Tai Shue Wan Development at Ocean Park

Environmental Monitoring and Audit Manual
Document No. 328011/03/02/D

May 2014
Ocean Park Corporation

Mott MacDonald

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1. Introduction

1.1 Purpose of the Manual

The purpose of this Environmental Monitoring and Audit (EM&A) Manual (hereafter referred to as the Manual) is to guide the setup of an EM&A programme to ensure compliance with the Environmental Impact Assessment (EIA) study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme proposed for the "Tai Shue Wan Development at Ocean Park" (the Project).

It should be noted that this EM&A Manual would be further reviewed and updated where necessary.

1.2 Project Description

The Project will redevelop the existing theme park areas at Tai Shue Wan (TSW) into a Water Park to enhance the attractiveness of Ocean Park into a world-class theme park and provide a must-see destination to the visitor. The Project area, of approximately 6.63 ha, is expected to comprise of a series of platforms matching with the natural topography of TSW and will not involve any marine works. The proposed Project can be largely categorised into the following parts:

- **An Indoor Zone** – water park with a wave pool, lazy river, play structure, water slides, surf-rider, various pools, food and beverage (F&B) facilities, electrical and mechanical (E&M) utilities, back of house and car-parking.
- **An Outdoor Zone** – water park with a wave pool, lazy river, water slides, ride platforms, various pools; 'sea turtle' exhibit; and some small-scale F&B facilities
- **General Approach Area –** coach and taxi drop-off point and Emergency Vehicular Access Road (EVA)
- **Sewerage Facilities –** sewage sump pit and twin above-ground rising mains of 150mm diameter each

The key project components are shown in **Figure 1.1**.

1.3 Tentative Construction Programme

The earliest advance site work is expected to be physically commenced by the third quarter of year 2014. The tentative programme for operation of the Project will be in 2017. The tentative construction programme is provided in **Appendix A.**

1.4 Project Organisation

The proposed project organisation is shown in **Figure 1.2**. The responsibilities of respective parties are set out below.

Ocean Park Corporation (OPC)

OPC is the Project Proponent for the development of the Project, and will assume overall responsibility for the Project.

Environmental Protection Department (EPD)

EPD is the statutory enforcement body for environmental protection matters in Hong Kong.

Engineer or the Engineer's Representative (ER)

The ER is responsible for overseeing the construction works and for ensuring that the works are undertaken by the contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A include:

- to monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- to monitor Contractors', ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual;
- to facilitate ET's implementation of the EM&A programme;
- participate in joint site inspection by the ET and IEC;
- to oversee the implementation of the agreed Event / Action Plan in the event of any exceedance; and
- to adhere to the procedures for carrying out complaint investigation.

The Contractor

The Contractor should report to the ER. The duties and responsibilities of the Contractor include:

- to comply with the relevant contract conditions and specifications on environmental protection;
- to facilitate ET's monitoring and site inspection activities;
- to participate in the site inspections undertake by the ET and IEC, and undertake any corrective actions;
- to provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts;
- to submit proposals on mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- to implement measures to reduce impact where Action and Limit levels are exceeded; and
- to adhere to the procedures for carrying out complaint investigation.

Environmental Team (ET)

The ET should be employed by the OPC / Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. ET Leader should have relevant professional qualifications in environmental control and possess at least 7 years' experience in EM&A. Suitably qualified professional and technical staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in the time under the Contract, to enable fulfilment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET shall include qualified botanist/ecologist for the ecological service and a Registered Landscape Architect for review of implementation of landscape and visual mitigation measures. The ET should report to the OPC and the duties should include:

- to monitor and audit various environmental parameters as required in this EM&A Manual;
- to analyse the EM&A data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising;
- to monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications;
- to audit environmental conditions on site;

- to report on the EM&A results to EPD, the ER, the IEC and Contractor or their delegated representatives;
- to recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- to liaise with the IEC on all environmental performance matters, and ensure timely submission of all relevant EM&A pro forma for IEC's approval;
- to provide advice to the Contractor on environmental improvement, awareness and enhancement matters, etc on site;
- to adhere to the procedures for carrying out complaint investigation;
- to prepare reports on the environmental monitoring data and the site environmental conditions;
- to submit the EM&A report to Director of Environmental Protection (DEP) timely;
- to review proposals of mitigation measures from the Contractor in case of exceedance of Action and Limit levels, in accordance with the Event and Action Plan; and
- to carry out site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and mitigation measures.

Independent Environmental Checker (IEC)

The IEC is empowered to audit the environmental performance of construction, but is independent from the management of construction works. As such, the IEC should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should be employed by OPC prior to the commencement of the construction of the Project. The IEC should be a person who has relevant professional qualifications in environmental control and at least 7 years' experience in EM&A and environmental management. The duties and responsibilities of the IEC are:

- to provide proactive advice to the ER and OPC on EM&A matters related to the project;
- to review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET;
- to arrange and conduct regular, at least monthly site inspections of the works during the construction phase, and to carry out ad hoc inspections if significant environmental problems are identified;
- to check compliance with the agreed Event and Action Plan in the event of any exceedance;
- to check compliance with the procedures for carrying out complaint investigation;
- to check the effectiveness of corrective measures;
- to feedback audit results to the ET by signing off relevant EM&A pro forma;
- to check that mitigation measures are effectively implemented;
- to report the works conducted, and the findings, recommendations and improvements of the site inspections, after reviewing ET's and Contractor's works, the ER and OPC on a monthly basis;
- to verify the investigation result of the environmental complaint cases and the effectiveness of corrective measures;
- to verify EM&A report that has been certified by ET leader; and
- to audit EIA recommendations and requirements against the status of implementation of environmental mitigation measures on site.

2. Air Quality Impact

2.1 Introduction

An assessment of potential air quality impacts during both the construction and operation phases of the Project has been assessed in Section 3 of the EIA report.

2.2 Construction Phase Air Quality Monitoring

With implementation of the recommended mitigation measures, no significant dust impact is expected and regular dust monitoring is therefore not considered necessary during the construction phase of the Project.

However, regular site audits are suggested to ensure the dust control measures are properly implemented.

2.2.1 Mitigation Measures

Appropriate dust suppression measures should be adopted as required under the relevant requirements stipulated in the *Air Pollution Control (Construction Dust) Regulation* and the good practices for dust control should be implemented to reduce the dust impact. A control programme can be instigated to monitor the construction process in order to enforce dust controls and modify methods of works where feasible to reduce the dust emission down to acceptable levels. The implementation schedule of recommended air quality mitigation measures is presented in **Appendix C**.

2.3 Operational Phase Air Quality Monitoring

No ASRs are predicted to exceed the relevant criteria under the AQOs. No monitoring during operation is required.

3. Noise Impact

3.1 Introduction

An assessment of potential noise impacts during both the construction and operational phases of the Project has been assessed in Section 5 of the EIA report.

3.2 Construction Airborne Noise Monitoring

3.2.1 Monitoring Requirements

The construction noise level should be measured in terms of the A-weighted equivalent continuous sound pressure level (Leq). Leq (30 minutes) should be used as the monitoring parameter between 0700 and 1900 hours on normal weekdays. For all other time periods, Leq (5 minutes) should be employed for comparison with the Noise Control Ordinance (NCO) criteria.

Supplementary information for data auditing, statistical results such as L10 and L90 should also be obtained for reference.

3.2.2 Monitoring Equipment

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

Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed should be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

The ET is responsible for the provision of the monitoring equipment. He should 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 should be clearly labelled.

A sample data record sheet is shown in **Appendix B** for reference.

3.2.3 Monitoring Locations

The noise monitoring locations (refer to **Figure 3.1**) are summarised in **Table 3.1**. The status and locations of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET should propose updated monitoring locations and seek agreement from EPD, the OPC and the IEC before baseline monitoring commences.

Table 3.1: Construction Noise Monitoring Stations

ID	ID adopted in Construction Noise Assessment	Description
NM1	VSA	Victoria Shanghai Academy
NM2	HKJCC	Hong Kong Juvenile Care Centre

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

- monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts;
- monitoring at the noise sensitive receivers as defined in the TM; and
- assurance of minimal disturbance to the occupants during monitoring.

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

3.2.4 Baseline Monitoring

The ET should carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring should be carried out daily for a period of at least two weeks. Before commencing the baseline monitoring, the ET should develop and submit to the IEC the baseline monitoring programme such that the IEC can conduct on-site audit to check accuracy of the baseline monitoring results.

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

In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader should liaise with the OPC, EPD and IEC to agree on an appropriate set of data to be used as a baseline reference and submit to the OPC and IEC for agreement and EPD for approval.

3.2.5 Impact Monitoring

Noise monitoring should be carried out at all the designated monitoring stations throughout the entire construction work period. The following is an initial guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:

- one set of measurements between 0700 and 1900 hours on normal weekdays

If construction works are extended to include works during the hours of 1900 – 0700 as well as public holidays and Sundays, additional weekly impact monitoring should be carried out during respective restricted hour periods. Applicable permits under NCO should also be obtained by the Contractor.

Noise monitoring should be carried out at the monitoring stations for the schools during the school examination periods. The ET Leader should liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 3.3**, should be carried out. This additional monitoring should be continued until the recorded noise levels are rectified or demonstrated to be unrelated to the construction activities.

3.2.6 Event and Action Plan

The Action and Limit (AL) Levels for construction noise are defined in **Table 3.2**. Should non-compliance of the criteria occur, action in accordance with the Event and Action Plan in **Table 3.3** should be carried out.

Table 3.2: Action and Limit Level for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one valid documented complaint is received.	70* dB(A)

Note: * 65 dB(A) during school examination periods.
If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Table 3.3: Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	1. Notify ER, IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Advise the ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures.	1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, Contractor and EPD; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contractor's working procedures; 6. Discuss with the IEC, Contractor and ER on remedial measures required; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, 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.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures; 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.

3.2.7 Mitigation Measures

Recommended construction noise control and mitigation measures are proposed in the EIA report. The Contractor should be responsible for the design and implementation of these measures under the supervision of the ER and monitored by the ET. The implementation schedule of the recommended noise mitigation measures is presented in **Appendix C**.

3.3 Operational Noise Monitoring

3.3.1 Traffic Noise Monitoring

No adverse noise impact is anticipated from off-site road traffic, therefore no environmental monitoring and audit is proposed.

3.3.2 Fixed Plant Noise Monitoring

3.3.2.1 Maximum Permissible Sound Power Levels of Fixed Plant

The maximum permissible sound power levels of the identified fixed noise sources of the Project were predicted in the EIA report. The specified sound power levels should be implemented and refined by the Contractor as appropriate to ensure that the noise impact associated with the fixed plant operations would comply with the noise standards stipulated in the EIAO-TM and NCO.

3.3.2.2 Commissioning Test

Prior to the operation of the Project, the Contractor should conduct noise commissioning tests for all major fixed noise sources within OPC. The test should be carried out by a qualified person possessing at least 7 years of noise control experience and a corporate membership of Hong Kong Institute of Acoustics or equivalent. The noise commissioning test report should be submitted to the ET Leader, IEC and OPC for approval.

3.3.3 Mitigation Measures

The relevant noise mitigation measures have been recommended in the EIA report. The implementation schedule of the mitigation measures are given in **Appendix C**.

4. Water Quality Impact

4.1 Introduction

Adverse water quality impact was not predicted during the construction and operation phase of the Project. Nevertheless, appropriate mitigation measures are recommended to minimise potential water quality impacts. Water quality monitoring is not considered necessary.

4.2 Audit Requirements

Regular audit of the implementation of the recommended mitigation measures during construction phase at the work areas should be undertaken to ensure the recommended mitigation measures are properly implemented.

4.2.1 Mitigation Measures

The implementation schedule of the recommended water quality mitigation measures is presented in **Appendix C.**

5. Sewerage and Sewage Treatment Implications

5.1 Introduction

Adverse impact to the sewerage system due to the Project was not predicted in the EIA study. Nevertheless, appropriate design measures are recommended to minimise potential septicity impacts.

5.2 Detailed Design Report

In order to prevent septicity problems during operation phase, it is recommended that a detailed sewerage design report be submitted to DSD for approval prior to installation of the rising mains.

5.2.1 Mitigation Measures

The implementation schedule of the recommended design measures is presented in **Appendix C.**

6. Waste Management Implications

6.1 Introduction

Waste management would be the contractor's responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements. The recommended mitigation measures should form the basis of the site Waste Management Plan to be developed by the Contractor in the construction phase.

6.2 Construction Phase Waste Management Implications

During construction phase, regular site inspection as part of the EM&A procedures should be carried out to determine if wastes are being managed in accordance with approved procedures and the site Waste Management Plan. It should look at different aspects of waste management including waste generation, storage, recycling, treatment, transport and disposal.

6.2.1 Mitigation Measures

The implementation schedule of the recommended waste management mitigation measures is presented in **Appendix C.**

7. Land Contamination

7.1 Introduction

Desktop study and site appraisal have been conducted during EIA study and potential land contamination hotspots was not identified in the Project area.

7.2 Construction Phase Monitoring

According to the desktop appraisal and the site reconnaissance survey results, bulk excavation of soil for land remediation is not expected at this stage. As such, any environmental monitoring in relation to land remediation is not required.

However, during construction, EM&A is to be carried out in the form of regular site inspections. All related procedures and facilities for handling or storage of chemicals and chemical wastes will be audited regularly to ensure they are in order, intact and reported in the EM&A reports accordingly.

7.2.1 Mitigation Measures

The implementation schedule of the recommended land contamination mitigation measures is presented in **Appendix C**.

8. Ecological Impact

8.1 Introduction

The ecological impact assessment in the EIA report has evaluated the ecological consequences of the Project and concluded that the overall impacts would be of minor significance with the implementation of mitigation measures.

The major mitigation measures proposed for the identified ecological impact include enhancement for ardeid roosting, woodland compensation and in-situ preservation of plant species of conservation interest. The proposed ecological mitigation measures to avoid, minimise and compensate the identified impacts arising from the proposed project should be checked as part of the EM&A programme during the construction and operation phases.

8.2 Ecological Mitigation Measure

Mitigation measures were designed in accordance with Annex 16 of the EIAO-TM which states the general policy and guidance in planning of ecological measures. The implementation schedule of the recommended mitigation measures is presented in **Appendix C**. The major ecological mitigation measures proposed include habitat enhancement for ardeid roosting, provision of woodland area (approx 1.62 ha proposed) and in-situ preservation of plant species of conservation interest.

8.3 Environmental Monitoring and Audit

8.3.1 Baseline Monitoring

8.3.1.1 Vegetation Survey for Plant Species of Conservation Interest

According to the EIA finding, flora species of conservation interest *Platycodon grandiflorus* within the site formation boundary will be preserved in-situ. As the abundance of plants recorded in the EIA stage may be varied in the detailed design stage, conducting a detailed vegetation survey to confirm the number and location of the potentially affected plants prior to the commencement of site clearance is recommended. A qualified botanist/ecologist with 5 years of experience in flora study or survey shall be appointed to carry out the vegetation survey. The scope of the vegetation survey shall include the following:

- Checking and updating of the number, locations and condition of the *Platycodon grandiflorus* identified in the EIA and any other flora species of conservation interest by actively searching within the site formation boundary;

- Preparation of an updated location plan showing the individuals of *Platycodon grandiflorus* and any other flora species of conservation interest identified within the site formation boundary during the detailed vegetation survey;

- Confirmation on whether any of the individuals of *Platycodon grandiflorus* and any other flora species of conservation interest identified within the site formation boundary during the detailed vegetation survey will likely be affected by the proposed works of the Project; and

- Recommendation on protective measures of identified individuals of *Platycodon grandiflorus* and any other flora species of conservation interest identified within the site formation boundary during the

detailed vegetation survey should *in situ* preservation be considered feasible. Otherwise, remedial actions, such as transplantation, shall be proposed.

A Vegetation Survey Report summarising the findings and recommendations of the detailed vegetation survey shall be prepared as attachment to the Baseline Monitoring Report and submitted to AFCD for approval no later than one month prior to commencement of site clearance.

8.3.1.2 Inspection of Active Ardeid Nest

Prior to site clearance works at the planting area abandoned for ardeid breeding, the area around the indicative boundary of the ardeids roosting site as shown in **Figure 8.1** shall be inspected to confirm no active ardeid nest is present. If any active ardeid nest is observed, suitably sized buffer area shall be established to avoid human or machinery disturbance until the nest is abandoned. A qualified ecologist with at least 5 years of experience in ardeids monitoring or survey shall be appointed to carry out the inspection. Findings of inspection shall be reported in the Baseline Monitoring Report.

8.3.1.3 Inspection of Short-nosed Fruit Bat

Prior to any proposed arboricultural works of the trees, particularly the Chinese Fan-palms, daytime inspection shall be carried out to confirm no Short-nosed Fruit Bat is present on the fronds of the trees. If any Short-nosed Fruit Bat is observed roosting on tree, suitably sized buffer area shall be established around the tree to minimise human or machinery disturbance until the bat has left.

8.3.2 Environmental Monitoring

8.3.2.1 Monitoring of In-situ Preservation of Plant Species of Conservation Interest

Protective fence shall be erected along the area where flora species of conservation interest identified under the detailed vegetation survey would be retained within the site formation boundary. The protective fence shall be properly maintained and monitored for the effectiveness. Monthly monitoring of individuals of *Platycodon grandiflorus* and any other flora species of conservation interest identified in the detailed vegetation survey shall be conducted during the construction phase to make sure that the flora species of conservation interest are not affected by the construction works of the Project. The ET shall inspect whether the protective fence is properly erected and maintained during construction for adequate protection of the individuals and record the conditions of the individuals of *Platycodon grandiflorus* and any other flora species of conservation interest identified in the detailed vegetation survey.

8.3.2.2 Inspection of Ardeid Nest during Breeding Season

After commencement of construction phase, the Site shall be checked monthly in breeding season (April to July) for any potential breeding and nesting activities. If active ardeid nest is observed, suitably sized buffer area shall be established to avoid human or machinery disturbance until the nest is abandoned. A qualified ecologist with at least 5 years of experience in ardeids monitoring or survey shall be appointed to carry out the monitoring.

8.3.2.3 Monitoring for Ardeid Night Roost

The existing ardeid night roost location as illustrated in **Figure 8.1** shall be monitored monthly during peak wintering season (November to March) within construction phase by a qualified ecologist to check its status.

The survey shall be conducted using point count method at evening time from an hour before sunset, and last until the nightfall. Direct observation shall be made from a vantage point which enables an unobstructed view over the area and the potential roosting area. The seawall at TSW should be taken as first priority of the vantage point.

8.3.2.4 Inspection of Enhancement Area for Ardeid Roosting

As the plantation and pond area to be permanently lost was used by a small group of ardeids for roosting, it is recommended to enhance part of the TSW area to become suitable for ardeid use. An area enhanced with following features shall be provided. The location of the enhancement area shall be at the southern part within the project boundary as indicated in **Figure 8.1**. The enhancement area shall include a Flamingo Pond. Native tree species *Macaranga tanarius* and *Celtis sinensis* and tree species which was used by ardeids for roosting *Mallotus paniculatus*, *Ficus hispida* and *Cratoxylum cochinchinense* shall be used in the enhancement area. Heavy standard sized trees shall be used for planting to allow early establishment of the trees around the Flamingo Pond.

Implementation of the above design features shall be checked and endorsed by a qualified ecologist having at least 5 years of experience in ardeids monitoring or survey with an aim to ensure the setting is feasible for ardeid use.

Monitoring Requirements

After establishment of the enhancement area for the ardeid roosting site, it shall be monitored monthly for one year during operation phase to check the effectiveness of the setting. The survey shall be conducted using point count method at evening time from an hour before sunset, and last until the nightfall. Direct observation shall be made from a vantage point which enables an unobstructed view over the area. The seawall at TSW should be taken as first priority of the vantage point. Any aggregation of night roosting ardeids in the enhancement area or adjacent area shall be located and the ardeid species shall be identified and counted. Monitoring results shall be reported monthly in EM&A reports.

8.3.2.5 Monitoring on Woodland Compensation

In order to mitigate the ecological impact on woodland habitats, woodland area of about 1.62 ha, which is constituted of 0.84 ha woodland compensation together with 0.78 ha on-site woodland reinstatement (for temporary lost woodland), is proposed on-site area adjoining to existing woodland habitat and tall shrubland. Location of the woodland area for compensation and reinstatement is illustrated in **Figure 8.2**. In the woodland compensation area, whips shall be planted with predominately native tree species similar to the affected woodland, such as *Celtis sinensis*, *Cratoxylum cochinchinense*, *Polyspora axillaris* and *Sterculia lanceolata*. A Woodland Compensation Plan with an aim to form the basis to guide the implementation of the proposed woodland mitigation shall be prepared by a qualified botanist/ecologist of the ET and submitted to AFCD for approval no later than one month prior to commencement of site clearance.

Apart from the standard inspection and establishment works for landscape softworks, a 3-year ecological monitoring programme covering planting phases is proposed. The necessity for further monitoring would be reviewed after the 3-year ecological monitoring programme. The monitoring of planting includes parameters of: general health condition and survival rate; with establishment works would include basic replacement of dead plants, weeding and watering. Monitoring is proposed to be carried out in inspection walk to observe the overview/ progress of the planting within the whole woodland compensation area.

Monitoring Requirements

The monitoring shall be conducted by the ET and supervised by a qualified botanist/ecologist of the ET.

The routes of the general inspection walk shall be selected to cover the whole woodland compensation area as far as possible. The general health condition (good/fair/poor/dead) and survival (%) of individual species of planted trees and whips shall be recorded by direct observation.

The frequency of the monitoring is proposed to be bi-monthly. Change of monitoring frequency shall be advised by the Project Ecologist/Botanist and approved by EPD and AFCD.

The Trigger and Action Levels for Monitoring and Action Plan of the woodland compensation area are presented in **Table 8.1**.

Table 8.1: Trigger and Action Levels for Monitoring and Action Plan of the Woodland Compensation Area

Parameters	Trigger and Action Level	Action Plan
General Health Condition	Trigger Level: % of individual plant species in poor health condition >20%	• the ET should inform OPC/ Contractor appointed by OPC and IEC immediately; • identify the cause(s) of the increased % in poor condition; • advise OPC/ Contractor appointed by OPC the necessity of replanting.
	Action Level: % of individual plant species in poor health condition >30%	• the ET should inform OPC/ Contractor appointed by OPC and IEC immediately; • identify the cause(s) of the increased % in poor condition; • advise remedial action and work out solution including change of species in re-planting, re-soiling of the target areas; and seek acceptance from AFCD; • Once the remedial action has been accepted by AFCD, OPC/ Contractor appointed by OPC should implement the remedial action.
Survival of Plants	Trigger Level: Survival rate of individual plant species < 80%	• the ET should inform OPC/ Contractor appointed by OPC and IEC immediately; • identify the cause(s) of the drop in survival rate; • advise OPC/ Contractor appointed by OPC the necessity of replanting.
	Action Level: Survival rate of individual plant species < 70%	• the ET should inform OPC/ Contractor appointed by OPC and IEC immediately; • identify the cause(s) of the drop in survival rate; • advise remedial action and work out solution including change of species in re-planting, re-soiling of the target areas; and seek acceptance from AFCD; • Once the remedial action has been accepted by AFCD, OPC/ Contractor appointed by OPC should implement the remedial action.

8.3.3 Environmental Audit

The implementation of mitigation measures stated in **Section 8.2** of this Manual shall be routinely audited, during the implementation of the Project. Requirements of the environmental audit are given in **Section 10** of this Manual. Implementation of the recommended ecological mitigation measures, detailed in Section 15 of the EIA report and **Appendix C** of this Manual, shall be examined during the routine environmental audit. Any observations and recommendations shall be reported in periodic EM&A reports.

9. Landscape and Visual Impact

9.1 Introduction

Potential landscape and visual impacts arising from the construction and operation of the Project have been identified and evaluated in the EIA report. Landscape and visual impacts are anticipated during the construction and operation phase of the Project. With the implementation of recommended mitigation measures which aim at minimising the impacts and improving the overall landscape and visual quality, the residual impacts are generally insubstantial and acceptable.

The main Contractor to be employed by Ocean Park shall be responsible for the implementation of the recommended landscape and visual mitigation measures. Both Ocean Park and the main Contractor shall employ their own qualified landscape consultants in both the construction and operation phases. A Registered Landscape Architect (RLA), as a member of the ET team, with substantial construction site experience, shall be responsible for undertaking the landscape and visual baseline review prior to commencement of construction works, and monitoring the implementation of landscape and visual mitigation measures during the construction and operation phases.

9.2 Baseline Monitoring

A landscape and visual baseline review shall be undertaken as a one-off site survey prior to commencement of construction works. The objectives of the baseline review are:

- to verify the status of the Landscape Resources (LRs) within and in close proximity to the construction site and works areas;
- to determine whether any change has occurred to the status of the LRs since the EIA;
- to determine whether amendments in the design of the landscape and visual mitigation measures are required for any identified changes in the status of the LRs; and
- to recommend any necessary amendments to the design of the landscape and visual mitigation measures.

Representative photographs of all LRs within the Project area shall be included in the baseline review report.

9.3 Mitigation Measures

The EIA has recommended a series of landscape and visual mitigation measures for both the construction and operation phases of the Project, which are summarised in **Table 9.1** and **Table 9.2** respectively.

Table 9.1: Recommended Construction Phase Mitigation Measures

Mitigation Code	Responsible Agent for Mitigation Implementation	Mitigation Measure
CP01	OPC via Contractor	**Minimisation of Construction Period** – The construction programme should be carefully designed to minimise the length of the construction period.
CP02	OPC via Contractor	**Minimisation of Works Areas** – The footprint of the proposed hard structures as well as the extent of temporary works areas should be minimised as far as practicable.
CP03	OPC via Contractor	**Construction Site Controls** – Construction site controls should be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities, such as the storage of materials, the location and

Mitigation Code	Responsible Agent for Mitigation Implementation	Mitigation Measure
		appearance of site accommodation, etc. are minimised.
CP04	OPC via Contractor	**Preservation of Existing Vegetation** – The development proposal should avoid disturbance to existing vegetation as far as practicable. A formal tree removal application should be submitted for approval by relevant authorities in accordance with LAO PN No. 07/2007 "Tree Preservation and Tree Removal Application for Building Development in Private Projects" during the detailed design phase of the Project. Where possible, all trees which are not in direct conflict with the development proposals should be retained *in situ*.
CP05	OPC via Contractor	**Transplantation of Existing Trees** – Trees which are in direct conflict with the development proposals and suitable for transplantation should be transplanted as far as practicable. A tree transplantation proposal should be submitted together with the tree removal application. Trees proposed to be transplanted should preferably be transplanted from their original locations directly to their final recipient locations in one go. If this is infeasible, the trees should be held in a temporary tree nursery, preferably within the Project area, where the trees will be properly maintained.
CP06	OPC via Contractor	**No Intrusion Zones** – Where practicable, "no intrusion zones" should be designated within the Project area for protection of existing vegetation. Durable boundary fences should be erected to clearly demarcate these "no intrusion zones". No construction activities, storage of materials and vehicular access will be allowed within the "no intrusion zones" to prevent potential damage to canopies and root zones of vegetation.
CP07	OPC via Contractor	**Temporary Tree Nurseries** – Temporary tree nurseries may be set up within the Project area at an early stage to allow small trees to grow during the construction period. By the time these trees are needed for landscape planting at the end of the construction phase, they will have grown larger, require minimal pruning and suffer much less damage during transplanting, as the moving distance from an on-site rather than off-site nursery will be much smaller. The temporary tree nurseries can also temporarily hold the existing trees to be transplanted if direct transplantation from their original locations to the final recipient location is impracticable. The locations of the temporary tree nurseries should be carefully selected so that the trees can also act as screen planting to block the views of the Project area from the VSRs during the construction phase, if practicable.
CP08	OPC via Contractor	**Advance Planting** – Advance planting should be undertaken at the earliest possible stage of the construction phase of the project. Plant species, preferably native ones, should be carefully selected to blend in with the existing preserved vegetation. Landscape planting in movable planters should also be considered as a temporary greening measure for the Project area.
CP09	OPC via Contractor	**Construction Site Hoardings** – Two types of hoardings should be considered. One is used for areas in close contact with visitors and for areas where visual intrusion is a key concern. It should be graphical and thematic, and visually 'impermeable' to block the views of construction activities from the VSRs. The other is used for areas to be viewed at a distance. It should be subtle and camouflaged so that it blends in with the surrounding landscape.
CP10	OPC via Contractor	**Dust and Erosion Control for Exposed Soil** – Exposed soil shall be covered or "camouflaged" and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydroseeded and / or covered with suitable protective fabrics.
CP11	OPC via Contractor	**Appearance of Construction Plant / Machinery** – To minimise the visual intrusion of construction activities to visitors and other VSRs, a suitable colour scheme of construction machines and plants should be adopted where possible.
CP12	OPC via Contractor	**Construction Lighting Control** - All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimise light pollution and night-time glare to the VSRs.
CP13	OPC via Contractor	**Appearance of Construction Workers** – To protect Ocean Park's image, construction workers should be required to enter the park areas with their helmets and safety vests properly stored or carried in non-transparent bags. They should

Mitigation Code	Responsible Agent for Mitigation Implementation	Mitigation Measure
		also dress properly and cleanly.

Table 9.2: Recommended Operation Phase Mitigation Measures

Mitigation Code	Responsible Agent for Mitigation Implementation	Mitigation Measure
OP01	OPC via Contractor	**Sensitive Design and Disposition** – All proposed hard structures should be sensitively designed in a manner that responds to the existing and planned landscape context, and minimises potential adverse landscape and visual impacts. The structural design should seek to reduce the apparent visual mass through the use of natural materials such as wooden frame and semi-transparent panels. Subdued tones should be considered for the colour palette with non-reflective finishes to reduce glare effect. Site specific measures, such as the disposition of the key structures closer to the northern slopes, the design of building forms as extension along the existing slope topography, the use of concave roof form and the location of ride platforms on or near the slopes to minimise structural support, should also be considered for better integration with the surroundings and minimisation of potential visual impacts.
OP02	OPC via Contractor	**Compensatory Tree Planting** – Existing trees to be felled should be compensated as far as practicable. Native species should be proposed as far as practicable to re-create a native landscape, restore the ecological habitats and blend in with the existing native vegetation. A compensatory tree planting proposal should be submitted together with the tree removal application for approval by relevant authorities in accordance with LAO Practice Note No. 7/2007. It is recommended that approximately 608 heavy standard trees and approximately 18,202 whip trees could be planted on-site. The availability of off-site compensatory tree planting area is still subject to further investigation and agreement with relevant authorities.
OP03	OPC via Contractor	**Enhancement Planting** – Other than compensatory tree planting, additional trees, shrubs, groundcovers and lawn should also be considered to maximise greening within the redevelopment area.
OP04	OPC via Contractor	**Green Roofs and Vertical Greening** – Green Roofs and Vertical Greening should be provided where feasible and appropriate to screen and soften the hard edges of building structures.
OP05	OPC via Contractor	**Reprovision of Flamingo Pond** – A pond is recommended to replace the demolished Flamingo Pond as compensation for the loss of semi-natural ponds, where wildlife, such as birds, can utilise.
OP06	OPC via Contractor	**Responsive Lighting Design** – Overall lighting design would carefully consider a reasonable level of functional and thematic lighting with due consideration of possible light pollution and night-time glare to the surroundings. Consideration shall be made by the lighting designers to the following measures: - Lighting shall be designed with due consideration of mounting height and direction of light fixtures so as not to point directly towards any sensitive receiver. - Lighting shall be arranged with due consideration of reflectance so as to avoid glare effect. - Lighting shall be regularly monitored during operation. - Lights located adjacent or in proximity to neighbours shall be carefully designed to prevent possible light intrusion. - Lighting operation schedule shall specify only lights necessary for security to be left on after business hours. - Paving materials should be selected as necessary to reduce potential glare from surface reflectance. - Particular attention should be paid to the use of lighting having a high intensity or harsher tone (e.g. metal halide lamps). - Lights shall generally be models having precise cut-off range (such as full cut-off optics where available and practicable) and if necessary be fitted with adjustable

Mitigation Code	Responsible Agent for Mitigation Implementation	Mitigation Measure
		anti-glare shields.
OP07	OPC via Contractor	**Woodland Compensation** – 1.53ha of affected woodland is recommended to be reinstated / compensated by 1.62ha of whip tree planting adjacent to the existing unaffected woodland and tall shrubland. Native species should be proposed as far as practicable to re-create a native landscape, restore the ecological habitats and blend in with the existing native vegetation.

9.4 Construction Phase Monitoring

The design, implementation and maintenance of landscape and visual mitigation measures shall be checked bi-weekly to ensure that they are fully realised during the construction phase. The scope of the site audit during construction shall include the following:

- The extent of the agreed works areas should be regularly checked. No construction activities or storage shall be undertaken outside the limit of the works;
- 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 landscaping works are carried out in accordance with the specifications; and
- All new planting are carried out properly and within the right season.

Any potential conflicts between the proposed landscape and visual mitigation measures and any other project works or operational requirements shall be recorded for the Contractor to resolve in an early stage, without compromising the intention of the mitigation measures.

9.5 Operation Phase Monitoring

All landscape planting shall be monitored bi-monthly during the first year of the operation phase to ensure proper establishment and its effectiveness as landscape and visual mitigation measures. The scope of the site audit during this 12-month establishment period in operation phase shall include the following:

- All necessary horticultural operations and replacement planting are undertaken throughout the 12-month establishment period to ensure healthy establishment.

Any observation of unsatisfactory horticultural maintenance works, failure of establishment of soft landscape or poor condition of established planting shall be recorded for the Contractor to undertake any necessary actions to improve the conditions of the landscape planting.

9.6 Event and Action Plan

Should non-compliance of the landscape and visual impacts occur, actions in accordance with the action plan as shown in **Table 9.3** shall be carried out.

Table 9.3: Event and Action Plan for Landscape and Visual Impact during Construction Phase

Action Level	Environmental Team Leader (ETL)	Independent Environmental Checker (IEC)	Engineer's Representative (ER)	Contractor
Non-conformity on one occasion	1. Identify source 2. Inform the IEC and the ER 3. Discuss remedial actions with the IEC, the ER and the	1. Check report 2. Check the Contractor's working method 3. Discuss with the ER and the	1. Notify the Contractor 2. Ensure remedial measures are	1. Amend working methods 2. Rectify damage and undertake

Action Level	Environmental Team Leader (ETL)	Independent Environmental Checker (IEC)	Engineer's Representative (ER)	Contractor
	Contractor 4. Monitor remedial action until rectification has been completed	Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures	properly implemented	remedial measures or any necessary replacement
Repeated Non-conformity	1. Identify source 2. Inform the IEC and the ER 3. Increase monitoring (site audit) frequency 4. Discuss remedial actions with the IEC, the ER and the Contractor 5. Monitor remedial actions until rectification has been completed 6. If exceedance stops, cease additional monitoring (site audit)	1. Check report 2. Check the Contractor's working method 3. Discuss with the ER and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures 5. Supervise implementation of remedial measures	1. Notify the Contractor 2. Ensure remedial measures are properly implemented	1. Amend working methods 2. Rectify damage and undertake remedial measures or any necessary replacement

10. Environmental Auditing

10.1 Site Inspection

Site inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They should be undertaken routinely by the ET to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. 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.

The ET Leader is responsible for formulating the environmental site inspection, the deficiency and action reporting system, and for carrying out the site inspection works. He should prepare a proposal for site inspection and deficiency and action reporting procedures to the IEC for agreement, and to the ER for approval. The Contractor's proposal for rectification would be made known to the ER and IEC.

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

- the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- the EP conditions;
- ongoing results of the EM&A program;
- works progress and programme;
- individual works methodology proposals (which should include proposal on associated pollution control measures);
- contract specifications on environmental protection;
- relevant environmental protection and pollution control laws; and
- previous site inspection results undertaken by the ET and others.

The Contractor should keep the ET Leader updated with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works should be submitted to the IEC and the Contractor within 24 hours for reference and for taking immediate action. The Contractor should follow the procedures and time-frame stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.

The ET should also carry out ad hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work.

10.2 Compliance with Legal and Contractual Requirements

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

In order that the works are in compliance with the contractual requirements, relevant sections (e.g. sections related to environmental measures) of works method statements submitted by the Contractor to the ER for approval should be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included.

The ET Leader should also keep himself informed of the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violation can be prevented.

The Contractor should regularly copy relevant documents to the ET Leader so that works checking can be carried out. The document should at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licences / permits under the environmental protection laws, and copies of all valid licences / permits. The site diary should also be made available for the ET Leader's inspection upon his request.

After reviewing the documentation, the ET Leader should advise the Contractor of any noncompliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions, including any potential violation of requirements.

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

10.3 Environmental Complaints

Complaints should be referred to the ET for action. The ET should undertake the following procedures upon receipt of any valid complaint:

- The Contractor to log complaint and date of receipt onto the complaint database and inform the ER, ET and IEC immediately;
- The Contractor to investigate the complaint to determine its validity, and assess whether the source of the problem is due to construction works of the Project with the support of additional monitoring frequency, stations and parameters, if necessary;
- The Contractor to identify mitigation measures in consultation with IEC, ET and ER if a complaint is valid and due to the construction works of the Project;
- The Contractor to implement the remedial measures as required by the ER and to agree with the ET and IEC any additional monitoring frequency, stations and parameters, where necessary, for checking the effectiveness of the mitigation measures;
- The ER, ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;
- The ET to undertake additional monitoring and audit to verify the situation if necessary, and oversee that circumstances leading to the complaint do not recur;
- If the complaint is referred by the EPD, the Contractor is to prepare interim report on the status of the complaint investigation and follow-up actions stipulated above, including the details of the remedial measures and additional monitoring identified or already taken, for submission to EPD within the time frame assigned by EPD; and
- The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and additional monitoring results in the monthly EM&A reports.

Handling of environmental complaints should follow the environmental complaint flow diagram and reporting channel as presented in **Figure 10.1**.

During the complaint investigation work, the Contractor and ER should cooperate with the ET in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor should promptly carry out the mitigation works. The ER should ensure that the measures have been carried out by the Contractor.

11. Reporting

11.1 General

The reporting requirements of EM&A are based upon a paper-documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the IEC, the ER and EPD (for construction phase), and with the Environmental Consultant, OPC and EPD (for operation phase). This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach.

For construction phase EM&A, types of reports that the ET Leader shall prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports shall be made available to the Director of Environmental Protection. The exact details of the frequency, distribution and time frame for submission shall be agreed with the IEC, the ER and EPD prior to commencement of works.

11.2 Baseline Monitoring Report

The ET Leader should 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 should be submitted to the Contractor, the IEC, the ER, OPC and EPD. The ET Leader should liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format should be agreed with the IEC, the ER and EPD prior to submission.

The baseline monitoring report should include at least the following:

i. up to half a page of executive summary

ii. brief project background information

iii. drawings showing locations of the baseline monitoring stations

iv. an updated construction programme with milestones of environmental protection / mitigation activities annotated

v. 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, where relevant)
- monitoring date, time, frequency and duration
- quality assurance (QA) / quality control (QC) results and detection limits

vi. details of influencing factors, including:

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

vii. determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data, the analysis should conclude if there is any significant difference between control and impact stations for the parameters monitored

viii. revisions for inclusion in the EM&A Manual

ix. comments and conclusions

11.3 Monthly EM&A Reports

The results and findings of all EM&A work carried out during the month should be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report should be prepared and submitted within 10 working days after the end of each reporting month. Each monthly EM&A report should be submitted to the following parties: the Contractor, the IEC, the ER, OPC and the EPD. Before submission of the first EM&A report, the ET Leader should liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

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

11.3.1 First Monthly EM&A Report

The first monthly EM&A report should include at least but not be limited to the following:

i. executive summary (1-2 pages):

- breaches of Action and Limit levels
- complaint log
- notifications of any summons and status of prosecutions
- changes made that affect the EM&A
- future key issues

ii. basic project information:

- project organisation including key personnel contact names and telephone numbers
- scope of works of the project

- construction programme
- works undertaken during the month with illustrations (such as location of works etc)
- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations(with co-ordinates of the monitoring locations).

iii. a brief summary of EM&A requirements including:

- all monitoring parameters
- environmental quality performance limits (Action and Limit levels)
- Event and Action Plans
- environmental mitigation measures, as recommended in the project EIA study final report
- environmental requirements in contract documents

iv. environmental status

- advice on status of compliance with EP including the status of submissions under the EP

v. implementation status

- implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA report

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

- monitoring methodology
- name of laboratory and types of equipment used and calibration details
- parameters monitored
- monitoring locations
- monitoring date, time frequency, and duration
- weather conditions during the period / monitoring
- graphical plots of the monitored parameters in the month annotated against
- the major activities being carried out on site during the period
- weather conditions that may affect the monitoring results
- any other factors which might affect the monitoring results

- QA / QC results and detection limits

vii. analysis of monitoring results, non-compliance, complaints, and notifications of summons and status of prosecutions:

- analysis and interpretation of monitoring results in the month
- any non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels)
- changes made that affect the EM&A during the month
- 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
- notification of summons and status of prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary
- reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures
- actions taken in the event of non-compliance and deficiency, and follow-up actions related to earlier non-compliance

viii. others

- an account of the future key issues as reviewed from the works programme and work method statements
- comment on the solid and liquid waste management status during the month including waste generation and disposal records
- outstanding issues and deficiencies
- comments on effectiveness of the environmental management systems, practices, procedures and mitigation measures, recommendations (for example, any improvement in the EM&A programme) and conclusions

ix. appendix

- monitoring schedule for the present and next reporting period
- cumulative statistics on complaints, notifications of summons and successful prosecutions
- outstanding issues and deficiencies

11.3.2 Subsequent Monthly EM&A Reports

The subsequent monthly EM&A reports should include the following:

i. executive summary (1-2 pages):

- breaches of Action and Limit levels
- complaint log
- notifications of any summons and status of prosecutions
- changes made that affect the EM&A
- future key issues

ii. environmental status:

- advice on status of compliance with EP including the status of submissions under the EP

iii. implementation status:

- implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA report

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

- monitoring methodology
- name of laboratory and types of equipment used and calibration details
- parameters monitored
- monitoring locations
- monitoring date, time frequency, and duration
- weather conditions during the period / monitoring
- graphical plots of the monitored parameters in the month annotated against:
  - the major activities being carried out on site during the period
  - weather conditions that may affect the monitoring results
  - any other factors which might affect the monitoring results
  - QA / QC results and detection limits

v. analysis of monitoring results, non-compliance, complaints, and notifications of summons and status of prosecutions:

- analysis and interpretation of monitoring results in the month
- any non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels)
- changes made that affect the EM&A during the month
- 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
- notification of summons and status of prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary
- reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures
- actions taken in the event of non-compliance and deficiency, and follow-up actions related to earlier non-compliance

vi. others

- an account of the future key issues as reviewed from the works programme and work method statements
- comment on the solid and liquid waste management status during the month including waste generation and disposal records
- outstanding issues and deficiencies
- comments on effectiveness of the environmental management systems, practices, procedures and mitigation measures, recommendations (for example, any improvement in the EM&A programme) and conclusions

vii. appendix

- monitoring schedule for the present and next reporting period
- cumulative statistics on complaints, notifications of summons and successful prosecutions
- outstanding issues and deficiencies

Some information concerning the EM&A works, such as the EM&A requirements would remain unchanged throughout the EM&A programme. In the subsequent Monthly EM&A Reports, the First Monthly EM&A Report can be referred instead of repeating the description of the unchanged information.

11.4 Quarterly EM&A Reports

A quarterly EM&A report should be produced and should contain at least the following information. In addition, the first quarterly summary report should also confirm if the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

i. up to half a page executive summary

ii. basic project information including a synopsis of the project organisation and programme, and a synopsis of works undertaken during the quarter

iii. a brief summary of EM&A requirements including:

- monitoring parameters
- environmental quality performance limits (Action and Limit levels)
- environmental mitigation measures, as recommended in the project EIA Final Report

iv. drawings showing the project area, environmental sensitive receivers and the locations of the monitoring and control stations

v. implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA report

vi. graphical plots of the monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:

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

vii. advice on the solid and liquid waste management during the quarter including waste generation and disposal records

viii. a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels)

ix. a brief review of the reasons for and the implications of any non-compliance, including a review of pollution sources and working procedures

x. a summary description of actions taken in the event of non-compliance and any follow-up procedures related to any earlier non-compliance

xi. a summary of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken

xii. comments on the effectiveness and efficiency of the mitigation measures; recommendations on any improvements in the EM&A programme and conclusions for the quarter

xiii. proponents' contacts and any hotline telephone number for the public to make enquiries.

11.5 Final EM&A Review Report

The EM&A program could be terminated upon completion of those construction activities that have the potential to cause significant environmental impacts.

The proposed termination by the Contractor should only be implemented after the proposal has been endorsed by the IEC, the ER and OPC followed by final approval from the DEP.

The final EM&A report should include, inter alia, the following information:

i. an executive summary

ii. basic project information including a synopsis of the project organisation and programme, contacts of key management, and a synopsis of work undertaken during the entire construction period

iii. a brief summary of EM&A requirements including:

- monitoring parameters
- environmental quality performance limits (Action and Limit levels)
- environmental mitigation measures, as recommended in the project EIA study final report

iv. drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations

v. advice on the implementation status of environmental and pollution control / mitigation measures, as recommended in the project EIA study final report, summarised in the updated implementation status pro forma

vi. graphical plots of the monitoring parameters over the construction period for representative monitoring stations, including the post-project monitoring annotated against:

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

vii. compare the EM&A data with the EIA predictions

viii. effectiveness of the solid and liquid waste management

ix. a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels)

x. a brief account of the reasons the non-compliance including a review of pollution sources and working procedures

xi. a summary of the actions taken against the non-compliance

xii. a summary of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken

xiii. a review of the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness)

xiv. a summary of notifications of summons and successful prosecutions for breaches of the current environmental protection / pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results

xv. a review of the practicality and effectiveness of the EM&A programme (e.g. effectiveness and efficiency of the mitigation measures), and recommendation on any improvement in the EM&A programme

xvi. a conclusion to state the return of ambient and / or the predicted scenario as per EIA findings

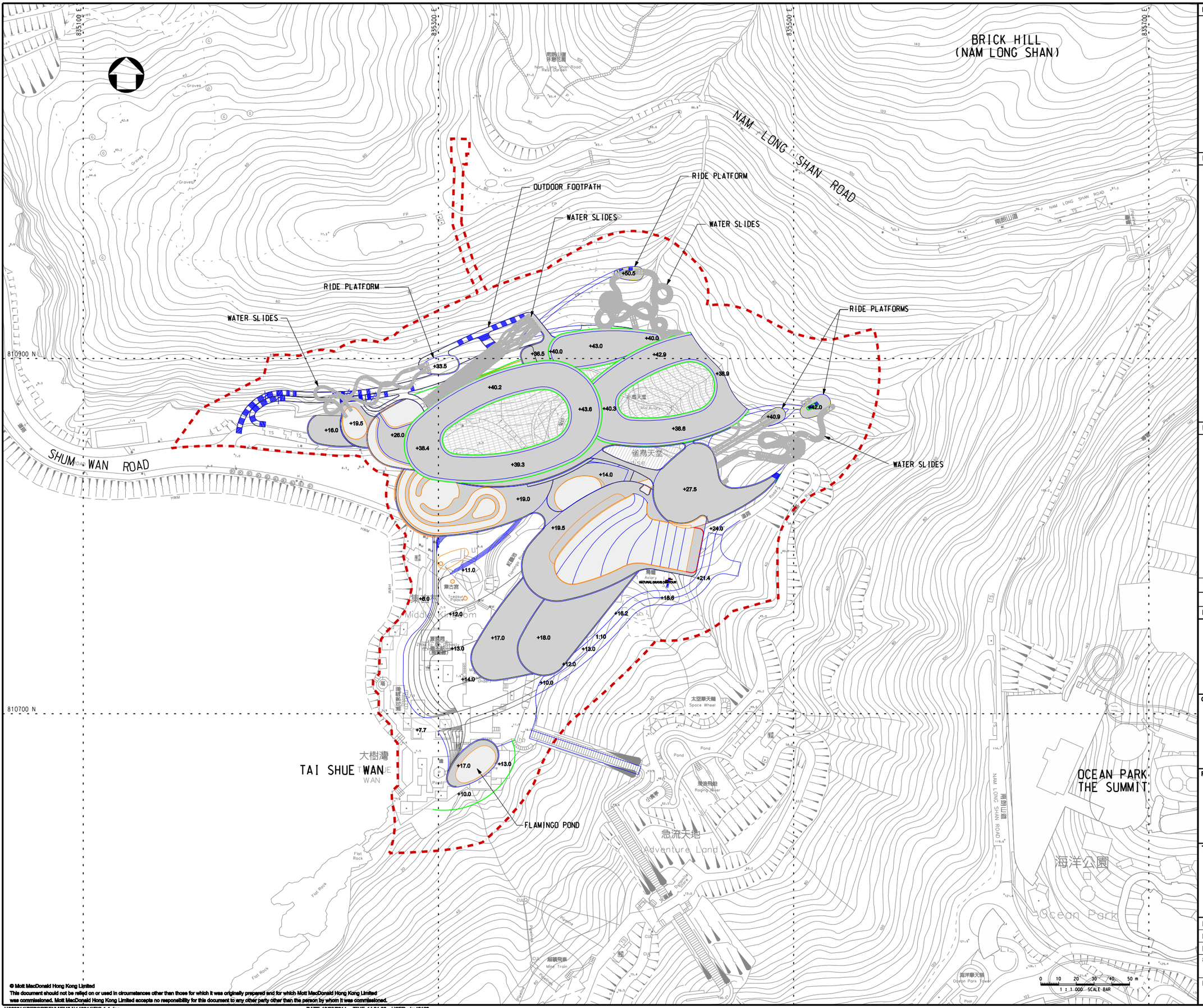
11.6 Data Keeping

No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the EM&A reporting documents. However, any such document should be retained by the ET Leader / Monitoring Team and be ready for inspection upon request. All relevant information should be clearly and systematically recorded in the document. Monitoring data should also be recorded in digital format, and the soft copy must be available upon request. Data format should be agreed with the IEC, the ER, OPC and EPD. All documents and data should be kept for at least one year following completion of the construction contract and one year after the completion of operation phase monitoring for construction phase EM&A and operational phase EM&A respectively.

11.7 Interim Notifications of Environmental Quality Limit Exceedances

For construction phase EM&A, with reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader should immediately notify the IEC, the ER, OPC and EPD, as appropriate and should keep them informed of the results of the investigation, proposed remedial measures, actions taken, updated situation on site, need for further follow-up proposals, etc. A sample template for the interim notifications is shown in **Appendix D**. The ET Leader may modify the interim notification form for this EM&A programme, the format of which should be approved by the ER and agreed by the IEC.

Figures



Notes

Key to symbols

PROJECT BOUNDARY

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	MAR 14	MING	GENERAL REVISION	HY	AFK
P1	FEB 14	MING	FIRST ISSUE	HY	AFK

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20/F Two Landmark East
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W www.mottmac.com.hk

Client

Ocean Park Hong Kong 香港海洋公園

Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

Title

PROJECT LAYOUT PLAN

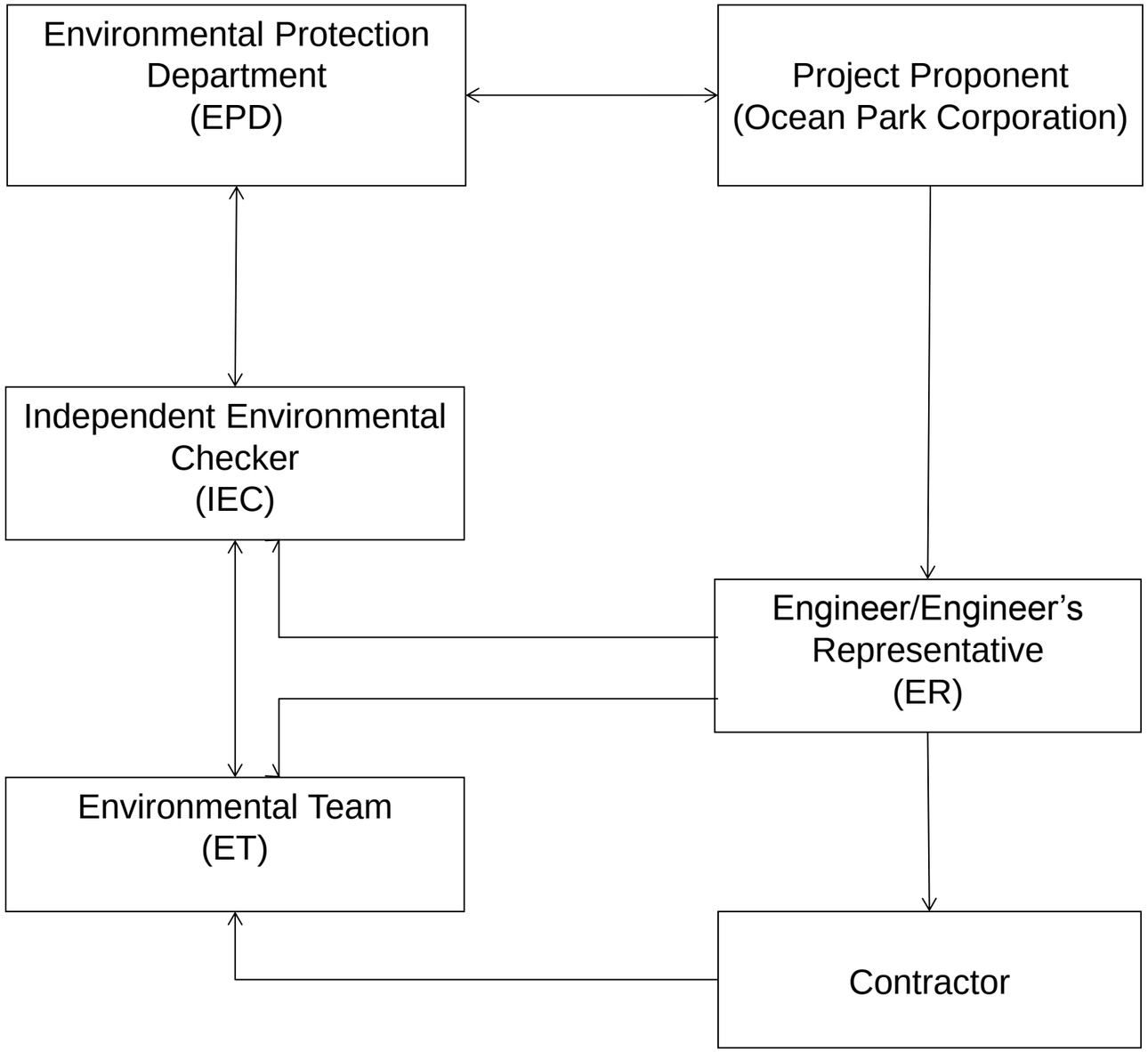
Designed	HY		Eng check	FW	
Drawn	MING		Coordination	FW	
Dwg check	HY		Approved	AFK	

Scale at A1	Status	Rev
1:1000	PRE	P2

Drawing Number

FIGURE 1.1

J:\328011\REPORT\ENV\EM&A\140311\FIG 1-1.dgn DATE: 10/03/2014 TIME: 14:31:00 USER: ytm42169



Notes

Key to symbols

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd

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Client

Ocean Park Hong Kong 香港海洋公園

Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

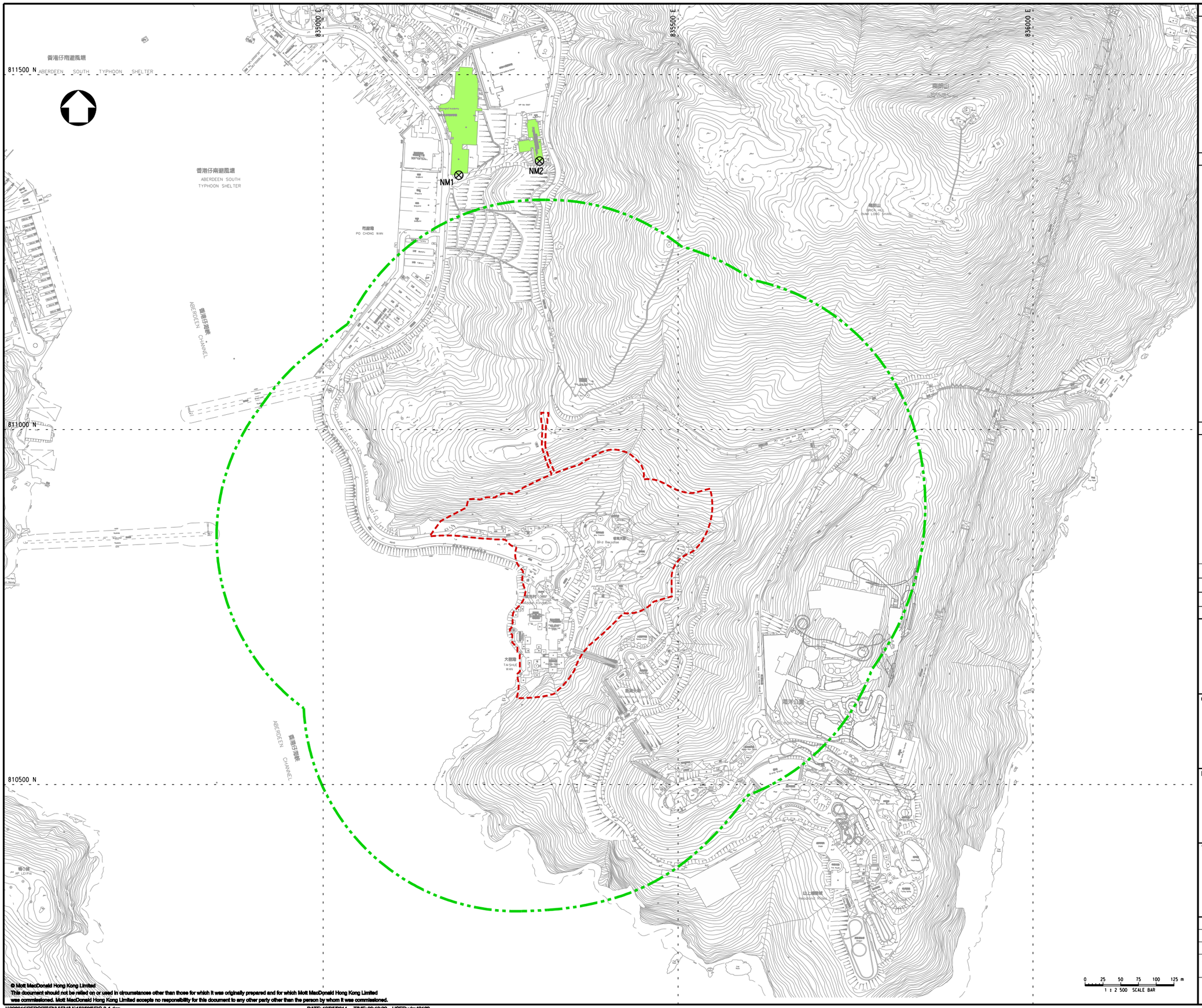
Title

PROJECT ORGANISATION CHART

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	

Drawing Number

FIGURE 1.2



Notes

Key to symbols

- 300m ASSESSMENT AREA
- PROJECT BOUNDARY
- ⊗ CONSTRUCTION NOISE MONITORING STATION

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P3	MAY 14	MING	GENERAL REVISION	FK	AFK
P2	MAR 14	MING	GENERAL REVISION	AM	AFK
P1	FEB 14	MING	FIRST ISSUE	AM	AFK

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Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

Title

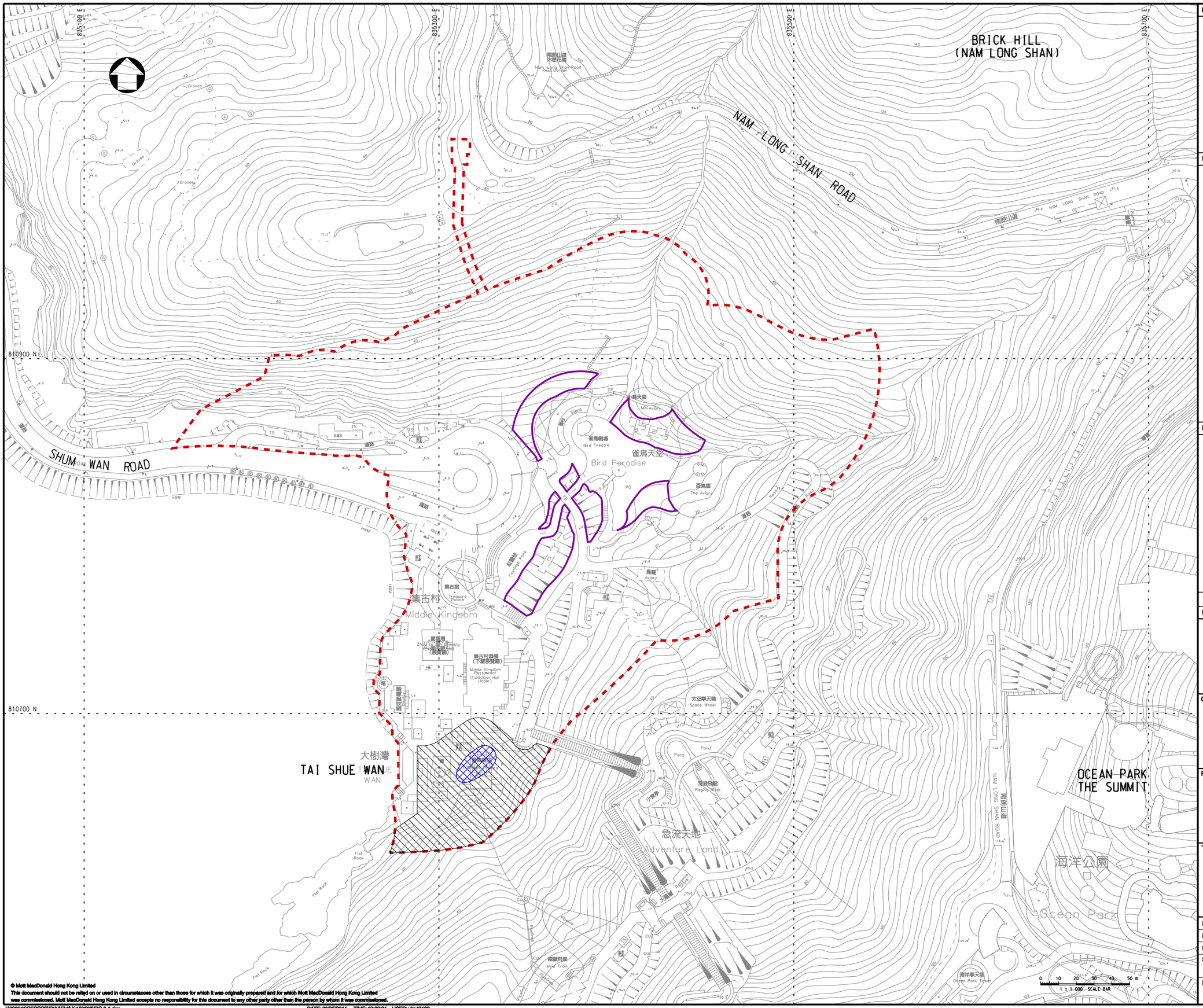
PROPOSED LOCATIONS OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	AM		Eng check	FW	
Drawn	MING		Coordination	FW	
Dwg check	AM		Approved	AFK	
Scale at A1	1:2500	Status	PRE	Rev	P3

Drawing Number

FIGURE 3.1

J:\328011\REPORT\ENV\EM&A\150506\FIG 3-1.dgn DATE: 12/05/2014 TIME: 09:19:32 USER: ylm42169



Notes

Key to symbols

- PROJECT BOUNDARY
- INDICATIVE BOUNDARY OF ROOSTING SITES OF ARDEIDS
- PROPOSED ENHANCEMENT AREA (INDICATIVE)
- PROPOSED FLAMINGO POND

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	MAY 14	MING	FIRST ISSUE	FK	AFK

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Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

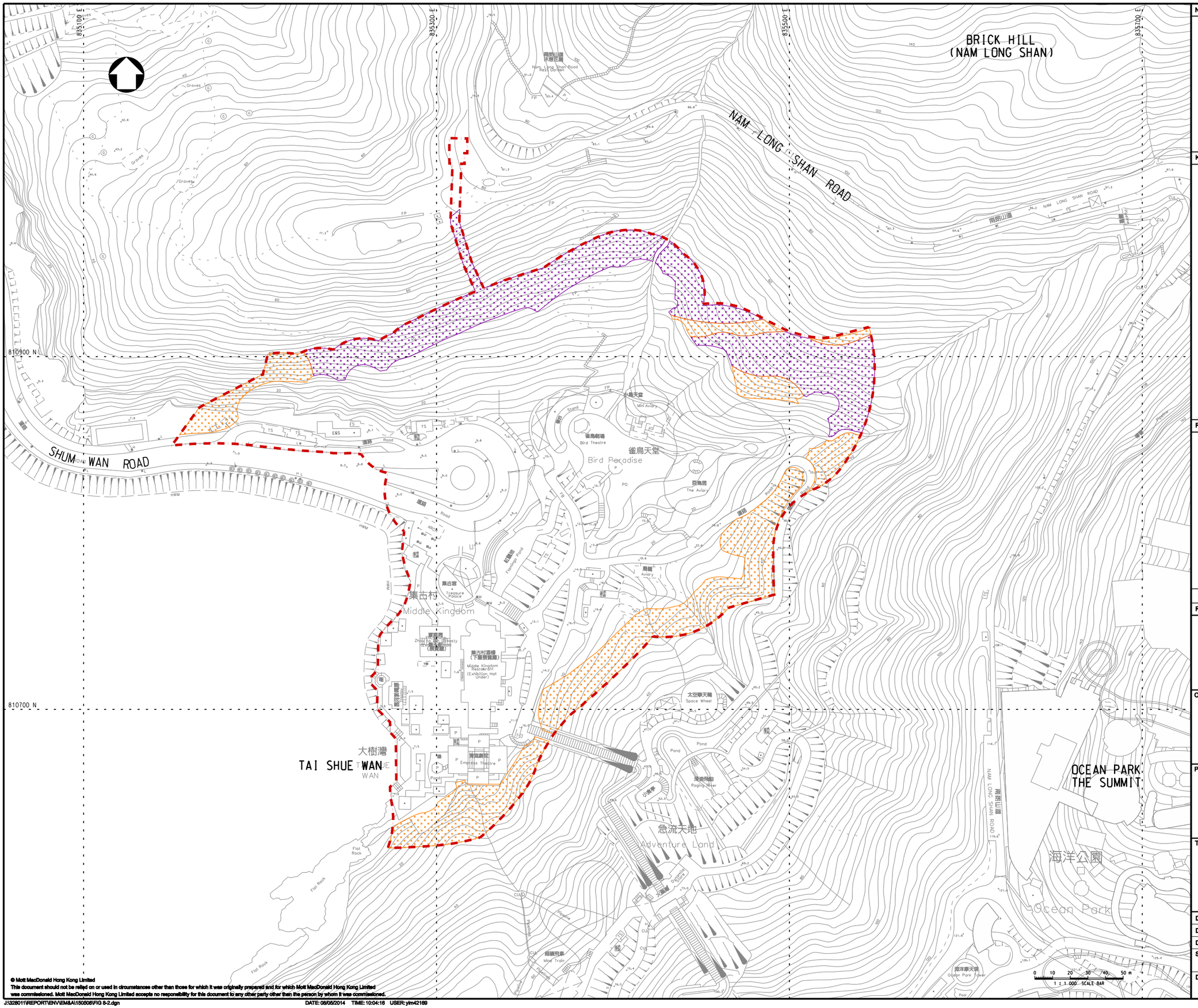
Title

EXISTING ARDEID ROOSTING SITE AND PROPOSED ENHANCEMENT AREA

Designed	HY		Eng check	FW	
Drawn	MING		Coordination	FW	
Dwg check	HY		Approved	AFK	
Scale at A1	1:1000	Status	PRE	Rev	P1

Drawing Number

FIGURE 8.1



Notes

Key to symbols

- PROJECT BOUNDARY
- PROPOSED WOODLAND COMPENSATION AREA
- PROPOSED WOODLAND REINSTATEMENT

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	MAY 14	MING	FIRST ISSUE	FK	AFK

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Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

Title

PROPOSED WOODLAND COMPENSATION AREA

Designed	RH		Eng check	GC	
Drawn	MING		Coordination	FW	
Dwg check	RH		Approved	AFK	
Scale at A1	1:1000	Status	PRE	Rev	P1

Drawing Number

FIGURE 8.2

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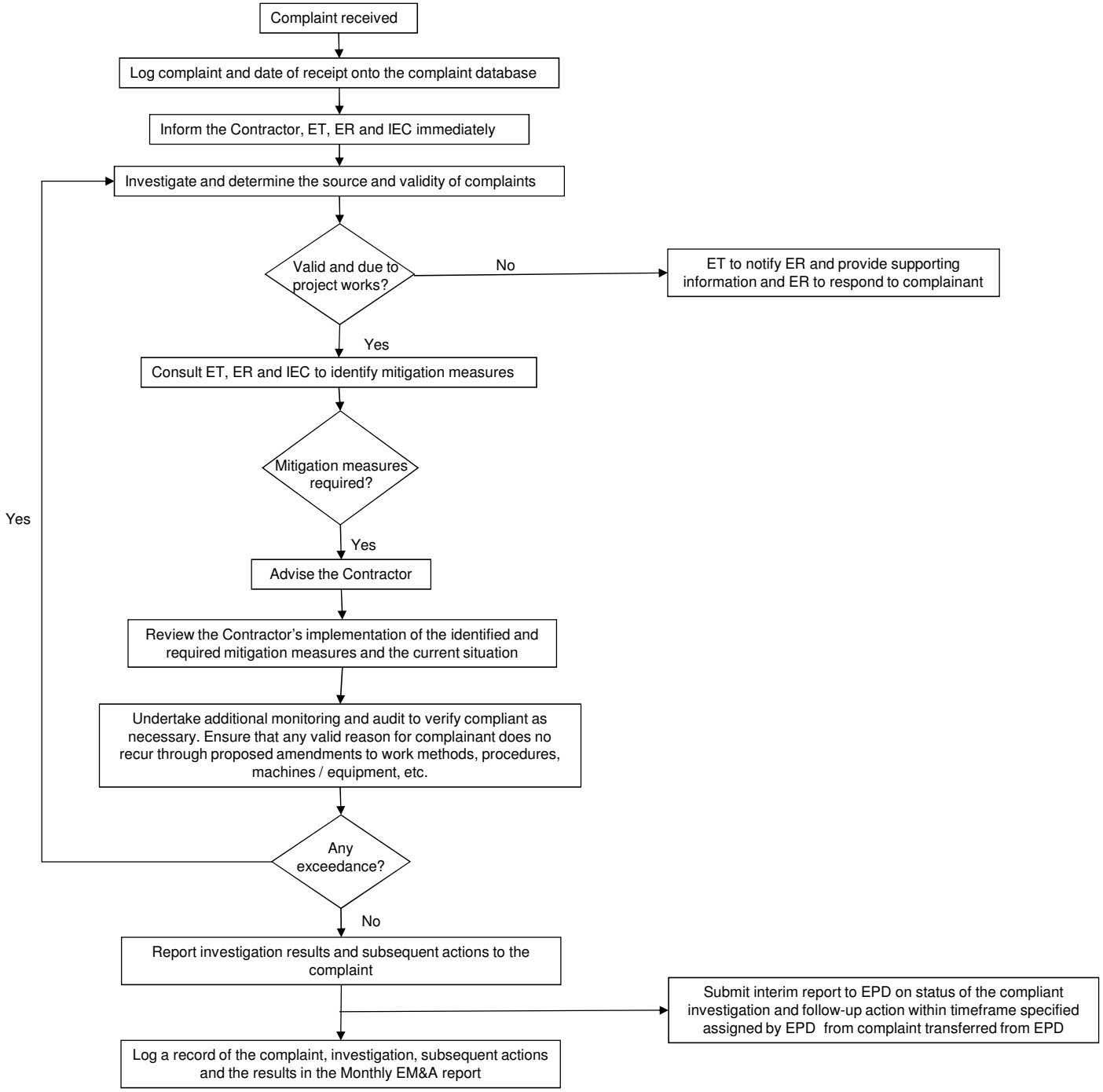

Notes

Key to symbols

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd

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Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

Title

FLOW CHART OF COMPLAINT INVESTIGATION PROCEDURES

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	

Drawing Number

FIGURE 10.1

Appendix A. Tentative Construction Programme

Appendix A - Tentative Construction Programme

Construction Activity	Duration (month)	2014 Q3	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1
EVA, slope stabilization & site formation works	9											
Foundation	8											
Main building construction	18											
Superstructure	5											
Glass curtain wall installation	7											
Water rides installation	3											
Interior fitting out	10											
Total	29											

Appendix B. Sample Environmental Monitoring Data Recording Sheets

Noise Monitoring Field Record Sheet

Monitoring Location							
Details of Location							
Date of Monitoring							
Measurement Start Time (hh:mm)							
Measurement Time Length (min.)							
Weather Conditions	Fine / Sunny / Cloudy / Rainy						
Wind Speed (m/s)							
Noise Meter Model/Identification							
Calibrator Model/Identification							
Calibration Before Measurement (dB(A))							
Calibration After Measurement (dB(A))							
Measurement Result	5min	5min	5min	5min	5min	5min	30min
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
Record by:	_____	_____	_____
Checked by:	_____	_____	_____

Appendix C. Implementation Schedule for Environmental Mitigation Measures

Appendix C. Implementation Schedule for Environmental Mitigation Measures

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1]				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
Cat.1 Key/specific proposed mitigation measure									
Noise Impact (Construction)									
5.7	3.2	**Selecting Quiet Plant** The actual SWL of quiet plant is less than the value specified in GW-TM for the same piece of equipment. It should be noted that the silenced PME taken from EPD's Quality Powered Mechanical Equipment (QPME) Inventory.	Within Project area / Duration of the construction phase / Prior to commencement of operation	Contractor appointed by OPC		✓			EIAO and Noise Control Ordinance
5.7	3.2	**Use of Movable Barriers** Movable noise barriers can be very effective in screening noise from particular items of plant when constructing the Project. Noise barriers located along the active works area close to the noise generating component of a PME could produce at least 10 dB(A) screening for stationary plant and 5 dB(A) for mobile plant provided that the direct line of sight between the PME and the NSRs is blocked.	Within Project area / Duration of the construction phase / Prior to commencement of operation	Contractor appointed by OPC		✓			EIAO and Noise Control Ordinance
Ecological Impact									
10.7	8.3	**Inspection of Active Ardeid Nest** Prior to site clearance works at the planting area abandoned for ardeid breeding, the area around the boundary of the ardeids roosting site as indicatively shown in Figure 8.1 should be inspected to confirm no active ardeid nest is present. If any active ardeid nest is observed, suitably sized buffer area should be established to avoid human or machinery disturbance until the nest is abandoned.	Indicative boundary of the ardeids roosting site within Project construction site (location indicated in Figure 8.1) / For once / Before site clearance	Qualified ecologist appointed by OPC	✓				EIAO-TM; HK Ordinance Cap. 170
10.7	8.3	**Inspection of Short-nosed Fruit Bat** As precautionary measure, prior to any proposed arboricultural works of the trees (particularly the Chinese Fan-palms), daytime	Project construction site / For once / Before arboricultural works of	ET appointed by OPC	✓	✓			EIAO-TM; HK Ordinance Cap. 170

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		inspection should be carried out to confirm no Short-nosed Fruit Bat is present. If any Short-nosed Fruit Bat is observed roosting, suitably sized buffer area should be established around the tree to minimise human or machinery disturbance until the bat has left.	the trees						
10.7	8.3	**In-situ Preservation of Plant Species of Conservation Interest** During construction phase, protective fence for the identified flora species of conservation concern shall be erected and maintained.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			EIAO-TM
10.7	8.3	**Inspection of Ardeid Nest during breeding season** After commencement of construction phase, the Site should be monitored monthly in breeding season (April to July) to check for any potential breeding and nesting activities.	Project construction site / Throughout construction stage / Until completion of all construction activities	Qualified ecologist appointed by OPC		✓			EIAO-TM
10.7	8.2	**Timing of site clearance and tree felling works** Site clearance and tree felling works at the existing ardeid night roost location as shown in Figure 8.1 should be avoided during the peak wintering season of ardeids, i.e. between November and March.	Indicative boundary of the ardeids roosting site within Project construction site (location indicated in Figure 8.1) / Throughout construction stage / Until completion of site clearance and tree felling works within the boundary	Contractor appointed by OPC		✓			EIAO-TM
10.7	8.3	**Compensation for Ardeid Roosting Site** An enhancement area with following features should be provided as an alternative roosting site for ardeids. ▪ The location is at southern part of the Project area (location indicated in Figure 8.1) ▪ The enhancement area shall include a Flamingo Pond ▪ Native tree species *Macaranga tanarius* and *Celtis sinensis* and tree species which was used by ardeids for roosting *Mallotus paniculatus, Ficus hispida* and *Cratoxylum cochinchinense* shall be considered in the plan. ▪ Heavy standard sized trees shall be considered for planting to allow early establishment of the trees around the Flamingo	Southern part of Project construction site (location indicated in Figure 8.1) / Before and throughout construction stage / Until completion of Flamingo Pond construction and tree planting activities at that area	Qualified ecologist and Contractor appointed by OPC	✓	✓	✓		EIAO-TM

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		Pond.							
10.7	8.3	**Compensation for Woodland Habitat** ▪ Provision of a Woodland Area of about 1.62 ha, which includes 0.84 ha woodland compensation on-site and 0.78 ha on-site woodland reinstatement, to mitigate for permanent loss of woodland habitat. ▪ In the woodland compensation area, whips should be planted with predominately native tree species similar to the affected woodland, such as *Celtis sinensis*, *Cratoxylum cochinchinense*, *Polyspora axillaris* and *Sterculia lanceolata*.	Location of Woodland Compensation Area indicated in Figure 8.2/ Before and throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓	✓		EIAO-TM
Landscape and Visual Impact (Construction)									
Table 12.13 (CP07)	Table 9.1 (CP07)	**Temporary Tree Nurseries** Temporary tree nurseries may be set up within the Project area at an early stage to allow small trees to grow during the construction period. By the time these trees are needed for landscape planting at the end of the construction phase, they will have grown larger, require minimal pruning and suffer much less damage during transplanting, as the moving distance from an on-site rather than off-site nursery will be much smaller. The temporary tree nurseries can also temporarily hold the existing trees to be transplanted if direct transplantation from their original locations to the final recipient location is impracticable. The locations of the temporary tree nurseries should be carefully selected so that the trees can also act as screen planting to block the views of the Project area from the VSRs during the construction phase, if practicable.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM
Table 12.13 (CP08)	Table 9.1 (CP08)	**Advance Planting** Advance planting should be undertaken at the earliest possible stage of the construction phase of the project. Plant species, preferably native ones, should be carefully selected to blend in with the existing preserved vegetation. Landscape planting in movable planters should also be considered as a temporary greening measure for the Project area.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM
Landscape and Visual Impact (Operation)									
Table 12.14 (OP04)	Table 9.2 (OP04)	**Green Roofs and Vertical Greening** Green Roofs and Vertical Greening should be provided where feasible and appropriate to screen and soften the hard edges of	Project building rooftops / During design stage / Throughout operation	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		building structures.	phase						
Table 12.14 (OP05)	Table 9.2 (OP05)	**Reprovision of Flamingo Pond** A pond is recommended to replace the demolished Flamingo Pond as compensation for the loss of semi-natural ponds, where wildlife, such as birds, can utilise.	Project area / During design stage / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM
Table 12.14 (OP07)	Table 9.2 (OP07)	**Woodland Compensation** 1.53ha of affected woodland is recommended to be reinstated / compensated by 1.62ha of whip tree planting adjacent to the existing unaffected woodland and tall shrubland. Native species should be proposed as far as practicable to re-create a native landscape, restore the ecological habitats and blend in with the existing native vegetation.	Project area / During design stage / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM
Cat. 2 Submission required post EIA stage									
Sewerage and Sewage Treatment Implications									
7.7	5.2	**Detailed Sewerage Design Report** In order to prevent septicity problems during operation phase, a detailed sewerage design report should be submitted to DSD for approval prior to installation of the rising mains.	Rising mains site / During design stage	Design Engineer	✓				Sewerage Manual Part 1
Ecological Impact (Construction)									
10.7	8.3	**Vegetation Survey for Plant Species of Conservation Interest** For precautionary purposes and to further ensure no flora species of conservation interest to be affected, a detailed vegetation survey need to conduct to the exact locations, number and condition of individuals of *Platycodon grandiflorus*.	Project construction site / For once / Before site clearance	Qualified botanist/ecologist of the ET appointed by OPC	✓				EIAO-TM; Hong Kong Ordinance Cap. 96
10.7	8.3	**Woodland Compensation Plan** A Woodland Compensation Plan shall be prepared and submitted to AFCD for approval no later than one month prior to commencement of site clearance. The plan shall include but not limited to the following: ▪ Timing of planting works ▪ Planting location ▪ Species, size and number of trees ▪ Monitoring methodology	Location of Woodland Compensation Area indicated in Figure 8.2/ Before construction stage / No later than one month prior to commencement of site clearance	Qualified botanist/ecologist of the ET appointed by OPC	✓				EIAO-TM

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		▪ Action Plan							
Landscape and Visual Impact (Construction)									
Table 12.13 (CP05)	Table 9.1 (CP05)	**Transplantation of Existing Trees** Trees which are in direct conflict with the development proposals and suitable for transplantation should be transplanted as far as practicable. A tree transplantation proposal should be submitted together with the tree removal application. Trees proposed to be transplanted should preferably be transplanted from their original locations directly to their final recipient locations in one go. If this is infeasible, the trees should be held in a temporary tree nursery, preferably within the Project area, where the trees will be properly maintained.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM; LAO PN No. 07/2007
Landscape and Visual Impact (Operation)									
Table 12.14 (OP02)	Table 9.2 (OP02)	**Compensatory Tree Planting** Existing trees to be felled should be compensated as far as practicable. Native species should be proposed as far as practicable to re-create a native landscape, restore the ecological habitats and blend in with the existing native vegetation. A compensatory tree planting proposal should be submitted together with the tree removal application for approval by relevant authorities in accordance with LAO Practice Note No. 7/2007. It is recommended that approximately 608 heavy standard trees and approximately 18,202 whip trees could be planted on-site. The availability of off-site compensatory tree planting area is still subject to further investigation and agreement with relevant authorities.	Project area / During design stage / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM; LAO PN No. 07/2007
Cat. 3 Good site practice/housekeeping measures under EM&A mechanism									
Air Quality Impact (Construction)									
3.9.1	2.2	**Dust Control Measures** To achieve compliance with the FSP, RSP and TSP criteria during the construction phase, good practices for dust control should be implemented to reduce dust impacts. The dust control measures are detailed as follows: ▪ Use of regular water spraying (once every 2.5 hours or 4 times per day) to reduce dust emissions from heavy construction activities (including ground excavation, earth moving, etc.) at all active works area exposed site surfaces and unpaved	Project construction site / Duration of the construction phase / Prior to commencement of operation	Contractor appointed by OPC		✓			EIA Recommendation and Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		roads, particularly during dry weather. ▪ Covering 80% of stockpiling area by impervious sheets and spraying all dusty material with water immediately prior to any loading transfer operations to keep the dusty materials wet during material handling at the stockpile areas Relevant dust control practices as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted: Good Site Management ▪ Good site management is important to help reduce potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain high standards of housekeeping to prevent emissions of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning. Disturbed Parts of the Roads ▪ Main temporary access points should be paved with concrete, bituminous hardcore materials or metal plates and be kept clear of dusty materials; or ▪ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. Exposed Earth ▪ Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. Loading, Unloading or Transfer of Dusty Materials ▪ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as								

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		to keep the dusty material wet. Debris Handling ▪ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides. ▪ Before debris is dumped into a chute, water should be sprayed onto the debris so that it remains wet when it is dumped. Transport of Dusty Materials ▪ Vehicles used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards. Wheel washing ▪ Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. Use of vehicles ▪ The speed of the trucks within the site should be controlled to about 10 km/hour in order to reduce adverse dust impacts and secure the safe movement around the site. ▪ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. ▪ Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle. Site hoarding ▪ Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4 m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit							
Noise Impact (Construction)									

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
5.7	3.2	**Good Site Practice** Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. ▪ only well-maintained plant to be operated on-site and plant should be serviced regularly during the construction works; ▪ machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum; ▪ plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs; ▪ mobile plant should be sited as far away from NSRs as possible; and ▪ material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities.	Project construction site / Duration of the construction phase / Prior to commencement of operation	Contractor appointed by OPC		✓			EIAO and Noise Control Ordinance
Noise Impact (Operation)									
5.7	3.3.2	**Fixed Plant Noise** With the adoption of the proposed maximum allowable SWLs, all representative NSRs is expected to comply with the relevant noise criteria for the daytime and evening time periods. No adverse fixed plant noise impact is anticipated. It is also recommended that the following noise reduction measures should be considered as far as practicable during design stage: ▪ choose quiet plant such as those which have been effectively silenced; ▪ include noise levels specification when ordering new plant (including chiller and E&M equipment); ▪ locate fixed plant / louvre away from any NSRs as far as practicable; ▪ locate fixed plant in walled plant rooms or in specially designed enclosures; ▪ locate noisy machine in a basement or a completely separate building;	Within Project area / Prior to operation phase / Duration of the operation phase / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓	✓	✓		EIAO and Noise Control Ordinance

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		▪ install direct noise mitigation measures including silencers, acoustic louvres and acoustic enclosure where necessary; and ▪ develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise. Prior to the operation of the Project, noise commissioning tests for all major fixed noise sources should be conducted.							
5.7	3.3.2	**Open Air Entertainment Noise** With the adoption of the proposed maximum allowable SWLs, all representative NSRs is expected to comply with the relevant noise criteria for the daytime and evening periods, the following measures should be considered as far as practicable during stage: ▪ use small clusters of small power loudspeakers rather than a few large power loudspeakers; and ▪ loudspeakers should be pointed away from nearby NSRs.	Within Project area / Duration of the operation phase / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓	✓			EIAO and Noise Control Ordinance
Water Quality Impact (Construction)									
6.7	4.2	**Construction Site Runoff** The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and erosion. The following measures are recommended to protect water quality of the inland areas: ▪ At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractors prior to the commencement of construction; ▪ Sand/ silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			EIAO-TM; ProPECC Note PN 1/94; WPCO; TM-DSS

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractors prior to the commencement of construction; ▪ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times; ▪ Measures should be taken to minimise the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from site formation excavations should be discharged into storm drains via silt removal facilities; ▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains; ▪ Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system; ▪ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers; ▪ Precautions should be taken at any time of the year when								

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes; and, ▪ Bentonite slurries used on site should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries. The Contractor would be required to obtain a license from EPD under the WPCO for discharge to the public drainage system or the marine environment. Construction site discharge should be collected by the temporary drainage system installed by the Contractor and treated or desilted on-site to fulfil the WPCO discharge license requirements before discharge.							
6.7	4.2	**General Construction Activities** Best Management Practices (BMPs) should be implemented at the construction site, including proper handling, sorting and storage of construction solid waste, debris and refuse generated on-site prior to disposal. Stockpiles of cement and other construction materials should be kept covered when not being used. The Contractor should also follow the guidelines set in the "Pesticides Used for Outdoor Mosquito Control", published by AFCD in 2010, for mosquito control on site.	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			EIAO-TM; ProPECC Note PN 1/94
6.7	4.2	**Expansion of Existing Storm U-Channel** Guidelines and measures summarised in ProPECC PN 1/94 for trenching activities should be implemented.	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			ProPECC Note PN 1/94
6.7	4.2	**Interception of Natural Streams** Guidelines and measures summarised in ProPECC PN 1/94 for excavation and stockpiling activities should be implemented.	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			ProPECC Note PN 1/94
6.7	4.2	**Site Formation Works** The construction programme should be properly planned to minimise excavation works during the wet season (April to September), temporarily exposed slope/soil surfaces should be	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			ProPECC Note PN 1/94

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		covered by a tarpaulin or other means, as far as practicable. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Measures will be taken to minimise water ingress into the excavation. Diverting any water from the excavated areas to on-site wastewater treatment facilities for treatment prior to discharge should also be performed. Other measures that need to be implemented before, during and after rainstorms are summarised in ProPECC PN 1/94.							
6.7	4.2	**Construction of Sewage Sump Pit and Rising Mains** Measures for excavation works summarised for site formation works should also be implemented during construction of the sewage sump pit. During the laying of rising mains, guidelines and measures summarised in ProPECC PN 1/94 for trenching activities should be performed. Concrete water generated from the construction of the concrete support should be collected and treated with the wastewater treatment facilities prior to discharge.	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			ProPECC Note PN 1/94
6.7	4.2	**Accidental Spillage** The Contractor should register as a chemical waste producer if chemical wastes are produced from construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes. This will prevent contamination of top soil and water pollution due to construction site runoff. Maintenance of vehicles and equipment, involving activities with potential for leakage and spillage, should only be undertaken within areas appropriately equipped to control these discharges. Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			ProPECC Note PN 1/94; Waste Disposal Ordinance (Cap 354); Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: ▪ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. ▪ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. ▪ Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.							
6.7	4.2	**Sewage Effluent from the Construction Workforce** The Contractor should provide temporary sanitary facilities, such as portable chemical toilets within the construction site to handle sewage from the workforce. The Contractor has the responsibility to ensure that chemical toilets are used and properly maintained, and that licensed Contractors are employed to collect and dispose of the waste off-site at approved locations.	Project construction site / Duration of the construction phase	Contractor appointed by OPC		✓			ProPECC Note PN 1/94
Water Quality Impact (Operation)									
6.7	4.2	**Runoff from Road Surfaces** Road drainage system design has already included silt traps in the gully inlets to remove silt and grit before the runoff enters the public storm water drainage system. Silt traps should be regularly checked and maintained to ensure efficient operation.	Within Project area / During operation phase	OPC/Operator appointed by OPC			✓		EIAO-TM; WPCO
6.7	4.2	**Runoff from On-site Planting Area** Watering of plants on site should always be performed before application of pesticides, herbicides and fertilizers. Regular training should also be provided to frontline staff on the appropriate treatment and disposal of pesticides, herbicides and fertilizers.	Within Project area / During operation phase	OPC/Operator appointed by OPC			✓		EIAO-TM; WPCO; TM-DSS
Waste Management Implications (Construction)									
8.5.1.1	6.2	**Good Site Practice**	Project construction site / Throughout construction	Contractor		✓			Waste Disposal Ordinance; Waste

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		Recommendations for good site practices during the construction activities include: ▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site ▪ Training of site personnel in proper waste management and chemical handling procedures ▪ Provision of sufficient waste disposal points and regular collection of waste ▪ Appropriate measures to minimise windblown litter and dust/ odour during transportation of waste by either covering trucks or by transporting wastes in enclosed containers ▪ Stockpiles of C&D materials should be kept covered by impervious sheets to avoid wind-blown dust ▪ All dusty materials including C&D materials should be sprayed with water immediately prior to any loading transfer operation so as to keep the dusty material wet during material handling at the stockpile areas ▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction to public roads ▪ Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting the inert or non-inert C&D materials is not anticipated	stage / Until completion of all construction activities	appointed by OPC					Disposal (Chemical Wastes) (General) Regulation; and ETWB Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site
8.5.1.2	6.2	**Waste Reduction Measures** Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: ▪ Sort inert C&D materials to recover any recyclable portions such as metals ▪ Segregation and storage of different types of waste in different containers or skips to enhance reuse or recycling of	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			Waste Disposal Ordinance

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		materials and their proper disposal ▪ Encourage collection of recyclable waste such as waste paper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the work force ▪ Proper site practices to minimise the potential for damage or contamination of inert C&D materials ▪ Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste							
8.5.1.3	6.2	**Inert and Non-inert C&D materials** In order to minimise impacts resulting from collection and transportation of inert C&D materials for off-site disposal, the inert C&D materials should be reused on-site as fill material as far as practicable. In addition, inert C&D materials generated from excavation works could be reused as fill materials in local projects that require public fill for reclamation. The surplus inert C&D materials will be disposed of at the Government's PFRFs for beneficial use by other projects in Hong Kong. The C&D materials generated from general site clearance should be sorted on site to segregate any inert materials for reuse or disposal of at PFRFs whereas the non-inert materials will be disposed of at the designated landfill site. In order to monitor the disposal of inert and non-inert C&D materials at respectively PFRFs and the designated landfill site, and to control fly-tipping, it is recommended that the Contractor should follow the DEVB Technical Circular (Works) No.6/2010 for Trip Ticket System for Disposal of Construction & Demolition Materials issued by Development Bureau. In addition, it is also recommended that the Contractor should prepare and implement a Waste Management Plan detailing their various waste arising and waste management practices in accordance with the relevant requirements of the ETWB Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			Waste Disposal Ordinance ; DEVB Technical Circular (Works) No.6/2010 for Trip Ticket System for Disposal of Construction & Demolition Materials; and ETWB Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site
8.5.1.4	6.2	**Chemical Waste** If chemical wastes are produced at the construction site, the	Project construction site / Throughout construction	Contractor appointed by OPC		✓			Code of Practice on the Packaging

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the "Code of Practice on the Packaging Labelling and Storage of Chemical Wastes". Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor should use a licensed collector to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. Potential environmental impacts arising from the handling activities (including storage, collection, transportation and disposal of chemical waste) are expected to be minimal with the implementation of appropriate mitigation measures as recommended.	stage / Until completion of all construction activities						Labelling and Storage of Chemical Wastes; Waste Disposal (Chemical Waste) (General) Regulation
8.5.1.5	6.2	**General Refuse** General refuse should be stored in enclosed bins or compaction units separated from inert C&D materials. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from inert C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
8.5.1.6	6.2	**Floating Refuse** Provide general refuse collection points on site can minimise the refuse contaminate the marine environment. The construction contractors will be required to regularly check and clean any refuse trapped or accumulated along the artificial seawall. Such refuse will then be stored and disposed of together with the general refuse.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			Waste Disposal Ordinance
Waste Management Implications (Operation)									
8.5.2.1	6.2	**General Refuse** General refuse should be collected on daily basis and delivered	Project area / On a regular basis /	Contractor appointed by OPC			✓		Waste Disposal Ordinance

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		to the refuse collection point accordingly. A reputable waste collector should be employed to remove general refuse regularly to avoid odour nuisance or pest/vermin problem. Sufficient recycling containers are recommended to be provided at suitable locations of the Project to encourage recycling of such waste as aluminium cans, plastics and waste paper.	Throughout operation stage						
8.5.2.2	6.2	**Chemical Waste** If chemical wastes are expected to be produced during the operation phase, the Project Proponent should register with the EPD as a chemical waste producer and follow the guidelines stated in the "Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes". Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. Licensed collector should be deployed to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Project area / On a regular basis / Throughout operation stage	Contractor appointed by OPC			✓		Code of Practice on the Packaging Labelling and Storage of Chemical Wastes; Waste Disposal (Chemical Waste) (General) Regulation
8.5.2.3	6.2	**Floating Refuse** Regular inspection should be carried out along the artificial seawall of the Project boundary for any entrapment or accumulation of floating refuse. Where an appreciable amount of floating refuse is found on the artificial seawall during the inspection, the locations of such refuse will be recorded and arrangements with the project proponent will immediately be made to collect and clear the refuse from the seawall.	Project area / On a regular basis / Throughout operation stage	Contractor appointed by OPC			✓		Waste Disposal Ordinance
Land Contamination (Construction)									
9.6	7.2	In any case where contaminated soil is identified after the commencement of works, a Contamination Assessment Plan (CAP) is required to be prepared for EPD's endorsement prior to	Project construction site / Before construction stage	Contractor appointed by OPC	✓				Guidance Note for Contaminated Land Assessment and Remediation

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		the site investigation. The Contamination Assessment Report (CAR) and/ or Remediation Action Plan (RAP) should be prepared for EPD's approval after the site investigation. If land contamination is confirmed, remediation works should be carried out according to the approved RAP. A Remediation Report (RR) should also be prepared for EPD's endorsement to demonstrate that the clean-up of the contaminated land is completed. No construction work or development of site should be carried out before the approval of the RR.							Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management Practice Guide for Investigation and Remediation of Contaminated Land
9.6	7.2	If contaminated soil is identified, the following mitigation measures are for the excavation and transportation of contaminated materials (if any): ▪ To minimise the incidents of construction workers coming in contact with any contaminated materials, bulk earth-moving excavation equipment should be employed; ▪ Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when working directly with contaminated material), provision of washing facilities and prohibition of smoking and eating on site; ▪ Stockpiling of contaminated excavated materials on site should be avoided as far as possible; ▪ The use of any contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out; ▪ Vehicles containing any excavated materials should be suitably covered to reduce dust emissions and/or release of contaminated wastewater; ▪ Truck bodies and tailgates should be sealed to prevent any discharge; ▪ Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			Waste Disposal Ordinance (Cap 354) Waste Disposal (Chemical Waste) (General) Regulation (Cap 354)

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		tipping; ▪ Speed control for trucks carrying contaminated materials should be exercised. ▪ Observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354) and obtain all necessary permits where required; and ▪ Maintain records of waste generation and disposal quantities and disposal arrangements.							
Landscape and Visual Impact (Construction)									
Table 12.13 (CP01)	Table 9.1 (CP01)	**Minimisation of Construction Period** The construction programme should be carefully designed to minimise the length of the construction period.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM
Table 12.13 (CP02)	Table 9.1 (CP02)	**Minimisation of Works Areas** The footprint of the proposed hard structures as well as the extent of temporary works areas should be minimised as far as practicable.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM
Table 12.13 (CP03)	Table 9.1 (CP03)	**Construction Site Controls** Construction site controls should be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities, such as the storage of materials, the location and appearance of site accommodation, etc. are minimised.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM
Table 12.13 (CP04)	Table 9.1 (CP04)	**Preservation of Existing Vegetation** The development proposal should avoid disturbance to existing vegetation as far as practicable. A formal tree removal application should be submitted for approval by relevant authorities in accordance with LAO PN No. 07/2007 "Tree Preservation and Tree Removal Application for Building Development in Private Projects" during the detailed design phase of the Project. Where possible, all trees which are not in direct conflict with the development proposals should be retained *in situ*.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM; LAO PN No. 07/2007
Table	Table	**No Intrusion Zones**	Project construction site /	Contractor	✓	✓			EIAO-TM

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1]				Relevant Legislation & Guidelines
					Des	Con	Op	Dec	
12.13 (CP06)	9.1 (CP06)	Where practicable, “no intrusion zones” should be designated within the Project area for protection of existing vegetation. Durable boundary fences should be erected to clearly demarcate these “no intrusion zones”. No construction activities, storage of materials and vehicular access will be allowed within the “no intrusion zones” to prevent potential damage to canopies and root zones of vegetation.	Throughout construction stage / Until completion of all construction activities	appointed by OPC					
Table 12.13 (CP09)	Table 9.1 (CP09)	**Construction Site Hoardings** Two types of hoardings should be considered. One is used for areas in close contact with visitors and for areas where visual intrusion is a key concern. It should be graphical and thematic, and visually ‘impermeable’ to block the views of construction activities from the VSRs. The other is used for areas to be viewed at a distance. It should be subtle and camouflaged so that it blends in with the surrounding landscape.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC	✓	✓			EIAO-TM
Table 12.13 (CP10)	Table 9.1 (CP10)	**Dust and Erosion Control for Exposed Soil** Exposed soil shall be covered or “camouflaged” and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydroseeded and / or covered with suitable protective fabrics.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			EIAO-TM
Table 12.13 (CP11)	Table 9.1 (CP11)	**Appearance of Construction Plant / Machinery** To minimise the visual intrusion of construction activities to visitors and other VSRs, a suitable colour scheme of construction machines and plants should be adopted where possible.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			EIAO-TM
Table 12.13 (CP12)	Table 9.1 (CP12)	**Construction Lighting Control** All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimise light pollution and night-time glare to the VSRs.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			EIAO-TM
Table 12.13 (CP13)	Table 9.1 (CP13)	**Appearance of Construction Workers** To protect Ocean Park’s image, construction workers should be required to enter the park areas with their helmets and safety vests properly stored or carried in non-transparent bags. They should also dress properly and cleanly.	Project construction site / Throughout construction stage / Until completion of all construction activities	Contractor appointed by OPC		✓			EIAO-TM
Landscape and Visual Impact (Operation)									

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
Table 12.14 (OP01)	Table 9.2 (OP01)	**Sensitive Design and Disposition** All proposed hard structures should be sensitively designed in a manner that responds to the existing and planned landscape context, and minimises potential adverse landscape and visual impacts. The structural design should seek to reduce the apparent visual mass through the use of natural materials such as wooden frame and semi-transparent panels. Subdued tones should be considered for the colour palette with non-reflective finishes to reduce glare effect. Site specific measures, such as the disposition of the key structures closer to the northern slopes, the design of building forms as extension along the existing slope topography, the use of concave roof form and the location of ride platforms on or near the slopes to minimise structural support, should also be considered for better integration with the surroundings and minimisation of potential visual impacts.	Project buildings / During design stage / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM
Table 12.14 (OP03)	Table 9.2 (OP03)	**Enhancement Planting** Other than compensatory tree planting, additional trees, shrubs, groundcovers and lawn should also be considered to maximise greening within the redevelopment area.	Project area / During design stage / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM
Table 12.14 (OP06)	Table 9.2 (OP06)	**Responsive Lighting Design** Overall lighting design would carefully consider a reasonable level of functional and thematic lighting with due consideration of possible light pollution and night-time glare to the surroundings. Consideration shall be made by the lighting designers to the following measures: ▪ Lighting shall be designed with due consideration of mounting height and direction of light fixtures so as not to point directly towards any sensitive receiver. ▪ Lighting shall be arranged with due consideration of reflectance so as to avoid glare effect. ▪ Lighting shall be regularly monitored during operation. ▪ Lights located adjacent or in proximity to neighbours shall be carefully designed to prevent possible light intrusion. ▪ Lighting operation schedule shall specify only lights necessary for security to be left on after business hours. ▪ Paving materials should be selected as necessary to reduce	Project area / During design stage / Throughout operation phase	Design Architect / Contractor appointed by OPC	✓		✓		EIAO-TM

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of measures / Timing of completion of measures	Implementation Agent	Implementation Stage[1] Des	Con	Op	Dec	Relevant Legislation & Guidelines
		potential glare from surface reflectance. ▪ Particular attention should be paid to the use of lighting having a high intensity or harsher tone (e.g. metal halide lamps). ▪ Lights shall generally be models having precise cut-off range (such as full cut-off optics where available and practicable) and if necessary be fitted with adjustable anti-glare shields.							

Remarks:
1. Des – Design Stage, Con – Construction Stage, Op – Operation, Dec - Decommissioning

Appendix D Sample Template for the Interim Notifications

Sample template for the 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: