs with SWLs similar to or less than that as presented in the EIA report as far as practicable.

5.7.4 For the types of equipment presented in Table 5-4 that are likely required in the construction works of the Project, quiet/silenced plant with SWL that is similar or less than that presented shall be adopted as far as possible.

Table 5-4 Quiet/ Silenced Equipment Inventory

Powered Mechanical Equipment	SWL of quiet/silenced PME, dB(A)
Bulldozer	104
Excavator	104
Compactor	105
Dump truck	103

Grader	110
Piling, large diameter bored, oscillator	115
Piling, large diameter bored, reverse circulation drill	100
Generator	95
Mobile crane	101
Concrete lorry mixer	100
Concrete pump	109
Compressor	100
Hoist, Material	95
Crane (Tower)	95
Steel bending machine	90
Vibratory poker	98
Trench compactor	105
Lorry	101
Asphalt paver	101
Road roller	101

Use of Temporary Noise Barriers and Acoustic Enclosures

5.7.5 The erection of temporary mobile noise barriers between noise sources and NSRs will be effective in reducing the potential construction noise impact, especially for the low-rise village huts which are the target NSRs to be protected.

5.7.6 The erection of noise barriers between noise sources and NSRs will be effective in reducing the noise impact, especially for low-rise residential premises. When required, temporary barriers of sufficient height (typically 3-5m high depending on the size of the machines that need to be screened) can be erected within a few metres from stationary plants, and at practicable distance from mobile plants operating over a small area or using a well defined route, to alleviate the construction noise impact. The minimum effective height of the noise barriers should be such that no part of the noise source will be visible from the target NSRs to be protected. The guidelines contained in the Booklet entitled "*A Practical Guide for the Reduction of Noise from Construction Works*" issued by EPD have recommended the design of the temporary acoustic barriers. Barriers/enclosures should have no openings or gaps, and preferably have a superficial surface density of at least 10 kg/m^2. The locations of the temporary noise barriers shall be adjusted where necessary taking into consideration the locations of the noise sources and the NSRs intended to be protected.

5.7.7 Particular attention should be drawn to bored piling works at the residential area where they are considered the major construction noise sources. Noise barriers are recommended to be erected close to the stationary point of piling works during piling to alleviate the potential noise impact to the adjacent village huts.

5.7.8 To the NSRs along Fuk Shun Street which are represented by NM4, the widening works of access road is considered the major noise nuisance during the construction phase. Considering the close proximity of the village huts (NM4) to the construction site of access road, setting up of a noise barrier with approximate 3m height between the noise source and those village huts along Fuk Shun Street is considered necessary during the construction works of access road.

5.7.9 The contractor shall provide the designs of such noise barriers/acoustic enclosures certified by the ET Leader and verified by the IC(E) to EPD for approval prior to the commencement of the construction works.

Other Recommended Noise Mitigation Measures

5.7.10 To be prudent in the construction noise management, the following additional noise mitigation and good site practices are also recommended for implementation.

1. The Contractor shall comply with and observe the Noise Control Ordinance (NCO) and its current subsidiary regulations;
2. Before the commencement of any work, the Contractor shall submit to the Engineer for approval the method of working, equipment and sound-reducing measures intended to be used at the site;
3. The Contractor shall devise and execute working methods that will minimise the noise impact on the surrounding environment; and shall provide experienced personnel with suitable training to ensure that these methods are implemented;
4. Only well-maintained plants should be operated on-site;
5. Plants should be serviced regularly during the construction programme;
6. Machines that may be in intermittent use should be shut down or throttled down to a minimum between work periods;
7. Methods of noise reduction suggested in BS 5228 Part I: 1997 should be referred. For example, silencer and mufflers on construction equipment should be utilised and should be properly maintained during the construction programme;
8. Noisy activities can be scheduled to minimise exposure of nearby NSRs to high levels of construction noise. For example, noisy activities can be scheduled for midday or at times coinciding with periods of high background noise (such as during peak traffic hours);
9. Noisy equipment such as emergency generators shall always be sited as far away as possible from noise sensitive receivers;
10. Mobile plants should be sited as far away from NSRs as possible; and
11. Material stockpiles and other structures should be effectively utilised as noise barrier, where practicable.

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time	(hh:mm)	
Measurement Time Length	(hh:mm)	
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L_{90} (dB(A))	
	L_{10} (dB(A))	
	L_{eq} (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks		

	Name & Designation	Signature	Date
Recorded by :			
Checked by :			

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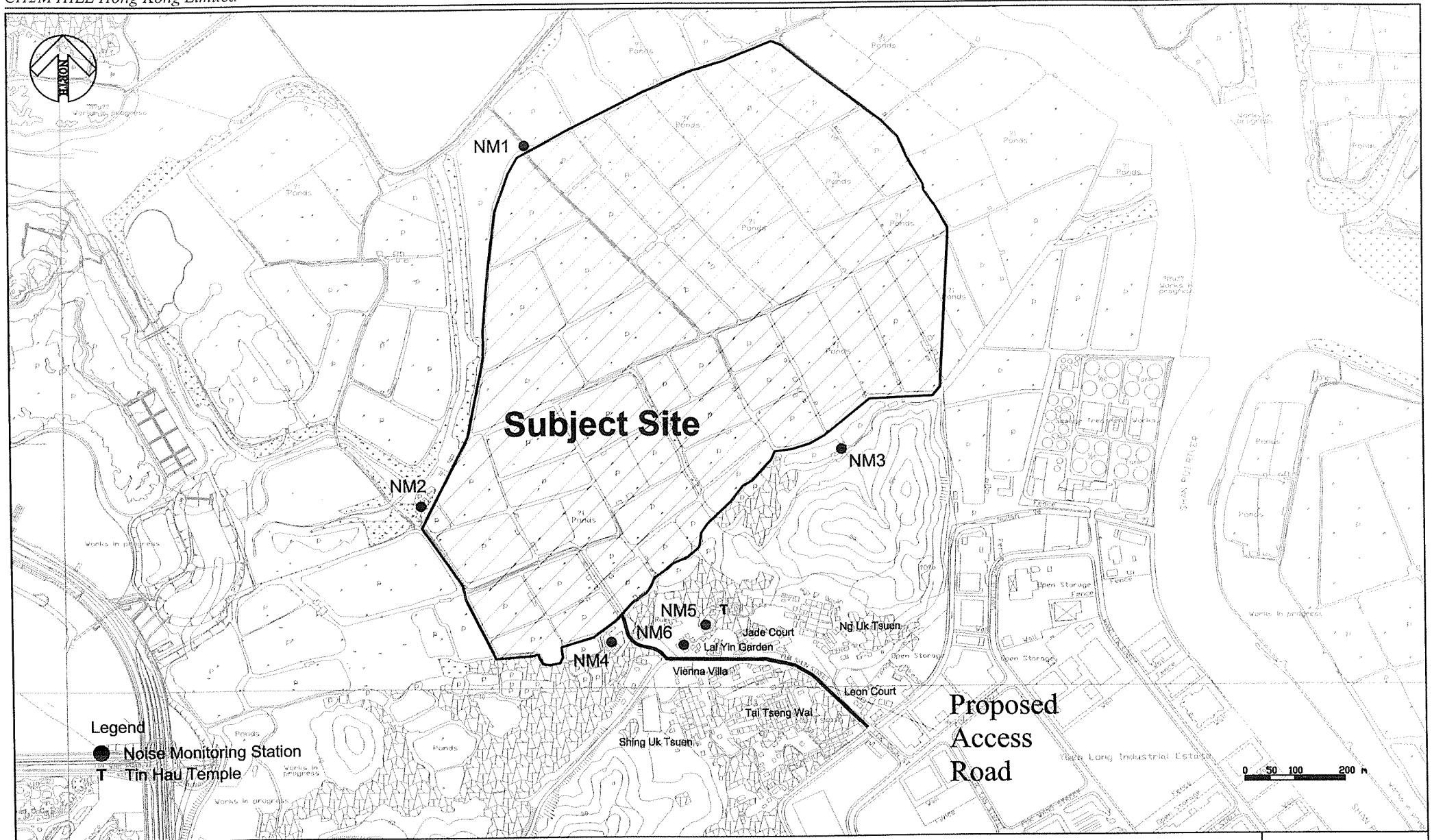
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D. D. 123		



CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	**Title:** Locations of the Proposed Noise Monitoring Stations	**Scale:** As Shown
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123	**Figure:** 5-2

6. WATER QUALITY MONITORING

6.1 Introduction

6.1.1 The Subject Site is surrounded by existing fishponds. The Shan Pui River and the Tai River are to the east and west of the Subject Site respectively. The Inner Deep Bay area is at the northern side of Subject Site. Potential water quality impact on these inland water bodies during the construction and operation of the Project should be minimised.

6.1.2 The Contractor shall adopt the Best Management Practices (BMPs) in controlling potential water pollution through following the guidelines for handling and disposal of construction site drainage as detailed in EPD's ProPECC Note PN1/94 *Construction Site Drainage* during the construction phase. During the operational phase, the control measures recommended in the EIA as well as in the Habitat Creation and Management Plan should be implemented.

6.1.3 Water quality monitoring at designated locations in the nearby inland water bodies are proposed to be carried out during the construction phase to monitor any sub-standard water discharge into the nearby water bodies from the site.

6.1.4 Furthermore, since the Subject Site is located in the vicinity of the WNR, water quality monitoring shall be conducted in the vicinity of the fishpond areas during both construction and operational phases which contribute to one of the criteria for ensuring the overall ecological impacts are within acceptable levels. Details of the ecological monitoring programme are presented in Section 9 of this EM&A Manual.

6.2 Water Quality Parameters

6.2.1 Required construction activities of the development will mainly be land-based. Potential water quality impact could be resulted from runoff loaded with suspended particulate or other contaminants. The ET should carry out spot check to ensure that the Contractor has undertaken all recommended control measures to prevent direct contact of pollutants with rainwater or runoff, and measures to abate contaminants in the stormwater runoff.

6.2.2 The parameters shown in Table 6-1 are recommended to be recorded/ monitored in the routine monitoring programme.

Table 6-1 Water Quality Parameters

Phase	Water Quality Parameters
Construction	• Temperature (°C) • pH (pH unit) • Turbidity (NTU) • Water Depth (m) • Salinity (mg/L) • Dissolved oxygen (DO) (mg/L and % of saturation) • Suspended solids (SS) (mg/L)

6.2.3 It is recommended to carry out sampling at least three times per week to measure turbidity, suspended solids, dissolved oxygen, pH, salinity and water temperature at a number of control and monitoring locations recommended below. The monitoring frequency required shall be reviewed after the first three months and regularly thereafter.

6.2.4 In association, other relevant data such as monitoring locations/positions, time, water depth, water temperature, salinity, weather conditions, sea conditions, tidal stage and any special phenomena and work underways should be recorded. A sample monitoring record sheet is shown in Figure 6-1 for reference.

6.3 Monitoring Equipment

6.3.1 All monitoring equipment shall be provided by the ET and approved by the ER in consultation with the IE(C).

Dissolved Oxygen and Temperature Measuring Equipment

6.3.2 The instrument shall be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and use a DC power source. It should 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° C.

6.3.3 It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall 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).

6.3.4 Should salinity compensation not be built-in in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

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

Suspended Solids

6.3.6 A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres and can be effectively sealed with latex cups at both ends. The sampler shall also have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).

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

Water Depth Detector

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

Salinity

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

Checking and Calibration of Equipment

6.3.10 A hand-held or boat-fixed type digital Global Positioning System (GPS) with way point bearing indication or other equivalent instrument of similar accuracy shall be provided and used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

6.3.11 All in-situ monitoring instrument shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality

monitoring. Responses of sensors and electrodes shall be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

6.3.12 For the on site calibration of field equipment, the BS 127:1993, "Guide to Field and on-site test methods for the analysis of waters" shall be observed.

6.3.13 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.

6.4 Laboratory Measurement / Analysis

6.4.1 Analysis of suspended solids shall be carried out in a HOKLAS or other internationally accredited laboratory. Water samples of about 1,000 ml shall be collected at the monitoring stations for carrying out the laboratory SS determination. The detection limit shall be 1 mgL-1 or better. The SS determination work shall start within 24 hours after collection of the water samples. The SS determination shall follow APHA 17ed 2540D or equivalent methods subject to approval of DEP.

6.4.2 The testing laboratory shall be HOKLAS accredited (or if not, approved by the ER) and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results.

6.4.3 If a site laboratory is set up, or a non-HOKLAS and non-international accredited laboratory, is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control shall be approved by the DEP. All the analyses shall be witnessed by the ER and the IC(E). The ET Leader shall provide the ER and IC(E) with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" updated edition and any other relevant document for his reference.

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

6.5 Proposed Monitoring Locations

6.5.1 It is recommended to establish control and impact monitoring station approach to monitor water quality impact during construction phase. Control stations shall be selected to compare the water quality from potentially impacted sites with the ambient water quality. Hence, control stations shall be located within the same water body as the impact monitoring stations but outside the vicinity of the influence of the works and, as far as practicable, not affected by any other works.

6.5.2 The proposed water quality monitoring stations are shown in Table 6-2. The locations of the control stations (Stations C1 and C2) are set in the inlet points of the drainage channel “X” and

"Y" in the nearby catchment areas respectively. Corresponding impact stations (W1 and W2) are set at the outfall of drainage channel "X" and "Y". An additional impact station W3 was set at the downstream of the Tai River to monitor the quality of water discharging into Inner Deep Bay The monitorirng stations W1 and W2 at the upstream of Tai River can serve the purpose of control station of W3. Figure 6-2 presents the locations of the water quality monitoring stations.

Table 6-2 Locations of Water Quality Monitoring Stations

Phase	Monitoring Station ID	Category
Construction	C1	Control Station
	C2	Control Station
	W1	Impact Station
	W2	Impact Station
	W3	Impact Station

6.5.3 It is expected that the exact locations of the control and monitoring stations may need to be altered subject to the location of the construction work areas and the wastewater effluent discharge points from the site. The Contractor shall submit the wastewater effluent discharge plan as stipulated in the Water Discharge License to the ET and the ET shall change the corresponding monitoring points in accordance to the submission. The exact locations of the control and monitoring stations should also be confirmed by the ET taking into account factors such as accessibility, suitability, etc. The ET shall seek approval from the IC(E) and DEP on the monitoring locations proposed prior to the commencement of the baseline and construction phase sampling programme.

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

- at locations close to and preferably at the boundary of the mixing zone of the major site activities, which are likely to have water quality impacts;
- close to the sensitive receptors which are directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receptors, care should be taken to cause minimal disturbance during monitoring; and
- control station shall be selected at a location to allow a comparison of the water quality at the potentially impacted site with the ambient water quality. The control station shall be selected such that it is located within the same body of water as the impact monitoring station but is located outside the area of influence of the works.

6.5.5 At monitoring stations coincident with seawater intakes, the measurements should make reference to the vertical levels of the individual intake pipes. Where the water depth is less than 6 m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station shall be monitored. The ET Leader shall seek approval from the IC(E) and DEP on all monitoring station locations. Replicates in situ measurements and sample collected from each independent sampling event are required for all parameters to ensure a robust statistically interpretable dataset.

6.6 Baseline Monitoring

6.6.1 Baseline conditions of water quality should be established by the ET and agreed with IC(E) and DEP. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the works, to demonstrate the suitability of the proposed control and impact monitoring stations, and for establishment of the action and limit levels.

6.6.2 The baseline conditions should be established by measuring the water quality parameters specified in section 6.2.2 above. The measurements shall be taken at all the designated control and monitoring stations (i.e. Stations C1 and C2, W1, W2 and W3 respectively), 3 days a week, under two tidal conditions (mid-flood and mid-ebb) at 3 water depths, namely, 1 m below water surface, mid-depth and 1 m above seabed, for a period of 4 weeks prior to the commencement of construction works. Where the water depth is less than 6 m, the mid-depth station may be omitted. Should be water depth be less than 3 m, only the mid-depth station shall be monitored. The interval between two sets of monitoring shall not be less than 36 hours and the baseline monitoring schedule shall be submitted to EPD at least one week prior to the commencement of the baseline monitoring. Flow rates and sample depth shall also be recorded, where appropriate. Also, all seasonal variations such as rainfall, tidal flow, typhoons and shipping activities shall be assessed. The target is to collect sufficient data to enable the baseline situation, including background variation in water quality, to be quantified. Alternative proposal including the sampling frequencies proposed by the ET should be agreed with IC(E) and DEP in prior.

6.6.3 There shall not be any major construction activities in the vicinity of the stations during the baseline monitoring.

6.6.4 In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from EPD on an appropriate set of data to be used as baseline reference.

6.7 Impact Monitoring

6.7.1 During the course of the construction works, impact monitoring shall be undertaken three days per week, at mid-flood and mid-ebb tides, with sampling/measurement at the designated control and monitoring stations (i.e. Stations C1 and C2, W1, W2 and W3 respectively). The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency shall be increased.

6.7.2 Measurement shall be taken at 3 water depths, namely, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth less than 6 m, the mid-depth station may be omitted. Should the water depth be less than 3 m, only the mid-depth station shall be monitored.

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

6.7.4 Proposed water quality monitoring schedule shall be faxed to EPD at least 1 week before the first day of the monitoring month. EPD shall also be notified immediately for any changes in schedule by fax.

6.8 Event and Action Plan for Water Quality

6.8.1 The water quality criteria, namely Action and Limit levels shall be based on the results of baseline monitoring, the Water Quality Objectives, or based on the results of statistical analysis on the difference between impact monitoring results and 30% above control, and/or specific levels defined for the sensitive receivers. Should non-compliance of the action or limit levels occurs, the ET should review and identify the potential source(s) of the impact, devise and implement appropriate mitigate measures in a collaborative manner. The Action and Limit Levels for water quality is presented in Table 6-3.

6.8.2 When the monitoring results of the water quality parameters at any designated monitoring stations exceed the water quality criteria, the actions in accordance with the Event and Action Plan in Table 6-4 shall be carried out.

Table 6-3 Typical Action and Limit Levels for Water Quality

Parameters	Action	Limit
DO in mg/L (Surface, Middle & Bottom)	Surface & Middle 5%-ile of baseline data for surface and middle layer Bottom 5%-ile of baseline data for bottom layer	Surface & Middle 4 mg/L or 1%-ile of baseline data for surface and middle layer Bottom 2 mg/L or 1%-ile of baseline data for bottom layer
SS in mg/L (depth-averaged)	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 upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements
Turbidity (Tby) in NTU (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's Tby at the same tide of the same day	99%-ile of baseline or 130% of upstream control station's Tby at the same tide of the same day

Table 6-4 Event and Action Plan for Water Quality Monitoring

EVENT	ACTION			
	ET	IC(E)	ER	CONTRACTOR
ACTION LEVEL				
Action level being exceeded by one sampling day	1. Repeat in situ measurement to confirm findings; 2. Repeat in situ measurement to confirm findings; 3. Identify source(s) of impact; 4. Inform IC(E), contractor and ER; 5. Check monitoring data, all plant, equipment and Contractor's working methods; 6. Discuss mitigation measures with IC(E) and Contractor; and 7. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 2. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER; 6. Implement the agreed mitigation measures.
Action level being exceeded by two or more consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER and Contractor; 6. Ensure mitigation	1. Discuss with ET and Contractor on the mitigation measures. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 2. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented. 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and 4. Consider changes of working methods; 5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER within 3 working days; 6. Implement the agreed

	measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance.			mitigation measures.

EVENT	ACTION			
	ET	IC(E)	ER	CONTRACTOR
LIMIT LEVEL				
Limit level being exceeded by one sampling day	1. Repeat measurement on next of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER and Contractor;	1. Check monitoring data submitted by ET and Contractor's working methods; 2. Discuss with ET and Contractor on possible mitigation measures; and 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IC(E), ET and Contractor on the proposed mitigation; 3. Request Contractor to view the working methods; and 4. Ensure mitigation measures are properly implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET, IC(E) and ER and propose mitigation measures to ER and IC(E) within 3 working days; and 5. Implement the agreed mitigation measures.
Limit level being exceeded by two or more consecutive sampling days	1. Repeat measurement on next of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER and Contractor; 6. Ensure mitigation measures are implemented; and 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	1. Check monitoring data submitted by ET and Contractor's working methods. 2. Discuss with ET and Contractor on possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; and 4. Supervise the implementation of mitigation measures.	1. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Take immediate action to avoid further exceedance 2. Discuss with ET, IC(E) and ER and propose mitigation measures to ER and IC(E) within 3 working days; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; and 5. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

6.9 Control/ Mitigation Measures Addressing Water Quality Impact

6.9.1 The EIA report has recommended mitigation measures during the construction and operational phases of the Project. The implementation schedule for the recommended mitigation measures is presented in Appendix I.

Construction Phase

6.9.2 Control of potential water quality impact arising from the construction works shall be implemented based on the following principles:

- Minimisation of runoff;
- Prevention or minimisation of the likelihood of the identified pollutants being in contact with rainfall or runoff; and
- Measures to abate pollutants in the stormwater runoff.

6.9.3 Surface runoff and pollutant could be minimised by scheduling the foundation and WNR construction works during the dry seasons only (i.e. from December to April of the next year). During the dry seasons, the fishponds will have maximum spare capacity to allow temporary storage of pond water during re-profiling of the WNR so as to avoid the discharge of pond water. The Contractor should make best use of existing ponds for the purpose of temporary storage during bunds removal and realignment upon the construction of WNR. In addition, stormwater runoff will be reduced to minimum.

6.9.4 Besides, the Best Management Practices (BMPs) will be implemented in controlling water pollution during the construction phase. The guidelines for handling and disposal of construction site discharges as detailed in EPD's ProPECC Note PN1/94 "Construction Site Drainage" will be followed. The water pollution control measures that are considered most relevant to this Project are listed below which should be implemented by the Contractor during the execution of the site formation and road works, where practicable:

Runoff from Construction Site

1. High loading of suspended solids (SS) in construction site runoff shall be prevented through proper site management by the Contractor;
2. The boundary of critical work areas shall be surrounded by ditches or embankment. Accidental release of soil or refuse into the adjoining land should be prevented by the provision of site hoarding or earth bunds, etc. at the site boundary. These facilities should be constructed in advance of site formation works and roadworks;
3. Consideration should be given to plan construction activities to allow the use of natural topography of the site as a barrier to minimise uncontrolled non-point source discharge of construction site runoff;
4. Temporary ditches, earth bunds should be provided to facilitate directed and controlled discharge of runoff into storm drains via sand/ silt removal facilities such as sand traps, silt traps and sediment retention basin. Oil and grease removal facilities should also be provided where appropriate, for example, in area near plant workshop/ maintenance areas;
5. Sand and silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly by the contractor, and at the onset of and after each rainstorm to ensure that these facilities area functioning properly;
6. Slope exposure should be minimised where practicable especially during the wet season. Exposed soil surfaces should be protected from rainfall through covering temporarily exposed slope surfaces or stockpiles with tarpaulin or the like;
7. Access roads should be protected by crushed rock, gravel or other granular materials to minimise discharge of contaminated runoff;
8. Slow down water run-off flowing across exposed soil surfaces;
9. Plant workshop/ maintenance areas should be bunded and constructed on a hard standing. Sediment traps and oil interceptors should be provided at appropriate locations;

10. Manholes (including newly constructed ones) should be adequately covered or temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system;

11. Construction works should be programmed to minimise soil excavation works where practicable during rainy conditions;

12. Chemical stores should be contained (bunded) to prevent any spills from contact with water bodies. All fuel tanks and/ or storage areas should provided with locks and be sited on hard surface;

13. Chemical waste arising from the site should be properly stored, handled, treated and disposed of in compliance with the requirements stipulated under the Waste Disposal (Chemical Waste) (General) Regulation;

14. Drainage facilities must be adequate for the controlled release of storm flows.

15. Dredged materials requiring temporary storage on-site (for filling of marshland afterwards) should be securely stored and covered, if possible. Dried up mud materials can then be used for marshland formation.

Wastewater from Construction Site

1. Sewage generated from the construction workforce should be contained in chemical toilets before connection to public foul sewer can be provided. Chemical toilets should be provided at a minimum rate of about 1 per 50 workers. The facility should be serviced and cleaned by a specialist contractor at regular intervals;

2. Foul water from canteens should also be contained by chemical toilets before connection to public foul sewer can be provided;

3. Vehicle wheel washing facilities should be provided at the site exit such that mud, debris, etc. deposited onto the vehicle wheels or body can be washed off before the vehicles are leaving the site area;

4. Section of the road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains;

5. Bentonite slurries used in diaphragm wall and bore-pile construction, etc. should be reconditioned and reused as far as practicable. Spent bentonite should be kept in a separate slurry collection system for disposal at a marine spoil grounds subject to obtaining a marine dumping licence from EPD. If used bentonite slurry is to be disposed of through public drainage system, it should be treated to meet the respective applicable effluent standards for discharges into sewers, storm drains or the receiving waters.

Oils and Solvents

1. Spillage of fuel oils or other polluting fluids should be prevented at source. It is recommended that all stocks should be stored inside proper containers and sited on sealed areas, preferably surrounded by bunds.

Draining of Fishpond Water

1. Through transferring the pond water within the subject site, the need of discharging pond water into the surrounding water bodies during the construction of the Project can be minimized.

2. Any draining of fishpond water should be handled with prudence. Water quality should be checked and monitored to ensure that relevant water quality criteria can be complied with the requirements as stipulated in the EM&A programme.

3. Sedimentation tanks should be set up at the construction site so that water to be discharged can be retained for sedimentation if any discharging activity is considered necessary.

Operational Phase

6.9.5 The project proponent or the developer shall be responsible for the following measures:

Residential Development and Access Road

6.9.6 All domestic sewage generated will be discharged to the public sewerage. The drainage system will be designed to avoid any case of flooding based on the 1 in 50 years scenario with provision of treatment facilities including sand traps and oil interceptors. Temporary buffer containers should be provided to retain wastewater in case emergency discharge from sewage pump houses and sewer bursting discharge occur as a contingency measure.

6.9.7 Regular cleaning and sweeping of the access road and other paved areas are suggested so as to minimise exposure of pollutants to stormwater. Stormwater gullies and ditches provided along the access road and among the residential development will be regularly inspected.

6.9.8 Planter strips are provided along the access road and around the residential development where practicable. In the event of emergency (e.g. car accident) where there is a major spillage of oil, chemical or fuel, dispersants or fire fighting foam, etc., a system of contaminant bunding is recommended as far as practicable.

Wetland Nature Reserve

6.9.9 Best management practice will be adopted for the maintenance of the wetland and fishpond areas. Regular maintenance of fishponds will be exercised to remove excessive nutrients. Fish species will be carefully selected and the quantity will be controlled to avoid excessive fish farming as usually happened before the development of the Project.

6.9.10 A Wetland Nature Reserve management plan has been devised. No application of herbicides, or pesticides is considered necessary. Re-circulation pumping system will be provided for circulation of water between ponds and in turn to reduce the likelihood of overflowing of ponds due to even distribution of water volume.

6.9.11 Fishponds in the WNR will be self-contained. During normal operation, under the management of conservation manager, pond water will only be transferred within the WNR and the likelihood of pond water discharge will be minimal.

6.9.12 The temporary storage of water at the storage pond can allow sedimentation and removal of pollutants before discharge. It is particularly useful prior to wet season as cleaner water will be discharged to allow spare capacity for rainstorm.

6.9.13 The way to avoid overflow by intentional discharge upon the water quality, for example, is also recommended. Reed bed and alike can be provided in the marshland area to reduce nutrient discharge.

Mitigation Implementation Schedule

6.9.14 The implementation schedules of mitigation measures for water quality control during construction and operational phases are presented in Appendix I.

6.9.15 The effectiveness of these water quality control measures shall be checked by the EM&A requirements recommended in the above section. If the above measures are not sufficient to restore the water quality to an acceptable levels, the Contractor (during construction) or the project proponent (during operational phase) shall liaise with the ET Leader, propose to ER, and IC(E) for approval, on the implementation of some other mitigation measures.

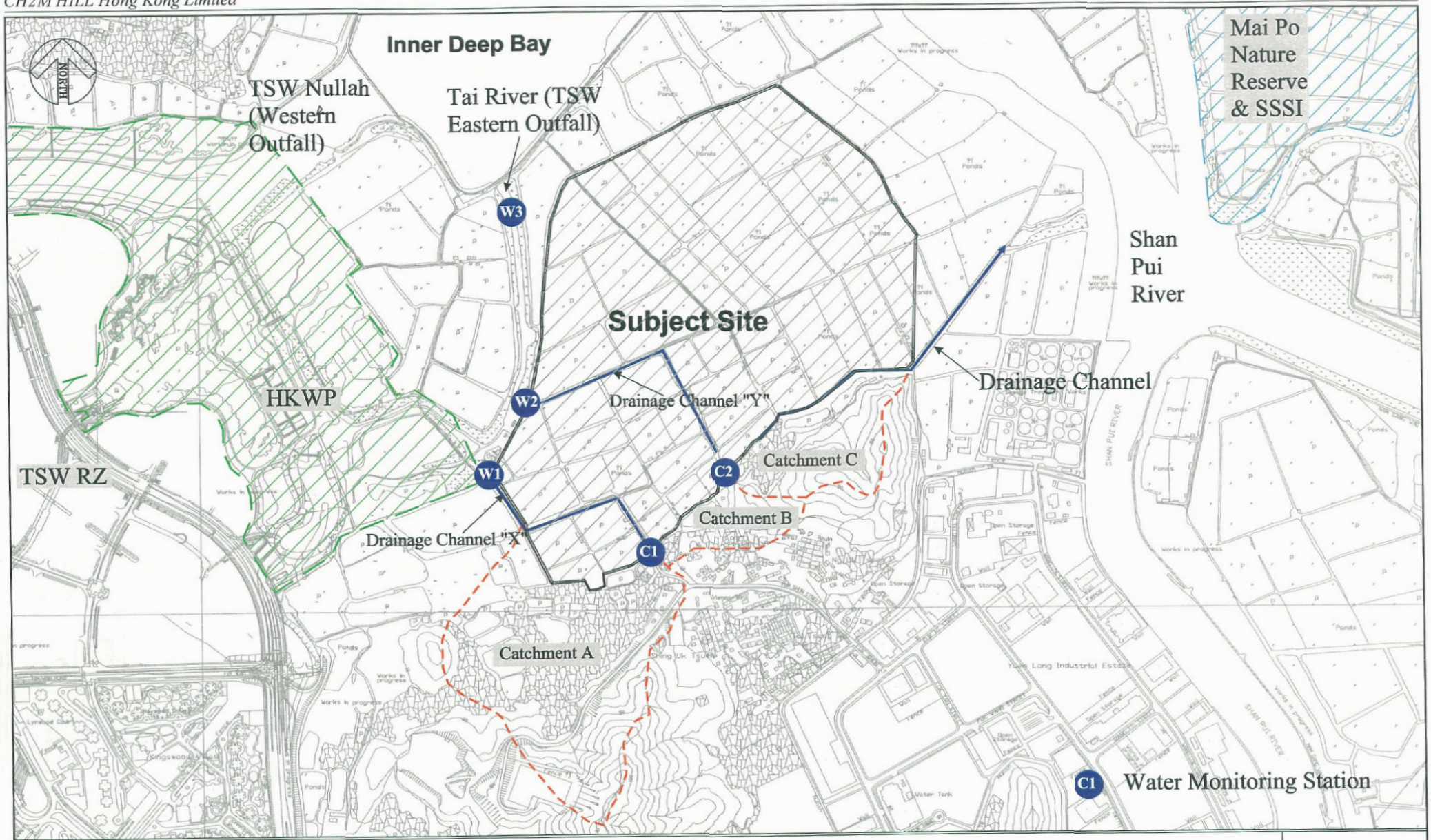
Water Quality Monitoring Field Record Sheet

Monitoring Location				
Date (dd/mm/yy)				
Start Time (hh:mm)				
Weather				
Sea Conditions				
Tidal Mode				
Water Depth (m)				
Monitoring Depth		Surface	Middle	Bottom
Salinity				
Temperature (°C)				
DO Saturation (%)				
DO (mg/L)				
Turbidity (NTU)				
Suspended Solids (SS) Sample Identification				
SS Laboratory Results* (mg/L)				
Observed Construction Activities	<100m from location			
	>100m from location			
Other Observations				

**The SS results are to be filled up once they are available from the laboratory*

	Name & Designation	Signature	Date (dd/mm/yy)
Recorded By			
Checked By			

CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	**Title:** Water Quality Monitoring Field Record Sheet	**Figure:** 6-1	**Scale:** -
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D. D. 123		



CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	Title: Locations of the Water Quality Monitoring Stations	Scale: NTS
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123	Figure: 6-2

7. CONSTRUCTION WASTE MANAGEMENT

7.1 Introduction

7.1.1 The Contractor is responsible for proper handling of construction and demolition material (C&DM), chemical waste and general refuse within the construction site, for disposal offsite, and to implement measures to minimise waste generation.

7.2 Mitigation Measures

7.2.1 The overall construction management strategy shall be minimisation of waste generation, coupled with maximum reuse and recycling of construction and demolition materials onsite or offsite as far as practicable. Contract requirements should include the responsibilities of the Contractor for waste collection and disposal. The following measures are recommended at this planning stage for proper handling of waste material during the construction phase.

Waste Management Plan

7.2.2 To ensure the appropriate handling of the C&DM, it is recommended that a Waste Management Plan (WMP) shall be proposed by the Contractor at the commencement of the construction works. The WMP should be developed taking into account the recommended control measures given in the EIA Report for the Project, which are summarised below. The WMP shall be submitted to the Engineer at the commencement of the Project for approval and submission to EPD as per the requirement of the Environmental Permit.

Overall Waste Management

7.2.3 Storage areas for different waste types - different types of waste should be segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. An on-site temporary storage area equipped with required control measures (e.g. dust) should be provided;

7.2.4 Trip-ticket system - in order to monitor the disposal of inert C&DM at public filling facilities and the remaining C&D waste to landfills, and control fly-topping, a trip-ticket system should be included as a contractual requirements and audited by the Environmental Team;

7.2.5 Records of Wastes - a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed;

7.2.6 Training - training should be provided to workers in respect of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling, and avoid contamination of reusable C&DM.

Construction & Demolition Material

7.2.7 "Selective demolition" approach is recommended to facilitate to avoid the mixing of reusable/ recyclable material with the waste requiring disposal;

7.2.8 Construction waste such as used wood from framework, surplus concrete, etc. is not expected to be in large quantity due to the nature of the roadwork;

7.2.9 Generation of surplus construction material is recommended to be minimised by the Contractor through careful design, planning, good site management, control of ordering procedures, segregation and reuse of material;

7.2.10 Maximise the reuse opportunities of excavated material onsite;

7.2.11 Proper disposal of inert excavated material offsite to public filling areas.

Chemical Waste

7.2.12 Chemical material generated shall be recycled/ reused onsite/ offsite as far as practicable;

7.2.13 Chemical waste requiring disposal shall be handled, collected and delivered to the Tsing Yi Chemical Waste Treatment Facility in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

General Refuse

7.2.14 General refuse shall be properly handled, collected and disposed of to avoid cross contamination and minimise potential odour, pest and litter impacts.

8. LANDSCAPE AND VISUAL

8.1 Introduction

8.1.1 The EIA has recommended the EM&A for landscape and visual resources is undertaken during the design, construction and operational phases of the project. The design, implementation and maintenance of landscape mitigation measures is a key aspect of this and should be checked to ensure that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest possible date and without compromise to the intention of the mitigation measures. In addition, implementation of the mitigation measures recommended by the EIA will be monitored through the site audit programme.

8.2 Mitigation Measures

8.2.1 The Landscape and Visual Assessment of the EIA recommended a series of mitigation measures for both the construction and operation phases to ameliorate the landscape and visual impacts of the Project. These measures include the following as shown in Table 8-1 and Table 8-2, which are also summarised in the environmental mitigation implementation schedules provided in Appendix I:

Table 8-1 Proposed Construction Stage Mitigation Measures

Mit. Code	Mitigation Measure
CP1	**Preservation of Existing Vegetation** - The development proposals would avoid disturbance to the existing trees as far as practicable within the confines of both the development site, Southern Development Access and the proposed Wetland Nature Reserve (WNR). It is recommended that a full tree survey and felling application will be undertaken and submitted for approval by the relevant government departments in accordance with WBTC No. 03/2006, Management and Maintenance of Natural Vegetation and Landscape Works, and Tree Preservation during the detailed design phase of the project. Where possible all trees which are not in conflict with the proposals would be retained and shall be protected by means of fencing where appropriate to prevent potential damage to tree canopies and root zones from vehicles and storage of materials. Specifications for the protection of existing trees will be circulated for approval by the relevant government authorities during the preparation of the detailed tree survey.
CP2	**Preservation of Existing Topsoil -** Topsoil disturbed during the construction phase will be tested using a standard soil testing methodology and where it is found to be worthy of retention stored for re-use. The soil will be stockpiled to a maximum height of 2m and will be either temporarily vegetated with hydroseeded grass during construction or covered with a waterproof covering to prevent erosion. The stockpile should be turned over on a regular basis to avoid acidification and the degradation of the organic material, and reused after completion. Alternatively, if this is not practicable, it should be considered for use elsewhere, including other projects.
CP3	**Development Site and Temporary Works Areas -** The landscape of these works areas would be restored following the completion of the construction phase. Construction site controls shall be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities are minimised including the storage of materials, the location and appearance of site accommodation and the careful design of site lighting to prevent light spillage. Screen hoarding may not be a practicable for this project due to the viewing distances involved and the elevated viewing position of the majority of VSRs.
CP4	**Mitigation Planting -** Replanting of disturbed vegetation should be undertaken at the earliest possible stage of the construction phase of the project and this should use predominantly native plant species. All imported plants should be quarantined in local nursery for a minimum of 1 month to check there are no symptoms of infection by pests or diseases prior to planting on site. It is proposed that the origin of the trees be

Mit. Code	Mitigation Measure
	established through site visits to the nursery. In addition, certain trees will be brought to a temporary holding nursery at a small size as early in the construction period as possible and grown to the semi-mature size required as part of the proposed mitigation planting. This nursery will be located either on site or within the local area.
CP5	**Transplantation of Existing Trees** - Existing trees to be transplanted as shown in the Landscape Master Plan *(*approximately 28 trees), final recipient site will subject to the findings of the detailed tree survey and felling application undertaken at the detailed design stage

Table 8-2 Proposed Operational Stage Mitigation Measures

Mit. Code	Mitigation Measure
OP1	**Design of Built Development** - the proposed residential development will incorporate design features including: • **Stepped building height principle** – The proposed residential blocks for Option 1A will range in height from 14 to 18 floors fronted by low-rise buildings in order to provide a greater sense of visual integration with the existing landscape context and mirror the form of the existing landform particularly the ridgeline to the south of the development site. The proposed built form will also provide a more visually interesting architectural form contrasting with the abrupt nature of the existing development associated with Tin Shui Wai. Whereas Option 1B will adopt a common height (15 storeys) for the blocks which will also be fronted by low-rise buildings which also serve to enhance the development's visual integration. • **Building massing and permeable development facade** - the proposed use of slightly higher building blocks for Option 1A has allowed the incorporation of significant view corridors and the creation of voids in the façade of each of the blocks allowing views through the development to the green backdrop formed by the wooded hillsides to the south. These view corridors and viods within the façade of each block also allow the development to avoid the walling effect evident in the existing developments to the south and west particularly when viewed from locations such as the development in the northern part of Tin Shui Wai. The adoption of a slightly lower building height for Option 1B will require the introduction of one additional block and a subsequent reduction in the width of the proposed view corridors. • **Maintenance of existing ridgeline and green backdrop** – the proposed development form allows the maintenance of the existing ridgeline and green backdrop to the south of the development site even in relatively close views. This is achieved in Options 1A and 1B through a combination of the building heights and the creation of the view corridors. • **Colour treatment of building facades** - the architectural design for both Option 1A and 1B seeks to reduce the apparent visual mass of the development further through the use of colour blocking utilising range of visually recessive earth colours and tones on the facades of the different blocks. • **Underground car parking** - the proposed development for Options 1A and 1B will utilise underground car parking in order to maximise the area available for landscaping and minimise potential impacts of extensive hard surfaced areas in elevated views both within and without the development site. • **Responsive building finishes** - In terms of the building finishes for Options 1A and 1B natural tones should be considered for the colour palette with non-reflective finishes are recommended on the outward facing building facades to reduce glare effect. • **Responsive lighting design** – Aesthetic design of architectural and road lighting with following glare design measures: - Directional and full cut off lighting is recommended particularly for recreation and roadside areas to minimise light spillage to the surrounding areas. - Minimise geographical spread of lighting, only applied for safety at the key access points and staircases;

Mit. Code	Mitigation Measure
	- Limited lighting intensity to meet the minimum safety and operation requirement; and - High pressure sodium road lighting is recommended for more stringent light control reducing spillage and thus visual impacts.
OP2	**Landscape Buffer Planting** – According to the guidelines provided in the Final Report of the Fish Pond Study at Deep Bay Area, the buffer area will extend around the periphery of the development to the proposed marsh habitat in WNR providing screening of the development at low levels and creating a transitional structure, not less than 50m wide, between the low-lying fishponds of the WNR and the upright forms of the proposed built development. This planting in addition to the proposed bamboo planting proposed as part of the ecological mitigation measures will also serve to visually integrate the proposals into the existing landscape framework. The buffer will utilise native tree species to link where possible to the existing wooded areas with the advantage of creating a more coherent landscape framework whilst also improving the ecological connectivity between existing woodland habitats. A woodland management programme will be employed during the operational phase of the project with the objective of conserving and enhancing the ecological interest (approximate area 3750 square metres equating to 750 trees at 2.5m planting centres). Apart from the landscape buffer planting, some limited tree clusters will be planted on bunds within the WNR to facilitate the establishment of habitat for different bird species. The primary objective of the tree planting within the WNR will be ecological in the creation of a favourable habitat for birds rather than for amenity purposes. As such within the fishpond or freshwater marshland area, trees will be planted in small clusters in positions designed not to intrude upon the bird flight lines, create enclosure or shade the marshland and fishponds. Some fruit-bearing trees, such as *Ficus hispida*, *Ficus microcarpa* and *Melia azedarach*, are recommended from ecological perspectives to enhance foraging opportunities for some bird species. Whilst wide canopied tree species such as *Ficus microcarpa* in combination with bamboo species such as *Bambusa eutuldoides* are recommended to be planted at the edge of the alternative egretry I in order to provide a favourable habitat for the egrets and screen the area from human activity.
OP3	**Landscape Strategy for the Design of Amenity Space** - The proposals are described in detail below (approximate area 3.4 ha).
OP4	**Compensatory Planting Proposals** - the planting proposals for the residential amenity areas and landscape woodland buffer areas presented as Figure 11-12, Landscape Master Plan include some 300 new specimen trees in addition to the 3750 square metres of mass woodland planting described under OP2 above would be established within the project boundary. The proposed planting of some 1050 trees will result in a compensatory planting ratio of 2.6:1 (new tree planting: trees recommended for felling). This compares favourably with the report's assertion that some 399 trees would be felled due to the proposals in this area. Following the retention of existing trees, the successful establishment of newly planted trees and the transplantation of some of the existing trees, the project area will contain approximately 1316 trees. Trees forming part of the landscape buffer area will utilise species native to Hong Kong while the species selection for the areas within the development site will respond to the landscape concept for the area. These proposals will be subject to the detailed design stage of the project.
OP5	**Southern Development Access** – the landscape of the road corridor will be restored to its existing condition following the completion of the road enhancement works.

8.3 Design Phase Audit

8.3.1 The landscape measures proposed within the EIA to mitigate the landscape and visual impacts of the scheme should be embodied into the detailed landscape design drawings and contract documents including the protection of existing trees where possible, the transplanting of existing trees and the planting of new trees and shrubs. Designs should be checked to ensure that the measures are fully incorporated and that potential conflicts with building, civil engineering, geo-technical, structural, lighting, signage, drainage, underground utility and operational requirements are resolved prior to construction.

8.3.2 The design phase EM&A requirements for landscape and visual resources comprise the audit of the detailed landscaping and visual specifications to be prepared during the detailed design together with ensuring that the design is sensitive to landscape and visual impacts and that landscape resources are retained as far as practicable. Monitoring of design works against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken as and when the designs are produced to ensure that they fulfil the intentions of the mitigation measures.

8.3.3 The landscape and visual auditor shall review the designs as and when they are prepared and liaise with the landscape architect and design engineer to ensure all measures have been incorporated in the design in a format that can be specified to the Contractor for implementation. In the event of a non conformity, the Event/Action plan as detailed in Table 8-3 below should be followed.

Table 8-3 Event / Action Plan for Design Phase

Action Level	Landscape and Visual Auditor	Project Architect (PA)/ Project Engineer (PE)	Project Landscape Architect (PLA)
Non Conformity (with Design Standards and Specification)	1. Identify Source; 2. Inform PA, PE and PLA; 3. Discuss remedial actions with PA,PE, PLA; and 4. Verify remedial actions when complete.	1. Amend building or engineering designs; 2. Notify PLA; 3. Discuss remedial actions with PLA; and 4. Ensure remedial designs are fully incorporated.	1. Amend landscape designs; and 2. Discuss remedial actions with PA and PE.

8.4 Baseline Monitoring

8.4.1 Baseline monitoring for the landscape will comprise a vegetation survey of the vegetation and trees on the site. Representative vegetation types will be identified along with typical species composition.

8.4.2 The landscape and visual baseline will be determined with reference to the landscape and visual impact assessments included in the EIA Report.

8.5 Construction and Operational Phase Audit

8.5.1 A specialist Landscape Sub-Contractor should be employed by the Contractor for the implementation of landscape construction works and subsequent maintenance operations during the 12 month establishment period. It is proposed that as the majority of the planting works in the area not to be development initially, the planting should be conducted within the first half of the construction contract. Thus, the establishment works will be undertaken through the latter half of the construction contract. The intention is to provide at least 12 months establishment period for the majority of the planting works.

8.5.2 All measures undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the construction phase and first year of the operational phase shall be audited by a Registered Landscape Architect, as a member of the environmental auditing team, on a regular basis to ensure compliance with the intended aims of the measures. Site inspections should be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase. The broad scope of the audit is detailed below but should also be undertaken with reference to the more specific checklist provided in Table 8-4. Operational phase auditing will be restricted to the last 12 months of the establishment works of the landscaping proposals and thus only the items below concerning this period are relevant to

the operational phase.

- The extent of the agreed works areas should be regularly checked during the construction phase. Any trespass by the Contractor outside the limit of the works, including any damage to existing trees shall be noted;
- The progress of the engineering works should be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken;
- All existing trees and vegetation within the study area which are not directly affected by the works are retained and protected;
- The methods of protecting existing vegetation proposed by the Contractor are acceptable and enforced;
- Preparation, lifting transport and re-planting operations for any transplanted trees;
- All landscaping works are carried out in accordance with the specifications;
- The planting of new trees, shrubs, groundcover, climbers, ferns, grasses and other plans, together with the replanting of any transplanted trees are carried out properly and within the right season; and
- All necessary horticultural operations and replacement planting are undertaken throughout the Establishment Period to ensure the healthy establishment and growth of both transplanted trees and all newly established plants.

Table 8-4 Construction / Operational Phase Audit Checklist

Area of Works	Items to be Monitored
Advance planting	• Monitoring of implementation and maintenance of planting, and against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Protection of all trees to be retained	• Identification and demarcation of trees / vegetation to be retained; • Creation of precautionary area around trees to be retained equal to half of the trees canopy diameter and fenced the precautionary area; • Prohibition of the storage of materials including fuel, the movement of construction vehicles, and the refuelling and washing of equipment including concrete mixers within the precautionary area; • Phased segmental root pruning for trees to be retained over a suitable period (determined by species and size) prior to lifting or site formation works which affect the existing rootball of trees identified for retention. The extent of the pruning will be based on the size and the species of the tree in each case; • Pruning of the branches of existing trees identified for retention to be based on the principle of crown thinning maintaining their form and amenity value; • The watering of existing vegetation particularly during periods of excavation when the water table beneath the existing

Area of Works	Items to be Monitored
	vegetation is lowered; and • The rectification and repair of damaged vegetation following the construction phase to its original condition prior to the commencement of the works or replacement using specimens of the same species, size and form where appropriate to the design intention of the area affected.
Clearance of existing vegetation	• Identification and demarcation of trees / vegetation to be cleared; and • Checking of extent of works to minimise damage, monitoring of adjacent areas against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Transplanting of trees	• Identification and demarcation of trees / vegetation to be transplanted; • Phased segmental root pruning for trees to be transplanted over a suitable period (determined by species and size) prior to lifting or site formation works which affect the existing rootball of trees identified for retention. The extent of the pruning will be based on the size and the species of the tree in each case; • Pruning of the branches of existing trees identified for transplantation to be based on the principle of crown thinning maintaining their form and amenity value; and • Monitoring of extent of pruning / lifting works to minimise damage, timing of operations, implementation of all stages of preparatory and translocation works, and maintenance of transplanted vegetation, etc.
Plant supply	• Monitoring of operations relating to the supply of specialist plant material (including the collecting, germination and growth of plants from seed) to ensure that plants will be available in time to be used within the construction works.
Soiling, planting, etc.	• Monitoring of implementation and maintenance of soiling and planting works and against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Decorative treatment of site hoarding	• Implementation and maintenance, to ensure compliance with agreed designs.
Architectural design and treatment of building and associated engineering works.	• Implementation and maintenance of mitigation measures, to ensure compliance with agreed designs.
Establishment Works	• Monitoring of implementation of maintenance operations during Establishment Period
Lighting operation and management scheme	• Implementation and maintenance of mitigation measures during operation phase, to ensure compliance with agreed designs.

8.5.3 In the event of non compliance the responsibilities of the relevant parties is detailed in the Event /Action plan provided on *Table 8-5*.

Table 8-5 Responsibilities of Parties in the Event of Non-compliance

Action Level	Environmental Specialist (ES)	Independent Checker (Environmental) (IC(E))	Franchisee's Site Representative (FSR)	Contractor
Non-conformity on one	1. Identify Source;	1. Check report; 2. Check the	1. Notify Contractor;	1. Amend working

Action Level	Environmental Specialist (ES)	Independent Checker (Environmental) (IC(E))	Franchisee's Site Representative (FSR)	Contractor
occasion	2. Inform the Contractor, IC(E) and the FSR; 3. Discuss remedial actions with the IC(E), the FSR and the Contractor; and 4. Monitor remedial actions until rectification has been completed	Contractor's working method; 3. Discuss with the ES and the Contractor on possible remedial measures; 4. Advise the FSR on effectiveness of proposed remedial measures; and 5. Check implementation of remedial measures.	and 2. Ensure remedial measures are properly implemented.	methods; 2. Rectify damage and undertake any necessary replacement.
Repeated Non-conformity	1. Identify Source; 2. Inform the Contractor, ICE and the FSR; 3. Increase monitoring frequency; 4. Discuss remedial actions with the IC(E), the FSR and the Contractor; 5. Monitor remedial actions until rectification has been completed; and 6. If exceedance stops, cease additional monitoring.	1. Check monitoring report; 2. Check the Contractor's working method; 3. Discuss with the ES and the Contractor on possible remedial measures; 4. Advise the FSR on effectiveness of proposed remedial measures; and 5. Supervise implementation of remedial measures.	1. Notify the Contractor; and 2. Ensure remedial measures are properly implemented.	1. Amend working methods; and 2. Rectify damage and undertake any necessary replacement.

9. ECOLOGICAL MITIGATION

9.1 General Requirements

9.1.1 Five main categories of potential ecological impacts on habitats and Species of Conservation Importance were identified as follow:

- Temporary habitat loss resulting from construction phase disturbance;
- Permanent habitat loss associated with the construction of the residential development and a disturbance area around the site associated with operation of the site;
- Habitat fragmentation arising from the construction of the residential development and erection of fencing;
- Pollution events arising from construction activities; and
- Pollution events arising from sewerage leaks during site operation.

9.1.2 Of these, the permanent habitat loss associated the construction and operation of the residential development is the most significant because it will potentially have a high impact on habitats of high conservation value (aquaculture ponds) and Species of Conservation Importance.

9.1.3 The key strategy for mitigating permanent and temporary habitat loss is the construction and appropriate management of a Wetland Nature Reserve (WNR). In addition to creating this freshwater marsh habitat, enhancement and management of the remaining fishponds will increase their carrying capacity for bird Species of Conservation Importance.

9.1.4 The strategy for constructing the WNR has been carefully considered and incorporates the following strategic elements:

- Advance construction. WNR construction works completed before commencement of Residential Development construction;
- Staged construction. Staged construction of the WNR;
- Interim management. Ensuring the carrying capacity of areas unaffected by construction is sufficient to maintain populations of Species of Conservation Importance (during WNR and Residential Development construction phases); and
- Long-term management. Once construction works are completed and the Residential Development enters its operational phase, long-term management within the WNR will commence.

9.1.5 The key objective of mitigation is to maintain the functional capacity of the Fung Lok Wai wetlands during construction and operation. Details of the mitigation measures are presented in Section 13.9 of the EIA with key information extracted in the following sections for ease of reference.

Mitigation of Construction Phase Habitat Loss and Disturbance

9.1.6 Interim management of ponds that are not directly affected by construction activities will be required to increase the carrying capacity within remaining habitat. Mitigation targets will be agreed and the method to achieve these can be found in Section 13.9 of the EIA. In summary, a flexible approach is required to increasing food availability for key piscivorous waterbird Species of Conservation Importance, paying particular attention to water quality, adjustment to stocking densities, periodic review of the timing and duration of draw-down and continuous monitoring.

Mitigation of Operational Phase Habitat Loss and Disturbance

9.1.7 During the operational phase of the development, disturbance is predicted to be lower and mitigation will be achieved through the long-term management of the WNR. The key strategy for compensating the functional loss of wetland arising from the ongoing operation of the residential development is the long-term management of the WNR. Mitigation targets will be agreed and targets achieved by enhancement of the carrying capacity of those fishponds unaffected by disturbance effects as a precautionary approach is taken assuming unavailability of the marsh habitat within the WNR. Details can be found in the Draft Habitat Conservation and Management Plan for the proposed Wetland Nature Reserve (Section 14 of the EIA).

Residual Disturbance during Operation of Wetland Nature Reserve

9.1.8 Several measures will be taken to reduce human disturbances. These include locking gates at vehicle access points and erecting a wall between the WNR and residential area, while reviewing fish farming activities in the WNR.

Mitigation for Disturbance to Egretry

9.1.9 In the event that herons and egrets resume to the abandoned egretry at Shing Uk Tsuen, mitigation by relocation of the egretry within the WNR. A successful, early establishment by the planting of appropriate trees, shrubs and tall grass species would compensate for any potential impact caused by construction and subsequent interference with flightlines. Drawn out fish ponds will be used to provide foraging habitats.

Mitigation for Non-disturbance Impacts

Minimisation of Dust Deposition

9.1.10 Minimisation of dust deposition will be accomplished using standard procedures (detailed in Section 4.8 of this Manual), such as damping down using water spray during dry weather periods.

Minimisation of Increased Sediment Load

9.1.11 Effective management and maintenance programmes are expected to adequately control potential impacts from this source.

Minimisation of Pollution

9.1.12 Good storage practices and handling of the chemicals used during the construction period will minimise the opportunity for impact on the terrestrial and aquatic environments, while regular maintenance of interceptors will maximise efficiency of trapping pollutants.

Soil Compaction

9.1.13 During construction, the extent of the area to be compacted for works should be minimised and re-instated once the works in that area are completed, re-establishing that environment as similar as possible to the original habitat.

Bird Strikes with Glazed Towers

9.1.14 This issue is taken into consideration in the mitigation of landscape and visual impacts and through the design of the residential towers and the use of non-reflective glass.

Mitigation for Non-bird Species

9.1.15 Currently the Study Site has a low diversity of habitats and non-bird taxa. However, the mitigation proposed has been designed to provide additional habitat for non-target species such as odonata, amphibians, bats, fish, invertebrates, snakes, otters and mongoose.

9.1.16 Re-profiling bunds encourage aquatic and marginal plants, enhancing ponds by creating shallow gently sloping areas and deeper steeper areas, and not stocking some ponds with carnivorous or

omnivorous fish, should encourage damselflies and amphibians. Creation of the freshwater marsh and management of native plant species will improve the water quality for freshwater fish. Extra cover provided within the freshwater marsh, a reduction in on-site disturbance and more stringent guidelines on sympathetic management practices should encourage Eurasian Otter and Crab-eating Mongoose and lower disturbance to breeding Mangrove Water Snakes.

9.2 Ecological Monitoring

9.2.1 The following defines the ecological monitoring requirements to establish that mitigation measures are implemented and meet required standards of effectiveness so that overall ecological impacts are within acceptable limits. As the proposed Wetland Nature Reserve is the key mitigation measure for the Residential Development, the focus of monitoring will be on evaluating the performance of the habitats within this area, particularly with respect to the abundance and richness of bird Species of Conservation Importance they support during construction and operation.

Pre-construction Monitoring

9.2.2 As indicated in the EIA Report it is considered that in the period since completion of the baseline surveys that bird activity at Fung Lok Wai is likely to have declined (due to a reduction in management activity and the abandonment of the Shing Uk Tsuen egretry). To confirm that the existing baseline data provide an appropriate basis for setting mitigation targets, pre-construction surveys of bird populations at Fung Lok Wai will be undertaken after obtaining the planning approval and application of the lease modification / land exchange. These surveys will involve monthly counts of each pond within the Study Site for one year prior to the commencement of construction activities. The extent and timing of these surveys will, however, be agreed with AFCD prior to their commencement. All bird species observed within each pond will be recorded. Particularly attention will be given to key bird Species of Conservation Importance that are specifically identified in the mitigation targets outlined above. Once these surveys are completed specific mitigation targets will be agreed with AFCD.

Construction Phase Monitoring

9.2.3 The start of the construction phase is dependent on the approval of the EIA and the preparation of a detailed project timetable. Detailed ecological monitoring will be undertaken from the commencement of works.

9.2.4 During construction works an interim management regime will be implemented within the enhanced fishponds of the WNR. Targets for key birds species during this period are shown in Table 9-1. These species have been selected because they are considered to be the most sensitive or abundant waterbird species and hence most susceptible to impacts arising from habitat loss and disturbance. It is expected that habitat management undertaken to achieve the mitigation targets defined for these species will be more than sufficient to mitigate impacts on other species that are less sensitive to disturbance or which occur in lower numbers.

Table 9-1 Mitigation targets for key wetland bird species of conservation importance within remaining wetland areas of the Study Site required to fully compensate for habitat loss and disturbance impacts during construction

Species	Mitigation target (population increase)	Implied target densities (birds/ha) using existing baseline data[1]
Black-faced Spoonbill	Double	0.07
Chinese Pond Heron	Increase by 61%	0.22
Great Cormorant[2]	Double	0.12
Great Egret	Double	0.54
Grey Heron	Increase by 61%	0.27
Little Egret	Increase by 92%	1.41
Cattle Egret	Increase by 33%	0.28

Notes:

[1] The figures included for reference only. The actual mechanism for identifying targets is to be agreed with AFCD

[2] If Great Cormorant numbers exceed mitigation targets it may be necessary to implement controls on the size of the population. The implementation of such controls will be determined in the context of the Adaptive Management framework and in discussion with AFCD

9.2.5 In practice, because the populations of these species will fluctuate within the North-west New Territories due to a range of external factors beyond the control of the developers, the targets densities will be calculated using information obtained from control site locations. These control sites will be established in appropriate locations, that is, locations that are known to support similar communities and populations of birds to those found at Fung Lok Wai. In line with the adaptive management framework within which management will take place, the outcomes of monitoring are explicitly linked back to management. That is, decisions about appropriate management will be informed directly by performance of the WNR as indicated by the data obtained through monitoring.

9.2.6 Although the key focus during the construction phase will be the achievement of the bird densities identified in Table 9-1, management will also aim to encourage the presence of three snake species listed in Table 9-2.

Table 9-2 Mitigation Targets for Enhanced Aquaculture Pond Species (other than birds)

Species	**Mitigation target**
Common Rat Snake	Present
Indo-Chinese Rat Snake	Present
Mangrove Water Snake	Present

9.2.7 During the construction phase monitoring of bird populations will be undertaken on a weekly basis within ponds under interim management. Monitoring frequency can be increased during specific management activities such as pond draw down. During establishment of the freshwater marsh monitoring surveys of the freshwater marsh will be undertaken weekly. The selection of control sites, details of the monitoring survey methodology and arrangements for reporting on the outcomes of monitoring shall be agreed with AFCD prior to commencement of construction activities.

9.2.8 In addition surveys of other ecological attributes (biological, physical and chemical) of both aquaculture ponds and freshwater marsh habitats to monitor their status and to establish baseline information. Details of proposed monitoring are listed in Table 9-3 . The proposed monitoring

will be undertaken at the locations and according to the methodology documented in Standard Operating Procedures.

Table 9-3 Ecological monitoring programme for Fung Lok Wai WNR (Construction Phase)

Ecological attribute	Number of measurements	Timing	Frequency of measurement
Habitats			
Vegetation map	All of WNR	Wet and dry season	On completion of construction works
Plant species			
Survival, health and growth of plant species planted	*Aquaculture ponds*: Visual assessment of all areas		Monthly for one year on completion of enhancement works
	Constructed marsh habitat: 100 randomly marked plants in each planting zone		Weekly for first 2 months after planting, then monthly for remainder of the first year
Plant species richness, relative abundance and cover Frequency and cover of alien and invasive plant species	*Aquaculture ponds:* Continuous visual assessment		Continuous
	Constructed marsh habitats: Ten 1m x 1m quadrats per planting zone Continual visual assessment of alien and invasive species abundance will also be conducted by the WNR management staff	Wet and dry season	6 monthly during establishment
Dragonflies: species richness and abundance	Establish representative transects throughout WNR	March – November	During interim management period: Monthly during March, September, October and November. Twice monthly during April – August
Aquatic invertebrates: species richness and abundance	*Aquaculture ponds*: Five benthic cores and dip nets within 5 fish ponds	End of wet season (Aug / Sept)	Annually during interim management period
	Constructed marsh habitat: Five benthic cores and dip nets at five locations	Wet and dry seasons	During establishment: 6 monthly during wet and dry season
Freshwater fish: species richness and abundance	*Aquaculture ponds*: Record species, abundance, average		Every two months (throw and drag netting)

Ecological attribute	Number of measurements	Timing	Frequency of measurement
	length and average mass of all species removed at harvesting		during interim management period
	Constructed marsh habitat: Netting within representative areas of the permanent marsh		Every two months (throw and drag netting) during establishment
Amphibians: species richness and abundance	Establish representative transects throughout WNR	April – November	During interim management period: monthly during period April - November
Reptiles: species richness and abundance	Establish representative transects throughout WNR	April – November –	During interim management period: monthly during period April - November
Birds: species richness and abundance (see above for specific details on bird monitoring)	*Aquaculture ponds:* Each pond		Weekly during interim management period
	Constructed marsh habitat: Each marsh type (ie seasonal marsh and permanent marsh)		Weekly during interim management period
Hydrology			
Water surface level	*Aquaculture ponds:* One gauge board per pond		Daily during interim management period
	Constructed marsh habitat: Two gauge boards per marsh type		Daily during establishment
Water chemistry			
Water quality variables: pH BOD DO Ammonia concentration Conductivity Turbidity Temperature Suspended solids Salinity	*Aquaculture ponds*		Monthly during interim management period
	Constructed marsh habitat: At representative locations within each marsh habitat		Monthly during establishment
Water quality variables: Total oxidised nitrogen Total phosphorus concentration Orthophosphate concentration	*Aquaculture ponds*		Once on completion of enhancement works
	Constructed marsh habitat: At representative locations within each marsh habitat		Once on completion of construction works

Ecological attribute	Number of measurements	Timing	Frequency of measurement
Heavy metals (Cadmium, Copper, Nickel, Lead, Zinc, Mercury)	*Aquaculture ponds*: Representative aquaculture ponds adjacent to the active construction area		Once on completion of works
	Constructed marsh habitat: At representative locations within each marsh habitat		Once on completion of works

Operation Phase

9.2.9 Once construction is completed the WNR will be managed according to the long-term management plan outlined in the HCMP. The following outlines the monitoring requirements to ensure that the WNR is achieving its objectives during its long-term operation. Prior to the implementation of long-term monitoring, survey methods and frequency will be reviewed in light of the outcomes of construction phase monitoring.

9.2.10 In line with the adaptive management framework within which management will take place, the outcomes of monitoring are explicitly linked back to management. That is, decisions about appropriate management will be informed directly by performance of the WNR as indicated by the data obtained through monitoring.

9.2.11 Targets have been set for habitats that will form part of the WNR. The specific aquaculture pond habitat targets for the mitigation area are indicated in Table 9-4

Table 9-4 Mitigation Targets for Enhanced Aquaculture Ponds

Mitigation issue	Target
Enhancement of aquaculture pond area	61.7 ha. (including bunds, control structures and potential alternative egretry)
Shallow fish pond area (i.e. < 10cm depth)	More than 20% (excluding aquaculture ponds that are dry for maintenance)
Cover of undesirable invasive species and exotic species	Less than 10% of vegetation cover (excluding open water marsh area)
Plant cover on bunds and islands (in aquaculture ponds)	Vegetation of height >10cm to comprise less than 5% plant cover on more than 75% of the area of aquaculture pond bunds and islands
Area under traditional polyculture fish pond management systems	70-90% of the fish pond area (Excluding bunds and ponds that are dry for maintenance)
Area set-aside from fish farming and under specific conservation management	10 - 30% of the fish pond area (Excluding bunds and ponds that are dry for maintenance)

9.2.12 A key objective of the management of enhanced aquaculture ponds is the achievement of the bird densities indicated in Table 9-5 (targets for marshland species are dealt with separately below) which shows the increase in the population required to mitigate disturbance effects during the operational phase of the development. Using the results of the baseline surveys the densities (ie birds per hectare of wetland) implied by these mitigation targets are shown. Species with low target densities (including Greater Spotted Eagle, Imperial Eagle, Osprey and Crested Serpent Eagle which recorded very infrequently and have a limited dependence on the site) have not been included in this table. It should be noted that these targets are intended as a reference

point to inform the implementation and evaluation of mitigation, which will need to be undertaken using an adaptive management approach.

Table 9-5 Mitigation targets for key wetland bird species of conservation importance within enhanced aquaculture ponds during the operational phase

Species	Mitigation target (population increase)[1]	Implied target densities (birds/ha) using existing baseline data[2]
Black-faced Spoonbill	Increase by 45%	0.05
Chinese Pond Heron	Increase by 32%	0.18
Great Cormorant[3]	Increase by 41%	0.08
Great Egret	Increase by 45%	0.37
Grey Heron	Increase by 32%	0.22
Little Egret	Increase by 33%	0.98
Cattle Egret	Increase by 32%	0.27

Notes:

[1] For these calculations it is assumed that mitigation will be achieved only through management to increase the carrying capacity of those fishponds unaffected by operational disturbance

[2] The figures included for reference only. The actual mechanism for identifying targets is to be agreed with AFCD prior to the commencement of construction

[3] If Great Cormorant numbers exceed mitigation targets it may be necessary to implement controls on the size of the population. The implementation of such controls will be determined in the context of the Adaptive Management framework and in discussion with AFCD

9.2.13 These key species have been selected because they are considered to be the most sensitive and abundant waterbird species and hence most susceptible to impacts arising from habitat loss and disturbance. It is expected that habitat management undertaken to achieve the mitigation targets defined for these species will be more than sufficient to mitigate impacts on other species that are less sensitive to disturbance and which occur in lower numbers.

9.2.14 In practice, because the populations of these species will fluctuate within the north-west New Territories due to a range of external factors beyond the control of the developers, the targets densities will be calculated using information obtained from control site locations. These control sites will be established in appropriate locations, that is, locations that are known to support similar communities and populations of birds to those found at Fung Lok Wai.

9.2.15 During the operation phase monitoring of bird populations will be undertaken on a weekly basis within aquaculture ponds and the freshwater marsh. More frequent monitoring may be required during specific tasks (eg pond draw down). Prior to implementation of long term monitoring, survey methods and frequency will be reviewed in light of the outcome of construction monitoring.

9.2.16 Although the key focus of mitigation works within aquaculture ponds is an increase in bird densities (see below), management will also aim to encourage the presence of those non-avian species listed in Table 9-6.

Table 9-6 Mitigation Targets for Enhanced Aquaculture Pond Species (other than birds)

Species	Mitigation target
Common Rat Snake	Present
Indo-Chinese Rat Snake	Present
Mangrove Water Snake	Present

9.2.17 In addition to aquaculture ponds targets have also been set for habitats and species associated with the freshwater marsh habitats that will be created within the WNR. The specific targets for the Marsh Habitat mitigation area are indicated in Table 9-7.

Table 9-7 Mitigation Targets for Marsh Habitat

Mitigation issue	Target
Creation and maintenance of a total of marshland habitat in Favourable Condition	14.4 ha. (including essential structures, e.g. water control structures and other habitats eg bunds) Freshwater marsh habitats are defined as areas where wetland hydrological conditions, or wetland soils are present or where wetland plants are dominant, with shallow water (average < 1m) and wetland plant species cover greater than 30% of the area.
Cover of wetland plant species	More than 90% established vegetation
Cover of undesirable invasive species and exotic species	Less than 10% of vegetation cover
The average depth of water	30 – 50 cm (outside drawn down periods for maintenance)
Area of open water (i.e. unvegetated water)	20-30%.

9.2.18 As the Marsh Habitat will be new habitat there are no existing animal populations associated with marsh habitats upon which to base mitigation targets. In addition it is anticipated that the Marsh Habitat will be subject to disturbance arising during the operation phase due to its proximity to the residential development. Nevertheless there are a range of species that would be expected to use the Marsh Habitat. Management of the marsh habitats will focus on ensuring that these "primary" species (see Table 9-8) are present. In addition there are a range of other species that are associated with marsh habitats ("secondary species"). Whilst it is desirable that these species are present, they will not form the primary focus of management effort.

Table 9-8 Bird Species Expected to use the Marsh Habitat

Primary Species (Presence expected)	Secondary Species (Presence desirable)
Birds	
Little Egret (R)	Japanese Quail (P / W)
Chinese Pond Heron (R)	Eurasian Coot (W)
Great Egret (W)	Pheasant-tailed Jacana (P)
Grey Heron (W)	Greater Painted Snipe (R)
Eurasian Teal (W)	Black-winged Stilt (B)
Black-winged Stilt (W)	Richard's Pipit (P / W)
Pintail / Swinhoe's Snipe (P / W)	Bluethroat (P / W)
Common Snipe (W)	Pallas's Grasshopper Warbler (P)
Zitting Cisticola (W)	

Key: R – resident; W – winter; P – passage; B - breeding

9.2.19 To ensure that these targets are achieved, a monitoring programme will be carried out of the ecological attributes listed in Table 9-9 according to the locations and methodology documented in Standard Operating Procedures that will be produced prior to the implementation of monitoring.

Table 9-9 Ecological monitoring programme for Fung Lok Wai WNR (Operation Phase)

Ecological attribute	Number of measurements	Timing	Frequency of measurement
Habitats			
Vegetation map	All of WNR	Wet and dry season	After completion of construction works survey every 6 months (wet and dry season) for first 5 years at which point frequency of survey will be reviewed
Plant species			
Survival, health and growth of plant species planted	*Aquaculture ponds*: Visual assessment of all areas		Annually thereafter
	Constructed marsh habitat: 100 randomly marked plants in each planting zone		Quarterly in second year after planting then annually thereafter
Plant species richness, relative abundance and cover Frequency and cover of alien and invasive plant species	*Aquaculture ponds:* Continuous visual assessment		Continuous
	Constructed marsh habitats: Ten 1m x 1m quadrats per planting zone Continual visual assessment of alien and invasive species abundance will also be conducted by the WNR management staff	Wet and dry season	6 monthly (wet and dry season) for first 5 years at which point frequency of survey will be reviewed
Dragonflies: species richness and abundance	Establish representative transects throughout WNR	March – November	During long-term management period: Monthly during March, September, October and November. Twice monthly during April – August. Frequency of monitoring to be reviewed after 5 years.
Aquatic invertebrates: species richness and abundance	*Aquaculture ponds*: Five benthic cores and dip nets within 5 fish ponds	End of wet season (Aug / Sept)	Annually
	Constructed marsh habitat: Five benthic cores and dip nets at five locations	Wet and dry seasons	Thereafter 6 monthly during wet and dry seasons. Frequency of monitoring to be reviewed after 5 years.
Freshwater fish: species richness and abundance	*Aquaculture ponds*: Record species, abundance, average length and average mass of all species removed at harvesting		Annually at harvesting and every two months (throw and drag netting). Frequency of monitoring to be reviewed after 5 years.
	Constructed marsh habitat: Netting within representative areas of the permanent marsh		Thereafter every two months (throw and drag netting). Frequency of monitoring to be reviewed after 5 years.

Ecological attribute	Number of measurements	Timing	Frequency of measurement
Amphibians: species richness and abundance	Establish representative transects throughout WNR	April – November	Thereafter monthly during period April – November. Frequency of monitoring to be reviewed after 5 years.
Reptiles: species richness and abundance	Establish representative transects throughout WNR	April – November –	Thereafter monthly during period April – November. Frequency of monitoring to be reviewed after 5 years.
Birds: species richness and abundance (see above for specific details on bird monitoring)	*Aquaculture ponds:* Each pond		Weekly monitoring supplemented by opportunistic records at other times. More frequent monitoring may be required during specific mamagement activities (eg pond draw down)
	Constructed marsh habitat: Each marsh type (ie seasonal marsh and permanent marsh)		Weekly monitoring supplemented by opportunistic records at other times
Hydrology			
Water surface level	*Aquaculture ponds:* One gauge board per pond		Weekly and after heavy rain
	Constructed marsh habitat: Two gauge boards per marsh type		Weekly and after heavy rain
Water chemistry			
Water quality variables: pH BOD DO Ammonia concentration Conductivity Turbidity Temperature Suspended solids Salinity	*Aquaculture ponds*		Monthly
	Constructed marsh habitat: At representative locations within each marsh habitat		Monthly
Water quality variables: Total oxidised nitrogen Total phosphorus concentration Orthophosphate concentration	*Aquaculture ponds*		Monthly for first year at which point frequency will be reviewed
	Constructed marsh habitat: At representative locations within each marsh habitat		Monthly for first year at which point frequency will be reviewed
Heavy metals (Cadmium, Copper, Nickel, Lead, Zinc, Mercury)	*Aquaculture ponds*: Representative aquaculture ponds adjacent to the active construction area		Annually thereafter

Ecological attribute	Number of measurements	Timing	Frequency of measurement
	Constructed marsh habitat: At representative locations within each marsh habitat		Annually thereafter

9.3 Reporting

9.3.1 All data recorded during monitoring will be recorded on standardised pro formas. Each year a summary report will be produced by the WNR Reserve Manager detailing the outcomes of monitoring and indicating any remedial actions taken or required.

9.4 Event and action plan for ecological attributes

9.4.1 The results of the ecological monitoring shall be compared with Action Levels and Limits detailed in Table 9-10 and corrective actions taken accordingly.

Table 9-10 Key Action Levels and Limits and their associated management actions

	Action level	Action	Limit	Action
Plant species				
Survival, health and growth of plant species planted	<75% survival of any planted species	Check soil and water conditions; replace dead material. If survival rate does not increase implement contingency plan	<30% survival of any planted species	Implement contingency plan
	> 10% fungal or pest infestation of any species with >50% loss of vegetative growth	Remove dead and infected material, identify pest / infection	> 30% fungal or pest infestation of any species with >50% loss of vegetative growth	
Plant species richness, relative abundance and cover	<75% species survival within planted areas	Within first 2 years of establishment: Replace plants and check soil and water conditions After 2 years: on direction of WNR Reserve Manager implement contingency plan	<50% species survival	
Plant community composition	Wetland plant species comprise <95% of vegetation	Review observed water levels against targets	Wetland plant species comprise <90% of vegetation	
	Frequency or cover of any individual species is <50% or >200% of proportion allocated in planting plan	Replace or remove plants as necessary	Frequency or cover of any individual species is <10% or >1000% of proportion allocated in planting plan	
Frequency and cover of alien and invasive plant species	Alien species >5% of total cover	Remove plants as necessary	Alien species >10% of total cover	Remove or utilise limited spot spraying of appropriate herbicide on direction of WNR Reserve Manager
Animal species				
Dragonflies: species richness and abundance	No increase from baseline over 2 consecutive years	Review management actions	Decline from baseline over 2 consecutive years	Investigate causes and review management actions
Aquatic invertebrates: species richness and abundance	Establish action levels after 2 years of monitoring *	Establish actions after 2 years of monitoring *	Establish action levels after 2 years of monitoring *	Establish actions after 2 years of monitoring *

	Action level	Action	Limit	Action
Freshwater fish: species richness and abundance	Establish action levels after 2 years of monitoring *	Establish actions after 2 years of monitoring *	Establish action levels after 2 years of monitoring *	Establish actions after 2 years of monitoring *
Amphibians: species richness and abundance	No increase from baseline over 2 consecutive years	Review management actions	Decline from baseline over 2 consecutive years	Investigate causes and review management actions
Reptiles: species richness and abundance	No increase from baseline over 2 consecutive years	Review management actions	Decline from baseline over 2 consecutive years	Investigate causes and review management actions
Birds: species richness and abundance	*Fishponds*: <50% baseline richness and / or abundance in one year **OR** <80% baseline richness and / or abundance for 3 consecutive years	<u>Construction phase</u> Investigate causes of decline eg reference to monitoring data from other locations within HK and overseas. Review construction practices <u>Operation phase</u> Investigate causes of decline eg reference to monitoring data from other locations within HK and overseas. Review management practices	<50% baseline richness and / or abundance for 3 consecutive years	<u>Construction phase</u> Undertake detailed investigation of causes. Reduce disturbance effects caused by construction (eg noise) until causes identified <u>Operation phase</u> Undertake detailed investigation of causes. Implement short-term management actions aimed at increasing numbers
	Constructed marsh habitat: Establish action levels after 2 years of monitoring *	Establish action levels after 2 years of monitoring *	Establish action levels after 2 years of monitoring *	Establish action levels after 2 years of monitoring *
Hydrology Water surface level	*Fishpond:* Level >100mm above or below target	Adjust as required	*Fishpond:* Level >200mm above or below target	Review levels, implement contingency plan
	Constructed marsh habitat: Level > 25mm above or below target		*Constructed marsh habitat:* Level > 100mm above or below target	
Water chemistry PH	Outside range 5.5 – 7.5	Double water quality and	Outside range 4 – 8	Identify alternative water

	Action level	Action	Limit	Action
BOD	>6.0mg/l	vegetation survival rate monitoring, identify problem and implement plan to rectify	>9mg/l	source until problem is rectified
DO	Within the ranges 51-70% or 121-130% saturation		<50% or >130% saturation	
Ammonia concentration	>2mg/l		>5mg/l	
Salinity	>1ppt		>3ppt	
Total oxidised nitrogen	>3mg/l		>10mg/l	
Total phosphorus concentration	>1mg/l		>3mg/l	
Orthophosphate concentration	>0.1mg/l		1mg/l	

Note: * The action levels and actions will be established after 2 years for the communities of those species groups (ie aquatic invertebrates, freshwater fish and marsh bird species) which are currently not features of the existing FLW fauna. That is action levels and actions can only be established once the communities have become established and it becomes clear what their composition and relative abundance is.

10. CULTURAL HERITAGE

10.1.1 In order to retrieve information concerning the composition of the bunds it is recommended that a brief recording exercise with methodology agreed with the Antiquities and Monuments Office be carried out during site formation.

11. SITE ENVIRONMENTAL AUDIT

11.1 Site Surveillance

11.1.1 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 construction activities 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 construction site.

11.1.2 The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspections under the EM&A works. He shall, in accordance with the IC(E), 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 for approval. A preliminary site inspection, deficiency and action reporting system in form of a flow chart is prepared for reference. This is shown in Figure 11-1 for review and refinement by the ET Leader at the commencement of the Project.

11.1.3 Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site, it should also review the environmental situation outside the site area which is likely to be affected, directly or indirectly, by the site activities. The ET leader shall make reference to the following information in conducting the inspection:

1. The EIA recommendations on environmental protection and pollution control mitigation measures with regard to air quality, noise, water quality, ecological and visual impacts and waste management;
2. Works progress and programme;
3. Individual works methodology proposals (which shall include proposal on associated pollution control measures);
4. The contract specifications on environmental protection and pollution prevention control;
5. The relevant environmental protection and pollution control laws, ProPECC Notes; and
6. Previous site inspection results.

11.1.4 Monitoring of the effectiveness of the construction waste mitigation measures recommended in the EIA is not considered necessary and has not been proposed. The satisfactory implementation of relevant recommended mitigation measures, however, shall be checked during the ET's regular site inspections during the relevant phases of construction works.

11.1.5 The Contractor shall update with the ET Leader on all relevant information of the construction 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 IC(E) 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 Leader to report on any remedial measures subsequent to the site inspections.

11.1.6 Ad hoc site inspections shall also be carried out by the ET and/or IC(E) if significant environmental problems are identified. Inspections may also be required subsequent to receipt

of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

11.2 Compliance with Legal and Contractual Requirements

11.2.1 There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong, which the construction activities shall comply.

11.2.2 The ET Leader shall review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.

11.2.3 The Contractor shall regularly copy relevant documents to the ET Leader so that the checking work can be carried out. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permits under the environmental protection laws, and all the valid licence/permit. The site diary shall also be available for the ET's inspection upon his request.

11.2.4 After reviewing the document, the ET Leader shall advise the ER and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET'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 IC(E) for any follow-up action.

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

11.3 Environmental Complaints

11.3.1 Complaints received on environmental issues shall be referred to the ET Leader for carrying out complaint investigation procedures. The ET shall undertake the steps given below in (1) to (9) upon receipt of the complaints. The complaint investigation procedures are also presented in form of a flow chart in Figure 11-2 for easy reference.

1. Log complaint and date of receipt onto the complaint database and inform the IC(E) immediately;
2. Investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
3. If a complaint is valid and due to works, identify mitigation measures in consultation with the IC(E);
4. If mitigation measures are required, advise the Contractor accordingly;
5. Review the Contractor's implementation of the identified a required mitigation measures, , and the concurrent situation;
6. 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;
7. Undertake additional monitoring and audit to verify the compliant 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;

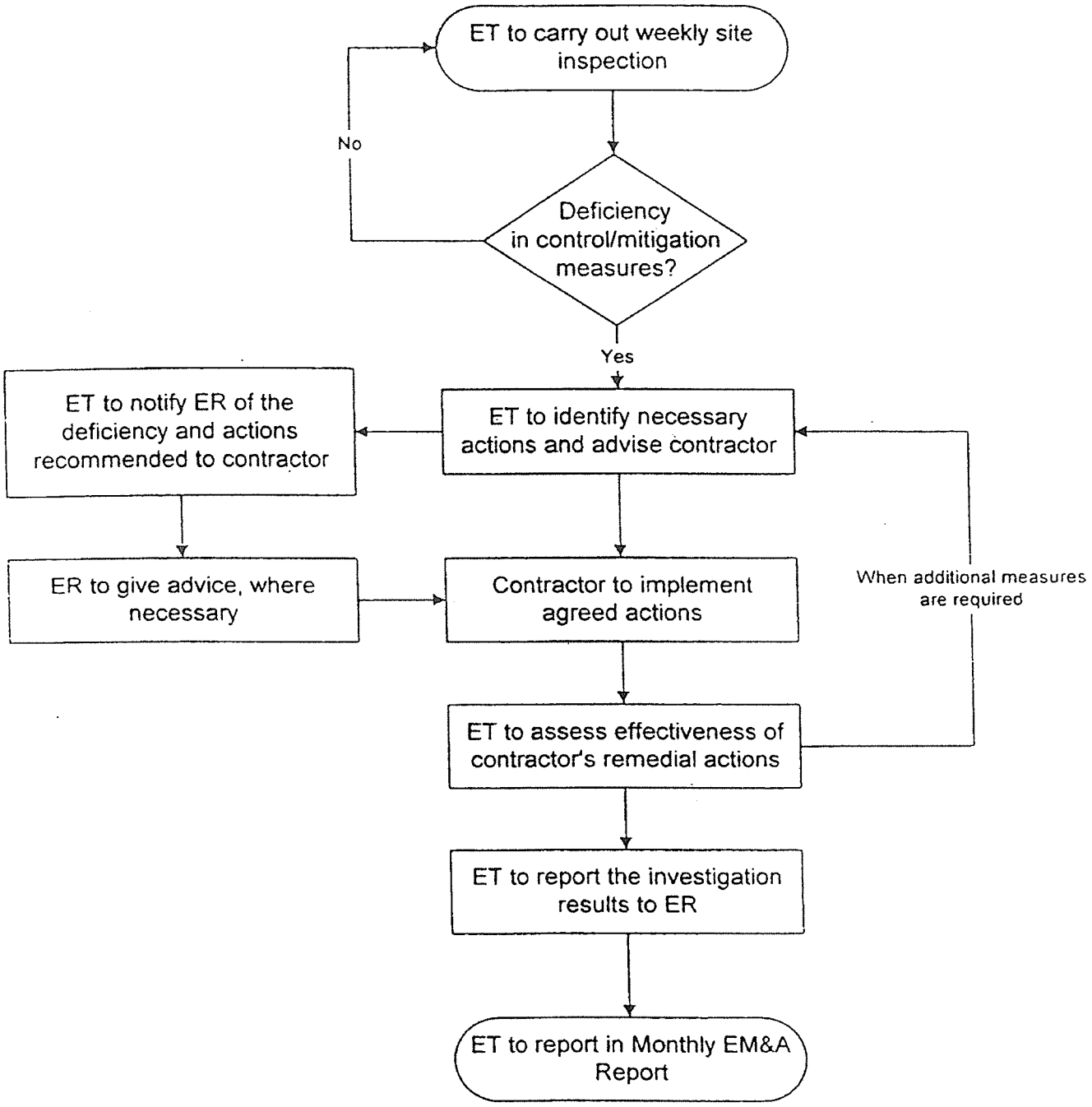
8. Report the investigation results and the subsequent actions to the source of complaint (If the source of complaint is identified through EPD, the results should be reported within the time frame assigned by EPD); and
9. Log a record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

11.3.2 The ER shall notify the project proponent of any complaints received and keep him well informed of the actions being taken to settle these complaints.

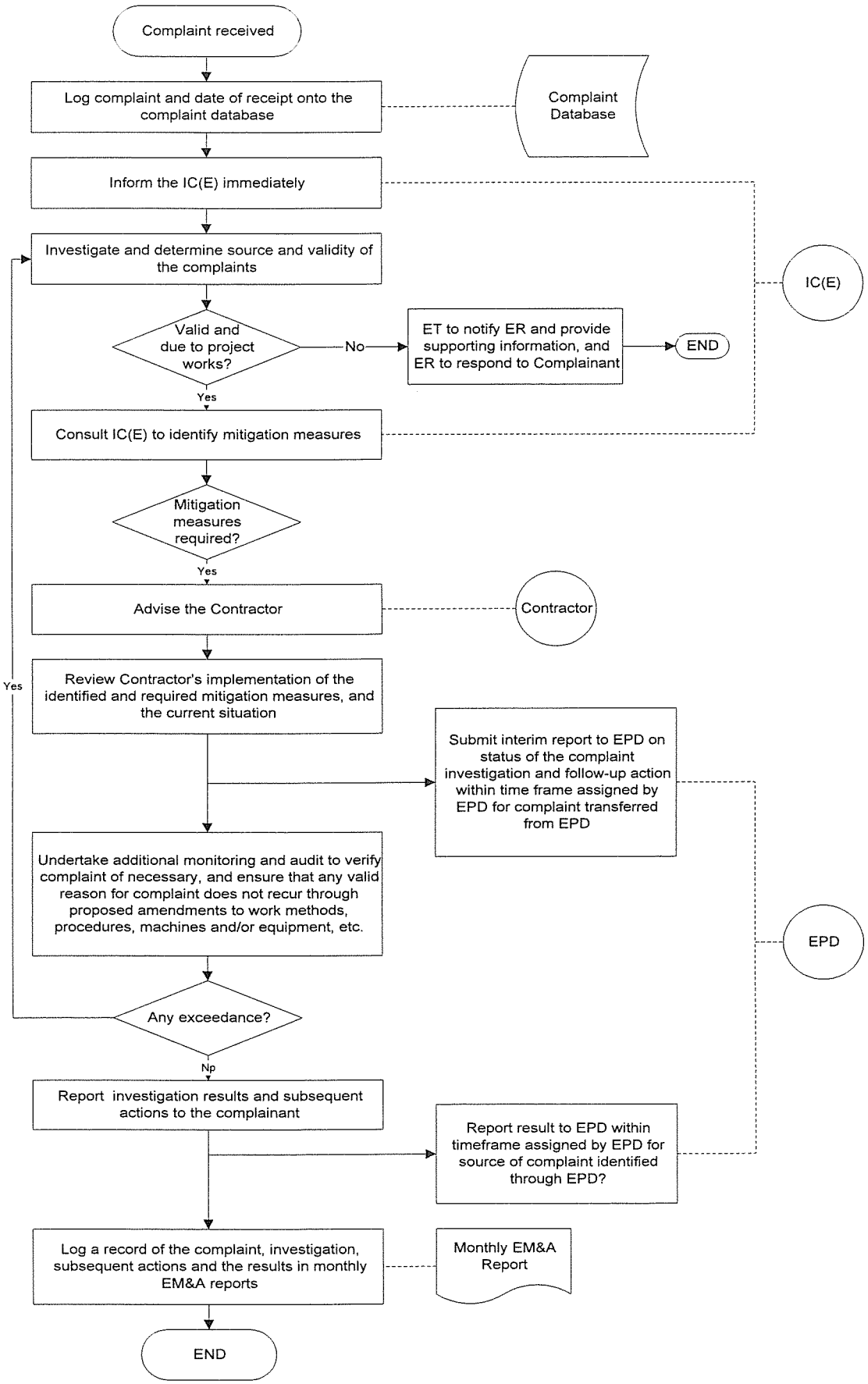
11.3.3 During the complaint investigation work, the Contractor and ER shall co-operate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures (in consultation with the IC(E), see Section 1.1) are required in the investigation, the Contractor shall promptly carry out the measures. The ER shall ensure that the measures have been carried out by the Contractor.

11.4 Documentation

11.4.1 All documentation is required to be filed in a traceable and systematically manner and ready for inspection upon request. All Construction Phase EM&A results and findings shall be documented in the Construction Phase EM&A report prepared by the ET Leader and endorsed by IC(E) prior to disseminate to the Contractor, ER and EPD.



CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	**Title:** Preliminary Site Inspection, Deficiency and Action Report System	**Figure:** 11-1	**Scale:** -
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D. D. 123		



CH2M HILL Hong Kong Limited In association with RPS ADI Ltd. Archaeological Assessments MVA Hong Kong Limited	**Title: Complaint – Response Procedures**	**Figure: 11-2**	**Scale: -**
	Project: EIA for Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D. D. 123		

12. REPORTING

12.1 General

12.1.1 The following reporting requirements based upon a paper-documented approach. However, the same information can 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 diskettes in an agreed format. This would enable a transition from a paper/historic and reactive approach to an electronic/real time proactive approach.

12.2 Baseline Monitoring Report

12.2.1 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 IC(E), the ER, and EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies needed. The format and content of the report, and the representation of the baseline monitoring data to be submitted to EPD shall be agreed with EPD.

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

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

12.3 Monthly EM&A Reports

12.3.1 The results and findings of all EM&A work required in the Manual shall be recorded and submitted to the ET Leader. Based on this information a monthly EM&A reports shall be prepared by the ET Leader. The EM&A report shall be prepared by A/ER and endorsed by IC(E), and submitted to EPD within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. A maximum of 4 copies of each monthly EM&A report shall be submitted to each of the four parties: the Contractor, the IC(E), the ER and EPD. Before submission of the first EM&A report, the ET Leader shall liase with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium required.

12.3.2 The ET Leader shall review the number and location of monitoring stations and parameters to monitor every 6 months or on as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

12.4 First Monthly EM&A Report

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

1. Executive Summary (1-2 pages);
    - Breaches of AL levels;
    - Complaint Log;
    - Notifications of any summons and successful prosecutions;
    - Reporting Changes;
    - Future key issues.
2. Basic Project Information
    - Project organisation including key personnel contact names and telephone numbers;
    - Construction Programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
    - Management structure;
    - Works undertaken during the month.
3. Environmental Status
    - Works undertaken during the month with illustrations (such as location of works, daily, dredging/filling rates, percentage fines in the fill material used);
    - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
4. Summary of EM&A requirements including:
    - All monitoring parameters;
    - Environmental quality performance limits (Action and Limit levels);
    - Event-Action Plans;
    - Environmental mitigation measures, as recommended in the project EIA study final report;
    - Environmental requirements in contract documents;

5. Implementation Status

    - Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for ecological, and the landscape and visual impacts, as recommended in the project EIA study report, summarised in the updated implementation schedule.

6. Monitoring Results (in both hard and diskette copies) together with the following information;

    - Monitoring methodology;
    - Name of laboratory and types of equipment used and calibration details;
    - Parameters monitored;
    - Monitoring locations (and depth);
    - Monitoring date, time, frequency, and duration;
    - Weather conditions during the period;
    - Graphical plots of the monitored parameters in the month annotated against:
    - Major activities being carried out on site during the period;
    - Weather conditions that may affect the results;
    - Any other factors which might affect the monitoring results; and
    - QA/QC results and detection limits.

7. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

    - Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
    - Record of all complaints received (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 legislations, 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;
    - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance;

8. Others

    - 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;
    - Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarizing the EM&A of the period.

12.5 Subsequent Monthly EM&A Reports

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

1. Executive Summary (1-2 pages)
    - Breaches of AL levels;
    - Complaint Log;
    - Notifications of any summons and successful prosecutions;
    - Reporting Changes;
    - Future key issues.
2. Environmental Status
    - Construction Programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
    - Works undertaken during the month with illustrations including key personnel contact names and telephone numbers;
    - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
3. Implementation Status
    - Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for ecological, and landscape and visual impacts, as recommended in the project HA study report, summarised in the updated implementation schedule.
4. Monitoring Results to provide monitoring results (in both hard and diskette copies) together with the following information
    - Monitoring methodology;
    - Name of laboratory and types of equipment used and calibration details;
    - Parameters monitored;
    - Monitoring locations (and depth);
    - Monitoring date, time, frequency, and duration;
    - Weather conditions during the period;
    - Graphical plots of the monitored parameters in the month annotated against:
    - Major activities being carried out on site during the period;
    - Weather conditions that may affect the results;
    - Any other factors which might affect the monitoring results;
    - QA/QC results and detection limits.
5. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
    - Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
    - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;

- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, 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;
- A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

6. Others
    - 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.
    - Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarizing the EM&A of the period.
7. Appendix
    - AL levels
    - Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
    - Major activities being carried out on Site during the period;
    - Weather conditions during the period;
    - 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
    - Outstanding issues and deficiencies

12.6 Quarterly EM&A Summary Reports

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

1. Up to half a page executive summary;
2. Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
3. A brief summary of EM&A requirements including:
    - Monitoring parameters;
    - Environmental quality performance limits (Action and Limit levels); and

- Environmental mitigation measures, as recommended in the project EIA study final report;

4. Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
5. Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
6. Graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against;
    - The major activities being carried out on site during the period;
    - Weather conditions during the period; and
    - Any other factors which might affect the monitoring results;
7. Advice on the solid and liquid waste management status;
8. A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
9. A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
10. For project where measurement of suspended solids is required, quarterly assessment of construction impacts on suspended solids at the project site, including, but not limited to, a comparison of the difference between the quarterly mean and 1.3 times of the ambient mean, which is defined as 30% increase of the baseline data or EPD data, of the related parameters by using appropriate statistical procedures. Suggestion of appropriate mitigation measures if the quarterly assessment analytical results demonstrate that the quarterly mean is significantly higher than the 1.3 on water quality times of the ambient mean ($p < 0.05$);
11. A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
12. A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
13. A summary record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
14. Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
15. Proponents' contacts and any hotline telephone number for the public to make enquiries.

12.7 Final EM&A Summary Reports

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

1. An executive summary;
2. Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the entire construction period;
3. A brief summary of EM&A requirements including:
    - Monitoring parameters;
    - Environmental quality performance limits (Action and Limit levels); and

- Environmental mitigation measures, as recommended in the project EIA study final report;

4. Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation status proformas;
5. Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
6. Graphical plots of the trends of monitored parameters over the construction period 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.
7. Compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies;
8. Provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
9. Advice on the solid and liquid waste management status;
10. A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
11. A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
12. A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
13. A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
14. Review the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
15. A summary record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
16. Review the practicality and effectiveness of the EIA princess and EM&A programme (e.g. effectiveness and efficiency of the mitigation measures), recommend any improvement in the EM&A programme; and
17. A conclusion to state the return of ambient and/or the predicted scenario as per EIA findings.

12.8 Forms to be Adopted

12.8.1 To facilitate the management of the EM&A programme for the construction works, the record forms presented in Appendix II (including those presented in the preceding section) should be adopted where applicable during the construction phase of the Project. These forms are listed as follows:

1. Implementation Status Proforma;
2. Data Recovery Schedule;

3. Site Inspection Proforma;
4. Proactive Environmental Protection Proforma;
5. Regulatory Compliance Proforma;
6. Complaint Log;
7. Sample Template for Interim Notifications of Environmental Quality Limits Exceedances;
8. Data Sheet for TSP Monitoring;
9. Noise Monitoring Field Record Sheet; and
10. Water Monitoring Field Record Sheet.

12.9 Data Keeping

12.9.1 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 magnetic media form, and the software copy can be available upon request. The water quality data software format shall be agreed with EPD. All the documents and data shall be kept for at least one year after completion of the construction contract.

12.10 Interim Notifications of Environmental Quality Limit Exceedances

12.10.1 With reference to Event/Action Plans in previous sections, when the environmental quality limits are exceeded, the ET shall immediately notify the ER & 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 Figure 12-1.

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

Location Plan

Prepared by : _____

Designation : _____

Signature : _____

Date : _____

APPENDIX IA

Implementation Schedule of Recommended Environmental Mitigation Measures

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
Construction Phase							
Section 4	***Air Quality Impact - Fugitive Dust Emission***						
Paragraph 4.4.25 to 4.4.32	*General Site Works* • Use appropriate working methods to minimize dust emission; • Ensure all dust control system are properly functioning during construction operation; • Twice daily watering of all dust emission sources, adjust frequency depending on meteorological conditions; • Provide hard paved surface for site area with regular vehicular movements; • Impose a speed limit of 10km/hr for dump trucks and other vehicles traveling on unpaved site roads; • Cover side and tail boards of dusty trucks with tarpauline which extends at least 300m over edges of side and tail boards; • Provide wheel-wash troughs and hoses at exit points of site; • Arrange truck to unload filling material to drained ponds directly without stockpiling at site; • Keep filled ponds and stockpile wet by water spraying; • Side enclosure and covering, where practicable, of any aggregate or other dusty material storage piles to reduce emissions; • All dusty material should be sprayed with water immediately prior to any loading, unloading or transfer operation to minimise dust emission; • Instigation of a programme to monitor the construction process in order to enforce controls and modify methods of work if dusty conditions arise; and • Phasing of dusty construction activities to control dust generation during the construction period.	Whole site / all times	Contractor		✓		EIAO and Environmental Permit APCO and its regulations
Section 5	***Noise Impact***						
Paragraphs 5.6.28 to 5.6.43	*General :* • Use of quiet/silenced equipments; • Erecting temporary noise barriers and provision of Noise Enclosure; • Phasing the construction activities; • Good site practice and noise management; and • Reduce number of PME operating together in area close the site boundary.	Whole site / all time	Contractor		✓		EIAO and Environmental Permit NCO and its regulations

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
Section 6	***Water Quality Impact***						
Paragraph 6.10.2	*Minimize Runoff and Pollutants* • Foundation and WNR construction works should be carried out during dry season only (i.e. from December to April of the next year).	Whole site / all time	Contractor		✓		EIAO and Environmental Permit WPCO and its regulations
Paragraph 6.10.3	*Construction Site Runoff* • High loading of suspended solids (SS) in construction site runoff shall be prevented through proper site management by the contractor; • The boundary of critical work areas shall be surrounded by ditches or embankment. Accidental release of soil or refuse into the adjoining land should be prevented by the provision of site hoarding or earth bunds, etc. at the site boundary. These facilities should be constructed in advance of site formation works and roadworks; • Consideration should be given to plan construction activities to allow the use of natural topography of the site as a barrier to minimise uncontrolled non-point source discharge of construction site runoff; • Temporary ditches, earth bunds should be provided to facilitate directed and controlled discharge of runoff into storm drains via sand/ silt removal facilities such as sand traps, silt traps and sediment retention basin. Oil and grease removal facilities should also be provided where appropriate, for example, in area near plant workshop/ maintenance areas; • Sand and silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly by the contractor, and at the onset of and after each rainstorm to ensure that these facilities area functioning properly; • Slope exposure should be minimised where practicable especially during the wet season. Exposed soil surfaces should be protected from rainfall through covering temporarily exposed slope surfaces or stockpiles with tarpaulin or the like; • Access roads should be protected by crushed rock, gravel or other granular materials to minimise discharge of contaminated runoff; • Slow down water run-off flowing across exposed soil surfaces; • Plant workshop/ maintenance areas should be bunded and constructed on a hard standing. Sediment traps and oil interceptors should be	Whole site / all time	Contractor		✓		EIAO and Environmental Permit WPCO and its regulations

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
	provided at appropriate locations; • Manholes (including newly constructed ones) should be adequately covered or temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system; • Construction works should be programmed to minimise soil excavation works where practicable during rainy conditions; • Chemical stores should be contained (bunded) to prevent any spills from contact with water bodies. All fuel tanks and/ or storage areas should provided with locks and be sited on hard surface; • Chemical waste arising from the site should be properly stored, handled, treated and disposed of in compliance with the requirements stipulated under the Waste Disposal (Chemical Waste) (General) Regulation; • Drainage facilities must be adequate for the controlled release of storm flows; and • Dredged materials requiring temporary storage on-site (for filling of marshland afterwards) should be securely stored and covered, if possible. Dried up mud materials can then be used for marshland formation.						
Paragraph 6.10.3	*Wastewater from Construction Site* • Sewage generated from the construction workforce should be contained in chemical toilets before connection to public foul sewer can be provided. Chemical toilets should be provided at a minimum rate of about 1 per 50 workers. The facility should be serviced and cleaned by a specialist contractor at regular intervals; • Foul water from canteens should also be contained by chemical toilets before connection to public foul sewer can be provided; • Vehicle wheel washing facilities should be provided at the site exit such that mud, debris, etc. deposited onto the vehicle wheels or body can be washed off before the vehicles are leaving the site area; • Section of the road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains; • Bentonite slurries used in diaphragm wall and bore-pile construction, etc. should be reconditioned and reused as far as practicable. Spent	Whole site/ all time	Contractor		✓		EIAO and Environmental Permit WPCO and its regulations

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
	bentonite should be kept in a separate slurry collection system for disposal at a marine spoil grounds subject to obtaining a marine dumping licence from EPD. If used bentonite slurry is to be disposed of through public drainage system, it should be treated to meet the respective applicable effluent standards for discharges into sewers, storm drains or the receiving waters.						
Paragraph 6.10.3	*Oils and Solvents* • Spillage of fuel oils or other polluting fluids should be prevented at source. It is recommended that all stocks should be stored inside proper containers and sited on sealed areas, preferably surrounded by bunds.	Whole site/ all time	Contractor		✓		EIAO and Environmental Permit WPCO and its regulations
Paragraph 6.10.3	*Draining of Fishpond Water* • The need of discharging pond water into surrounding water bodies should be minimized by transferring pond water within the subject site for water usage; • Any draining of fishpond water should be handled with prudence. • Sedimentation tanks should be set up at the construction site so that water to be discharged can be retained for sedimentation if any discharging activity is considered necessary.	Whole site/ all time	Contractor		✓		EIAO and Environmental Permit WPCO and its regulations
Section 9	***Waste Management***						
Paragraphs 9.4.1 to 9.4.2	*Overall Waste Management* • A Waste Management Plan (WMP) should be developed, submitted to the ER and approved on the advice of the DEP at the commencement of the construction works to ensure appropriate handling of the C&DM; • Storage areas for different waste types - different types of waste should be segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. An on-site temporary storage area equipped with required control measures (e.g. dust) should be provided; • Trip-ticket system - in order to monitor the disposal of inert C&DM at public filling facilities and the remaining C&D waste to landfills, and control fly-topping, a trip-ticket system should be included as a contractual requirements and audited by the Environmental Team; • Records of Wastes - a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed; and • Training - training should be provided to workers in respect of site	Whole site/ all time	Contractor		✓		EIAO and Environmental Permit WDO and its subsidiary regulations Dumping at Sea Ordinance (1995) Crown Land Ordinance (Cap. 28) Public Health and Municipal Services Ordinance (Cap. 132) Public Cleansing and Prevention of Nuisances (Urban Council) and (Regional

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
	cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling, and avoid contamination of reusable C&DM.						Council) By-laws Dangerous Goods Ordinance Various guidelines stated in paragraph 9.2.3 of the EIA report
Section 13	***Ecological Impact***						
Paragraph 13.9.3 – 13.9.38	*Habitat loss and disturbance* • Construction of WNR in advance of the commencement of the construction of the Residential Development • Staged construction of WNR • Achieve mitigation targets through interim management of fish ponds - adjustment of stocking densities; attention to water quality; and periodic reviews of draw-down timing and duration of fishponds	WNR/ staged (for details refer to figure 13-13 in ES)	Contractor		✓		
Paragraph 13.9.55 – 13.9.60	*Residual disturbance of WNR* • Lock gates at vehicle access points • Screening of perimeter bunds in aquaculture ponds through tree and shrub establishment • Screening on the margins of open water through planting and establishment of wetland species of trees, shrubs, bamboo and reeds • Incorporation of design features e.g. islands	Whole site/ All times	Contractor / Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	
Paragraph 13.9.61 – 13.9.68	*Mitigation for Disturbance to Egretry* • Relocation of egretry to WNR – plantation and early establishment of trees, shrubs and tall grass species • Draw-out fish ponds for foraging habitats	WNR	Contractor / Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	
Paragraph 13.9.69	*Minimisation of Dust deposition* Refer to air quality measures	-	-	-	-	-	-
Paragraph 13.9.70	*Minimisation of Sediment loads* • Implementation of good site management practice – provision of means for sediment to settle before discharge of the clear supernatant	Whole site/ All times	Contractor		✓		

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
Paragraph 13.9.71	*Minimisation of Pollution* • Good storage practices and handling of chemicals • Regular maintenance of interceptors (trap pollutants)	Whole site/ All times	Contractor		✓		
Paragraph 13.9.72	*Minimisation of Soil compaction* • Minimise area of works • Re-instate area if work finished in area for some time	WNR/ All times	Contractor		✓		
Paragraph 13.9.74 – 13.9.81	*Mitigation for non-bird species* • Sympathetic management practices • Re-profiling bunds • Enhance ponds • Creation of freshwater marsh and management of native plant species	WNR/ All times	Contractor / Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	
Operation Phase							
Section 6	***Water Quality Impact***						
Paragraphs 6.10.5 to 6.10.7	*Residential Development and Access Road* • Drainage system with provision of treatment facilities including sand traps and oil interceptors should be provided to retain wastewater in case of emergency discharge; • Regular cleaning and sweeping of the access road and other paved areas so as to minimise exposure of pollutants to stormwater; • Regular inspection of stormwater gullies and ditches provided along the access road and among the residential development; • Planter strips to be provided along the access road and around the residential development where practicable; and • In the event of emergency where there is a major spillage of oil, chemical or fuel, dispersants or fire fighting foam, etc., a system of contaminant bunding is recommended to be deployed as far as practicable.	Residential Area and Access Road / all times	Project Proponent			✓	N.A.
Paragraphs 6.10.8 to 6.10.12	*Wetland Nature Reserve* • Regular maintenance of fishponds to remove excessive nutrients; • Fish species to be carefully selected and quantity to be controlled to avoid excessive fish farming; • No application of herbicides, or pesticides is considered necessary. • Re-circulation pumping system provided for circulation of water between ponds and to reduce likelihood of overflowing of ponds; • Temporary storage of water at the storage pond to allow sedimentation and removal of pollutants before discharge; and • Intentional discharge upon water quality, for example, reed bed to be	Wetland Nature Reserve / all times	Project Proponent			✓	N.A.

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
	provided in the marshland area to reduce nutrient discharge.						
Section 13	***Ecological Impact***						
Paragraph 13.9.39-13.9.54	*Habitat loss and disturbance* Achieve mitigation targets through long-term management of WNR. For details refer to the Draft Habitat and Conservation Management Plan (Section 14 of the ES)	WNR/ All times	Project Proponent / HKSAR Wetland Nature Foundation			✓	
Paragraph 13.9.55 – 13.9.60	*Residual disturbance of WNR* • Lock gates at vehicle access points • Screening of perimeter bunds in aquaculture ponds and margins of open water through establishment of trees, shrubs and wetland emergent species	Whole site/ Ongoing	Project Proponent / HKSAR Wetland Nature Foundation			✓	
Paragraph 13.9.61 – 13.9.68	*Mitigation for Disturbance to Egretry* • Relocation of egretry to WNR – Establishment of trees, shrubs and tall grass species • Draw-out fish ponds for foraging habitats	WNR/ Ongoing	Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	
Paragraph 13.9.69	*Minimisation of Dust deposition* Refer to air quality measures	-	-	-	-	-	-
Paragraph 13.9.70	*Minimisation of Sediment loads* Regular maintenance of interceptors (trap sediment)	Drainage system Residential Development / Management of Fish Ponds	Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	
Paragraph 13.9.71	*Minimisation of Pollution* Regular maintenance of interceptors (trap pollutants)	Drainage system Residential Development	Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	
Paragraph 13.9.73	*Bird strikes with Glazed towers* Refer to Landscape and Visual Impacts measures	-	-	-	-		-

EIA Ref*	Environment Protection Measures	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
				D	C	O	
Paragraph **13.9.74 – 13.9.81**	*Mitigation for non-bird species* • Sympathetic management practices • Management of native plant species	WNR/ All times	Project Proponent / HKSAR Wetland Nature Foundation		✓	✓	

APPENDIX IB

Implementation Schedule of Recommended Landscape and Visual Mitigation Measures

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
Construction Phase Landscape and Visual Mitigation Measures											
11.11 Table 11-8	CP1	Preservation of Existing Vegetation									
	CP1.1	To retain trees that have high amenity or ecology value and contribute most to the landscape and visual amenity of the site and its immediate environs.	Site	Project Proponent	Project Landscape Architect / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002	✓			Throughout design phase	To minimise the disturbance to the existing landscape resources.
	CP1.2	Creation of precautionary area around trees to be retained equal to half of the trees canopy diameter. Precautionary area to be fenced.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Before construction phase commence	To ensure the success of the tree preservation proposals.
	CP1.3	Prohibition of the storage of materials including fuel, the movement of construction vehicles, and the refuelling and washing of equipment including concrete mixers within the precautionary area.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Throughout construction phase	To ensure the success of the tree preservation proposals.
	CP1.4	Phased segmental root pruning for trees to be retained and transplanted over a suitable period (determined by species	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 &		✓		Throughout construction phase	To ensure the success of the tree preservation proposals.

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		and size) prior to lifting or site formation works which affect the existing rootball of trees identified for retention. The extent of the pruning will be based on the size and the species of the tree in each case.				WBTC No. 14/2002					
	CP1.5	Pruning of the branches of existing trees identified for transplantation and retention to be based on the principle of crown thinning maintaining their form and amenity value.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Throughout construction phase	To ensure the success of the tree preservation proposals.
	CP1.6	The watering of existing vegetation particularly during periods of excavation when the water table beneath the existing vegetation is lowered.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Throughout construction phase	To ensure the success of the tree preservation proposals.
	CP1.7	The rectification and repair of damaged vegetation following the construction phase to it's original condition prior to the commencement of the works or replacement using specimens of the same species, size and form where appropriate to	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Throughout construction phase	To ensure the success of the tree preservation proposals.

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		the design intention of the area affected									
	CP1.8	All works affecting the trees identified for retention and transplantation will be carefully monitored. This includes the key stages in the preparation of the trees, the implementation of protection measures and health monitoring through out the construction period	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Throughout construction phase	To ensure the success of the tree preservation proposals.
	CP1.9	Detailed landscape and tree preservation proposals will be submitted to the relevant government departments for approval under the lease conditions and in accordance with ETWB TCW No. 2/2004 and WBTC No. 14/2002.	Site	Project Proponent	Project Landscape Architect / NA	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002	✓			Throughout design phase	To ensure the tree preservation and planting proposals are integrated with the existing landscape context and that the landscape resources are preserved where appropriate.
	CP2.0	The tree preservation works should be implemented by approved Landscape Contractors and inspected and approved on site by a qualified Landscape Architect. A tree	Site	Project Proponent	Project Proponent / NA	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002	✓	✓		Throughout design and construction phases	To ensure the tree preservation and planting proposals are integrated with the existing landscape context and that the landscape

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		protection specification would be included within the contract documents.									resources are preserved where appropriate.
11.11 Table 11-8	CP2	Preservation of Existing Topsoil									
	CP2.1	Topsoil disturbed during the construction phase should be tested using a standard soil testing methodology and where it is found to be worthy of retention stored for re-use..	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18		✓		Throughout construction phase	To provide a viable growing medium suited to the existing conditions and reduce the need for the importation of top soil.
	CP2.2	The soil will be stockpiled to a maximum height of 2m and will be either temporarily vegetated with hydroseeded grass during construction or covered with a waterproof covering to prevent erosion.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18		✓		Throughout construction phase	To provide a viable growing medium suited to the existing conditions and reduce the need for the importation of top soil.
	CP2.3	The stockpile should be turned over on a regular basis to avoid acidification and the degradation of the organic material, and reused after completion. Alternatively, if this is	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18		✓		Throughout construction phase	To provide a viable growing medium suited to the existing conditions and reduce the need for the importation of top soil.

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		not practicable, it should be considered for use elsewhere, including other projects.									
11.11 Table 11-8	CP3	Development Site and Temporary Works Areas									
	CP3.1	Where appropriate to the final design the landscape of these works areas should be restored following the completion of the construction phase.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18		✓		Through out construction phase	To minimise the disturbance to existing landscape resources and change of visual amenity.
	CP3.2	Construction site controls should be enforced including the storage of materials, the location and appearance of site accommodation and the careful design of site lighting to prevent light spillage.	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18		✓		Through out construction phase	To minimise the disturbance to existing landscape resources and change of visual amenity.
	CP3.3	Screen the works area during the construction phase through the use of decorative hoarding along the site boundary facing adjacent VSRs	Site	Project Proponent	Contractor / Contractor	TM-EIA Annex 18		✓		Through out construction phase	To minimise the disturbance to existing landscape resources and change of visual amenity.
11.11 Table 11-8	CP4	Mitigation Planting									
	CP4.1	Replanting of disturbed	Site	Project	Contractor / Contractor	TM-EIA		✓		After the site	To minimise the

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		vegetation should be undertaken at the earliest possible stage of the construction phase		Proponent		Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002				formation and on completion of planting area.	disturbance to existing landscape resources and minimize the impacts on the visual amenity of the area.
	CP4.2	Use of native plant species predominantly in the planting design for the buffer areas.	Site	Project Proponent	Project Landscape Architect/ NA	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002	✓	✓		After the site formation and on completion of planting area.	To enhance the local landscape and ecological value.
	CP4.3	The tree planting works should be implemented by approved Landscape Contractors and inspected and approved on site by a qualified Landscape Architect. A tree planting specification would be included within the contract documents.	Site	Project Proponent	Project Proponent / NA	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002	✓	✓		Throughout design and construction phases	To ensure the tree preservation and planting proposals are integrated with the existing landscape context and that valuable landscape resources are preserved where appropriate to the final design.
	CP4.4	All imported plants should be quarantined in local nursery for minimum 1 month.	Local Green Nursery	Project Proponent	Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002		✓		Throughout construction phases	To check there are no symptoms of infection by pests or diseases prior to planting on site.

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
11.11 Table 11-8	CP5	Transplantation of Existing Trees									
	CP5.1	The tree transplanting works should be implemented by approved Landscape Contractors and inspected and approved on site by a qualified Landscape Architect. A tree protection / transplanting specification would be included within the contract documents.	Site	Project Proponent	Project Proponent / NA	TM-EIA Annex 18, ETWB TCW No. 2/2004 & WBTC No. 14/2002	✓	✓		Throughout design and construction phases	To ensure the tree preservation and planting proposals are integrated with the existing landscape context and that valuable landscape resources are preserved where appropriate to the final design.
Operational Phase Landscape and Visual Mitigation Measures											
11.11 Table 11-9	OP1	Design of Built Development									
	OP1.1	Adopt a non-linear building orientation and a stepped building height principle.	Site	Project Proponent	Project Architects / NA	TM-EIA Annex 18 and BD	✓			Throughout design phase	To ensure the proposals are integrated with the existing landscape and visual context, and avoid walling effect.
	OP1.2	Use of a layout and	Site	Project	Project Architects /	TM-EIA	✓			Throughout	Create visual

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		slightly higher building blocks to allow the incorporation of significant view corridors.		Proponent	NA	Annex 18 and BD				design phase	access through the development to the green backdrop formed by the wooded hillsides to the south. These view corridors also allow the development to avoid the walling effect evident in the existing developments to the south and west particularly when viewed from locations such as the development in the northern part of Tin Shui Wai. The proposed view corridors are also important from an ecological perspective.
	OP1.3	Use of colour blocking utilising range of visually recessive earth colours and tones on the building facades of the different blocks. Non-reflective finishes are recommended on the outward facing building facades. Utilisation of	Site	Project Proponent	Project Architects for design / contractor for implementation / Property Management Agent for maintenence	TM-EIA Annex 18 and BD	✓			Throughout design phase	Responsive building façade treatment to reduce the apparent visual mass of the development and reduce the glare effect from the reflection of sunlight.

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		planting on building façade and balcony to soften the architectural form of the building.									
	OP1.4	Utilise underground car parking and utilities so as to maximise the area of landscaping.	Site	Project Proponent	Project Architects / Property Management Agent	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	To maximise the area available for landscaping and minimise potential impacts of extensive hard surfaced areas in elevated views both within and without the development site.
	OP1.5	Use of responsive aesthetic design of architectural and road lighting with glare containment design measures.	Site	Project Proponent	Project Architects / NA	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	To reduce the night-time glare effect to the surrounding environs.
	OP1.6	Formulate lighting operation management programme to minimise potential light spillage and glare impacts.	Site	Project Proponent	Property Management Agent/ Property Management Agent	TM-EIA Annex 18			✓	Throughout operation phase	To reduce the night-time glare effect to the surrounding environs.
11.11 Table 11-9	OP2	Landscape Buffer Planting									
	OP2.1	Create a landscape buffer	Site	Project	Contractor / Property	TM-EIA	✓			Throughout	This planting in

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		area extending around the periphery of the development to the proposed marsh habitat in WNR providing screening of the development at low levels and creating a transitional structure, not less than 50m wide, between the low-lying fishponds of the WNR and the upright forms of the proposed built development.		Proponent	Management Agent for the area within the 4ha development footprint and a contractor for the area within the WNR	Annex 18, HKPSG and BD				design phase	addition to the proposed bamboo planting proposed as part of the ecological mitigation measures will also serve to visually integrate the proposals within the existing landscape framework.
	OP2.2	Utilise native tree species in the planting mix for the landscape buffer area.	Site	Project Proponent	Contractor / Property Management Agent for the area within the 4ha development footprint and a contractor for the area within the WNR	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	Provide a linkage with the existing wooded areas creating a more coherent landscape framework whilst also improving the ecological connectivity between existing and proposed woodland habitats.
	OP2.3	Formulate a woodland management programme for implementation during the operational phase.	Site	Project Proponent	Project Landscape Architect / Property Management Agent for the area within the 4ha development footprint and a contractor for the area within the WNR	TM-EIA Annex 18, HKPSG & BD	✓			Throughout design phase	Conserve and enhance the ecological interest.
11.11	OP3	Landscape Strategy for									

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
Table 11-9		the Design of Amenity Space									
	OP3.1	The concept should provide a synthesis between a contemporary design philosophy and sustainable development principles. The spatial hierarchy involves movement from the public areas to more intimate spaces. Each of these spaces will be imbued with an individual character through the use of for example distinctive paving and street furniture, and plant combinations. The layout of the space and interconnected footpaths is designed to be legible with visual access between nodes and distinct entrance courtyards to the individual development blocks.	Site	Project Proponent	Project Landscape Architect / Property Management Agent	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	Serve to visually integrate the proposals into the existing landscape framework and provide visual amenity for the enjoyment of the future residents.
	OP3.2	The buffer planting is provided along the edge of the residential development extending to the north in association with the marsh habitat	Site	Project Proponent	Project Landscape Architect / Property Management Agent for the area within the 4ha development footprint and a contractor for the	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	Landscape buffer designed to create a transitional zone between the general landscape of the development

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		created under the WNR.			area within the WNR						and the ecological important landscape beyond. This buffer will also screen low level views of the proposed development.
11.11 Table 11-9	OP4	Compensatory Planting Proposals									
	OP4.1	Utilise ornamental species within the residential development area whilst species native to Hong Kong will be utilized within the buffer planting areas.	Site	Project Proponent	Project Landscape Architect / Property Management Agent for the area within the 4ha development footprint and a contractor for the area within the WNR	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	The planting proposal seeks to compensate for the predicted tree loss resulting from the construction of the development, visually integrate the proposals within its existing landscape framework and provide an improved visual amenity for future residents.
	OP4.2	A qualified or registered landscape architect will be involved in the design, construction supervision and monitoring, and maintenance period to	Site	Project Proponent	Project Proponent / NA	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	The planting proposal seeks to compensate for the predicted tree loss resulting from the construction of the

EIA Ref.	Mit. Code	Recommended Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stages			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
							D	C	O		
		oversee the implementation of the recommended landscape and visual mitigation measures including the tree preservation and landscape works on site.									development, visually integrate the proposals within its existing landscape framework and provide an improved visual amenity for future residents.
11.11 Table 11-9	OP5	Southern Development Access									
	OP5.1	Adopt a responsive streetscape design with new street tree planting.	Site	Project Proponent	Project Landscape Architect / LCSD and HyD for public portion of the road and Property Management Agent for private areas.	TM-EIA Annex 18, HKPSG and BD	✓			Throughout design phase	The design seeks to visually integrate the road proposals within the landscape of the existing village setting of Shing Uk Tsuen and Ng Uk Tsuen.

Legend: D – Design, C – Construction, O - Operation

Note: BD– Building Ordinance
ETWB TCW – Environmental and Transport Works Bureau Technical Circular
HKPSG – Hong Kong Planning Standards and Guidelines
TM-EIA – Technical Memorandum on Environmental Impact Assessment Process
TPO – Town Planning Ordinance
WBTC - Works Bureau Technical Circulars

APPENDIX II
Record Forms

IMPLEMENTATION STATUS PROFORMA

Ref:_____

Ref**	Environmental Protection Measures*	Implementation Status

* *All recommendations and requirements resulted during the Course of EIA/EA Process, including ACE and /or accepted public comment to the proposed project*

** *EIA Ref/EM&A Log Ref/Design Document Ref*

Signed by Environmental Team Manager: _____ Date: _____

Audited by Independent Checker (Environment): _____ Date: _____

DATA RECOVERY SCHEDULE

Ref:_____

Date	Air Quality Monitoring					Noise Monitoring					Water Quality Monitoring				
	Monitoring Station*					Monitoring Location*					Monitoring Location*				
	A1	A2	A3	A4	A5	N1	N2	N3	N4	N5	W1	W2	W3	W4	W5
1															
2															
3															
4															
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30															
31															
% of R															

* *Remark type of parameters*

% of R *The percentage of Data Recovery is the actual monitoring over the scheduled monitoring*

Signed by Environmental Team Leader: _____ Date: _____

Copy to Independent Checker (Environment)

SITE INSPECTION PROFORMA

Ref:_____

Date	Location	Req't Ref.*	Observation/Deficiency	Mitigation Action** (Responsible Agency)	Date*** of Confirmation

* *EIA Ref/EM&A Log Ref/Design Document Ref/Environmental Protection Contract Clause*

** *Specific Environmental Mitigation Measures should be stated, such as, equipment, processes, systems, practices or technologies.*

*** *The required completion date to confirm the specified Environmental Protection Action*

This Proforma is an Environmental Protection Instruction for: _____ on _____

Signed by Environmental Team Leader: _____ Date: _____

Copy to Independent Checker (Environment)

PROACTIVE ENVIRONMENTAL PROTECTION PROFORMA

Ref:_____

Ref*	Proposed Construction Method**	Location/ Working Period	Anticipated Impacts	Recommended Mitigation Measures

* *EIA Ref/EM&A Log Ref/Design Document Ref*

** *Details of equipment, vehicles, plants, processes, technologies for the option of construction method*

Reviewed by Environmental Team Leader: _____ Date: _____

Approved by Independent Checker (Environment): _____ Date: _____

REGULATORY COMPLIANCE PROFORMA

Ref:_____

Ref**	Environmental License/Permit*	Control Area/Facility/Location	Effective Date

* *Name of Applicant, Business Corporation, relevant regulation and remark of license/permit conditions*

** *File reference of the licensee/permittee*

Recorded by Environmental Team Leader: _____ Date: _____

Signed by Independent Checker (Environment): _____ Date: _____

COMPLAINT LOG

Ref:_____

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

Filed by Environmental Team Leader: _____ Date: _____

Sample Template for Interim Notifications of Environmental Quality Limits Exceedances

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

Location Plan

Prepared by : _____

Designation : _____

Signature : _____

Date : _____

Data Sheet for TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti (°C)	
	Hi (in.)	
	Qsi (Std. m^3)	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf (°C)	
	Hf (in.)	
	Qsf (Std. m^3)	
Average Flow Rate (Std. m^3)		
Total Volume (Std. m^3)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final Wt. of Filter (g)		
Measured TSP Level ($\mu g/m^3$)		

		Name & Designation	Signature	Date
Field Operator	:	_____	_____	_____
Laboratory Staff	:	_____	_____	_____
Checked by	:	_____	_____	_____

Noise Monitoring Field Record Sheet

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time (hh:mm)		
Measurement Time Length (min.)		
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L_{90} (dB(A))	
	L_{10} (dB(A))	
	LEQ (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks		

	Name & Designation	Signature	Date
Recorded By :	_____	_____	_____
Checked By :	_____	_____	_____

Water Quality Monitoring Field Record Sheet

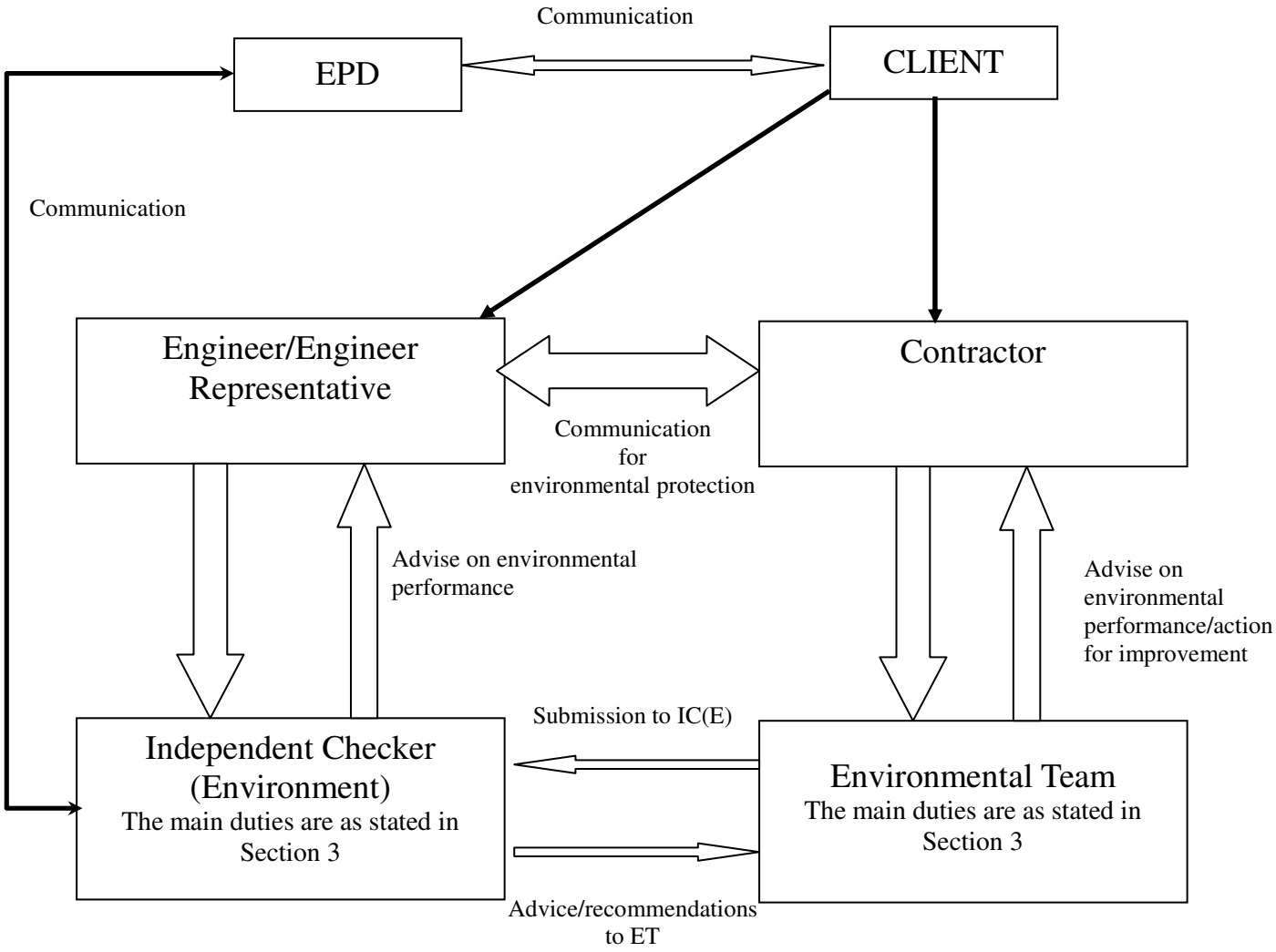
Monitoring Location				
Date (dd/mm/yy)				
Start Time (hh:mm)				
Weather				
Sea Conditions				
Tidal Mode				
Water Depth (m)				
Monitoring Depth		Surface	Middle	Bottom
Salinity				
Temperature (°C)				
DO Saturation (%)				
DO (mg/L)				
Turbidity (NTU)				
Suspended Solids (SS) Sample Identification				
SS Laboratory Results* (mg/L)				
Observed Construction Activities	<100m from location			
	>100m from location			
Other Observations				

**The SS results are to be filled up once they are available from the laboratory*

	Name & Designation	Signature	Date (dd/mm/yy)
Recorded By	_____	_____	_____
Checked By	_____	_____	_____

APPENDIX III

A Typical Construction Phase Environmental Monitoring & Audit Procedure



Notes:

Submission from ET to IC(E)

* Implementation status proforma on mitigation action;
* Proactive environmental protection proforma for construction method alternative;
* Regulatory compliance proforma listing licenses/permit compliance;
* Site inspection proforma;
* Complaint report;
* EM&A report for endorsement;
* Effectiveness of EIA recommendations.

Advice/Recommendations from IC(E) to ET

* Advise on environmental performance
* Return/sign off audit proformas
* Environmental concerns recommendations on construction methods