

FINAL - ISSUE 1

Environmental Monitoring and Audit Manual

Agreement No. CE 26/2022 (EP)
Development of Integrated Waste
Management Facilities Phase 2
(I-PARK2)

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Contents

1	Introduction.....	1
1.1	Background.....	1
1.2	Project Scope and Location.....	1
1.3	Project Programme	2
1.4	Purpose of the Manual.....	2
1.5	Scope of the Manual	2
1.6	Project Organization	3
1.7	Structure of this Manual	6
2	Air Quality.....	8
2.1	Introduction.....	8
2.2	Construction Dust Monitoring during Construction Phase	8
2.3	Monitoring during Operational Phase.....	18
2.4	Odour Patrol.....	21
3	Noise Impact	26
3.1	Introduction.....	26
3.2	Mitigation Measures.....	26
3.3	Audit Requirements	26
4	Water Quality Impact.....	27
4.1	Introduction.....	27
4.2	Monitoring Locations.....	28
4.3	Monitoring Parameters.....	29
4.4	Monitoring Depths.....	30
4.5	Field Log.....	30
4.6	Monitoring Equipment.....	30
4.7	Laboratory Measurement / Analysis.....	33
4.8	Baseline Monitoring.....	34
4.9	Construction Phase Impact and Post-construction Monitoring.....	35
4.10	Operational Phase Impact Monitoring.....	35
4.11	Event and Action Plan.....	36
4.12	Site Audits	41
5	Waste Management Implications.....	42
5.1	Introduction.....	42
5.2	Audit Requirements	43
5.3	Monitoring Requirements.....	43



6	Ecological Impact	46
6.1	Introduction.....	46
6.2	Mitigation Measures.....	46
6.3	Monitoring Audit Requirements	46
7	Fisheries Impact	47
7.1	Introduction.....	47
7.2	Mitigation Measures.....	47
8	Visual Impact	48
8.1	Introduction.....	48
8.2	Mitigation Measures	48
8.3	Design Phase Audit	49
8.4	Baseline Review.....	49
8.5	Construction and Operational Phase Audit	49
9	Health Impact	50
9.1	Introduction.....	50
9.2	Monitoring of Radon Concentration	50
9.3	Contingency Plan for Potential Accidental Events	50
10	Landfill Gas Hazard	52
10.1	Introduction.....	52
10.2	Audit Requirements	52
10.3	Monitoring and Measurement of Landfill Gas.....	52
11	Site Environmental Audit & Environmental Complaints	56
11.1	Site Inspection.....	56
11.2	Compliance with Legal and Contractual Requirements	57
11.3	Environmental Complaints	58
12	Reporting	59
12.1	General.....	59
12.2	Baseline Monitoring Report(s)	59
12.3	EM&A Reports for Construction Phase	60
12.4	EM&A Reports for Operational Phase	66
12.5	Data Keeping	67
12.6	Interim Notifications of Environmental Quality Limit Exceedances	68



List of Tables

Table 2-1	Proposed Dust Monitoring Stations during Construction Phase	8
Table 2-2	Construction Dust Monitoring Programme	13
Table 2-3	Action and Limit Levels for Construction Dust Monitoring	14
Table 2-4	Action and Limit Plan for Construction Dust Monitoring	15
Table 2-5	Analytical Parameters and Methodology	18
Table 2-6	Odour Intensity Level.....	22
Table 2-7	Action and Limit Levels for Odour Nuisance.....	23
Table 2-8	Event and Action Plan for Odour Patrol.....	23
Table 4-1	Proposed Marine Water Quality Monitoring Stations for All Monitoring Stages	28
Table 4-2	Proposed Marine Water Quality Monitoring Parameters for Different Monitoring Stages.....	29
Table 4-3	Analytical Methods to be Applied to Water Quality Samples	33
Table 4-4	Summary of Baseline Marine Water Quality Monitoring	34
Table 4-5	Summary of Marine Water Quality Monitoring During Construction and Post-construction Stages	35
Table 4-6	Summary of Operational Stage Marine Water Quality Monitoring	36
Table 4-7	Action and Limit Levels for Water Quality	36
Table 4-8	Event and Action Plan for Construction and Operational Stage Water Quality.....	38
Table 5-1	Incineration Residue Pollution Control Limits	43
Table 8-1	Proposed Mitigation Measures for Operational Phase	48
Table 9-1	Potential Accidental Events and Preventive Measures	51
Table 10-1	Actions in the Event of Gas Being Detected	53

List of Figures

Figure 1.1	Project Location Plan
Figure 2.1	Construction Dust Monitoring Stations
Figure 4.1	Water Sensitive Receivers

List of Appendices

Appendix 1.1	Project Organization for EM&A Works
Appendix 4.1	Sample Data Record Sheet for Water Quality Monitoring
Appendix 11.1	Implementation Schedule
Appendix 12.1	Sample Template for the Interim Notifications



1 Introduction

1.1 Background

The Waste Infrastructure Division (WID) of Environmental Protection Department (EPD) appointed Binnies Hong Kong Limited (**Binnies**) on 28 December 2022 to undertake the consultancy "Agreement No. CE 26/2022 (EP) - Development of Integrated Waste Management Facilities Phase 2 – Investigation, Design and Construction". The consultancy scope includes the carrying out of an Environmental Impact Assessment (EIA) study for Development of Integrated Waste Management Facilities Phase 2 (**the Project** or **I-PARK2**).

1.2 Project Scope and Location

The Project comprises the construction and operation of I-PARK2 which will have a design treatment capacity sufficient to handle around 6 000 tonnes per day (tpd) of Municipal Solid Waste (MSW). The Project will adopt state-of-the-art incineration technology to substantially reduce the bulk size of waste. The energy from waste incineration will be recovered for electricity generation. Apart from meeting the electricity demand of the facility, the surplus electricity from the Project will be exported to the public power grid, thereby boosting up the portion of electricity generation from waste-to-energy (WtE) source. Moreover, appropriate community amenities will be integrated into the Project for public enjoyment.

The Project would comprise the following key facilities:

- MSW reception, storage and feeding system.
- Berthing area for marine vessels (include marine works).
- Incineration furnace and boiler system.
- Steam turbine generator, steam utilisation, cooling system and condensate recovery system.
- Power export/import system for plant electricity supply and connecting to public power grid's (e.g. CLP's grid) at 132kV voltage level.
- Flue gas treatment, flue ducts and continuous emission monitoring system.
- Reagent reception and storage system.
- Ash and residues storage, handling and treatment system.
- Process control and monitoring system.



- Water treatment facilities.
- Wastewater treatment facilities.

Design-Build-Operate (DBO) contract arrangement would be adopted for the Project. Under this contract arrangement, a DBO Contractor (hereafter referred to "I-PARK2 Contractor") would be engaged to conduct the detailed design, construction and operation of the I-PARK2.

The Project site is located in the eastern portion of Tsang Tsui Middle Ash Lagoon (TTMAL) at Nim Wan, Tuen Mun. The Project location plan is shown in **Figure 1.1**.

1.3 Project Programme

The construction of I-PARK2 is tentatively scheduled to commence in 2026 for completion in early 2030s. The land-based construction and marine-based construction of the Project would be carried out concurrently to shorten the total duration of construction period and facilitate early completion of the Project. I-PARK2 is expected to be commissioned in early 2030s.

1.4 Purpose of the Manual

This Environmental Monitoring and Audit (EM&A) Manual is prepared to guide the set-up of an EM&A programme for I-PARK2 with the aims to:

- ensure compliance with the recommendations of the EIA study;
- assess the effectiveness of the recommended mitigation measures; and
- identify any further need for additional mitigation measures or remedial action.

This Manual outlines the monitoring and audit requirements for the construction and operational phases of the I-PARK2 and provides systematic procedures for monitoring, auditing and minimizing environmental impacts.

1.5 Scope of the Manual

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

- Responsibilities of the I-PARK2 Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET), and the Independent Environmental Checker (IEC) under the context of EM&A.



- Project organization for the EM&A works.
- An implementation schedule, summarizing all recommended environmental mitigation measures with reference to the programme for their implementation including those identified at detailed design, contract preparation, construction and operation stages of the Project.
- The basis for, and description of the broad approach underlying the EM&A programme.
- EM&A methodologies to be adopted, including all laboratories and analytical procedures, equipment to be used and details on quality assurance and quality control programme.
- Definition of environmental quality performance limits (i.e. action and limit levels).
- Establishment of Event and Action Plans.
- Requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints.
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures.

1.6 Project Organization

1.6.1 Introduction

The roles and responsibilities of the various parties involved in the construction phase and operational phase of the EM&A process and the implementation of the EM&A programme are outlined below.

The proposed Project organization and lines of communication for the EM&A and environmental protection works during the construction and operational phases are shown in **Appendix 1.1**.

1.6.2 Engineer or Engineer's Representative

The Engineer or Engineer's Representative (ER) refers to the organization responsible for overseeing the construction works of the Project undertaken by the I-PARK2 Contractor, and for ensuring that the works are undertaken in accordance with the specification and contractual requirements. The responsibilities of the ER include the followings:

- Monitor the I-PARK2 Contractor's compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and ensure their effectiveness, and other aspects of the EM&A programme.
- Monitor the I-PARK2 Contractor's, the ET's compliance with the requirements in the Environmental Permit (EP), EIA report and EM&A Manual.



- Provide assistance to the ET as necessary in the implementation of the EM&A programme.
- Participate in joint site inspection undertaken by the ET.
- Comply with the agreed Event / Action Plan in the event of any exceedance.
- Adhere to the procedures for carrying out complaint investigation.

1.6.3 I-PARK2 Contractor

The term “I-PARK2 Contractor” should be taken to mean the contractor working for the I-PARK2 project. Besides reporting to the ER, the I-PARK2 Contractor should also be responsible for the following tasks:

- Work within the scope of the relevant contract and other tender conditions.
- Implement the recommendations and requirements of EIA, EP and EM&A Manual.
- Provide assistance to the ET in setting up the monitoring stations and carrying out monitoring and audit where necessary.
- Participate in the site inspections undertaken by the ET as required and undertake any corrective actions.
- Provide information / advice to the ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions.
- Submit proposals on mitigation measures in case of exceedances of action or limit levels in accordance with the event / action plans.
- Implement measures to reduce impact where action or limit levels are exceeded.
- Adhere to the procedures for carrying out complaint investigation.

1.6.4 Environmental Team (ET)

Only one Environmental Team (ET) with an ET Leader shall be appointed by the I-PARK2 Contractor and engaged for the Project at any time. The ET shall conduct the EM&A programme and ensure the I-PARK2 Contractor’s compliance with the Project’s environmental performance requirements. The ET shall not be in any way an associated body of the ER, I-PARK2 Contractor or the IEC for the Project.

The ET shall be led and managed by an ET leader. The ET leader shall possess at least 7 years of experience in EM&A and/or environmental management. At any one time, the ET Leader, or an ET Leader representative who shall be a member of the ET with at least 5 years of experience in EM&A or environmental management, shall work full time on-site during construction phase of the Project. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under



the Contract, to enable fulfilment of the Project's EM&A requirements as specified in the EM&A Manual. The ET shall report to the ER and the duties of ET shall include the followings:

- Monitor and audit various environmental parameters as required in this EM&A Manual.
- Analyse the EM&A data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions, and to identify any adverse environmental impacts arising.
- Carry out regular site inspection to investigate and audit the I-PARK2 Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems, and carry out ad-hoc site inspections if significant environmental problems are identified.
- Monitor compliance with requirements in the EP and EIA report, environmental protection, pollution prevention and control regulations and contract specifications.
- Audit environmental monitoring data and site environmental conditions.
- Report on the EM&A results to Environmental Assessment Division (EAD) of EPD, ER, IEC and I-PARK2 Contractor or their delegated representatives.
- Recommend suitable mitigation measures to the I-PARK2 Contractor in the case of exceedance of action or limit levels in accordance with the event and action plans.
- Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by the IEC.
- Advise the I-PARK2 Contractor on environmental improvement, awareness, enhancement matters, etc. on site.
- Adhere to the procedures for carrying out complaint investigation.
- Review and certify any submissions required in the EP as necessary.
- Timely submit the EM&A Reports to EAD of EPD.

Sufficient and suitably qualified professional and technical staff should be employed by the ET to ensure full compliance with their duties and responsibilities, as required under the EM&A programme.

1.6.5 Independent Environmental Checker (IEC)

An Independent Environmental Checker (IEC) with a supporting team shall be directly employed by the Project Proponent (WID) for the Project at any time. The IEC shall audit the overall EM&A programme, including the implementation of all environmental mitigation measures, submissions required in this Manual, as well as any other relevant submissions



required under the EP. The IEC shall not be in any way an associated body of the ER, I-PARK2 Contractor and the ET for the Project.

The IEC shall possess at least 7 years of experience in EM&A and/or environmental management. At any one time, the IEC, or an IEC representative who shall be a person with at least 5 years of experience in EM&A or environmental management, shall work full time on-site during construction phase of the Project. The IEC shall report directly to the EAD of EPD on matters relating to the EM&A programme and environmental impacts from the Project. The responsibilities of the IEC should include the followings:

- Provide proactive advice to the ER and ET on environmental matters.
- Review and audit all aspects of the EM&A programme, including the implementation of environmental mitigation measures and overall environmental performance of the Project.
- Review and verify the monitoring data and all submissions required under the EM&A programme submitted by the ET, including but not limited to the EM&A reports as well as the submissions required under the EP.
- Review the EM&A works performed by the ET and audit the ET's monitoring activities and results (at not less than monthly interval) including the validation and confirmation on the accuracy of monitoring results, equipment, locations and procedures etc.
- Arrange and conduct regular site inspections of the works during construction phase (at not less than monthly interval), and ad-hoc inspections if significant environmental problems are identified.
- Comply with the agreed event / action plan in the event of any exceedance.
- Check and ensure the procedures for carrying out complaint investigation being followed and check the effectiveness of corrective measures.
- Feedback audit results and other environmental performance review findings to ER and EAD of EPD.
- Report the works conducted, the findings, recommendation and improvement of the site inspections, the findings, recommendation, and improvement after reviewing the ET's and the I-PARK2 Contractor's works, and any advices to the ER and EAD of EPD on a monthly basis.

1.7 Structure of this Manual

Following this introductory section, the structure of the EM&A Manual is set out below:

- Sections 2 presents the EM&A requirements on air quality.



- Sections 3 presents the EM&A requirements on noise.
- Sections 4 presents the EM&A requirements on water quality.
- Sections 5 presents the EM&A requirements on waste management implication.
- Sections 6 presents the EM&A requirements on ecology.
- Sections 7 presents the EM&A requirements on fisheries.
- Sections 8 presents the EM&A requirements on visual aspect.
- Sections 9 presents the EM&A requirements on health impact.
- Section 10 presents the EM&A requirements on landfill gas hazards.
- Section 11 details the requirements on site environmental audit and the environmental complaints handling procedure.
- Section 12 details the EM&A reporting requirements.



2 Air Quality

2.1 Introduction

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

The objectives of the air quality monitoring include the following:

- to identify the extent of construction dust and operational air quality and odour impacts;
- to determine the effectiveness of mitigation measures to control dust emission from activities during construction phase and odour control measures during operational phase;
- to recommend further mitigation measures if found to be necessary; and
- to comply with action and limit levels for air quality as defined in this Manual.

2.2 Construction Dust Monitoring during Construction Phase

2.2.1 Monitoring Locations

The proposed construction dust monitoring stations are listed in **Table 2-1** and their locations are shown in **Figure 2.1**.

Table 2-1 Proposed Dust Monitoring Stations during Construction Phase

Station	Description	Easting	Northing	Tentative Duration *
AM1	Construction site boundary close to T·Park	810227	831397	2026 to early 2030s
AM2	Construction site boundary close to Tsang Tsui Columbarium	809767	831324	2026 to early 2030s
AM3	South-western side of the Construction site boundary	809855	831103	2026 to early 2030s

* Construction duration is indicative for reference only and will be subject to the actual progress of the construction works.

Construction dust monitoring at AM1, AM2 and AM3 is recommended during the construction work of this Project. Any change to the locations of monitoring stations shall be justified by the ET Leader, agreed by the ER, verified by the IEC before seeking approval from EAD of EPD prior to the commencement of the monitoring.



The ET shall agree with IEC on the position of the monitoring equipment. When positioning the monitoring equipment, the following points should be noted:

- a horizontal platform with appropriate support to secure the monitoring equipment against gusty wind should be provided;
- general housekeeping, cleaning works and other preventative maintenance activities such as checking the operating status of individual monitoring equipment should be carried out to ensure the proper operation of the system;
- the distance between the monitoring equipment and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the monitoring equipment including the air sensor;
- a minimum of 2m separation from walls, parapets and penthouses is required for monitoring equipment at rooftop;
- a minimum of 2m separation from any supporting structure, measures horizontally is required;
- no furnace or incinerator flue is located near the monitoring equipment;
- airflow around the monitoring equipment is unrestricted;
- the monitoring equipment is more than 20m from the dripline;
- any wire fence and gate to protect the monitoring equipment, should not cause any obstruction during monitoring;
- permission must be obtained to set up the monitoring equipment and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the monitoring equipment.

2.2.2 Monitoring Parameters

Parameters including RSP and FSP should be monitored continuously. For regulatory purpose, the RSP and FSP levels should be measured by the mean of air sensor such that variation in dust impact on a real-time basis could be readily detected and timely action could be undertaken.

2.2.3 Monitoring Equipment

Sensors to be employed should meet the purpose of monitoring 1-hour RSP, 24-hour RSP and 24-hour FSP concentrations in the ambient air. It should be capable of detection of PM10 and PM2.5. Particulates is typically measured using an optical approach where light scattered by a particle is used to estimate the particle mass concentration. The measurement range and



detection limit of the air sensor should be able to measure the full range of particulates commonly found in the ambient, e.g. 0 – 1000 $\mu\text{g}/\text{m}^3$. The accuracy of a sensor, in terms of precision and bias, should also be evaluated during selection of air sensor, according to the manufacturer's specification, evaluation reports and published literature. Whether the air sensor has calibrated upon purchase, when and how collocation should be performed and how to correct the measurement should be consulted with the sensor manufacturer and fully understood before the air monitoring. Other factors, such as response time, durability, enclosure, ease of use, power supply, any data display, data transmission, data access, data handling and cost should also be considered when selecting air sensor. The best practices and recommendations in "*The Enhanced Air Sensor Guidebook*" (USEPA, 2022), USEPA's Air Sensor Toolbox website or equivalent should be followed.

The ET shall be responsible for the provision of the monitoring equipment. The ET should propose and seek approval from IEC on the number of sensors and instrument model for carrying out the continuous impact monitoring, and ad-hoc monitoring. The sensors shall be calibrated against a Transfer Standard (TS) at regular intervals, in accordance with requirements stated in the manufacturer's operating manual.

Initial calibration of the dust monitoring equipment shall be conducted upon installation and prior to commissioning. The calibration data shall be properly documented for future reference by the concerned parties such as the IEC. All the data shall be converted into standard temperature and pressure conditions.

Generally, air sensor should be placed at least 1.5 metres above ground, and away from any obstruction, vegetation or emission source which would interfere with the measurement. Other factors of the monitoring location, such as security, availability of power supply, reliable communication (cellular, Wi-Fi, etc.), should also be considered.

To ensure accuracy of the measurements, the ET should calibrate the monitoring equipment including the air sensors regularly following the requirements specified by the equipment manufacturers. The performance of sensor shall be checked by a collocation process in which the TS should be placed near the sensor and operating them simultaneously under the same conditions. The TS is another particulate matter (PM) monitor that is at least as capable as the air sensor to be calibrated. Another sensor that has just been calibrated may serve the purpose provided its performance is known to be stable during the subsequent collocation period to be used as TS.

Right before each on-site calibration, the TS itself needs to be calibrated e.g. collocating with an PM reference monitor, such as the Federal Reference Method (FRM) or the Federal Equivalent Method (FEM) PM monitor at the accredited laboratories or research institutes, that has been calibrated against traceable standard. The collocation of TS with the PM reference monitor should last at least seven days.



The TS with known performance characteristics will be placed next to each air sensor on the field for collocation. During collocation, the TS should be placed near the subject sensor (< 1m if practicable) so that both devices would be monitoring under the same environment, i.e. the same pollution sources and weather conditions. The TS should be first warmed up for 30 – 60 minutes and then left running with the subject sensor for the collocation period (at least three hours). The measurements from the subject sensor and TS during the collocation period will be statistically analysed.

2.2.3.1 Quality Control Criteria

The response of the sensor should be adjusted if its performance during on-site calibration does not meet the following evaluation criteria. For each device, data below its detection limit will be excluded.

Tier 1: Correlation

- The minute average measurements from the two devices when subject to linear regression should have a coefficient of determination (R^2) > 0.7. The regression line slope should be between 0.75 to 1.25. If these criteria are not met due to narrow range of PM concentration (> 30 $\mu\text{g}/\text{m}^3$ and > 25 $\mu\text{g}/\text{m}^3$ as recommended span range for RSP and FSP, respectively) during the collocation period, Tier 2 will apply.

Tier 2: Root Mean Squared Error

- The root mean squared error of the sensor minute average measurements should be < 8 $\mu\text{g}/\text{m}^3$ for RSP and < 5 $\mu\text{g}/\text{m}^3$ for FSP.

2.2.3.2 Frequency

On-site checking of the monitoring equipment should be conducted by ET. The collocation of TS and each air sensor on the field should be carried out at regular intervals in accordance with requirements stated in the manufacturer's operating manual and at least every month. If a sensor repeatedly failed in 2 or 3 consecutive collocations, the sensor should be checked or maintained to improve its performance, or it should be replaced.

2.2.3.3 Wind Data Monitoring

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

- The wind sensors should be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- The wind data should be captured by a data logger. The data recorded in the data logger shall be downloaded periodically for analysis at least once a month;



- The wind data monitoring equipment should be re-calibrated at least once every six months; and
- Wind direction should be divided into 16 sectors of 22.5 degrees each.

2.2.3.4 Construction Dust Monitoring Plan

Before commencing the construction dust monitoring, the ET should formulate a construction dust monitoring plan with air sensor and submit to IEC to seek their feedback and consent. The plan should be certified by the ET leader and verified by IEC as confirming to the EM&A Manual. The plan should include but not limited to the followings:

- Details on the pollutants and environmental parameters to be monitored;
- Describe the equipment and measurement method to be used;
- Address the criteria for placing air sensors;
- Discuss the monitoring locations selected and rationale;
- Describe the criteria for selecting air sensors and test to determine if they are working properly;
- Determine the collocation location and establish the calibration and/or collocation and data correction methods;
- Identify types of data that may be used in the data analysis, including nearby reference monitor data, weather data, etc.
- List the procedures to maintain and operate air sensors, including site visits, routine maintenance, emergency maintenance, daily data review, periodic collocations, etc.;
- Describe the QC procedures to be performed;
- Describe how the data are processed, stored and adjusted;
- Describe the ownership of the data and who is granted access to it;
- Describe how the air monitoring data to be managed, tracing the path of data generation in the field to the final data use and end storage;
- Describe the procedures to verify and validate data during collection period;
- Describe the methods to produce meaningful figures and visualization;
- Describe how the monitoring results will be used.



If the ET proposes alternative dust monitoring equipment / methodology or alternative methods to obtain representative wind data, agreement from the ER and IEC should be sought. The instrument should also be calibrated regularly following the requirements specified by the equipment manufacturers.

2.2.4 Impact Monitoring

During the construction work of the I-PARK2, hourly impact monitoring should be undertaken continuously with air sensor networks at the designated monitoring stations. The hourly averaged RSP and daily averages of RSP and FSP are to be determined and reported in monthly EM&A Report. The impact monitoring programme is summarised in **Table 2-2**.

The monthly collocation schedule should be drawn up by the ET one month prior to the commencement of the scheduled construction period. Before commencement of the collocation, the ET should inform the IEC such that the IEC can conduct an on-site audit. If the monitoring data collected at the designated stations indicate that the Action or Limit Levels as shown in **Table 2-3** are exceeded, appropriate actions should be taken in accordance with the Event and Action Plan in **Table 2-4**.

Table 2-2 Construction Dust Monitoring Programme

Activities	Monitoring Frequency	Key Parameters	Monitoring Location
During construction	Continuous	1-hour RSP, 24-hour RSP and FSP	AM1, AM2, AM3

2.2.5 Site Audits

Implementation of regular site audits is to ensure that the recommended mitigation measures are to be properly undertaken during proposed construction works. It can also provide an effective control of any malpractices and therefore achieve continual improvement of environmental performance on site.

Site audits shall be carried out by the ET and shall be based on the mitigation measures for air quality pollution control recommended in the implementation schedule as presented in **Appendix 11.1** and air quality mitigation measures stipulated in Air Pollution Control (Construction Dust) Regulation. In the event that the recommended mitigation measures are not properly implemented, deficiency shall be recorded and reported to the site management. Suitable actions are to be carried out to:

- investigate the problems and the causes;
- issue action notes to the I-PARK2 Contractor who is responsible for the works;
- implement remedial and corrective actions immediately;



- re-inspect the site conditions upon completion of the remedial and corrective actions; and
- record the event and discuss with the I-PARK2 Contractor for preventive actions.

2.2.6 Event and Action Plan

The action and limit levels for construction dust monitoring are shown in **Table 2-3**. The action and limit levels may be subject to changes based on the prevailing AQOs implemented at the time of the impact monitoring. These criteria should be applied to ensure that any deterioration of air quality is readily detected, and timely action is taken to rectify the situation. Should the monitoring results at any designated monitoring station exceed the action or limit levels, the actions in accordance with the Event and Action Plan summarized in **Table 2-4** shall be carried out.

Table 2-3 Action and Limit Levels for Construction Dust Monitoring

Parameters	Action	Limit
1-hour RSP Level	150 $\mu\text{g}/\text{m}^3$	-
24-hour RSP Level (Rolling average)	-	100 $\mu\text{g}/\text{m}^3$
24-hour FSP Level (Rolling average)	-	50 $\mu\text{g}/\text{m}^3$

2.2.7 Mitigation Measures

Mitigation measures for air quality control including good site practices and air quality mitigation measures stipulated in Air Pollution Control (Construction Dust) Regulation have been recommended in the EIA Report and listed in the implementation schedule given in **Appendix 11.1**.

In the event of complaints or non-compliance / area for improvement being observed, the ET and the I-PARK2 Contractor should review the effectiveness of these mitigation measures, design alternative or additional mitigation measures as appropriate and propose to the IEC for approval and implement these alternative or additional measures.



Table 2-4 Action and Limit Plan for Construction Dust Monitoring

EVENT	ACTION			
	ET	IEC	ER	I-PARK2 CONTRACTOR
ACTION LEVEL				
Exceedance for one 1-hour RSP concentration	<ol style="list-style-type: none"> 1. Notify IEC and ER; 2. Check the monitoring data and error messages to confirm if the performance of the monitoring equipment is normal; 3. If exceedance is confirmed, identify source(s), investigate the causes of exceedance and propose remedial measures; and 4. Assess effectiveness of Contractor's remedial measures and keep IEC, and ER informed of the results until exceedance stops. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify Contractor; 3. In consultation with ET and IEC, agree with the Contractor on the remedial measures to be implemented; and 4. Ensure the proposal for remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Identify source(s) of exceedance, and discuss with ER, ET and IEC on possible remedial measures; 2. Implement remedial measures; and 3. Amend working methods if appropriate.
Exceedance for two or more consecutive 1-hour RSP concentration	<ol style="list-style-type: none"> 1. Notify IEC and ER; 2. Check the monitoring data and the performance of monitoring equipment to confirm if the performance of the monitoring equipment is normal; 3. If exceedance is confirmed, identify source(s), 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET; 2. Check Contractor's working method and verify the performance of the monitoring equipment to be checked by ET; 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with the ET and IEC, agree with the Contractor on the proposal for remedial measures to be implemented; and 	<ol style="list-style-type: none"> 1. Identify source(s) of exceedance and discuss with ER, ET and IEC on possible remedial measures; 2. Submit a proposal for remedial measures to ER, IEC and ET within two working days of notification of exceedance for agreement;



EVENT	ACTION			
	ET	IEC	ER	I-PARK2 CONTRACTOR
	<p>investigate the causes of exceedance and propose remedial measures;</p> <p>4. Discuss with IEC, ER and Contractor on possible remedial measures required; and</p> <p>5. Assess effectiveness of Contractor's remedial measures and keep IEC, and ER informed of the results until exceedance stops; and</p> <p>6. Notify EAD of EPD if the exceedance is confirmed to be related to the Project.</p>	<p>3. Discuss with ET, ER and Contractor on possible remedial measures;</p> <p>4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures; and</p> <p>5. Supervise Implementation of remedial measures.</p>	<p>4. Ensure the proposal for remedial measures are properly implemented.</p>	<p>3. Implement the agreed proposals; and</p> <p>4. Amend proposal as appropriate.</p>
LIMIT LEVEL				
<p>Exceedance for one 24-hour rolling average RSP concentration record and/or one 24-hour rolling average FSP concentration record</p>	<p>1. Notify IEC, ER and I-PARK2 Contractor and EAD of EPD;</p> <p>2. Check the monitoring data and the performance of the monitoring equipment;</p> <p>3. If exceedance is confirmed, identify source(s), investigate the causes of exceedance and propose remedial measures;</p>	<p>1. Check monitoring data submitted by the ET;</p> <p>2. Check I-PARK2 Contractor's working method; and verify the performance of the monitoring equipment to be checked by ET;</p> <p>3. Discuss with the ET, ER and I-PARK2 Contractor on possible remedial measures;</p>	<p>1. Confirm receipt of notification of exceedance in writing;</p> <p>2. Notify I-PARK2 Contractor;</p> <p>3. In consultation with the ET and IEC, agree with the I-PARK2 Contractor on the proposal for remedial measures to be implemented;</p>	<p>1. Identify source(s) and discuss with ER, ET and IEC on possible remedial measures;</p> <p>2. Take immediate action to avoid further exceedance;</p> <p>3. Submit a proposal for remedial measures to ER, ET and IEC within two working days of notification for agreement;</p>



EVENT	ACTION			
	ET	IEC	ER	I-PARK2 CONTRACTOR
	4. Discuss with IEC, ER and I-PARK2 Contractor on possible remedial measures required; and 5. Assess effectiveness of I-PARK2 Contractor's remedial measures and keep IEC, ER and EAD of EPD informed of the results until exceedance stops. 6. Notify EAD of EPD if the exceedance is confirmed to be related to the Project.	4. Advise the ET and ER on the effectiveness of the proposed remedial measures; 5. Review I-PARK2 Contractors' remedial measures whenever necessary to assure their effectiveness and advise ET and ER accordingly; and 6. Supervise implementation of remedial measures.	4. Ensure the proposal for remedial measures properly implemented. 5. If exceedance continues, identify what portion of the work is responsible and instruct the I-PARK2 Contractor to stop that portion of work until exceedance is abated.	4. Implement the agreed proposals; 5. Review and resubmit proposals if the problem is still not under control. 6. Stop the relevant portion of works as determined by ER until exceedance is abated.



2.3 Monitoring during Operational Phase

2.3.1 Stack Monitoring

Based on the prediction of the air quality modelling exercise conducted under this EIA study, no adverse air quality impact is anticipated during the operation of the Project. Air pollutants of the exhaust gas streams emitted from the stack will be continuously monitored and recorded in accordance with the prevailing guidance note on the BPM for incinerators (municipal waste incineration) in Hong Kong.

The parameters for measurement and the analytical methods are listed in **Table 2-5**. It should be noted that the proposed sampling methods below are for reference only and should be subject to the approval of EAD of EPD.

Table 2-5 Analytical Parameters and Methodology

Parameters	Method	Frequency
Dioxin and Furans	USEPA Method 23	Once per half year
PCBs and PAHs	USEPA Method 23	Once during commissioning stage
HCl and HF	USEPA Method 26, A USEPA Method 13B sampling train	On-line continuous
Heavy Metals Cd, Tl, Hg, Sb, As, Pb, Cr including Cr(VI), Co, Cu, Mn, Ni and V – particulate and gaseous form	USEPA Method 29	Monthly
Heavy Metals Se, Zn, Be	USEPA Method 29	Once during commissioning stage
Gaseous and vaporous organic substances, expressed as total organic carbon (TOC)	USEPA Method 18, USEPA Method 0031	Monthly
Combustion Gases		
Carbon Dioxide	Fyrite analyser, Combustion analyser	On-line continuous
Carbon Monoxide	Combustion Gas Analyser	On-line continuous
NO _x /NO	USEPA Reference methods USEPA Method 7 and associated methods,	On-line continuous
Oxygen	Combustion Gas Analyser (chemical cell and paramagnetic)	On-line continuous
Sulphur dioxide and Sulphuric Acid Mist	USEPA Method 8	On-line continuous
Particulates	ISO 9096, ASTM D3685-98,	On-line continuous



Parameters	Method	Frequency
	USEPA Method 17	
Velocity and Volumetric Flow	ISO 10780 and ISO 9096	On-line continuous
Ammonia	HJ 533-2009, HJ 534-2009 or international standard / method acceptable to the air pollution control authority	On-line continuous

Necessary monitoring equipment and techniques should be provided and used to demonstrate that the process is properly operated and the emissions can be minimized to meet the air pollution control requirements. The scope, manner and frequency of the monitoring shall be sufficient for this purpose and will be proposed by the I-PARK2 Contractor and agreed with the air pollution control authority according to the EPD's Guidance Note on the Best Practicable Means for Incinerators (Municipal Waste Incineration) BPM 12/1 (2024). Monitoring results shall be recorded in such manner specified by EAD of EPD. The record should be retained at the premises for a minimum of two years, or other period specified by EAD of EPD, after the date of last entry and be made available for examination as and when required by EAD of EPD.

On-line continuous monitoring and periodic measurement shall be carried out and the results shall be properly recorded. Evidence should be provided to demonstrate quality assurance procedures are in place to ensure all monitoring results are sufficiently accurate and reliable. Calibration on the monitoring equipment has to be done by means of parallel measurements with the reference methods as agreed by EAD of EPD. The requirements of the on-line monitoring and periodic measurement are provided in the following sections.

According to the EPD's Guidance Note on the Best Practicable Means for Incinerators (Municipal Waste Incineration) BPM 12/1 (2024), commissioning trial of the plant, to be witnessed by the air pollution control authority whenever appropriate, shall be conducted in such manner and format agreed with the air pollution control authority to demonstrate the effectiveness of the air pollution control measures and the compliance with emission limits. A report shall be submitted to the air pollution control authority within 1 month after the completion of the commissioning trial. For key air pollutants not covered in the prevailing guidance note on the BPM for incinerators (municipal waste incineration) including Be, Zn, Se, PCBs, PAHs and carcinogenic PAHs, commissioning test shall be conducted upon commissioning of I-PARK2 to demonstrate compliance with the emission rates assumed in the EIA report.

2.3.1.1 On-line Continuous Monitoring

Continuous monitoring of the in-stack exhaust gas and the process during operational phase shall be carried out during the entire period of I-PARK2 operation. Any proposed changes or proposed termination of the monitoring work shall only be implemented after the proposal has been agreed by the EAD of EPD. The system of continuous emission monitoring including instrument specifications, quality control, operation and maintenance to be implemented by the I-PARK2 Contractor shall meet the protocols set out in the



guideline "General Requirements of Continuous Emission Monitoring (CEM) System" issued by EPD. The continuous monitoring data should be transmitted instantaneously to EAD of EPD by telemetry system in such manner and format agreed with EAD of EPD. The parameters to be continuously monitored are listed below:-

In-stack Exhaust Gas Continuous Monitoring

- nitrogen oxides, expressed as nitrogen dioxide
- particulates
- hydrogen chloride
- hydrogen fluoride
- sulphur dioxide
- gaseous and vaporous organic substances, expressed as total organic carbon (TOCs)
- carbon monoxide
- ammonia
- oxygen content
- pressure
- temperature
- water vapour content (continuous measurement of water vapour content shall not be required if the sampled exhaust gas is dried before analysis.)
- volumetric flow rate of the exhaust gas

Process Continuous Monitoring

- temperature and oxygen content of the gas at the appropriate location(s) in the combustion chamber to demonstrate the compliance of the requirements set out in paragraphs 4.3.1 to 4.3.4 of EPD's Guidance Note on the Best Practicable Means for Incinerators (Municipal Waste Incineration) BPM 12/1 (2024) and the requirements set out in the EIA report
- temperature of the gas at the appropriate location(s) in the chimney to demonstrate the compliance of the requirements set out in paragraph 4.4.3 of EPD's Guidance Note on the Best Practicable Means for Incinerators (Municipal Waste Incineration) BPM 12/1 (2024) and the requirements set out in the EIA report



- other essential operating parameter(s) which may affect the performance of air pollution control measures

2.3.1.2 Periodic Measurement

To confirm that the levels of dioxin and heavy metals are being adequately controlled, periodic measurements shall be made to confirm that these pollutants continue to be adequately controlled.

The sampling and testing frequency will be proposed by the applicant and agreed with the air pollution control authority according to the EPD's Guidance Note on the Best Practicable Means for Incinerators (Municipal Waste Incineration) BPM 12/1 (2024). All measurement results should be recorded, processed and presented in a summary report as agreed by EAD of EPD. The report should be submitted to EAD of EPD without delay after the source sampling(s) as required is/are completed.

2.3.2 Monitoring for IBA Treatment Plant

For the IBA treatment plant, the monitoring requirements shall follow the EPD's Guidance Note on the Best Practicable Means for Mineral Works (Stone Crushing Plant) BPM 11/1 (95). The monitoring frequency shall be agreed with the air pollution control authority according to the above guidance note. The monitoring locations shall include the exhaust points of the IBA treatment plant to demonstrate compliance with the requirements set out in the EIA report.

According to the EPD's Guidance Note on the Best Practicable Means for Mineral Works (Stone Crushing Plant) BPM 11/1 (95), commissioning trial of the IBA treatment plant, to be witnessed by the air pollution control authority whenever appropriate, shall be conducted to demonstrate the performance and capacity of the air pollution control measures. A report of the commissioning trial shall be submitted to the air pollution control authority within one month after completion of the trial.

2.4 Odour Patrol

To determine the effectiveness of the proposed odour mitigation measures and to ensure no adverse odour nuisance arising from the operation of the I-PARK2 including the wastewater treatment facility, waste reception hall, waste storage areas and waste feed system, odour patrol shall be conducted by an independent odour patrol team as established by the I-PARK2 Contractor. The odour patrol team will patrol and sniff along an odour patrol route along the I-PARK2 site boundary as shown in **Figure 2.1**. The implementation of the odour patrol shall be subject to the prevailing weather forecast condition and no odour patrol should be carried out during rainy day.

The odour patrol team shall be comprised of at least two independent trained personnel / competent persons, who should pass a set of screening tests and fulfil the following requirements:-



- have their individual odour threshold of n-butanol in nitrogen gas in the range of 20 to 80 ppb/v required by the European Standard Method (EN 13725);
- be at least 16 years of age and willing and able to follow instructions;
- be free from any respiratory illnesses;
- not allowed to smoke, eat, drink (except water) or use chewing gum or sweets 30 min before and during odour patrol;
- take great care not to cause any interference with their own perception or that of others by lack of personal hygiene or the use of perfumes, deodorants, body lotions or cosmetics;
- and not communicate with each other about the results of their choices.

The independent trained personnel / competent persons should use their noses (olfactory sensors) to sniff odours at different locations. The main odour emission sources and the areas to be affected by the odour nuisance shall be identified. During the patrol, the sequence should generally start from less odorous locations to stronger odorous locations.

The perceived odour intensity is divided into 5 levels. **Table 2-6** describes the odour intensity for different levels.

Table 2-6 Odour Intensity Level

Level	Odour Intensity
0	Not detected. No odour perceived or an odour so weak that it cannot be easily characterised or described
1	Slight identifiable odour, and slight chance to have odour nuisance
2	Moderate identifiable odour, and moderate chance to have odour nuisance
3	Strong identifiable, likely to have odour nuisance
4	Extreme severe odour, and unacceptable odour level

The independent trained personnel / competent persons shall record the findings including date and time, weather condition (e.g. sunny, fine, cloudy, and rainy), odour intensity, odour nature and possible odour sources, local wind speed, and wind direction at each location. In addition, some relevant meteorological data such as daily average temperature, and daily average humidity on the day of odour patrol shall be obtained from the nearest Hong Kong Observatory station for reference.

Odour patrols will be conducted monthly in the first 2 operational years of the I-PARK2. In each month, the odour patrol shall be carried out during both daytime and evening / night time (a total of 2 odour patrols on the same day) when the I-PARK2 are operated under



normal operating condition. The findings of the odour patrols during the first 2 operational years of the I-PARK2 shall be certified by the ET Leader and verified by the IEC.

The need to continue the odour patrol after the first 2 operational years of the I-PARK2 would depend on the odour patrol results and should be agreed with EAD of EPD. If the level of odour intensity at any sniffing location is higher than 1 due to potential odour emission from the I-PARK2 including the wastewater treatment facility, waste reception hall, waste storage areas and waste feed system in two consecutive months, the odour patrol programme would be extended until the level of odour intensity (that is determined to be due to potential odour emission from the I-PARK2 or the associated facilities) at all the sniffing locations have dropped to 0 in three consecutive months.

Table 2-7 shows the action level and limit level to be used for odour patrol. Should any exceedance of the action and limit levels occurs, actions in accordance with the event and action plan in **Table 2-8** should be carried out.

Table 2-7 Action and Limit Levels for Odour Nuisance

Parameter	Action Level	Limit Level
Odour Intensity (from odour patrol)	When one documented complaint is received ^(Note) , or Odour Intensity of 1 is measured from odour patrol.	Two or more documented complaints are received ^(Note) within a week; or Odour intensity of 2 or above is measured from odour patrol.

Note: Once the complaint is received by the Project Proponent (WID) or I-PARK2 Contractor, the Project Proponent or I-PARK2 Contractor shall investigate and verify the complaint whether it is related to the potential odour emission from the I-PARK2 and associated facilities.

Table 2-8 Event and Action Plan for Odour Patrol

EVENT	ACTION	
	Person-in-charge of Odour Patrol	Project Proponent (WID) ^(Note) or I-PARK2 Contractor
ACTION LEVEL		
Exceedance of action level (Odour Patrol)	<ol style="list-style-type: none"> Identify source/reason of exceedance; Repeat odour patrol to confirm finding. 	<ol style="list-style-type: none"> Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; Rectify any unacceptable practice; Implement mitigation measures if necessary; Inform EAD of EPD.
Exceedance of action level (Odour Complaints)	<ol style="list-style-type: none"> Identify source/reason of exceedance; Carry out odour patrol to determinate odour intensity. 	<ol style="list-style-type: none"> Carry out investigation and verify the complaint whether it is related to potential odour emission from I-PARK2; Carry out investigation to identify the source/reason of



EVENT	ACTION	
	Person-in-charge of Odour Patrol	Project Proponent (WID) ^[Note] or I-PARK2 Contractor
		exceedance. Investigation should be completed within 2 weeks; 3. Rectify any unacceptable practice; 4. Implement more mitigation measures if necessary; 5. Inform EAD of EPD.
LIMIT LEVEL		
Exceedance of Limit level	1. Identify source/reason of exceedance; 2. Inform EAD of EPD; 3. Repeat odour patrol to confirm findings; 4. Increase odour patrol frequency to bi-weekly; 5. Assess effectiveness of remedial action and keep EAD of EPD informed of the results; 6. If exceedance stops, cease additional odour patrol.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 week; 2. Rectify any unacceptable practice; 3. Formulate remedial actions; 4. Ensure remedial actions properly implemented; 5. If exceedance continues, consider what more/enhanced mitigation measures should be implemented; 6. Inform EAD of EPD.

Note: An implementation agent will be identified by the Project Proponent to carry out an independent investigation if necessary.

In the event when an odour complaint is received, the Project Proponent or I-PARK2 Contractor should liaise with the complainant and register the complaint. The complaint register is to record detailed information regarding the odour complaint so as to facilitate the investigation work. The registration should contain, but not be limited to the following information:-

- Location of where the odour nuisance occurred;
- Date and time of the complaint and the nuisance event;
- Description of the complaint, i.e. the type and characteristics of the odour; and an indication of the odour strength (highly offensive/offensive/slightly offensive/just continuously detectable /intermittently detectable);
- Meteorological conditions from the nearest HK Observatory station at the time of complaint;
- Name and contact information of the complainant; and



- Remedial actions taken.



3 Noise Impact

3.1 Introduction

The EIA report concluded that no existing, committed or planned noise sensitive receiver (NSR) has been identified within the assessment area. Based upon this, no noise monitoring is considered necessary for either the construction or operational phases.

3.2 Mitigation Measures

Mitigation measures for noise impacts have been recommended in the EIA report. All the recommended mitigation measures and designs are provided in the implementation schedule in **Appendix B**.

3.3 Audit Requirements

Regular environmental site audits are recommended to ensure the proper implementation of proposed mitigation measures during the construction phase.



4 Water Quality Impact

4.1 Introduction

Seawall modification and construction of the new berthing facility for I-PARK2 would involve marine construction work. Non-dredged ground treatment method, i.e. Deep Cement Mixing (DCM) and deployment of silt curtain are recommended for the proposed marine construction works to reduce potential impacts on the water quality. The DCM involves injecting controlled volumes of cement into the underlying materials whilst simultaneously mixing the cement with the *in-situ* materials to improve their strength. A blanket layer of sand fill would be placed on top of the treatment works area prior to the DCM installation to prevent the escape of cement slurry into the water and disturbance of sediment fines during the mixing.

Marine water quality monitoring is recommended to verify the marine water quality impacts due to the sand blanket laying and DCM work of this Project. Site audit shall also be conducted throughout the marine and land-based construction under this Project to ensure that the recommended mitigation measures are properly implemented.

Operation of I-PARK2 would involve brine discharge from the proposed desalination plant and the spent effluent discharge from the proposed seawater cooling system if seawater-cooled option is adopted. Marine water quality monitoring and audit programme is proposed for the first year of Project operation to verify the marine water quality impacts due to these discharges.

Water quality monitoring will be carried out for different stages of the Project as follows:

- Baseline marine water quality monitoring prior to the commencement of the marine construction work.
- Construction phase marine water quality monitoring during the sand blanket laying and DCM works.
- Post-construction water quality monitoring after completion of Project construction.
- Marine water quality monitoring during the first year of Project operation.

Discharge licence(s) should be obtained under the Water Pollution Control (WPCO) for construction site discharges and operational phase effluent discharges from the Project. Regular monitoring of effluent quality may be specified in as a condition of the WPCO discharge licence(s), and effluent monitoring shall be implemented in accordance with the WPCO licence requirements. Effluent monitoring as required under the WPCO licence(s) during construction and operational phases of this Project is not presented in this Manual.



4.2 Monitoring Locations

It is recommended to establish impact and control monitoring stations during baseline, construction, post-construction and operational monitoring stages.

Seven (7) impact stations, that would potentially be affected by the Project, are proposed to verify the water quality impact predictions. These impact stations include water sensitive receivers (namely E1 and F2) and observation points (namely O1, O2, O3, B1 and B2). Two control stations (namely C1 and C2) are proposed for the Project. These control stations have been selected such that they are located within the same water body as the impact monitoring stations but are located outside the area of influence of the Project. The proposed marine water quality monitoring stations for baseline, construction, post-construction and operational stages are listed in **Table 4-1**. The locations of these monitoring stations are shown in **Figure 4.1**.

Table 4-1 Proposed Marine Water Quality Monitoring Stations for All Monitoring Stages

Station	Description	Name	Easting	Northing
E1	Impact Station	Mudflat / seagrass / horseshoe crab	812231	832329
F2	Impact Station	Mariculture Subzone	811698	833323
O1	Impact Station	Oyster Culture Activities	810512	832411
O2	Impact Station	Oyster Culture Activities	809868	831720
O3	Impact Station	Oyster Culture Activities	810603	831927
B1	Impact Station	Black Point	807831	831101
B2	Impact Station	Black Point	808141	830771
C1	Control Station	Inner Deep Bay	811885	834523
C2	Control Station	Outer Deep Bay	806808	830000

The status and locations of impact / control monitoring stations and the Project activities may change after issuing this Manual. The appointed ET Leader may propose alternative monitoring locations taking into consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. Any change to the monitoring stations shall be justified by the ET Leader, agreed by the ER, verified by the IEC before seeking approval from EAD of EPD prior to the implementation of monitoring programme.

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



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

Enough replicates *in-situ* measurements and sample collected from each independent sampling event are required for all parameters to ensure a robust statistically interpretable dataset.

4.3 Monitoring Parameters

The parameters that have been selected for measurement *in-situ* and in the laboratory are those that were either determined in the EIA to be those with the most potential to be affected by the Project or are a standard check on water quality conditions. Parameters to be measured during different monitoring stages are summarized in **Table 4.2**.

Table 4-2 Proposed Marine Water Quality Monitoring Parameters for Different Monitoring Stages

Parameters (Unit)	Baseline for Construction and Post-construction Stage	Construction Stage		Post-construction Stage	Operational Stage
		Marine Sand Blanket Laying	DCM Operation		
<i>In-situ</i> Measurements					
Dissolved Oxygen (mg/L)	✓	✓	✓	✓	✓
Salinity (‰ or ppt)	✓	✓	✓	✓	✓
Temperature (°C)	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓
Turbidity (NTU)	✓	✓	✓	✓	✓
Total Residual Chlorine (mg/L)	Not required	Not required	Not required	Not required	✓
Alkalinity (ppm)	✓	Not required	✓	✓	Not required
Laboratory Measurements					



Parameters (Unit)	Baseline for Construction and Post-construction Stage	Construction Stage		Post-construction Stage	Operational Stage
		Marine Sand Blanket Laying	DCM Operation		
Suspended Solids (mg/L)	✓	✓	✓	✓	Not required

4.4 Monitoring Depths

Marine water samples and *in-situ* water quality measurement should be taken from 1m below the surface, mid-depth and 1m above seabed. Where the water depth is less than 6 m, marine water sampling and *in-situ* measurement at the mid-depth may be omitted. Should the water depth be less than 3 m, marine water sampling and *in-situ* measurement should be carried out only at the mid-depth of the water column. Replicate *in-situ* measurement is recommended at each sampling depth.

4.5 Field Log

In addition to the monitoring parameters in **Table 4.2**, relevant field data should also be recorded, including monitoring location / position, time, water depth, sampling depth, pH, salinity, DO saturation, water temperature, tidal stages, weather conditions, sea conditions, current direction and velocity and any special phenomena or work underway nearby that may affect the monitoring results. A sample data record sheet is shown in **Appendix 4.1** for reference.

4.6 Monitoring Equipment

4.6.1 Dissolved Oxygen and Temperature Measuring Equipment

The instrument should be a portable and weatherproof Dissolved Oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring:

- a DO level in the range of 0 - 20 mg/L and 0 - 200% saturation; and
- a temperature of 0 - 45 degree Celsius.

It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary. For example, YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument.



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

4.6.2 Turbidity Measurement Instrument

Turbidity shall be measured *in-situ* by the nephelometric method. The instrument shall be portable and weatherproof turbidity measuring instrument using a DC power source complete with cable, sensor and comprehensive operation manuals. It shall have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (e.g. Hach model 2100P or an approved similar instrument). The cable shall not be less than 35m in length. The meter shall be calibrated to establish the relationship between NTU units and the levels of suspended solids.

4.6.3 pH Measurement Instrument

The instrument should consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It should be readable to 0.1 pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 should be used for calibration of the instrument before and after use. Details of the method shall comply with American Public Health Association (APHA), 19th ed. 4500-HTB.

4.6.4 Salinity Measuring Equipment

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

4.6.5 Total Alkalinity Measurement Instrument

A digital titrator capable of dispensing 0.002ml at one single dispense should be provided to measure the amount of sulphuric acid used in determination of alkalinity.

4.6.6 Total Residual Chlorine Measuring Equipment

Total residual chlorine (TRC) shall be measured *in-situ* using approved test kit.

4.6.7 Water Sampling Equipment

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

4.6.8 Water Depth Detector

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



should be suitably calibrated. The monitoring contractor shall seek agreement from the ET Leader, IEC and ER on the proposed equipment prior to deployment.

4.6.9 Current Velocity and Direction

No specific equipment is recommended for measuring the current velocity and direction. The monitoring contractor shall seek agreement from the ET Leader, IEC and ER on the proposed equipment prior to deployment.

4.6.10 Sample Containers and Storage

Water samples should be stored in high density polythene bottle, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples should be collected to achieve the detection limit stated in **Section 4.6**.

4.6.11 Monitoring Position Equipment

A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message 'screen pop-up' facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instruments of similar accuracy, should be provided and used to ensure that the water sampling locations are correct during the water quality monitoring work. The DGPS, or equivalent instrument, should be suitably calibrated at appropriate checkpoint (e.g. Quarry Bay Survey Nail) to verify that the monitoring station is at the correct position before the water quality monitoring commence.

4.6.12 Calibration of *In-Situ* Instruments

In-situ monitoring instruments for the monitoring of temperature, DO, turbidity, pH and salinity, alkalinity and TRC should be checked, calibrated and certified by a laboratory accredited under HOKLAS (or other international accreditation scheme that is HOKLAS-equivalent) before use, and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before use.

Wet bulb calibration for the DO meter should be carried out before commencement of monitoring and after completion of all measurements each day.

A zero check in distilled water should be performed with the turbidity probe at least once per monitoring day. The probe should then be calibrated with a solution of known NTU. In addition, the turbidity probe should be calibrated at least twice per month to establish the relationship between turbidity readings (in NTU) and levels of suspended solids (in mg/L). Accuracy check of the digital titrator should be performed at least once per monitoring day.



For the on-site calibration of field equipment, the BS 1427:2009, Guide to on-site test methods for the analysis of waters should be observed.

Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment should also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.

4.7 Laboratory Measurement / Analysis

Analysis of suspended solids (SS) should be carried out in a HOKLAS or other international accredited laboratory. Sufficient water samples should be collected at the monitoring stations for carrying out the laboratory determinations. Using chain of custody forms, collected water samples shall be transferred to the HOKLAS accredited laboratory for immediate processing. The determination work should start within 24 hours after collection of the water samples. The analytical methodology should follow the American Public Health Association (APHA) Standard Methods for the Examination of Water and Wastewater or an equivalent method subject to the approval of EAD of EPD. Analytical methods and detection limits for SS are present in **Table 4-3**.

Table 4-3 Analytical Methods to be Applied to Water Quality Samples

Parameters	Analytical Method	Detection Limit
Suspended Solids	APHA 2540D *	1 mg/L

*APHA American Public Health Association Standard Methods for the Examination of Water and Wastewater

The testing of SS should be HOKLAS accredited (or if not, approved by EAD of EPD) and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results.

Detailed testing methods, pre-treatment procedures, instruments use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per batch, etc.), detection limit and accuracy shall be submitted to EAD of EPD for approval prior to the commencement of monitoring programme. EAD of EPD may also request the laboratory to carry out analysis of known standards provided by EAD of EPD for quality assurance. The QA/QC shall be in accordance with the requirements of HOKLAS or international accredited scheme. The QA/QC results shall be reported. The testing methods and related proposal should be checked and certified by the ET Leader and verified by the IEC before submission to EAD of EPD for approval.

Additional duplicate samples may be required by EAD of EPD for inter-laboratory calibration. Remaining samples after analysis should be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to EAD of EPD. In any circumstance, the sample testing should have comprehensive quality assurance and quality control programmes. The



laboratory should prepare to demonstrate the programme to DEP or his representatives when requested.

4.8 Baseline Monitoring

Baseline conditions for marine water should be established and agreed with EAD of EPD prior to the commencement of marine construction works. The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the marine construction works and to demonstrate the suitability of the proposed monitoring stations. No marine construction activities shall be on-going in the vicinity of the stations during the baseline monitoring. The baseline conditions should be established by measuring the water quality parameters specified in **Table 4-2**.

The baseline marine water quality monitoring for construction phase should be taken at all designated monitoring stations, 3 days per week, at mid-flood and mid-ebb tides, for at least 4 weeks prior to the commencement of construction works. There should not be any marine construction activities in the vicinity of the stations during the baseline monitoring. The interval between 2 sets of monitoring should not be less than 36 hours.

For operational phase, the ET Leader shall collect all relevant existing available monitoring data and seek approval from the ER, IEC and EAD of EPD on an appropriate set of data to be used as baseline reference as well as the additional baseline monitoring methodology prior to the commencement of operational phase impact monitoring. Where necessary, EPD routine marine water quality monitoring data at the relevant station(s), dry and wet seasons inclusive, could also be referenced to establish the baseline water quality.

Baseline monitoring schedule should be submitted to EAD of EPD at least 1 week prior to the commencement of baseline monitoring. EAD of EPD should also be notified immediately for any changes in schedule. The baseline monitoring report should be certified by the ET Leader and verified by the IEC before submission to EAD of EPD. The ET shall be responsible for undertaking the baseline monitoring and submitting the results within 10 working days from the completion of the baseline monitoring work. The baseline monitoring programme is summarized in **Table 4-4**.

Table 4-4 Summary of Baseline Marine Water Quality Monitoring

Activities	Monitoring Duration	Monitoring Frequency	Monitoring Parameters	Monitoring Station
Establishment of baseline water quality condition for comparison with construction impact monitoring results	At least 4 weeks	Three days per week	DO, pH, salinity, temperature, turbidity, alkalinity, SS	All designated Stations in Table 4-1
Establishment of baseline water quality condition for comparison with operational impact monitoring results	ET to collect and review of all relevant existing available monitoring data and propose an appropriate set of data to be used as baseline reference as well as the additional baseline monitoring methodology			



4.9 Construction Phase Impact and Post-construction Monitoring

Impact monitoring should be undertaken at all designated monitoring stations three days per week during the sand blanket laying works and DCM operation. During each monitoring event, monitoring should be undertaken at both mid-flood and mid-ebb tides. Upon completion of the construction works, the monitoring exercise at the designated monitoring locations should be undertaken for four weeks in the same manner as the impact monitoring. The interval between two sets of monitoring should not be less than 36 hours except where there are exceedances of Action and/or Limit Levels, in which case the monitoring frequency will be increased. **Table 4-2** shows the proposed monitoring parameters.

The water quality monitoring schedule should be submitted to EAD of EPD at least 1 week before the first day of the monitoring month. EAD of EPD should be notified immediately of any changes in schedule. If the monitoring data collected at the designated stations indicate that the Action or Limit Levels as shown in **Table 4-7** are exceeded, appropriate actions should be taken in accordance with the Event and Action Plan in **Table 4-8**. The water quality monitoring programme for construction and post-construction stages is summarized in **Table 4-5**.

Table 4-5 Summary of Marine Water Quality Monitoring During Construction and Post-construction Stages

Activities	Monitoring Duration	Monitoring Frequency	Monitoring Parameters	Monitoring Station
Sand blanket laying	6 months *	Three days per week	DO, pH, salinity, temperature, turbidity, SS	All designated Stations in Table 4-1
DCM operation	6 months *	Three days per week	DO, pH, salinity, temperature, turbidity, alkalinity, SS	All designated Stations in Table 4-1
Post-construction stage monitoring	4 weeks	Three days per week	DO, pH, salinity, temperature, turbidity, alkalinity, SS	All designated Stations in Table 4-1

* Duration of sand blanket laying and DCM operation is indicative for reference only and will be subject to the actual progress of the construction works.

4.10 Operational Phase Impact Monitoring

Marine water monitoring should be carried out during the first year of Project operation at frequency of twice per month. At each monitoring event, *in-situ* measurement and water sampling should be carried out at both mid-flood and mid-ebb tides. The monitoring locations should be the same as that recommended for the construction phase marine water quality monitoring programme. **Table 4-2** shows the proposed monitoring parameters.



The proposed water quality monitoring schedule should be submitted to ER, IEC and EAD of EPD at least 4 weeks before the first day of the monitoring month. The ER, IEC and EAD of EPD should also be notified immediately for any changes in schedule. If the monitoring data collected at the designated stations indicate that the Action or Limit Levels as shown in **Table 4-7** are exceeded, appropriate actions should be taken in accordance with the Event and Action Plan in **Table 4-8**.

After obtaining one year of monitoring results, the ET shall review against the baseline conditions to identify if there is any change to the overall water quality in Deep Bay and propose remedial action if there is any deterioration in water quality due to the Project. The ET shall also review if water quality monitoring should be continued during the second year of operation and seek agreement from ER, IEC and EAD of EPD on any changes of the monitoring programme.

Table 4-6 Summary of Operational Stage Marine Water Quality Monitoring

Activities	Monitoring Duration	Monitoring Frequency	Monitoring Parameters	Monitoring Station
Project operation	First year of operation	Twice per month	DO, pH, salinity, temperature, turbidity, TRC	All designated Stations in Table 4-1

4.11 Event and Action Plan

The water quality criteria, namely Action and Limit Levels, are shown in **Table 4-7**. These criteria should be applied to ensure that any deterioration of water quality is readily detected and timely action is taken to rectify the situation. Should the monitoring results of the water quality parameters at any designated monitoring station exceed the water quality criteria, the actions in accordance with the Event and Action Plan summarized in **Table 4-8** shall be carried out.

Table 4-7 Action and Limit Levels for Water Quality

Parameters	Action	Limit	Stages
Dissolved Oxygen (DO) in mg/L ⁽¹⁾	<u>Surface Layer for E1 and F2</u> ≤ 5 percentile of baseline data <u>Depth-averaged for O1 to O3</u> ≤ 5 percentile of baseline data <u>Bottom Layer for O1 to O3</u> ≤ 5 percentile of baseline data	<u>Surface Layer for E1 and F2</u> ≤5 mg/L or ≤ 1 percentile of baseline data, whichever is lower ⁽³⁾ <u>Depth-averaged for O1 to O3</u> ≤4 mg/L or ≤ 1 percentile of baseline data, whichever is lower ⁽³⁾ <u>Bottom Layer for O1 to O3</u> ≤2 mg/L or ≤ 1 percentile of baseline data, whichever is lower ⁽³⁾	Construction and Operational stages
Suspended Solids (SS) in mg/L (Depth-averaged)	≥ 95 percentile of baseline data or 120% of data measured at control station at the same tide of the same day, whichever is higher ⁽³⁾	≥ 99 percentile of baseline or 130% of data measured at control station at the same tide of the same day, whichever is higher ⁽³⁾	Construction Stage



Parameters	Action	Limit	Stages
Turbidity in NTU (Depth-averaged)	≥ 95 percentile of baseline data or 120% of data measured at control station at the same tide of the same day, whichever is higher ⁽³⁾	≥ 99 percentile of baseline or 130% of data measured at control station at the same tide of the same day, whichever is higher ⁽³⁾	Construction Stage
Alkalinity in ppm (Depth-averaged)	≥ 95 percentile of baseline data or 120% of data measured at control station at the same tide of the same day, whichever is higher ⁽³⁾	≥ 99 percentile of baseline or 130% of data measured at control station at the same tide of the same day, whichever is higher ⁽³⁾	Construction Stage
Temperature	≥ 1.8°C above the relevant baseline data or ≥ 1.8°C above the temperature recorded at control station at the same tide of the same day, whichever is higher ⁽³⁾	≥ 2°C above the relevant baseline data or ≥ 2°C above the temperature recorded at control station at the same tide of the same day, whichever is higher ⁽³⁾	Operational Stage
Total Residual Chlorine (TRC) ⁽⁴⁾	≥ 0.01 mg/L	≥ 0.013 mg/L	Operational Stage
Salinity	≥ 8% above the relevant baseline data or ≥ 8% above the salinity recorded at control station at the same tide of the same day, whichever is higher ⁽³⁾	≥ 10% above the relevant baseline data or ≥ 10% above the salinity recorded at control station at the same tide of the same day, whichever is higher ⁽³⁾	Operational Stage

Notes:

- (1) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits. DO objective for E1 and F2 (within Mariculture Subzone) is available for surface layer only. DO objective for O1 to O3 is available for depth-average and bottom layer.
- (2) For other parameters, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (3) The alternative Action / Limit Levels are proposed to address the uncertainty of the baseline data.
- (4) The lowest detention limit for TRC is 0.01 mg/L.



Table 4-8 Event and Action Plan for Construction and Operational Stage Water Quality

Event	ET Leader	IEC	ER	I-PARK2 Contractor
Action level being exceeded by one sampling day	<ul style="list-style-type: none"> • Repeat <i>in situ</i> measurement to confirm findings; • Identify reasons for non-compliance and source(s) of impact; • Inform IEC and I-PARK2 Contractor; • Check monitoring data, all plant, equipment and I-PARK2 Contractor's working methods; • Discuss mitigation measures with IEC and I-PARK2 Contractor; • Repeat measurement on next day of exceedance. 	<ul style="list-style-type: none"> • Discuss with ET and I-PARK2 Contractor on the mitigation measures; • Review proposals on mitigation measures submitted by I-PARK2 Contractor and advise the ER accordingly; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Discuss with IEC on the proposed mitigation measures; • Make agreement on the mitigation measures to be implemented. • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Inform the ER and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Check all plant and equipment; • Consider changes of working methods; • Discuss with ET and IEC and propose mitigation measures to IEC and ER; • Implement the agreed mitigation measures.
Action level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> • Repeat <i>in situ</i> measurement to confirm findings; • Identify reasons for non-compliance and source(s) of impact; • Inform IEC and I-PARK2 Contractor; • Check monitoring data, all plant, equipment and I-PARK2 Contractor's working methods; • Discuss mitigation measures with IEC and I-PARK2 Contractor; • Ensure mitigation measures are implemented; • Prepare to increase the monitoring frequency to daily; • Repeat measurement on next day of 	<ul style="list-style-type: none"> • Discuss with ET and I-PARK2 Contractor on the mitigation measures; • Review proposals on mitigation measures submitted by I-PARK2 Contractor and advise the ER accordingly; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Discuss with IEC on the proposed mitigation measures; • Make agreement on the mitigation measures to be implemented; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Inform the ER and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Check all plant and equipment; • Consider changes of working methods; • Discuss with ET and IEC and propose mitigation measures to IEC and ER within three working days; • Implement the agreed mitigation measures.



Event	ET Leader	IEC	ER	I-PARK2 Contractor
Limit level being exceeded by one sampling day	<p>exceedance.</p> <ul style="list-style-type: none"> • Repeat <i>in situ</i> measurement to confirm findings; • Identify reasons for non-compliance and source(s) of impact; • Inform IEC, I-PARK2 Contractor and EAD of EPD; • Check monitoring data, all plant, equipment and I-PARK2 Contractor's working methods; • Discuss mitigation measures with IEC, ER and I-PARK2 Contractor; • Ensure mitigation measures are implemented; • Increase the monitoring frequency to daily until no exceedance of Limit level. 	<ul style="list-style-type: none"> • Discuss with ET and I-PARK2 Contractor on the mitigation measures; • Review proposals on mitigation measures submitted by I-PARK2 Contractor and advise the ER accordingly; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Discuss with IEC, ET and I-PARK2 Contractor on the proposed mitigation measures; • Request I-PARK2 Contractor to critically review the working methods; • Make agreement on the mitigation measures to be implemented; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Inform the ER and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Check all plant and equipment; • Consider changes of working methods; • Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within three working days; • Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> • Repeat in situ measurement to confirm findings; • Identify reasons for non-compliance and source(s) of impact; • Inform IEC, I-PARK2 Contractor and EAD of EPD; • Check monitoring data, all plant, equipment and I-PARK2 Contractor's working methods; • Discuss mitigation measures with IEC, ER and I-PARK2 Contractor; • Ensure mitigation measures are implemented; • Increase the monitoring frequency to daily until no exceedance of Limit 	<ul style="list-style-type: none"> • Discuss with ET and I-PARK2 Contractor on the mitigation measures; • Review proposals on mitigation measures submitted by I-PARK2 Contractor and advise the ER accordingly; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Discuss with IEC, ET and I-PARK2 Contractor on the proposed mitigation measures; • Request I-PARK2 Contractor to critically review the working methods; • Make agreement on the mitigation measures to be implemented; • Assess the effectiveness of the implemented mitigation measures; • Consider and instruct, if necessary, the I-PARK2 Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level. 	<ul style="list-style-type: none"> • Inform the ER and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Check all plant and equipment; • Consider changes of working methods; • Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within three working days; • Implement the agreed mitigation measures; • As directed by the ER, to slow down or to stop all or part of



DEVELOPMENT OF INTEGRATED WASTE MANAGEMENT FACILITIES PHASE 2 (I-PARK2)

Event	ET Leader	IEC	ER	I-PARK2 Contractor
	level for two consecutive days.			the construction activities.



4.12 Site Audits

Implementation of regular site audits is to ensure that the recommended mitigation measures are to be properly undertaken during proposed construction works. It can also provide an effective control of any malpractices and therefore achieve continual improvement of environmental performance on site.

Site audits shall be carried out by the ET and shall be based on the mitigation measures for water pollution control recommended in the implementation schedule as presented in **Appendix 11.1**. In the event that the recommended mitigation measures are not properly implemented, deficiency shall be recorded and reported to the site management. Suitable actions are to be carried out to:

- investigate the problems and the causes;
- issue action notes to the I-PARK2 Contractor who is responsible for the works;
- implement remedial and corrective actions immediately;
- re-inspect the site conditions upon completion of the remedial and corrective actions; and
- record the event and discuss with the I-PARK2 Contractor for preventive actions.



5 Waste Management Implications

5.1 Introduction

During the construction phase, the I-PARK2 Contractor shall be responsible for the implementation of mitigation measures to minimize waste or redress problems arising from the waste materials including construction and demolition (C&D) materials, chemical waste and general refuse. A Waste Management Plan (WMP), as a part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TC (W) No.19/2005 and submitted to the Engineer for approval. The recommended mitigation measures should form the basis of the WMP. Regular audit of the construction waste materials and waste management practice is recommended during the construction phase.

During operational phase, incineration by-products (including bottom ash, fly ash and Air Pollution Control (APC) residues), dewatered sludge, chemical waste and general refuse would be generated. The bottom ash generated or imported would be treated for off-site beneficial uses (e.g. construction material production)¹. Disposal of bottom ash at landfill would be the last resort if all possible options of the beneficial uses/outlet are exhausted and it is required to ensure compliance with the incineration residue pollution control limits and the leachate parameters set out for landfills in Hong Kong prior to landfill disposal. As for the fly ash / APC residues, the existing technology for recovering fly ash is immature with a high cost. The fly ash / APC residues will be treated by cement solidification or chemical stabilization to ensure compliance with the incineration residue pollution control limits and the leachate parameters set out for landfills in Hong Kong prior to landfill disposal. The Government will keep in view the development of fly ash treatment technology and consider recovering fly ash for beneficial use when the technology becomes mature and cost-effective.

Floating refuse may be trapped or accumulated along the artificial seawall during construction and operation of the Project. Considering no sharp turns or abrupt indentation for shoreline along the artificial seawall, entrapment or accumulation of floating refuse along the artificial seawall would be minimal. Floating refuse trapped within the Project area will be collected and properly treated or disposed of as general refuse.

¹ Taking MSW incineration bottom ash treated for use as aggregate in Mainland China as an example, the relevant requirements in GB/T 25032-2010 should be met. More stringent treatment requirements might be required for other options of beneficial uses/outlet of the treated bottom ash.



5.2 Audit Requirements

Weekly audit of waste management practice shall be carried out by the ET during the construction phase and regular site inspection should be carried out during operational phase of the Project to determine if waste is being managed in accordance with the good waste management practices and mitigation measures listed in **Appendix 11.1** as well as the prescribed waste management procedures and the EMP. The audits shall examine all aspects of waste management including waste generation, storage, recycling, treatment, transportation, delivery and disposal.

Apart from site inspection, documents including licences, permits, disposal and recycling records should be reviewed and audited for compliance with the legislation and contract requirements.

5.3 Monitoring Requirements

No monitoring is required during the construction phase of the Project.

During the operational phase, all bottom ash and stabilized fly ash / APC residues to be disposed of at landfill shall be tested in accordance with the requirements of the proposed Residue Pollution Control Limits (IRPCL) and leachability criteria presented in **Table 5-1** before disposal.

Table 5-1 Incineration Residue Pollution Control Limits

Pollutant Parameter	Pollution Control Limit
<i>Residue Itself: Bottom Ash, Fly Ash and APC residues</i>	
Total organic carbons ^(a)	3% by weight or loss on ignition is less than 5% of the dry weight ^(b)
Dioxins/Furans	1 ppb (or 1 µg/kg) ^(c)
<u>Leachate Derived from the Residue:</u>	
pH	>8 ^(d)
Heavy Metals ^(e)	
Cadmium (Cd)	10 mg/L
Chromium (Cr)	50 mg/L
Copper (Cu)	250 mg/L
Nickel (Ni)	250 mg/L
Lead (Pb)	50 mg/L
Zinc (Zn)	250 mg/L
Mercury (Hg)	1 mg/L
Tin (Sn)	250 mg/L
Silver (Ag)	50 mg/L
Antimony (Sb)	150 mg/L
Arsenic (As)	50 mg/L
Beryllium (Be)	10 mg/L
Thallium (Tl)	50 mg/L
Vanadium (V)	250 mg/L
Selenium (Se)	1 mg/L
Barium (Ba)	1,000 mg/L

Notes:



- (a) Checking of carbon burnout of the ash is necessary to ensure adequate sterility
- (b) European Union – Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
- (c) EPA's preliminary remediation goal for dioxin in soil is 1 ppb according to "Update to the ATSDR Policy Guideline for Dioxins and Dioxin-Like Compounds in Residential Soil"
- (d) Approved EIA Report of Integrated Waste Management Facilities (AEIAR-163/2012)
- (e) Toxicity Characteristic Leaching Procedure (TCLP) limits for landfill disposal.

Toxicity Characteristic Leaching Procedure (TCLP) tests shall be carried out for the bottom ash and stabilized fly ash / APC residues to be disposed of at landfill in accordance with the requirements of the proposed IRPCL prior to disposal to landfill. The proposed sampling frequencies of the test for stabilized fly ash / APC residues to be disposed of at landfill are as follows:

Testing and commissioning (T&C)

- During T&C, the Contractor shall sample and test every 20 m³ of stabilized fly ash / APC residues for conformance of the IRPCL and leachability criteria presented in **Table 5-1**.

First six months of operation

- During the first six months of operation, if all samples conform to the limits and criteria during T&C, the Contractor shall take two samples on daily basis for stabilized fly ash / APC residues; otherwise, the Contractor shall sample and test every 20 m³ of stabilized fly ash / APC residues until all samples conform to the limits and criteria throughout a continuous six-month period during operation.

After the first six months of operation

- If all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation, the Contractor shall take two samples on the same day on monthly basis for stabilized fly ash / APC residues; otherwise, the Contractor shall take two samples on daily basis until all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation..

The bottom ash will be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet of the treated bottom ash are exhausted. The proposed sampling frequencies of the test for the bottom ash to be disposed of at landfill are as follows:

Testing and commissioning (T&C)

- During T&C, the Contractor shall sample and test every 20 m³ of the bottom ash for conformance of the IRPCL and leachability criteria presented in **Table 5-1**.

First six months of operation

- During the first six months of operation, if all samples conform to the limits and criteria during T&C, the Contractor shall take two samples on the same day on monthly basis



for the bottom ash; otherwise, the Contractor shall sample and test every 20 m³ of the bottom ash until all samples conform to the limits and criteria throughout a continuous six-month period during operation.

After the first six months of operation

- If all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation, the Contractor shall take two samples on the same day every three months for the bottom ash; otherwise, the Contractor shall take two samples on the same day on monthly basis until all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation.

The detailed sampling and testing plan of the bottom ash and stabilized fly ash / APC residues to be disposed of at landfill site shall be agreed by EPD before commencement of the operation phase. The chemical analysis results of the sampling shall be submitted to EPD for approval before disposal of the bottom ash and stabilized fly ash / APC residues to the landfill.

The treated bottom ash for off-site beneficial use would be tested in accordance with the relevant requirements subject to the possible options of beneficial uses/outlet of the treated bottom ash.



6 Ecological Impact

6.1 Introduction

The EIA has evaluated the ecological consequences of the Project and recommended ecological mitigation measures to avoid, minimize and compensate for the impact arising from the Project.

In this section, the requirements for the monitoring and audit of ecological impacts arising from the Project are presented.

6.2 Mitigation Measures

Mitigation measures for ecological impacts have been recommended in the EIA report. All the recommended mitigation measures are provided in the implementation schedule in **Appendix 11.1**.

6.3 Monitoring Audit Requirements

6.3.1 Terrestrial Ecology

It is concluded in the EIA that the overall impacts on terrestrial ecology would be of negligible or low level of significance. No unacceptable impact is anticipated with mitigation measures in place. The recommended mitigation measures and good site practices in the EIA report and **Appendix 11.1** shall be audited regularly as part of the EM&A programme during the construction phase.

6.3.2 Marine Ecology

Water quality monitoring and audit programme is recommended as discussed in **Section 4** of this EM&A Manual. The monitoring and audit programme on water quality can also serve to protect the marine ecology. Marine ecological monitoring and audit is not required for the Project.



7 Fisheries Impact

7.1 Introduction

No unacceptable residual fisheries impact is expected from the Project. The water quality monitoring and audit programme proposed in **Section 4** of this EM&A Manual would also serve to protect against impacts to fisheries. No fisheries-specific monitoring programme is considered necessary for the Project.

7.2 Mitigation Measures

Mitigation measures recommended for controlling water quality impact would also serve to protect against impacts to fisheries. All the recommended mitigation measures are provided in the implementation schedule in **Appendix 11.1**.



8 Visual Impact

8.1 Introduction

This section presents the requirements of the baseline review, and audit of the visual mitigation measures during the design, construction and operational phases of the Project.

8.2 Mitigation Measures

The visual impact assessment of the EIA Study recommended a series of mitigation measures to ameliorate the visual impacts of the Project as summarized in **Table 8-1**.

Table 8-1 Proposed Mitigation Measures for Operational Phase

ID	Mitigation Measures	Funding Agency	Implementation Agency	Maintenance/Management Agency
OM1	<u>Infill Planting</u> Infill planting of trees, shrubs and/or groundcovers shall be provided where space is available.	WID of EPD	I-PARK2 Contractor	I-PARK2 Contractor
OM2	<u>Tree Planting along Site Boundary</u> Tree planting shall be provided along the site boundary as far as practicable to provide visual screening effect.	WID of EPD	I-PARK2 Contractor	I-PARK2 Contractor
OM3	<u>Green Roof and Vertical Greening</u> Where practicable, green roof and vertical greening on the external walls without the coverage of architectural elements will be provided.	WID of EPD	I-PARK2 Contractor	I-PARK2 Contractor
OM4	<u>Aesthetic Design of Buildings</u> Aesthetically pleasing design as regard to the form, material and finishes shall be incorporated to buildings, engineering structures and associated infrastructure facilities so as to blend in the buildings and structures to the adjacent landscape and visual context where practicable.	WID of EPD	I-PARK2 Contractor	I-PARK2 Contractor
OM5	<u>Control for Lighting and Glaring</u> Maintain only essential lighting and implement suitable measures to reduce potential light nuisance during night-time and minimise nuisance caused by glare reflected from buildings or photovoltaic (PV) panels (e.g. adjusting tilting angle and orientation of the panels, and applying	WID of EPD	I-PARK2 Contractor	I-PARK2 Contractor



ID	Mitigation Measures	Funding Agency	Implementation Agency	Maintenance/ Management Agency
	anti-reflective coating where appropriate) as far as practicable. The Guidelines on Industry Best Practices for External Lighting Installations should be observed with a view to minimising potential impacts arising from external lighting.			

8.3 Design Phase Audit

During the detailed design stage, the I-PARK2 Contractor shall appoint a registered architect and a registered landscape architect who are suitably qualified and experienced to further develop the detailed architectural and landscape design, taking into account the proposed design / mitigation measures to reduce or moderate the visual effects and enhance the overall visual quality. Design audit of the detailed architectural and landscape design shall be carried out by the ET Leader and verified by the IEC as conforming to the recommendations in Table 8-1 above.

8.4 Baseline Review

A baseline review shall be undertaken by by the registered architect and registered landscape architect appointed by the I-PARK2 Contractor prior to the commencement of the construction works. The purposes of the review are as follows:-

- To check the status and any changes of the baseline viewing points (VPs) within and immediately adjacent to the works areas;
- To determine whether amendments in the design of the visual mitigation measures are required; and
- To recommend any necessary amendments to the design of the visual mitigation measures due to the above changes, if any.

Any changes to the mitigation measures that may be recommended as a result of the baseline review shall be taken into account in the detailed architectural and landscape design and agreed by the ET Leader, ER, IEC before seeking approval from the relevant authorities.

8.5 Construction and Operational Phase Audit

All visual measures undertaken by the I-PARK2 Contractor shall be audited by the ET Leader and the IEC on a regular basis during the implementation and the first year after completion of the proposed design / mitigation measures to ensure the effectiveness of the proposed design / mitigation measures to reduce or moderate the visual effects and enhance the overall visual quality.



9 Health Impact

9.1 Introduction

The air quality monitoring and audit programme proposed in **Section 2** of this EM&A Manual would ensure compliance with the recommendations of the EIA study and assess the effectiveness of the recommended measures to avoid, minimise and mitigate the potential health impacts due to aerial and fugitive emissions arising from construction and operation of the Project including radon emissions associated with handling of pulverised fuel ash within the construction site during construction of the Project. Regular site inspections are recommended to ensure the proper implementation of proposed mitigation measures as presented in **Appendix 11.1** during the construction and operational phases.

The section will focus on the potential health impacts due to radon emissions and contingency plan for potential accidental events during operation phase of the I-PARK2.

9.2 Monitoring of Radon Concentration

With reference to EPD's Practice Note for Professional Persons ProPECC PN 1/99 "*Control of Radon Concentration in New Buildings*", a management and monitoring plan on radon for the ventilation systems and the buildings shall be devised by the I-PARK2 Contractor before commencement of operation of I-PARK2 and fully implemented during operation of the Project. The management and monitoring plan shall be certified by the ET Leader and verified by the IEC as conforming to the requirements set out in the EIA report and ProPECC PN 1/99. Supervision of the operation and preventive maintenance of the ventilation systems and regular indoor radon measurement shall be conducted by recognized professional in related fields as appointed by the I-PARK2 Contractor to ensure that the ventilation systems are performing as designed, and that the upkeep of building work is to a high standard,

9.3 Contingency Plan for Potential Accidental Events

The I-PARK2 Contractor will be required to design, construct and operate I-PARK2 according to the state-of-the-art technology and standards, emphasizing the necessity for well-trained operators to prevent potential accidental events. A list of potential accidental events that may give rise to potential health impacts and their respective preventive measures are presented in **Table 9-1**.



Table 9-1 Potential Accidental Events and Preventive Measures

Risks	Preventive Measures
<ul style="list-style-type: none"> Aerial emissions (emission discharges exceed the discharge limit) 	<ul style="list-style-type: none"> Use the best practicable means requirements for the prevention of emission of air pollutants including proper operation and maintenance of equipment, supervision when in use and training and supervision of properly qualified staff and conduct regular monitoring and checking to ensure optimal performance.
<ul style="list-style-type: none"> Transportation, storage and handling 	<ul style="list-style-type: none"> Implement good waste/ash transportation, storage and handling practices (see Section 10.3 of the EIA report) Arrange transportation routes to avoid of densely populated or sensitive regions. Establish protocols for and deploy emergency response measures, including spill response, in the event of accidents involving transportation vehicles. Enforce rigorous driver skill standards and provide training on safe driving practices for both drivers and navigators, emphasizing road and marine safety behaviours.
<ul style="list-style-type: none"> Chemical spillage and leakage 	<ul style="list-style-type: none"> Ensure the implementation of appropriate procedures for handling and storing chemicals and chemical wastes. Establish a spill prevention and response plan, which includes the provision of necessary equipment and trained personnel to effectively respond to spills.
<ul style="list-style-type: none"> Employee health and safety 	<ul style="list-style-type: none"> Follow industry best practices based on international standards and guidelines. Observe relevant requirements promulgated by the Labour Department in respect of occupational safety and health and consult Labour Department if needed.

The I-PARK2 Contractor will be required to develop and implement a Project-specific emergency response / contingency plan to handle potential accidental events during construction and operation of the I-PARK2 Project with a view to minimise the health impacts associated with the potential accidental events. By implementing the recommended preventive measures and a well-executed emergency response / contingency plan for the I-PARK2 Project, the likelihood of health impacts resulting from accidental events can be minimized, if not entirely avoided.



10 Landfill Gas Hazard

10.1 Introduction

The landfill gas hazard (LFG) assessment undertaken in the EIA Study identified the hazards that are likely to be generated from the WENT Landfill Extensions (WENTX), during the construction and operational phases of this Project and evaluated the associated risk. The EIA Report recommended that precautionary and protection measures would be required to protect the I-PARK2 from the LFG risk associated with WENTX. Appropriate LFG control protection systems referenced from the EPD's Landfill Gas Hazard Assessment Guidance Note were recommended. Regular monitoring during ground-works construction and operational phase of the Project was also recommended.

10.2 Audit Requirements

Regular environmental site audits are recommended to ensure the proper implementation of proposed precautionary and protection measures as presented in **Appendix 11.1** during the construction phase and first 2 years of the operational phase. The need to continue the regular environmental site audits after the first 2 operational years of the I-PARK2 should be agreed with EAD of EPD. The I-PARK2 Contractor shall appoint a Safety Officer or an appropriately qualified person to carry out the LFG monitoring during construction and operation of the Project as set out below.

10.3 Monitoring and Measurement of Landfill Gas

10.3.1 Monitoring Period

During construction, a Safety Officer should be appointed to carry out the monitoring works as presented in **Section 11.8.2** of the EIA Report.

During operation, regular monitoring of landfill gas at the monitoring wells, underground service voids and manholes should be conducted by a Safety Officer or an appropriately qualified person appointed by the I-PARK2 contractor in accordance with the monitoring programmes in the detailed qualitative risk assessment to be submitted during detailed design stage.

10.3.2 Construction Phase

LFG Monitoring shall be undertaken during construction phase as described below:



- Periodically during ground-works construction within the WENTX consultation zone, the works area should be monitored for methane, carbon dioxide and oxygen using appropriately calibrated portable gas detection equipment, which is appropriately calibrated and capable of measuring the following gases in the ranges indicated below:
 - ▽ Methane: 0-100% LEL and 0-100% v/v
 - ▽ Carbon dioxide: 0-100%
 - ▽ Oxygen: 0-21%
- Routine monitoring should be carried out in all excavations, manholes and chambers and any other confined spaces that may have been created by, for example, the temporary storage of building materials on the site surface.
- The monitoring frequency and areas to be monitored should be determined prior to commencement of groundworks either by the Safety Officer or by an appropriately qualified person.
- All measurements in excavations should be made with the monitoring tube located not more than 10mm from the exposed ground surface.
- For excavations deeper than 1m, measurements should be made:
 - at the ground surface before excavation commences;
 - immediately before any worker enters the excavation;
 - at the beginning of each working day for the entire period the excavation remains open; and
 - periodically through the working day whilst workers are in the excavation.
- For excavations between 300mm and 1m deep, measurements should be made:
 - directly after the excavation has been completed; and
 - periodically whilst the excavation remains open.
- For excavations less than 300mm deep, monitoring may be omitted, at the discretion of the Safety Officer or other appropriately qualified person.
- Depending on the results of the measurements, actions required will vary and should be set down by the Safety Officer or other appropriately qualified person. As a minimum these shall encompass those actions specified in **Table 10-1**.

Table 10-1 Actions in the Event of Gas Being Detected

Parameter	Measurement	Action
Oxygen (O ₂)	<19%	• ventilate trench/void to restore O ₂ to >19%
	<18%	• stop works • evacuate personnel/prohibit entry • increase ventilation to restore O ₂ to >19%
Methane (CH ₄)	>10% LEL	• prohibit hot works



	(i.e. >0.5% by volume)	• ventilate to restore CH ₄ to <10% LEL
	>20% LEL (i.e. >1% by volume)	• stop works • evacuate personnel/prohibit entry • increase ventilation to restore CH ₄ to <10% LEL
Carbon Dioxide (CO ₂)	>0.5%	• ventilate to restore CO ₂ to <0.5%
	>1.5%	• stop works • evacuate personnel/prohibit entry • increase ventilation to restore CO ₂ to <0.5%

- The hazards from landfill gas during the construction phase within the WENTX consultation zone shall be minimized by precautionary measures recommended in the Landfill Gas Hazard Assessment Guidance Note.
- In any emergency situation, the Safety Officer or other appropriately qualified person, shall have the necessary authority and shall ensure that the confined space is evacuated, and the necessary works implemented for reducing the concentrations of gas. The following organizations should also be contacted as appropriate:
 - Hong Kong Police Force (HKPF);
 - Fire Services Department (FSD);
 - Environmental Protection Department (EPD); and
 - Landfill Operator

10.3.3 Operational Phase

Landfill gas (LFG) cut-off trench barrier would be built along the boundary between WENTX, I-PARK2 and T-PARK. This will cut off any gas migration to the I-PARK2 from the WENTX and the barrier should be installed under the WENTX project. It is recommended that several LFG monitoring wells should be installed into the ground on the development side of the gas barrier by the I-PARK2 Contractor.

Regular monitoring of LFG (including methane and carbon dioxide) should be carried out at the monitoring wells (as mentioned above) as well as at the underground service voids and manholes by the I-PARK2 Contractor. Monitoring would be required to verify the effectiveness and to ensure the continued performance of the implemented protection measures. The maintenance and monitoring programmes shall be included in the detailed qualitative risk assessment to be prepared by the I-PARK2 Contractor during detailed design stage, which shall be certified by the ET Leader and verified by the IEC before submission to the Landfills and Development Group of EPD for vetting. The submission shall include maintenance and



monitoring programmes to ensure the continued performance of the proposed control measures.



11 Site Environmental Audit & Environmental Complaints

11.1 Site Inspection

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

The ET Leader should be responsible for formulating the environmental site inspection, the deficiency and action reporting system, and for carrying out the site inspection works. He / she should submit a proposal for site inspection and deficiency and action reporting procedures to the I-PARK2 Contractor for agreement, and to the IEC and ER for approval. The ET's proposal for rectification would be made known to the IEC.

Regular site inspections 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, the site inspections should also review the environmental situation outside the works area which is likely to be affected, directly or indirectly, by the site activities. The ET Leader should make reference to the following information in conducting the inspection:-

- (i) The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures (including e.g. dust control measures and good site practice measures for ecological impact);
- (ii) Ongoing results of the EM&A programme;
- (iii) Work progress and programme;
- (iv) Individual work methodology proposals (which shall include proposal on associated pollution control measures);
- (v) Contract specifications on environmental protection;
- (vi) Relevant environmental protection and pollution control laws; and
- (vii) Previous site inspection results undertaken by the ET and others.

The I-PARK2 Contractor should keep the ET Leader updated with all relevant information on the construction contract necessary for him / her 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 I-PARK2 Contractor within



24 hours for reference and for taking immediate action. The I-PARK2 Contractor should follow the procedures and time-frame as stipulated in 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 environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

11.2 Compliance with Legal and Contractual Requirements

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 to ensure that the works are undertaken in compliance with the contractual requirements on environmental aspects, all works method statements submitted by the I-PARK2 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 implementation schedule of mitigation measures is summarised in **Appendix 11.1**.

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

The I-PARK2 Contractor should regularly copy relevant documents to the ET Leader so that works checking could be carried out. The document should at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences/ permits. The site diary should also be available for the ET Leader's inspection upon his / her request.

After reviewing the documentation, the ET Leader should advise the IEC and the I-PARK2 Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he / she should also advise the I-PARK2 Contractor and the ER accordingly.



Upon receipt of the advice, the I-PARK2 Contractor should undertake immediate action to correct the situation. The ER should follow up to ensure that appropriate action has been taken to satisfy contractual and legal requirements.

11.3 Environmental Complaints

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

- (i) log complaint and date of receipt onto the complaint database and inform the IEC immediately;
- (ii) investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;
- (iii) identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;
- (iv) advise the I-PARK2 Contractor if mitigation measures are required;
- (v) review the I-PARK2 Contractor's response on the identified mitigation measure(s) and the updated situation;
- (vi) if the complaint is transferred from the EPD, submit interim report to the EAD of EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EAD of EPD;
- (vii) undertake additional monitoring and audit to verify the situation if necessary, and
- (viii) report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results should be reported within the timeframe assigned by the EAD of EPD); and
- (ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.



12 Reporting

12.1 General

The EM&A reporting shall be carried out in paper based plus electronic submission upon agreeing the format with the ER and EAD of EPD. All the monitoring data (baseline and impact) shall also be submitted in CD-ROM.

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

12.2 Baseline Monitoring Report(s)

The ET Leader should prepare and submit Baseline Environmental Monitoring Report(s) at least 2 weeks before commencement of construction of corresponding parts of the Project. The Baseline Monitoring Report(s) shall be certified by the ET Leded and verified by the IEC as having complied with the requirements as set out in the EM&A Manual before submission to the EAD of 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 EAD of EPD prior to submission.

The baseline monitoring report(s) should include at least the followings:

- (i) up to half a page executive summary;
- (ii) brief project background information;
- (iii) drawings showing locations of the baseline monitoring stations;
- (iv) monitoring results (in both hard and soft copies) together with the following information:
 - monitoring methodology;
 - types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations;
 - monitoring date, time, frequency and duration; and
 - quality assurance (QA) / quality control (QC) results and detection limits;
- (v) details of influencing factors, including:
 - major activities, if any, being carried out on the site during the period;
 - weather conditions during the period; and



- other factors which might affect results;
- (vi) determination of the action and limit levels for each monitoring parameter and statistical analysis of the baseline data, the analysis should conclude if there is any significant difference between control and impact stations for the parameters monitored;
- (vii) revisions for inclusion in the EM&A Manual; and
- (viii) comments, recommendations and conclusions.

12.3 EM&A Reports for Construction Phase

12.3.1 Introduction

The results and findings of all EM&A work required in the EM&A Manual 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 of the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report shall be certified by the ET Leader and verified by the IEC as having complied with the requirements as set out in the EM&A Manual before submission to the EAD of 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.

12.3.2 First Monthly EM&A Report

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

- (i) executive summary (1-2 pages):
 - breaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
- (ii) basic project information:
 - project organisation including key personnel contact names and telephone numbers;
 - construction programme;
 - management structure; and
 - works undertaken during the month.



- (iii) environmental status:
- works undertaken during the month with illustrations (such as location of works); and
 - 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).
- (iv) a brief summary of EM&A requirements including:
- all monitoring parameters;
 - environmental quality performance limits (Action and Limit levels);
 - Event-Action Plans;
 - environmental mitigation measures, as recommended in the project EIA Final Report; and
 - environmental requirements in contract documents.
- (v) implementation status:
- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Final Report.
- (vi) monitoring results (in both hard and soft copies) together with the following information:
- monitoring methodology;
 - name of types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations;
 - monitoring date, time, frequency, and duration;
 - weather conditions during the period;
 - any other factors which might affect the monitoring results; and
 - QA/QC results and detection limits.
- (vii) report on non-compliance, complaints, and notifications of summons and successful prosecutions:
- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;



- review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

(viii) others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status; and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

12.3.3 Subsequent Monthly EM&A Report for Construction Phase

The subsequent monthly EM&A report should include at least the following:

(ix) executive summary (1-2 pages):

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

(x) environmental status:

- Construction programme;
- works undertaken during the month with illustrations (such as location of works); and
- 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).

(xi) implementation status:

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

(xii) monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- name of types of equipment used and calibration details;
- parameters monitored;



- monitoring locations;
 - monitoring date, time, frequency, and duration;
 - weather conditions during the period;
 - any other factors which might affect the monitoring results; and
 - QA/QC results and detection limits.
- (xiii) report on non-compliance, complaints, and notifications of summons and successful prosecutions:
- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (xiv) others
- an account of the future key issues as reviewed from the works programme and work method statements;
 - advice on the solid and liquid waste management status; and
 - comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.
- (xv) appendix
- Action and Limit levels;
 - graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors that might affect the monitoring results.
 - monitoring schedule for the present and next reporting period;
 - cumulative statistics on complaints, notifications of summons and successful



prosecutions;

- outstanding issues and deficiencies

12.3.4 Quarterly EM&A Reports for Construction Phase

Quarterly EM&A reports of around five pages should be produced and should contain at least the following information.

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



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

12.3.5 Final EM&A Review Report for Construction Phase

The EM&A programme for construction phase shall be terminated upon completion of those construction activities that have potential to result in significant environmental impact and after completion of the post-construction monitoring (if required).

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

The final EM&A review report for construction phase should include, inter alia, the following information:

- (i) an executive summary;
- (ii) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (iii) basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period;
- (iv) a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (action and limit levels); and
 - environmental mitigation measures, as recommended in the project EIA Final Report;
 - Event-Action Plans.
- (v) a summary of the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA Report, summarised in the updated implementation schedule;
- (vi) graphical plots of the trends of monitored parameters over the construction period for representative monitoring stations, including the post-project monitoring annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
- (vii) a summary of non-compliance (exceedances) of the environmental quality performance limits (action and limit levels);
- (viii) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- (ix) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;



- (x) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xi) a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
- (xii) a review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;
- (xiii) comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and
- (xiv) recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigation action when necessary).

12.4 EM&A Reports for Operational Phase

Unless otherwise agreed by EAD of EPD, quarterly EM&A reports shall be submitted to record the results and findings of the operational phase EM&A programme, including but not limited to odour patrol for the first two years of Project operation, and the water quality monitoring during the first year of Project operation.

A final EM&A report for operational phase should be submitted to EAD of EPD upon completion of the relevant operational phase EM&A programme. The quarterly and final EM&A reports for operational phase shall be certified by the ET Leader and verified by the IEC as having complied with the requirements as set out in the EM&A Manual before submission to the EAD of EPD.

The EM&A programme for operational phase shall be terminated after the final EM&A report for operational phase has been endorsed by the IEC, the ER and the Project Proponent followed by final approval from the Director of Environmental Protection. The final EM&A report shall include, inter alia, the following information:

- (i) an executive summary;
- (ii) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (iii) basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period;
- (iv) a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (action and limit levels); and
 - environmental mitigation measures, as recommended in the project EIA Final



Report;

- Event-Action Plans.
- (v) a summary of the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA Report, summarised in the updated implementation schedule;
- (vi) graphical plots of the trends of monitored parameters over the construction period for representative monitoring stations, including the post-project monitoring annotated against:
- the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
- (vii) a summary of non-compliance (exceedances) of the environmental quality performance limits (action and limit levels);
- (viii) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- (ix) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- (x) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xi) a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
- (xii) a review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;
- (xiii) comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and
- (xiv) recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigation action when necessary).

12.5 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 monthly EM&A reports. However, any such document should be well kept by the ET Leader 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 magnetic media form, and the software copy must



be available upon request. Data format should be agreed with EAD of EPD. All documents and data should be kept for at least one year following completion of the DBO contract.





12.6 Interim Notifications of Environmental Quality Limit Exceedances

With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader should immediately notify the IEC and EAD of EPD, as appropriate. The notification should be followed up with advice to IEC and EAD of EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in **Appendix 12.1**.



Figures

LEGEND

-  I-PARK2
-  PROPOSED SEAWALL MODIFICATION / BERTHING FACILITY
-  PROJECT BOUNDARY
-  LOCATION OF PROPOSED OUTFALL

DEEP BAY

NIM WAN

BLACK POINT

KEY PLAN
A3: 1:50,000

Outfall Option 2
Outfall Option 3

Outfall Option 1

源.區 T PARK

源.區 Ash Lagoon

源.區 Ash Lagoon

源.區 Tsang Tsui

龍鼓灘發電廠
Black Point Power Station

Revision	Description			
	Designed	Reviewed	Drawn	Checked
Initial	PSY	Amy	PSY	Amy
Date	07/24	07/24	07/24	07/24

Approved

Agreement No. CE 26/2022 (EP)

Project Title
Development of Integrated Waste Management Facilities Phase 2- Investigation, Design and Construction

Figure Title
Project Location Plan

Drawing No. Figure 1.1	Revision -
------------------------	------------

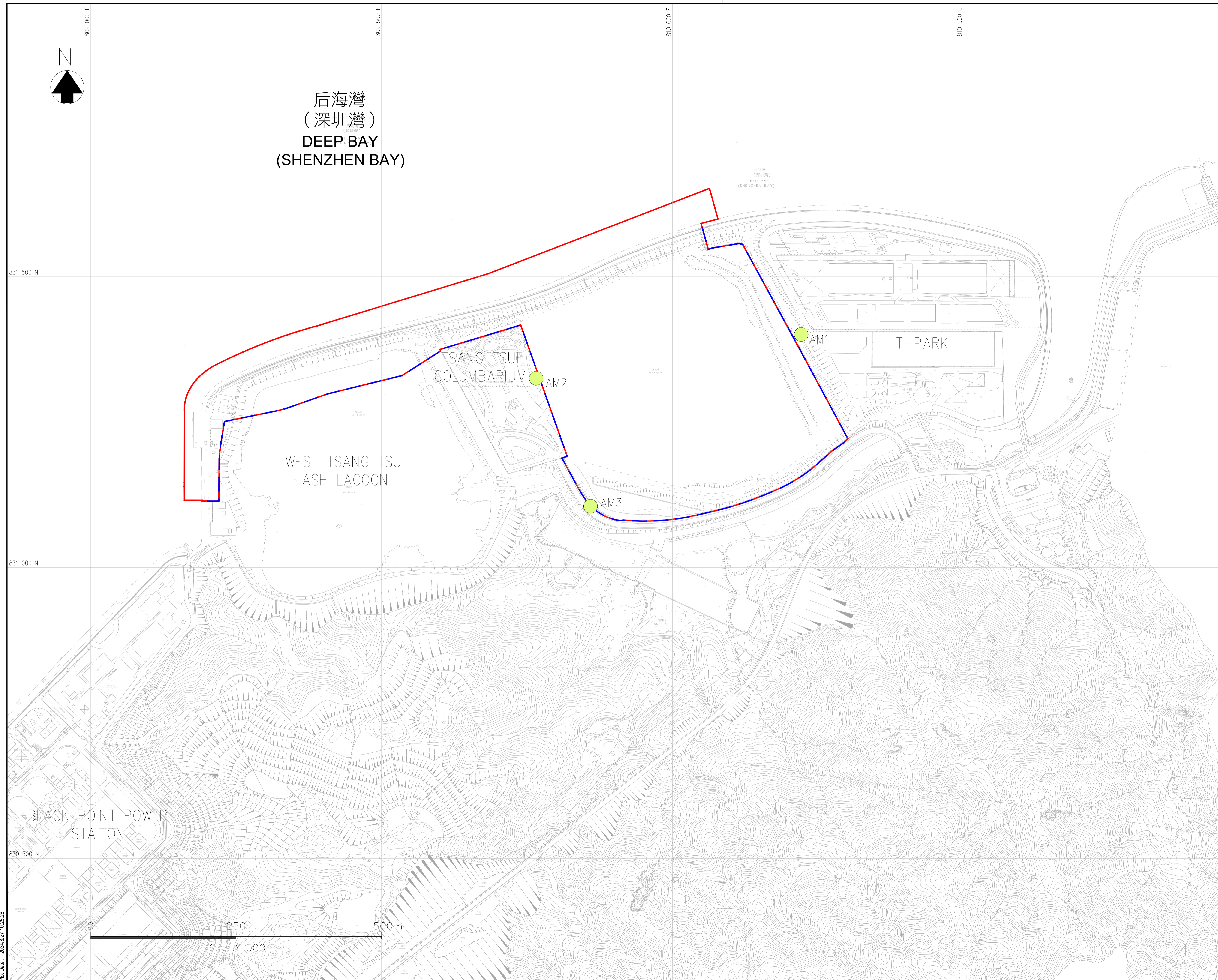
Scale
A3: 1:8,000

Client
 **Environmental Protection Department**
The Government of the Hong Kong Special Administrative Region

Consultant
 **binnies**
BINNIES HONG KONG LIMITED
賓尼斯工程顧問有限公司

LEGEND:

- PROJECT BOUNDARY
- DUST MONITORING STATION
- ODOUR PATROL ROUTE



Revision	Date	Description		Initial	
		Designed	Checked		Drawn

Approved

Agreement no.
CE 26/2022 (EP)

Agreement title
DEVELOPMENT OF INTEGRATED WASTE MANAGEMENT FACILITIES PHASE 2 – INVESTIGATION, DESIGN AND CONSTRUCTION








Drawing title
CONSTRUCTION DUST MONITORING STATION

Drawing No. FIGURE 2.1	Revision -
---------------------------	---------------

Scale
A1 1 : 3000
A3 1 : 6000



LEGEND:

-  1 • PARK2
-  PROPOSED SEAWALL MODIFICATION / BERTHING FACILITY
-  PROPOSED SEAWALL OUTFALL OPTIONS
-  PROJECT BOUNDARY
-  BOUNDARY OF WATER CONTROL ZONE
-  IMPACT STATIONS
 - F2 – MARICULTURE SUBZONE
 - E1 – MUDFLAT/SEAGRASS/HORSESHOE CRAB
 - O1 – OYSTER CULTURE ACTIVITIES OUTSIDE MARICULTURE SUBZONE
 - O2 – OYSTER CULTURE ACTIVITIES OUTSIDE MARICULTURE SUBZONE
 - O3 – OYSTER CULTURE ACTIVITIES OUTSIDE MARICULTURE SUBZONE
 - B1 – BLACK POINT
 - B2 – BLACK POINT
-  CONTROL STATIONS
 - C1 – INNER DEEP BAY
 - C2 – OUTER DEEP BAY

Revision	Date		Description		Initial	
	Designed	Checked	Drawn	Checked	Initial	Checked
Initial	PSY	AMY	PSY	AMY		
Date	10/23	10/23	10/23	10/23		

Approved

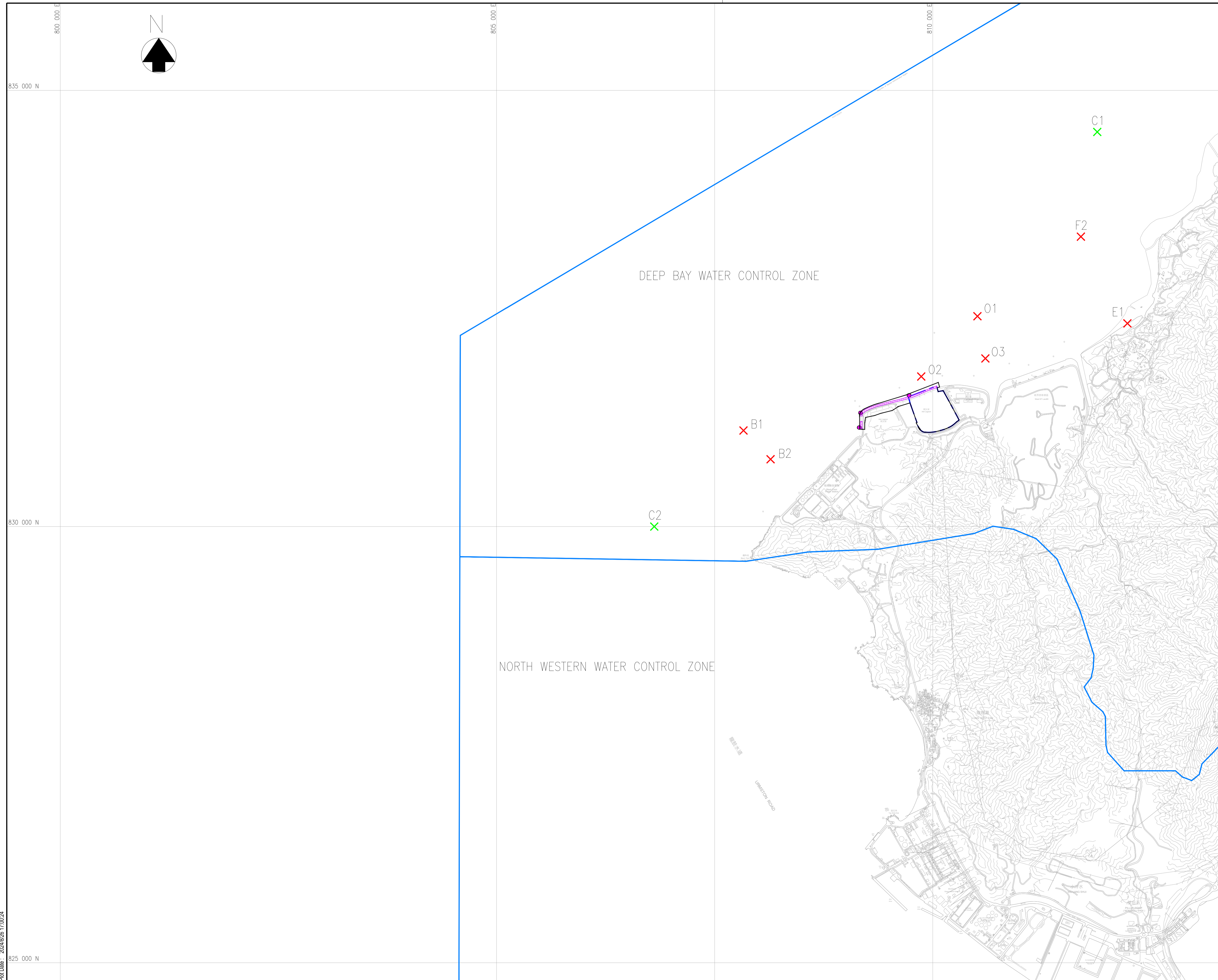
Agreement no.
CE 26/2022 (EP)

Agreement title
DEVELOPMENT OF INTEGRATED WASTE MANAGEMENT FACILITIES PHASE 2 – INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing title
LOCATIONS OF WATER QUALITY MONITORING STATIONS

Drawing No.	Revision
4110377/BIN/FIGURE 4.1	–

Scale
A1 1 : 20000
A3 1 : 40000





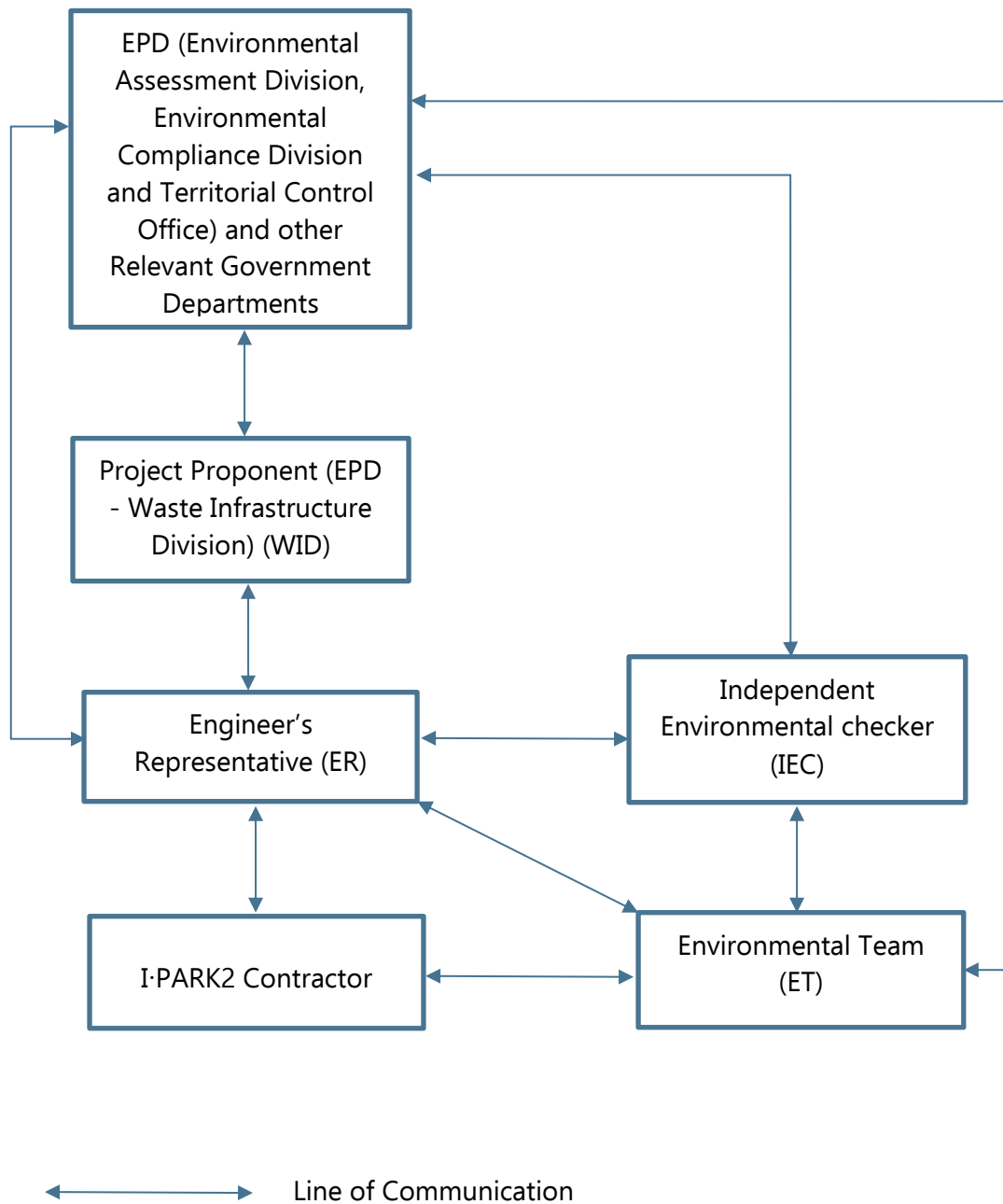
Appendix 1.1

Project Organization for EM&A Works





Project Organization for EM&A Works





Appendix 4.1

Sample Data Record Sheet for Water Quality Monitoring



Water Quality Monitoring Data Record Sheet

Location		Surface	Middle	Bottom
Monitoring Station				
Date				
Weather				
Sea Condition				
Tide Mode				
Start Time	(hh:mm)			
Water Depth	(m)			
Current Velocity	(m/s)			
Current Direction				
pH				
Temperature	(°C)			
Salinity	(ppt)			
Turbidity	(NTU)			
Sample Identification				
SS	(mg/L)			
DO	(mg/L)			
DO Saturation	(%)			
Observed Construction Activities	<100m from location			
	>100m from location			
Other Observations				

Name & Designation

Signature

Date

Recorded by:

Checked by:

Note: The SS results are to be entered once they are available from the laboratory.



Appendix 11.1

Implementation Schedule



Appendix 11.1 Implementation Schedule of the Proposed Mitigation Measures

EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
Air Quality							
3.10.1	<p>Air quality control measures stipulated in the Air Pollution Control (Construction Dust) Regulation will be implemented during the construction of the Project to control potential fugitive dust emissions. Standard construction practices for dust minimisation, including a number of practical measures such as regular water spraying, provision of vehicle wheel-washing and body washing facilities and shielding or covering with impervious sheet of stockpiled materials or exposed area when it is not use, will be implemented to reduce air quality nuisance.</p> <p>Site practices such as regular maintenance and checking of the diesel-driven PMEs will be adopted to avoid any black smoke emissions and to reduce gaseous and particulate emissions. Good site practices listed below should be carried out to further minimize construction air quality impact:</p> <ul style="list-style-type: none"> Regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry season. The working area of excavation or earth moving operation shall be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet. Skip hoist for material transport shall be enclosed by impervious sheeting. Stockpile of dusty materials shall be either covered entirely by impervious sheeting; placed in an area sheltered on the top and the 3 sides; or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet. Except for cement and pulverized fuel ash and for cases where the moisture content of the dusty materials is a matter of concern, dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet. Vehicle washing facilities including a high pressure water jet shall be provided at 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> Air Pollution Control (Construction Dust) Regulation Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>vehicle exit.</p> <ul style="list-style-type: none"> Construction vehicle shall be washed to remove any dusty materials from its body and wheels immediately before leaving a construction site. Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle. Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit. Imposing speed control for vehicles on site haul roads. Conduct construction phase environmental monitoring and auditing to monitor the construction air quality impact and effectiveness of the air quality control measures. <p>Moreover, all constructional plant powered by diesel fuel and operating on public works construction sites must use ULSD. Timely provision of electricity to construction sites should be arranged as soon as practicable to minimize air quality impact arising from construction machinery. Non-road mobile machineries (NRMMS) shall be switched off when not in use to control the air quality impact from NRMMS. The use of hybrid, electric or clean-fuel NRMMS should also be adopted to further minimise the emissions from NRMMS if practicable. Exempted NRMMS should also be avoided to be used at the construction site as far as practicable.</p>						
3.10.2	<p>Air pollution control and stack monitoring system will be installed for the I-PARK2 to ensure that the emissions from the stacks will meet the proposed target emission limits. The stack monitoring will follow the monitoring requirements in the prevailing guidance note on the best practicable means (BPM) for incinerators (municipal waste incineration) in Hong Kong. The IBA treatment plant will be fully enclosed with negative pressure and extracted air will be treated by a bag filter with 99% dust removal efficiency. Misting system will be provided inside the IBA treatment plant as fugitive emission control. Odorous facilities of this Project including the wastewater treatment facility, waste</p>	I-PARK2 stack emission / Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> Technical Memorandum on EIA Process (EIAO-TM)



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	reception hall, waste storage areas and waste feed system will also be fully enclosed with negative pressure and the odorous air will be extracted from these facilities to the combustion chamber of the incinerator for combustion and treated by flue gas treatment system before discharge. For the waste reception hall, odour control system with odour removal efficiency of more than 95% shall be provided for treatment of odorous air before discharging into open atmosphere during a shut-down or under the circumstances that the odorous air cannot be withdrawn into the combustion chamber of the incinerator for combustion. Besides, odour patrol will be carried out during operation of the Project to ensure that there would be no adverse odour impact arising from the Project. According to the assessment results, all the representative ASRs would comply with the AQOs and criteria for evaluating air quality impact in Annex 4 of EIAO-TM and thus no further mitigation measure would be required.						
Noise							
4.6.1, Table 4-6	<p>The quieter construction methods/ equipment as listed in Table 4-6 of the EIA report adopted as far as practicable. Other quieter construction methods and construction equipment listed in EPD website (https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/index.html) should be explored and adopted, as far as appropriate and necessary, to minimize the construction noise impact to the surroundings.</p> <p>EPD's "Recommended Pollution Control Clauses for Construction Contracts" should also be adopted to ensure proper control and minimization of construction noise impact. With reference to PN1/24, particular specifications should be imposed in the construction contracts to ensure implementation of the recommended quieter construction method and equipment above by the future contractor(s).</p> <p>The following good site practices should be adopted during construction of the Project to minimise noise impact to the surroundings:</p> <ul style="list-style-type: none"> • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction phase; 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • Noise Control Ordinance (NCO)



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<ul style="list-style-type: none"> Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction phase; Mobile plant should be sited as far away from sensitive uses as possible; Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from sensitive uses; Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities. And Noisy construction activities such as road surface breaking, should be scheduled to less sensitive hours during the day, e.g. midday, as far as practicable. 						
4.6.2	Noisy plant should be enclosed within reinforced concrete building as far as practicable. Noise control techniques such as selection of quiet equipment, use of enclosure or silencer set out in the "Good Practices on the Control of Noise from Electrical & Mechanical Systems" promulgated by EPD should be adopted as far as practicable with a view to minimising noise from fixed noise sources such as fan units during operation phase. Quieter equipment should be adopted as far as practicable.	Project Site / Design and Operational Phases	I-PARK2 Contractor	√		√	• EIAO-TM
Water Quality							
5.8.1.1	<p><u>Construction Site Runoff and Dust Suppression Sprays</u></p> <p>The site practices outlined in ProPECC PN 2/23 "Construction Site Drainage" should be followed where applicable to minimize surface runoff and the chance of erosion. Surface runoff including the spent effluent from dust suppression from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins. Channels or earth bunds or sandbag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided on site boundaries where necessary to intercept storm runoff from outside the site so that it will not wash</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM ProPECC PN 2/23 Water Pollution Control Ordinance (WPCO)



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>across the site. Catchpits and perimeter channels should be constructed in advance of construction and earthworks.</p> <p>Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding. Before disposal at the Public Fill Reception Facilities (PFRFs), the deposited silt and grit should be solicited in such a way that it can be contained and delivered by dump truck instead of tanker truck. Any practical options for the diversion and re-alignment of drainage should comply with both engineering and environmental requirements in order to provide adequate hydraulic capacity of all drains. Minimum distance of 100m should be maintained between the discharge points of construction site runoff and the nearby seawater intakes.</p> <p>Construction works should be programmed to minimize soil/PFA excavation works in rainy seasons (April to September). If excavation in soil/PFA cannot be avoided in these months or at any time of year when rainstorms are likely, for the purpose of preventing soil/PFA erosion, temporary exposed slope surfaces should be covered e.g. by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest / edge of excavation) to prevent storm runoff from washing across exposed soil/PFA surfaces. Arrangements should always be in place in such a way that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm.</p> <p>Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary.</p> <p>Measures should be taken to minimize the ingress of rainwater into trenches. If excavation of trenches in wet seasons is necessary, they should be dug and backfilled in short sections. Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.</p> <p>Construction materials (e.g. aggregates, sand and fill material) on sites should be</p>						



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>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 or nearby water environment. The excavated PFA should be backfilled as soon as possible, and stockpiles of the excavated PFA shall be covered with tarpaulin or similar fabric during rainstorms.</p> <p>Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system.</p>						
5.8.1.2	<p><u>Wastewater from General Land-based Construction Activities</u></p> <p>The mitigation measures as outlined in ProPECC PN 2/23 "Construction Site Drainage" for control of various types of discharges and wastewater generated in the construction site should be observed and adopted where applicable.</p> <p><i>Boring and Drilling Water</i></p> <p>Water used in ground boring and drilling for site investigation or rock / soil anchoring should as far as practicable be re-circulated and reused after sedimentation. When there is a need for final disposal, the wastewater should be discharged into storm drains via silt removal facilities. The treated discharges shall meet the respective effluent standards applicable to the receiving waters as set out in the Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS).</p> <p><i>Wheel Washing Water</i></p> <p>All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit. Wash-water should have sand and silt settled out or removed for re-circulation or reuse as far as practicable. Any surplus treated wash-water should be discharged into storm drains. The treated discharges shall meet the respective effluent standards applicable to the receiving waters as set out in the TM-DSS. The section of construction road between the wheel washing bay and the public road should</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • ProPECC PN 2/23 • WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	be paved with backfill to reduce vehicle tracking of soil and to prevent site runoff from entering public road drains.						
5.8.1.3	<p><u>General Refuse</u></p> <p>It is recommended to clean the construction sites on a regular basis. Good site practices should be adopted to remove rubbish, debris and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. All general refuse generated on-site should be stored in enclosed bins or compaction units separately from Construction and Demolition (C&D) material. A reputable waste collector should be employed to remove general refuse from the site, separately from C&D material, on a regular basis to an approved landfill. An enclosed and covered area should be provided to reduce the occurrence of “windblown” light material.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM Waste Disposal Ordinance (Cap. 354) DEVB TC(W) No. 6/2010
5.8.1.4	<p><u>Licensing of Construction Site Discharge</u></p> <p>There is a need to apply to EPD for a discharge license for discharge of effluent from the construction site under the WPCO. All the runoff and wastewater generated from the works areas should be treated and the effluent discharge quality should meet the requirements specified in the discharge license and follow the TM-DSS. The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., can minimize water consumption and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO license.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM ProPECC PN 2/23 WPCO
5.8.1.5	<p><u>Accidental Chemical Spillage</u></p> <p>Contractor must register as a chemical waste producer if chemical wastes would be produced from the 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.</p> <p>Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM ProPECC PN 2/23 WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.</p> <p>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:</p> <ul style="list-style-type: none"> • 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. 						
5.8.1.6	<p><u>Sewage Effluent from Construction Workforce</u></p> <p>It is recommended to provide sufficient chemical toilets in the works areas. A licensed waste collector should be deployed to maintain the chemical toilets on a regular basis. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the surrounding environment. Regular environmental audit of the construction site should be undertaken to provide an effective control of any malpractices and to encourage continual improvement of environmental performance on site.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • ProPECC PN 2/23 • WPCO
5.8.1.7	<p><u>Seawall Modification and Construction of Permanent Berthing Facility</u></p> <p>The following design and mitigation measures should be adopted for the seawall modification and construction of the berthing facility.</p> <ul style="list-style-type: none"> • Adopt non-dredged method (i.e. DCM treatment) for construction of the foundation for the proposed seawall modification / berthing facility. • Place sand blanket of at least 1 m thick on top of the sediments prior to DCM 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>treatment to avoid seabed sediment disturbance and release of fines.</p> <ul style="list-style-type: none"> Carefully control the cement slurry injection pressure to prevent leaching out of cement slurry during the DCM operation. Control the production rate of the marine sand blanket laying to no more than 3,000 m³ per day. Silt curtain shall be deployed during the marine sand blanket laying and DCM operation. No open dumping method should be used for the sand blanket laying in marine water. Adopt a “controlled bottom placement” method for the sand blanket laying work by releasing the sand material at a point near the seabed (by closed grab dredger or other appropriate method) and at a controlled sand filling rate to prevent localized overloading of the seabed and potential instability, and to minimize loss of fines when placing the sand blanket in marine water. 						
5.8.1.8	<p><u>Good Site Practices for Construction Vessels</u></p> <p>The following good site practices should be implemented to minimize water pollution from construction vessels and marine transportation of construction materials.</p> <ul style="list-style-type: none"> Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation. Excess materials shall be cleaned from the decks and exposed fittings of barges before the vessels are moved. Plants should not be operated with leaking pipes and any pipe leakages shall be repaired quickly. Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action. All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>by turbulence from vessel movement or propeller wash.</p> <ul style="list-style-type: none"> The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site. 						
5.8.2.1	<p><u>Discharges from Desalination Plant and Seawater Cooling System and Changes of Hydrodynamics and Water Quality</u></p> <p>All the discharges from desalination plant and seawater cooling system shall be controlled by the discharge license issued under the WPCO. The discharge quality must meet the requirements specified in the discharge license.</p>	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> EIAO-TM WPCO
5.8.2.2	<p>The practices outlined in ProPECC PN 1/23 “Drainage Plan subject to Comments by Environmental Protection Department” should be adopted where applicable for handling, treatment and disposal of operational stage effluent. Specific site effluent control measures for I-PARK2 are highlighted as follows for consideration in the detailed design stage.</p> <p>Wastewater Management Measures – Option 1</p> <ul style="list-style-type: none"> Type 1 wastewater such as leachate with high organic loading should be discharged to the on-site high strength wastewater treatment facility for treatment and the treated effluent shall be for reused on-site as process water and conveyed / handled within automatic close-loop systems to avoid direct human contact Type 2 wastewater such as domestic sewage should be discharged to the on-site low-strength wastewater treatment facility for treatment and the treated effluent shall meet the water quality standards specified in the “Technical Specifications on Grey Water Reuse and Rainwater Harvesting” issued by the WSD for beneficial reuse with possible human contact, such as irrigation, toilet flushing and washing (e.g. road washing). Type 3 wastewater with low / negligible pollution loading (e.g. boiler blowdown water) should be directly reused on-site as process water with no human contact. <p>Wastewater Management Measures – Option 2</p> <p>Wastewater generated from I-PARK2 shall be discharged to the on-site wastewater</p>	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> EIAO-TM ProPECC PN 1/23 WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>treatment system for proper treatment prior to discharging to the Urmston Road Submarine Outfall. A discharge licence for discharge of effluent from I-PARK2 shall be applied under the Water Pollution Control Ordinance. The quality of effluent discharged from I.PARK2 shall meet the requirements specified in the discharge licence. With reference to the requirements stipulated in Annex 6 of EIAO-TM for effluent discharge into the NW WCZ, secondary treatment plus nitrogen removal and disinfection shall be adopted for the on-site wastewater treatment system under the Option 2.</p> <p>Site Effluent Control Measures for Option 1 and Option 2</p> <ul style="list-style-type: none"> • MSW / ash handling and treatment areas should be located within buildings or covered areas to prevent the generation of contaminated rainwater runoff. • All wastewater (e.g. washing down from the waste reception facilities) collected by drainage outlets provided in covered areas should be discharged to the on-site wastewater treatment facility for treatment. • Backup power supply in the form of dual power supply or ring main supply or emergency generator(s) should be provided for all on-site wastewater treatment facilities and rainwater reuse treatment system to secure electricity supply. • Regular maintenance and checking of all on-site wastewater treatment facilities and rainwater reuse treatment system as well as conveying facilities should be carried out to prevent equipment and pipe failure. • The harvested roofing rainwater shall be collected and treated by the rainwater reuse treatment facilities provided on-site and the treated effluent shall meet the water quality standards specified in the "Technical Specifications on Grey Water Reuse and Rainwater Harvesting" issued by the WSD for beneficial reuse with possible human contact (e.g. irrigation, toilet flushing and washing). • Standby main treatment units and standby equipment parts / accessories should be provided for all on-site wastewater treatment facilities and rainwater reuse treatment system to prevent the occurrence of plant failure. • Any effluent discharges from the I-PARK2 should be pre-treated to comply with the 						



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>WPCO requirements, and sited away from the natural water streams.</p> <p>An Emergency Response Plan (ERP) should be developed by the future operators of the on-site wastewater treatment systems to deal with emergency situations caused by malfunctioning of the on-site wastewater treatment systems. The ERP should cover the following information:</p> <ul style="list-style-type: none"> • Programme of daily or regular integrity checking of the on-site wastewater treatment and conveying systems to inspect malfunctions. • Details of best management practices and maintenance programme of the on-site wastewater treatment and conveying systems. • Details of design and operation of backup power supply as well as the duty and standby treatment facilities of suitable capacities for emergency replacement. • Emergency response and rectification procedures to initiate emergency repairs, restore normal operation of the on-site wastewater treatment systems and other preventive measures such as the provision of temporary wastewater holding facility and / or alternative treatment facility where appropriate to avoid emergency discharge. • List of contact information including the names and contact information of key personnel and their responsibilities in the ERP. <p>The ERP should be submitted to the EPD for approval before commencement of the operation.</p>						
5.8.2.3	<p>Best Management Practices (BMPs) to reduce storm water and non-point source pollution are also proposed as follows:</p> <p><u>Design Measures</u></p> <ul style="list-style-type: none"> • Exposed surface shall be avoided within the proposed Project site to minimize soil erosion. Development site shall be either hard paved or covered by landscaping area where appropriate to reduce soil erosion. • The drainage system of the Project should be designed to avoid any case of flooding. 	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> • EIAO-TM • ProPECC PN 1/23 • WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p><u>Surface Runoff Control Measures</u></p> <ul style="list-style-type: none"> Screening facilities such as standard gully grating and trash grille, with spacing which is capable of screening off large substances such as fallen leaves and rubbish should be provided at the inlet of drainage system. A low flow interceptor drainage system shall be deployed at uncovered paved areas within the Project site for handling / delivery of MSW containers and MSW delivery trucks to intercept and convey the first flush of any potentially contaminated surface runoff to the on-site wastewater treatment facility for treatment. Roofing rainwater would be harvested and treated for beneficial reuse with possible human contact. Surface runoff from uncovered paved and development areas within the Project site (except the first flush and roofing rainwater) should be discharged to stormwater drains after removal of the particles by appropriate facilities (e.g. road gullies with standard design and silt traps,). <p><u>Administrative Measures</u></p> <ul style="list-style-type: none"> Good management measures such as regular cleaning and sweeping of road surface / open areas is proposed. The road surface / open area cleaning should also be carried out prior to occurrence of rainstorm. Manholes, as well as storm water gullies, ditches provided among the development areas should be regularly inspected and cleaned (e.g. monthly). Additional inspection and cleansing should be carried out before forecast heavy rainfall. 						
Waste Management Implications							
6.6.1.1	<p><u>General</u></p> <p>The management of C&D materials follows the same hierarchy as for other wastes i.e. in descending order of desirability: avoidance, minimization, reuse/recycling, treatment and safe disposal of waste.</p> <p>Training of construction staff should be undertaken by the Contractor about the concept</p>	Construction Sites, Transportation Route of Waste / Construction	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM Waste Disposal Ordinance (WDO) ETWB TC(W) No. 19/2005.



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>of site cleanliness and appropriate waste management procedures. The Contractor should develop and provide toolbox talk for on-site sorting of C&D materials to enhance workers' awareness in handling, sorting, reuse and recycling of C&D materials. Requirements for staff training should be included in the Contractor's Environmental Management Plan (EMP). The EMP shall be submitted to the Engineer for approval before construction works in accordance with ETWB TC(W) No. 19/2005.</p> <p>Good planning and site management practice should be employed to eliminate over ordering or mixing of construction materials to reduce wastage. Proper storage and site practices will minimize the damage or contamination of construction materials.</p> <p>Where waste generation is unavoidable, the potential for recycling or reuse should be explored. If waste cannot be recycled, disposal routes described in the EMP shall be followed. A recording system for the amount of wastes generated, recycled, delivered and disposed (including the delivery destinations / disposal sites) should be implemented. In order to monitor the delivery / disposal of C&D material and solid wastes at public fill reception facilities (PFRFs) and landfills and to control fly-tipping, a trip-ticket system should be included. DEVB TC(W) No. 6/2010 shall be referenced for details. Dump trucks shall be equipped with real-time tracking and monitoring devices as a means to prevent illegal dumping.</p>	Phase				<ul style="list-style-type: none"> • DEVB TC(W) No. 6/2010 	
6.6.1.2	<p><u>Best Management Practice</u></p> <p>The proposed mitigation measures are as below:</p> <ul style="list-style-type: none"> • An on-site environmental coordinator should be identified at the outset of the works. The EMP incorporating waste management shall be prepared in accordance with the requirements set out in the ETWB TC(W) No. 19/2005. The EMP shall include monthly and yearly Waste Flow Tables (WFT) that indicate the amounts of waste generated, recycled, delivered and disposed of (including final delivery destination / disposal site), and which shall be regularly updated. • The reuse/recycling of all materials on site shall be investigated prior to treatment/delivered / disposal off-site. 	Construction Sites, Transportation Route of Waste / Construction Phase	I-PARK2 Contractor		√	<ul style="list-style-type: none"> • EIAO-TM • WDO • ETWB TC(W) No. 19/2005 • DEVB TC(W) No.6/2010 • DEVB TC(W) No. 8/2010 	



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<ul style="list-style-type: none"> • Good site practices shall be adopted from the commencement of works to avoid the generation of waste, reduce cross contamination of waste and to promote waste minimization. • All waste materials shall be sorted on-site into inert and non-inert C&D materials, and where the materials can be recycled or reused, they shall be further segregated. Inert C&D materials will comprise stone, rock, masonry, brick, concrete, and soil which is suitable for land reclamation and site formation whilst non-inert C&D materials include all other wastes generated from the construction process such as plastic packaging and vegetation (from site clearance). • The Contractor shall be responsible for identifying what materials can be recycled/ reused, whether on-site or off-site. In the event of the latter, the Contractor shall make arrangements for the collection of the recyclable materials. The remaining non-inert C&D materials shall be collected and disposed of to the landfills whilst inert C&D materials shall be re-used on site where practicable. Alternatively, if inert C&D materials cannot be reused on-site, the materials would be delivered to PFRFs for beneficial reuse. • With reference to DEVB TC(W) No.6/2010, a trip ticket system should be established at the outset of the construction to monitor the delivery / disposal of C&D materials and solid wastes from the site to PFRFs and landfills. Dump trucks shall be equipped with real-time tracking and monitoring devices for monitoring of the transportation of construction waste. • Under the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall register as a Chemical Waste Producer if chemical wastes such as spent lubricants and paints are generated on site. Only licensed chemical waste collectors shall be employed to collect any chemical waste generated at site. The handling, storage, transportation, and disposal of chemical wastes shall be conducted in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme both published by EPD. • A sufficient number of covered bins shall be provided on site for the containment of 						



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>general refuse to prevent visual impacts and nuisance to the sensitive surroundings. These bins shall be cleared daily and the collected waste disposed of at landfill as designated by EPD after recyclable materials (e.g. food scraps, paper, metals, aluminium cans, etc.) have been sorted out. Further to the issue of DEVB TC(W) No. 8/2010, the Contractor is required to maintain a clean and hygienic site throughout the Project works.</p> <ul style="list-style-type: none"> The Contractor shall prepare and submit the C&DMMP in accordance with the Project Administrative Handbook for Civil Engineering Works for approval. The contractor should prepare a Waste Management Plan (WMP) as part of EMP in accordance with ETWB TC(W) No. 19/2005. The WMP should be submitted to the Engineer for approval. Mitigation measures proposed in the EIA Report and the EM&A Manual should be adopted. The Contractor shall comply with all relevant statutory requirements and guidelines and their updated versions that may be issued during the course of Project construction. 						
6.6.1.3	<p><u>On-site Sorting, Reuse and Recycling</u></p> <p>All waste materials should be segregated into categories covering:</p> <ul style="list-style-type: none"> Inert C&D materials suitable for reuse on-site. Inert C&D materials suitable for PFRFs. Recyclable non-inert C&D materials for recycling. Remaining non-inert C&D materials for landfill. Chemical waste. Recyclable general refuse for recycling Remaining general refuse for landfill. <p>Proper segregation and disposal of construction waste and general refuse should be implemented. Separate containers should be provided for inert and non-inert C&D materials. Separate recycling bins should be provided to facilitate recovery of recyclable</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM WDO DEVB TC(W) No. 6/2010



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>materials from general refuse generated from construction workforce.</p> <p>Sorting is important to recover materials for reuse and recycling. Specific area should be allocated for on-site sorting of C&D materials and to provide a temporary storage area for those sorted materials. If area is limited, all C&D materials should at least be sorted on-site into inert and non-inert components. Yard waste portion of non-inert C&D materials such as bamboo, timber, vegetation, should be collected and delivered to Yard Waste Recycling Centre (Y-PARK) for recycling where practicable. Other non-inert C&D materials such as packaging waste and other organic materials should be reused and recycled where practicable and disposed to the designated landfill only as a last resort. Inert C&D materials such as concrete, stone, clay, brick, soil, asphalt and the like should be separated and reused in this or other projects (subject to approval by the relevant parties in accordance with the DEVB TC(W) No. 6/2010) before delivered to a public filling facility operated by CEDD. Steel and other metals should be recovered from demolition waste stream and recycled. Recyclables (e.g. wastepaper from office, aluminium cans) should be recovered from the general refuse for proper collection by waste recyclers for off-site recycling or reuse.</p>						
6.6.1.4	<p><u>Construction and Demolition Material</u></p> <p>Inert C&D materials should be temporarily stored on-site for use as backfill where practicable. It should be properly covered with tarpaulin or similar impervious sheeting to prevent dust nuisance and site runoff. Surplus inert C&D materials should be delivered to PFRFs.</p> <p>Control measures for temporary stockpiles on-site should be taken in order to minimize the noise, generation of dust, pollution of water and visual impact. These measures include:</p> <ul style="list-style-type: none"> • Stockpiling areas should be enclosed where space is available. • Stockpiled soil in open space should be properly covered with tarpaulin especially when heavy rainstorms are predicted. • Surface of any uncovered stockpiled soil should be regularly wetted with water 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • WDO • DEVB TC(W) No. 6/2010



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>especially during dry season.</p> <ul style="list-style-type: none"> Disturbance of stockpiled soil should be minimized. Stockpiling location should be away from the water bodies. An independent surface water drainage system equipped with silt traps should be installed at the stockpiling area. <p>Disposal of non-inert C&D materials to landfill shall only be a last resort. Proper segregation of inert and non-inert C&D materials shall be carried out in the construction sites.</p> <p>The Public Fill Committee of CEDD should be consulted for delivery of inert C&D materials to PFRFs while EPD should be consulted for disposal of non-inert C&D materials to landfill. Disposal of C&D materials to landfill must not have more than 50% (by weight) inert material. The C&D materials delivered for landfill disposal should contain no free water and the liquid content should not exceed 70% by weight.</p> <p>In order to avoid dust impacts, any vehicle leaving a works area carrying inert or non-inert C&D materials should have their load covered up before leaving the construction site.</p> <p>C&D materials should be delivered to / disposed of at designated PFRFs or landfills. Delivery / disposal of these materials for the use at other construction projects is subject to the approval of the relevant project proponents and Public Fill Committee of CEDD. Furthermore, unauthorized disposal of C&D materials in particular on private agricultural land is prohibited and may be subject to relevant enforcement and regulating actions. The delivery / disposal of C&D materials will be controlled through trip-ticket system in accordance with DEVB TC(W) No. 6/2010.</p>						
6.6.1.5	<p><u>Chemical Waste</u></p> <p>Should any chemical waste be generated, the Contractor must register with EPD as a chemical waste producer. Chemical waste is defined in the Waste Disposal (Chemical Waste) (General) Regulation. EPD requires information on the particulars of the waste generation processes including the types of waste produced, their location, quantities</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM WDO Code of practice on the packaging labelling and



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				D	C	O	
	<p>and generation rates. An updated list of licensed chemical waste collector can be obtained from EPD.</p> <p>Storage, handling, transport and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published by EPD, and should be collected by a licensed chemical waste collector.</p> <p>Suitable containers should be used for specific types of chemical wastes. The containers should be properly labelled (in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations), resistance to corrosion, stored safely and closely secured. Stored volume should not be kept more than 450 litres unless the specification has been approved by the EPD. Storage area should be enclosed by three sides by a wall, partition of fence that is at least 2 m height or height of tallest container with adequate ventilation and space.</p> <p>Hard standing, impermeable surfaces draining via oil interceptors should be provided in works area compounds. Interceptors should be regularly emptied to prevent release of oils and grease into the surface water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain. Oil and fuel bunkers should be bunded and/or enclosed on three sides to prevent discharge due to accidental spillages or breaches of tanks. Bunding should be of sufficient capacity to accommodate 110% of the volume of the largest container or 20% of the total volume of waste, whichever is larger. Waste collected from oil interceptors should be collected and disposed of by a licensed chemical waste collector.</p> <p>Lubricants, waste oils and other chemical wastes are likely to be generated during the maintenance of vehicles and mechanical equipment. Used lubricants should be collected and stored in individual containers which are fully labelled in English and Chinese and stored in a designated secure place. The chemical waste shall be collected by licensed chemical waste collectors.</p> <p>The registered chemical waste producer (i.e. the Contractor) has to arrange for the chemical waste to be collected by licensed chemical waste collector. The licensed</p>					storage of chemical wastes	



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				D	C	O	
	<p>chemical waste collector should regularly take chemical waste to a licensed chemical waste treatment facility (such as the CWTC in Tsing Yi). A trip ticket system operates to control the movement of chemical wastes.</p> <p>No lubricants, oils, solvents or paint products should be allowed to discharge into water courses, either by direct discharge, or as contaminants carried in surface water runoff from the construction site.</p>						
6.6.1.6	<p><u>General Refuse</u></p> <p>General refuse should be disposed of to landfill as designated by EPD only after recyclable materials (e.g. food scraps, paper, metals, aluminum cans, etc.) have been sorted out.</p> <p>The Contractor should nominate approved site personnel 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 about site cleanliness, proper waste management and chemical handling procedures should be provided. Recyclable materials such as papers and aluminum cans should be segregated and collected by waste recycler. An adequate number of waste containers should be provided to avoid spillage of waste.</p> <p>General refuse generated on-site should be stored in enclosed bins or skips and collected separately from other construction and chemical wastes and disposed of at designated landfill by reputable waste collector. The removal of waste from the site should be arranged on a daily basis by the Contractor to minimize any potential odour impacts, minimize the presence of pests, vermin and other scavengers and prevent unsightly accumulation of waste.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • WDO • Public Health and Municipal Services Ordinance
6.6.1.7	<p><u>Floating Refuse</u></p> <p>The Contractor should regularly check and clean any refuse trapped or accumulated along the seawall. Collected floating refuse shall be disposed of as general refuse</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> • EIAO-TM • WDO • Public Health and Municipal Services Ordinance



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
6.6.2	<p>The following measures are recommended for the MSW handling:</p> <ul style="list-style-type: none"> The MSW containing vessel will be equipped with GPS Trackers to provide real time vessel location, which serves as an effective surveillance measure to avoid waste dumping at sea. The MSW shall be fully enclosed in sealed containers or covered entirely to prevent accidental leakage from vessels or vehicles during transportation. The containers shall be in good condition and free from damage or any other defects. The unloading and transferring of MSW shall be carried out under negative pressure to ensure no leakage of fugitive emission. 	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> EIAO-TM WDO Public Health and Municipal Services Ordinance
6.6.2.1	<p><u>Incineration By-products</u></p> <p>The following measures are recommended for the storage, handling and collection of incineration by-products:</p> <ul style="list-style-type: none"> Ash should be stored in intact storage pits / silos. Ash should be handled and conveyed in an enclosed environment with negative pressure to prevent leakage to the surrounding environment prior to treatment if needed. Ash should be wetted with water to control fugitive dust, where necessary. The bottom ash will be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet are exhausted. All bottom ash to be disposed of at landfill should be tested to ensure the compliance with the proposed IRPCL and leachability criteria prior to disposal. The stabilized fly ash / APC residues would be disposed of at the landfill site. Beneficial use of stabilized fly ash and APC residues will be explored where practicable. All stabilized fly ash / APC residues to be disposed of at landfill should be tested for compliance with the proposed IRPCL and leachability criteria prior to disposal. The bottom ash and stabilized fly ash / APC residues to be disposed of at landfill 	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> Incineration Residue Pollution Control Limits



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>should be stored in enclosed container during transportation.</p> <p>The Contractor should provide EPD with chemical analysis results of bottom ash and stabilized fly ash / APC residues to confirm the compliance with the proposed IRPCL before disposal of at landfill.</p>						
6.6.2.2	<p><u>Dewatered Sludge</u></p> <p>The dewatered sludge would be treated at I-PARK2 regularly. The dewatered sludge shall be stored in sealed containers to minimize associated odour impact.</p>	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> • EIAO-TM • WDO
6.6.2.3	<p><u>Chemical Waste, General Refuse and Floating Refuse</u></p> <p>The chemical waste, general refuse and floating refuse generated / collected during the operational phase would follow the same handling procedures and disposal method presented in Sections 6.6.1.5, 6.6.1.6 and 6.6.1.7 of the EIA report except that the non-recyclable general refuse shall be sent to the incineration plant of I-PARK2 for treatment (instead of to the designated landfill site).</p>	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> • EIAO-TM • WDO • Public Health and Municipal Services Ordinance • Code of practice on the packaging labelling and storage of chemical wastes
6.7.3.1	<p><u>Fuel Oil Spillage Prevention</u></p> <p>Precautionary measures to prevent fuel oil spillage include:</p> <p>a) Fuel Oil Tank Construction and Test</p> <ul style="list-style-type: none"> • The fuel tank to be installed should be of specified durability. • Double skin tanks are preferred. • Underground fuel storage tank should be placed within a concrete pit. • The concrete pit shall be accessible to allow regular tank integrity tests to be carried out at regular intervals. • Tank integrity tests should be conducted by an independent qualified surveyor or 	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> • Code of practice on the packaging labelling and storage of chemical wastes



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>structural engineer.</p> <ul style="list-style-type: none"> • Any potential problems identified in the test should be rectified as soon as possible. <p>b) Fuel Oil Pipeline Construction and Test</p> <ul style="list-style-type: none"> • Installation of aboveground fuel oil pipelines is preferable; if underground pipelines are unavoidable, concrete lined trenches should be constructed to contain the pipelines. • Double skin pipelines are preferred. • Distance between the fuel oil refuelling points and the fuel oil storage tank shall be minimized. • Integrity tests for the pipelines should be conducted by an independent qualified surveyor or structural engineer at regular intervals. • Any potential problems identified in the test should be rectified as soon as possible. <p>c) Fuel Oil Leakage Detection</p> <ul style="list-style-type: none"> • Installation of leak detection device at storage tank and pipelines. • Installation and use of pressure gauges (e.g. at the two ends of a filling line) in fuel filling, which allows unexpected pressure drop or difference and sign of leakage to be detected. <p>d) Fuel Oil Storage Tank Refuelling</p> <ul style="list-style-type: none"> • Storage tank refuelling (from road tanker) should only be conducted by authorized staff of the oil company using the company's standard procedures. <p>e) Fuel Oil Spillage Response</p> <ul style="list-style-type: none"> • An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incidents in detail. General procedures to be taken in case of fuel oil spillage are presented below: <p><u>Training</u></p> <p>Training on oil spill response actions should be given to relevant staff. The training shall cover the followings:</p>						



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<ul style="list-style-type: none"> •Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and fire fighting equipment; •General methods to deal with oil spillage and fire incidents; •Procedures for emergency drills in the event of oil spills and fire; and •Regular drills shall be carried out. <p><u>Communication</u></p> <p>Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department can be quickly sought.</p> <p><u>Response Procedures</u></p> <p>Any fuel oil spillage within the Project site should be immediately reported to the Plant Manager with necessary details including location, source, possible cause and extent of the spillage.</p> <p>Plant Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures shall include the following:</p> <ul style="list-style-type: none"> •Identify and isolate the source of spillage as soon as possible. •Contain the oil spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels. •Remove the oil spillage. •Clean up the contaminated area. •If the oil spillage occurs during storage tank refuelling, the refuelling operation should immediately be stopped. •Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The handling and disposal procedures for chemical wastes are discussed in the following paragraphs. 						
6.7.3.2	The precautionary measures to prevent improper handling/ use of chemicals and	Project Site /	I-PARK2			√	• Code of practice on



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>chemical waste spillage include:</p> <p>a) Chemicals and Chemical Wastes Handling & Storage</p> <ul style="list-style-type: none"> • Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas. • The storage of chemical wastes should comply with the requirements of the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • The storage areas for chemicals and chemical wastes shall have an impermeable floor or surface. The impermeable floor/ surface shall possess the following properties: <ul style="list-style-type: none"> ◆ Not liable to chemically react with the materials and their containers to be stored. ◆ Able to withstand normal loading and physical damage caused by container handling ◆ The integrity and condition of the impermeable floor or surface should be inspected at regular intervals to ensure that it is satisfactorily maintained • For liquid chemicals and chemical wastes storage, the storage area should be banded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater. • Storage containers shall be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed. • Chemical handling shall be conducted by trained workers under supervision. <p>b) Chemicals and Chemical Wastes Spillage Response</p> <ul style="list-style-type: none"> • A Chemicals and/ or Chemical Wastes Spillage Response Plan shall be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals/ chemical waste spillages are presented below: <p><u>Training</u></p> <p>Training on spill response actions should be given to relevant staff. The training shall cover the followings:</p>	Operation Phase	Contractor				the packaging and labelling and storage of chemical wastes



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<ul style="list-style-type: none"> •Tools & resources to handle spillage, e.g. locations of spill handling equipment; •General methods to deal with spillage; and •Procedures for emergency drills in the event of spills. <p><u>Communication</u> Establish communication channel with FSD and EPD to report the spillage incident so that necessary assistance from relevant department can be quickly sought.</p> <p><u>Response Procedures</u> Any spillage within the Project site should be reported to the Plant Manager. Plant Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures shall include the followings:</p> <ul style="list-style-type: none"> •Identify and isolate the source of spillage as soon as possible; •Contain the spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas); •Remove the spillage; the removal method/ procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed; •Clean up the contaminated area (in case the spillage occurs at locations out of the designated storage areas); and •The waste arising from the cleanup operation should be considered as chemical wastes. 						
6.7.3.3	<p><u>Preventive Measures for Incineration By-products Handling</u> The recommended measures listed below can minimize the potential contamination to the surrounding environment due to the incineration by-products:</p> <ul style="list-style-type: none"> • Ash should be stored in intact storage pits / silos. • Ash should be handled and conveyed in an enclosed environment with negative pressure to prevent leakage to the surrounding environment prior to treatment if 	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> • Incineration Residue Pollution Control Limits



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>needed.</p> <ul style="list-style-type: none"> Ash should be wetted with water to control fugitive dust, where necessary. The bottom ash will be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet are exhausted. All bottom ash to be disposed of at landfill should be tested to ensure the compliance with the proposed IRPCL and leachability criteria prior to disposal. The stabilized fly ash / APC residues would be disposed of at the landfill site. Beneficial use of stabilized fly ash and APC residues will be explored where practicable. All stabilized fly ash / APC residues to be disposed of at landfill should be tested for compliance with the proposed IRPCL and leachability criteria prior to disposal. The bottom ash and stabilized fly ash / APC residues to be disposed of at landfill should be stored in enclosed container during transportation. 						
6.7.3.4	<p><u>Incident Record</u></p> <p>After any spillage, an incident report should be prepared by the Plant Manager. The incident report should contain details of the incident including the cause of the incident, the material spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary.</p> <p>The incident report should provide sufficient details for the evaluation of any environmental impacts due to the spillage and assessment of the effectiveness of measures taken.</p> <p>In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the operator should be responsible for the cleanup of the affected area. The responses procedures described in Sections 6.7.3.1 and 6.7.3.2 of the EIA report should be followed accordingly together with the land contamination assessment and remediation guidelines stipulated in the <i>Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management</i> and the <i>Guidance</i></p>	Project Site / Operation Phase	I-PARK2 Contractor			√	<ul style="list-style-type: none"> Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land and Remediation



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<i>Note for Contaminated Land and Remediation.</i>						
Ecology							
7.10.2	<p><u>Avoidance</u> The Project would avoid direct impacts on terrestrial natural habitats (i.e. woodland / shrubland and natural streams) and recognized site of conservation importance.</p> <p><i>Marine Ecology</i> Non-dredged method will be adopted for the proposed marine construction works to prevent mud dredging and seabed disturbance. Potential marine ecological impacts due to the release of bed sediments and any sediment-bound contaminants would be avoided.</p> <p>The marine construction works would be confined in close vicinity of the artificial seawall of Middle Ash Lagoon and West Ash Lagoon with low ecological value, and thus avoiding the potential impacts to natural shores and areas with high ecological sensitivity.</p> <p>The associated water quality changes, in terms of SS elevation, sedimentation and DO depletion, are predicted to be localized. Wastewater and sewage arising from operation of the Project shall be treated for reuse within I-PARK2 or discharged into the existing Urmston Road Submarine Outfall in the NWWCZ outside Deep Bay after meeting relevant standards. The receiving water in NWWCZ is an open water with strong tidal flushing to assimilate the effluent discharge. The proposed wastewater treatment and management scheme would avoid adverse marine ecological impact in the sensitive Deep Bay water.</p> <p>The proposed seawater intake and outfall systems of the Project are isolated systems and free from any process water, MSW, leachate, ash and domestic sewage. Discharges from these seawater intake and outfall systems are predicted to cause only localized and insignificant water quality changes in Deep Bay.</p>	Construction and Project Sites / Design, Construction and Operation Phases	I-PARK2 Contractor	√	√	√	<ul style="list-style-type: none"> • EIAO-TM • WPCO
7.10.3.1	<p><u>Precautionary Site Check(s)</u> As a precautionary measure, site check(s) by qualified ecologist(s) before commencement</p>	Construction Sites /	I-PARK2		√		EIAO-TM



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	of the construction phase are recommended to be carried out to confirm that there is no breeding activity of avifauna species of conservation importance within the Project site. A report shall be prepared after the site check to keep record of relevant information (e.g. date & time, route, personnel, results & etc.)	Construction Phase	Contractor				
7.10.3.1	<p><u>Environmental Awareness and Construction Works Boundary</u></p> <p>In general, as mentioned, disturbance can be in the form of human activities (construction workers), noise, run-off and dust. Construction workers should be briefed regarding the ecological resources in the nearby areas before the commencement of the works and requested not to disturb any nearby ecological sensitive areas. Furthermore, the works boundary of the Project construction should be clearly defined (i.e. fenced with screening materials) and any works beyond the boundary should be strictly prohibited.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		EIAO-TM
7.10.3.1	<p><u>Consideration of Alternative Piling Method</u></p> <p>Quieter (non-percussive) piling method, namely pre-bored steel H piles is proposed for the foundation construction of this Project to minimize the noise disturbances to the nearby habitats. Pre-bored steel H piles would involve a hole (usually 600mm dia.) formed by rotary drill into the ground and to the rock where the upper section in soil is supported by a steel casing. The steel H piles is then inserted and grout is pumped into the hole while the steel casing is removed. No percussive action is required for forming the holes. Based on the preliminary Ground Investigation (GI) data, this quiet piling method is suitable at the Project site.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM Noise Control Ordinance
7.10.3.1	<p><u>Good Site Practices</u></p> <p>Good site practice and noise management techniques should be adopted to reduce the noise impact from construction site activities. The following measures should be practised during construction.</p> <ul style="list-style-type: none"> Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme Machines and plant (such as trucks, breakers) that may be in intermittent use should 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM NCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>be shut down between work periods or should be throttled down to a minimum</p> <ul style="list-style-type: none"> Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from the nearby ecological sensitive areas and woodland Silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works Mobile plant should be sited as far away from nearby ecological sensitive areas as possible and practicable Material stockpiles, site office and other structures should be effectively utilized, where practicable, to screen noise from on-site construction activities 						
7.10.3.1	<p><u>Use of Quality Powered Mechanical Equipment</u></p> <p>The Quality Powered Mechanical Equipment (QPME) system was developed by EPD to benchmark construction equipment items which are notably quieter and more environmentally friendly. The Contractor should source quiet plant associated with the construction works from the Powered Mechanical Equipment (PME) listed in the QPME system and other commonly used PME listed in EPD web pages as far as possible.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM NCO
7.10.3.1	<p><u>Control of Construction Site Run-off</u></p> <p>The relevant best practices including the requirements specified in the Professional Persons Environmental Consultative Committee Practice Note on Construction Site Drainage (ProPECC PN 2/23) should be followed to minimize the water quality impacts. All temporarily exposed surfaces, dusty stockpiles and earth working areas should be securely covered immediately after the works have been completed to prevent soil erosion. Earthwork final surfaces should be well compacted and subsequent permanent work or surface protection should be immediately performed. The construction site run-off should be collected by the temporary drainage system installed by the Contractor and then treated on-site before discharging into the storm drains via silt removal facilities.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> EIAO-TM ProPECC PN 2/93 WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
7.10.3.1	<p><u>Construction Dust Suppression Measures</u></p> <p>The dust control measures stipulated in the Air Pollution Control (Construction Dust) Regulations should be implemented for the construction of the proposed Project, where applicable, to minimize the construction dust impacts. Key mitigation measure include regular watering of exposed site surfaces and dusty materials, avoidance or covering open dusty material and stockpiles, tarpaulin covering of all dusty vehicle loads transported to, from and between site locations and establishment and use of vehicle wheel washing facilities at the exit points of the construction site</p>	Construction Sites / Construction Phase	I-PARK2 Contractor		√		• Air Pollution Control (Construction Dust) Regulation
7.10.3.1	<p><u>Light and Glare Control Measures</u></p> <p>All lights provided in the Project site should have the following features to minimize light and glare impact:</p> <ul style="list-style-type: none"> • The number of lighting should be kept minimum. • The lux level should be designed just sufficient for safety purpose. • Light should be pointed towards the Project site to minimize light spill outside the Project boundary. • Where light has to be pointed upward, the light direction should be adjusted to minimize light spillage outside the Project site. • Light should be shielded with hood to prevent sky glow. 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		• EIAO-TM
7.10.3.1	<p>During the operational phase, quieter equipment for fixed noise sources shall be adopted as far as practicable. Air pollution control measures, such as bag filter for particulates removal, would be implemented for the I-PARK2 operation as presented in the Air Quality Impact Assessment of this EIA. Mitigation measures such as landscape planting are recommended in the Visual Impact Assessment of this EIA to screen the visual interface and limit public access to the nearby habitat and the associated wildlife. Best Management Practices (BMP) would be implemented during the Project operation to control non-point source surface runoff. The light and glare control measures should be implemented in the I-PARK2 site. These mitigation and design measures are</p>	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	• EIAO-TM, • NCO, • Air Pollution Control Ordinance (APCO) • WPCO



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	considered sufficient for mitigating the potential disturbance impacts.						
Fisheries							
8.8.1.1	<p><u>Avoidance</u></p> <p>Non-dredged method will be adopted for the proposed marine construction works to prevent mud dredging and seabed disturbance. Potential impacts on fisheries resources due to the release of seabed sediments and any sediment-bound contaminants would be avoided.</p> <p>On-site wastewater treatment facilities and effluent reuse are proposed to prevent the discharge of process water and domestic sewage effluent from I-PARK2 into the marine environment.</p>	Construction Sites / Construction Phase	I-PARK2 Contractor	√	√	√	<ul style="list-style-type: none"> EIAO-TM ProPECC PN 2/93 WPCO
8.8.1.2	<p><u>Minimization</u></p> <p>Mitigation measures recommended in the water quality impact assessment for minimizing the potential water quality impact will also serve to protect fisheries resources and ensure no unacceptable adverse impact on fisheries.</p>	Project Site / Design and Operational Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> EIAO-TM ProPECC PN 2/93 WPCO
Visual							
9.6	<p><u>Infill Planting (OM1)</u></p> <p>Infill planting of trees, shrubs and/or groundcovers shall be provided where space is available.</p>	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> EIAO-TM
9.6	<p><u>Tree Planting along Site Boundary (OM2)</u></p> <p>Tree planting shall be provided along the site boundary as far as practicable to provide visual screening effect.</p>	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> DEVB TC(W) No. 3/2012 EIAO-TM
9.6	<p><u>Green Roof and Vertical Greening (OM3)</u></p>	Project Site / Design and	I-PARK2	√		√	<ul style="list-style-type: none"> DEVB TC(W) No.



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	Where practicable, green roof and vertical greening on the external walls without the coverage of architectural elements will be provided.	Operation Phases	Contractor				3/2012
9.6	<u>Aesthetic Design of Buildings (OM4)</u> Aesthetically pleasing design as regard to the form, material and finishes shall be incorporated to buildings, engineering structures and associated infrastructure facilities so as to blend in the buildings and structures to the adjacent landscape and visual context where practicable.	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	• EIAO-TM
9.6	<u>Control for Lighting and Glaring (OM5)</u> Maintain only essential lighting and implement suitable measures to reduce potential light nuisance during night-time and minimise nuisance caused by glare reflected from buildings or photovoltaic (PV) panels (e.g. adjusting tilting angle and orientation of the panels, and applying anti-reflective coating where appropriate) as far as practicable. The Guidelines on Industry Best Practices for External Lighting Installations should be observed with a view to minimising potential impacts arising from external lighting.	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	Guidelines on Industry Best Practices for External Lighting Installations
Health							
10.3.3	<ul style="list-style-type: none"> The storage bunker will be kept at negative pressure to ensure no leakage of fugitive emission out of the storage bunker. Bottom ash will be washed and collected at the bottom of the chamber. The wetted ash will then automatically be conveyed to the ash storage pit via an enclosed extractor. The storage and treatment of bottom ash and fly ash will be conducted within an enclosed environment with air withdrawn through the bunkers into the combustion chamber of the incinerator. Fabric filter and misting system will be installed at the IBA treatment plant for emission control. The waste and ash will be fully enclosed in sealed containers or covered entirely to ensure that the waste and ash do not leak from vessels or vehicles during transportation. 	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
10.3.4	<p><u>Potential Health Impacts of Fugitive Emissions during Transportation, Storage, Handling and Disposal of Waste and Ash</u></p> <p>To minimise the potential health impacts associated with transportation, storage, handling and disposal of waste and ash during operation of the Project, the following good site practices are recommended and should be properly implemented by the I-PARK2 contractor:</p> <ul style="list-style-type: none"> • Include in the environmental management system the identification of major fugitive emission sources during transportation, storage, handling and disposal of waste and ash, and definition and implementation of appropriate actions and techniques to prevent or reduce fugitive emissions; • Maintain good housekeeping in all plant areas with suitable equipment provided and maintained to clean up spilled materials; • Carry out loading, unloading, handling and storage of waste and ash in an acceptable manner (e.g. handle the waste and ash in enclosed environment and under negative air pressure, limit height of discharge, optimise moisture content, etc.) to prevent or reduce fugitive emissions; • Provide signage for clear indication of the travelling route of waste/ash trucks; • Monitor and control the traffic flow inside the reception hall of the plant; • Vehicle cleaning system should be provided to clean the waste/ash trucks before they leave the plant; • Apply good practice during unloading of MSW to waste storage pit including: provide signage to assist waste/ash truck drivers to stop at appropriate unloading position; provide sufficient training to waste/ash truck drivers; • Detection device / alarm should be installed to prevent overfilling of waste and ash storage pit; • In case manual handling of waste/ash is needed, the workers involved should wear personal protective equipment; • The on-site workers responsible for maintenance and cleaning of equipment or 	Construction and Project Sites / Design, Construction and Operation Phases	I-PARK2 Contractor	√	√	√	



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>vehicles contaminated with waste/ash should wear personal protective equipment; and</p> <ul style="list-style-type: none"> Emergency plan should be established and implemented to handle the situation of accidental incineration units shut down. 						
10.4.4.1	<p>The excavated PFA will be reused for backfilling on-site so that no off-site disposal of PFA will be required in this Project. During the PFA excavation, the I-PARK2 Contractor shall be required to implement the dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation, including regular watering of the excavation area to maintain the entire surface wet and reduce dust emissions. The I-PARK2 contractor shall also be required to provide personal protective equipment including suitable dust masks to the workers, consult the Labour Department on the need to conduct occupational dust monitoring at the location where the workers conducting the excavation of PFA, observe relevant requirements promulgated by the Labour Department in respect of occupational safety and health and comply with relevant statutory requirements.</p>	Construction Sites / Construction Phases	I-PARK2 Contractor		√		
10.4.5	<p><u>Health Impact Associated with PFA due to Radon Emissions</u></p> <p>To minimise the potential health risks from radon emissions associated with PFA, the following good site practices are recommended and should be properly implemented by the I-PARK2 contractor:</p> <ul style="list-style-type: none"> Prevention of radon influx from the PFA to the I-PARK2 buildings is preferred. Apply at least 1m thick general fill / soil cover on the PFA surface can significantly reduce the influx of radon. Utilize a slab-on-grade foundation design or employ soil suction techniques to draw radon from below the building and vent it through pipes above. These measures ensure a radon-free environment in the I-PARK2 buildings. Ensure adequate ventilation within the I-PARK2 buildings by implementing both natural and forced ventilation systems to enhance air exchange rates. For basement areas, consider pressurization techniques using external fans to prevent 	Construction and Project Sites / Design, Construction and Operation Phases	I-PARK2 Contractor	√	√	√	<ul style="list-style-type: none"> ProPECC Note PN 1/99



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>radon infiltration. It should be noted that most of the underground plant areas will be under negative air pressure.</p> <ul style="list-style-type: none"> Regular maintenance should be conducted on floor slabs and walls, with proper sealing of cracks and openings in the foundation to minimize radon entry. This sealing process reduces radon flow, enhances the effectiveness of other radon reduction methods, and minimizes conditioned air loss. Conduct regular measurement of radon concentrations during the work period. Observe the guidance on reduction of radon exposure outlined in EPD's ProPECC Note PN 1/99 "Control of Radon Concentration in New Buildings". 						
10.5.1	<p><u>Aerial emissions (emission discharges exceed the discharge limit)</u></p> <ul style="list-style-type: none"> Use the best practicable means requirements for the prevention of emission of air pollutants including proper operation and maintenance of equipment, supervision when in use and training and supervision of properly qualified staff and conduct regular monitoring and checking to ensure optimal performance. <p><u>Transportation, storage and handling</u></p> <ul style="list-style-type: none"> Implement good waste/ash transportation, storage and handling practices (see Section 10.3 of the EIA report) Arrange transportation routes to avoid of densely populated or sensitive regions. Establish protocols for and deploy emergency response measures, including spill response, in the event of accidents involving transportation vehicles. Enforce rigorous driver skill standards and provide training on safe driving practices for both drivers and navigators, emphasizing road and marine safety behaviours. <p><u>Chemical spillage and leakage</u></p> <ul style="list-style-type: none"> Ensure the implementation of appropriate procedures for handling and storing chemicals and chemical wastes. Establish a spill prevention and response plan, which includes the provision of 	Construction and Project Sites / Design, Construction and Operational Phases	I-PARK2 Contractor	√	√	√	



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>necessary equipment and trained personnel to effectively respond to spills.</p> <p><u>Employee health and safety</u></p> <ul style="list-style-type: none"> Follow industry best practices based on international standards and guidelines. Observe relevant requirements promulgated by the Labour Department in respect of occupational safety and health and consult Labour Department if needed. <p><u>Emergency Response / Contingency Plan</u></p> <ul style="list-style-type: none"> The I-PARK2 contractor will be required to develop and implement a Project-specific emergency response / contingency plan to handle potential accidental events during construction and operation of the I-PARK2 Project with a view to minimise the health impacts associated with the potential accidental events. 						
10.6	<p>The reception halls and ash storage pits will be enclosed with negative air pressure. Ash will be handled in enclosed environment, minimizing the possibility of any emissions escaping to the outside.</p>	Project Site / Design and Operation Phases	I-PARK2 Contractor	√		√	
Landfill Gas Hazard							
11.8.2.1 & 11.8.3.1	<p><u>Safety / Precautionary Measures</u></p> <p>The following safety measures shall be implemented during the construction phase and operation phase (where applicable):</p> <ul style="list-style-type: none"> For staff who work in, or have responsibility for “at risk” area, such as all excavation workers, supervisors and engineers working within the WENTX consultation zone, should receive appropriate training on working in areas susceptible to landfill gas, fire and explosion hazards. Safety Officer shall register under the Factories and Industrial Undertakings Ordinance and relevant associated regulations, trained in the use of gas detection equipment and landfill gas-related hazards (or other appropriately qualified person), and should be present on site throughout the groundworks phase. The Safety Officer (or other appropriately qualified person) should be provided with an intrinsically safe portable 	Construction and Project Sites / Construction and Operational Phases	I-PARK2 Contractor		√	√	<ul style="list-style-type: none"> LFG Hazard Assessment Guidance Note EPD/TR8/97)



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	<p>instrument.</p> <ul style="list-style-type: none"> • All personnel who work on site and all visitors to the site should be made aware of the possibility of ignition of gas in the vicinity of excavations. Safety notices should be posted warning of the potential hazards. • An excavation procedure or code of practice to minimize landfill gas related risk should be devised and carried out. • No worker should be allowed to work alone at any time in or near to any excavation areas within the WENTX consultation zone. At least one other worker should be available to assist with a rescue if needed. • Smoking, naked flames and all other sources of ignition should be prohibited within 15m of any excavation or ground-level confined space. 'No smoking' and 'No naked flame' notices should be posted prominently on the construction site, especially in excavation or trenches. • Welding, flame-cutting or other hot works should be confined to open areas at least 15m from any trench or excavation. • Welding, flame-cutting or other hot works may only be carried out in trenches or confined spaces when controlled by a 'permit to work' procedure, properly authorized by the Safety Officer. • The permit to work procedure should set down clearly the requirements for continuous monitoring for methane, carbon dioxide and oxygen throughout the period during which the hot works are in progress. The procedure should also require the presence of an appropriately qualified person, in attendance outside the 'confined area', who shall be responsible for reviewing the gas measurements as they are made, and who shall have executive responsibility for suspending the work in the event of unacceptable or hazardous conditions. Only those workers who are appropriately trained and fully aware of the potentially hazardous conditions which may arise should be permitted to carry out hot works in confined areas. • Where there are any temporary site offices, or any other buildings located within the 						



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				D	C	O	
	<p>WENTX consultation zone which have enclosed spaces with the capacity to accumulate LFG, then they should either be located in an area which has been proven to be free of landfill gas (by survey using portable gas detectors); or be raised clear of the ground by a minimum of 500mm. This aims to create a clear void under the structure which is ventilated by natural air movement such that emission of gas from the ground are mixed and diluted by air.</p> <ul style="list-style-type: none"> • Ground level construction plant used within in WENTX consultation zone should be fitted with vertical exhausts at least 0.6m above ground level and with spark arrestors. • Any electrical equipment, such as motors and extension cords, should be intrinsically safe. • During piping assembly or conduiting construction within WENTX consultation zone, all valves/seals should be closed immediately after installation. As construction progresses, all valves/seals should be closed as installed to prevent the migration of gases through the pipeline/conduit. All piping/conduiting should be capped at the end of each working day. • The contractor should formulate a health and safety policy, standards and instructions for site personnel to follow. • The contractor shall adopt the precautionary measures in Section 8 of the Guidance Note for the period of construction of infrastructure within the Consultation Zone. • Adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus (BA) sets should be made available on site. Fire drills should be organized at not less than six monthly intervals. WENTX consultation zone • Service runs within the WENTX consultation zone should be designated as “special routes”; utilities companies should be informed of this and precautionary measures should be implemented. Precautionary measures should include ensuring that staff members are aware of the potential hazards of working in confined spaces such as manholes and service chambers, and that appropriate monitoring procedures are in place to prevent hazards due to asphyxiating atmospheres in confined spaces. Detailed guidance on entry into confined spaces is given in Code of Practice on Safety 						



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				D	C	O	
	<p>and Health at Work in Confined Spaces (Labour Department, Hong Kong).</p> <ul style="list-style-type: none"> The precautionary and protection measures recommendations in Section 8 of the Guidance Note relating to the drilling of boreholes under site investigation / ground investigation works shall be adopted if such works will be carried out within the WENTX consultation zone. 						
11.8.2.2	<p><u>LFG Monitoring</u></p> <ul style="list-style-type: none"> Periodically during ground-works construction within the Consultation Zone, the works area should be monitored for methane, carbon dioxide and oxygen using appropriately calibrated portable gas detection equipment, which is appropriately calibrated and capable of measuring the following gases in the ranges indicated below: <ul style="list-style-type: none"> Methane: 0-100% LEL and 0-100% v/v Carbon dioxide: 0-100% Oxygen: 0-21% Routine monitoring should be carried out in all excavations, manholes and chambers and any other confined spaces that may have been created by, for example, the temporary storage of building materials on the site surface. The monitoring frequency and areas to be monitored should be determined prior to commencement of groundworks either by the Safety Officer or by an appropriately qualified person. All measurements in excavations should be made with the monitoring tube located not more than 10mm from the exposed ground surface. For excavations deeper than 1m, measurements should be made: <ul style="list-style-type: none"> at the ground surface before excavation commences; immediately before any worker enters the excavation; at the beginning of each working day for the entire period the excavation remains open; and 	Construction Sites / Construction Phase	I-PARK2 Contractor		√		<ul style="list-style-type: none"> LFG Hazard Assessment Guidance Note EPD/TR8/97) EIAO-TM



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
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	<ul style="list-style-type: none"> - periodically through the working day whilst workers are in the excavation. • For excavations between 300mm and 1m deep, measurements should be made: <ul style="list-style-type: none"> - directly after the excavation has been completed; and - periodically whilst the excavation remains open. • For excavations less than 300mm deep, monitoring may be omitted, at the discretion of the Safety Officer or other appropriately qualified person. • Depending on the results of the measurements, actions required will vary and should be set down by the Safety Officer or other appropriately qualified person. As a minimum these shall encompass those actions specified in Table 11.6 of the EIA report. • The hazards from landfill gas during the construction phase within the WENTX consultation zone shall be minimized by precautionary measures recommended in the Landfill Gas Hazard Assessment Guidance Note. • In any emergency situation, the Safety Officer or other appropriately qualified person, shall have the necessary authority and shall ensure that the confined space is evacuated, and the necessary works implemented for reducing the concentrations of gas. The following organizations should also be contacted as appropriate: <ul style="list-style-type: none"> - Hong Kong Police Force (HKPF); - Fire Services Department (FSD); - Environmental Protection Department (EPD); and - Landfill Operator. 						
11.8.3 and 11.8.3.1	During detailed design stage, the future I-PARK2 contractor shall prepare a detailed qualitative risk assessment and detailed design of landfill gas protection measures and submit to EPD for vetting. The submission shall include maintenance and monitoring programmes to ensure the continued performance of the proposed control measures, an event and action plan as well as an emergency and contingency plan. The types of protection measures which can be adopted are described below in relation to the	Within I-PARK2 / Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> • LFG Hazard Assessment Guidance Note EPD/TR8/97) • EIAO-TM



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
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	<p>generic terms set out in Table 11.3 of the EIA report.</p> <p><u>Gas Barrier</u></p> <p>The most common way of preventing gas from entering an area of ground is to set a “gas barrier” into the ground which is either keyed into low permeability strata or extends at least 1m below the lowest groundwater level.</p> <p>The presence of a gas barrier to the movement of gas may lead to a gradual build-up of gas on the landfill side of the barrier if the gas migration pathway is covered by low permeability materials. To relieve the potential build-up of gas, it may be necessary to install additional measures for venting the gas such as trenches filled with no-fines, granular material, e.g., gravel, connected to venting pipes which will provide a preferential pathway for the release of gas to atmosphere.</p> <p>According to the supporting document for Variation of Environmental Permit (VEP) for WENTX issued in 2022, the proposed landfill gas cut-off trench barrier has been adjusted with the revised boundary of WENTX site. It should be built along the boundary between WENTX landfill, I-PARK2 and T-PARK. This will cut off any gas migration to the I-PARK2 from the WENTX and the barrier should be installed under the WENTX project. It is also recommended that several landfill gas monitoring wells be installed into the ground on the development side of the gas barrier by I-PARK2 contractor. These are used to measure the concentrations of methane and carbon dioxide within the ground and hence determine the effectiveness of the measures in preventing LFG migration. The I-PARK2 contractor shall ensure that appropriate action (e.g. to notify the EPD and the WENTX landfill operator for inspection of the landfill gas cut-off trench barrier, to inspect sealing of joints and identify the cause, to rectify defects and seal the cracks if any, etc.), to be taken in the event of the trigger levels being exceeded, are specified in the detailed qualitative risk assessment as mentioned above.</p> <p>If ground or below ground level construction works will be carried out, the recommended precautionary and protection measures in Section 11.8.2.1 of the EIA report should be adopted, where applicable.</p>						



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
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11.8.3.2.1	<p><u>Building Protection Design – Passive Control</u></p> <p>Passive control measures for building structures with ground level or below ground rooms / voids including the following could be considered in the detailed design if necessary:</p> <ul style="list-style-type: none"> Gas-resistant polymeric membranes which can be incorporated into the floor or wall construction as a continuous sealed layer. Membranes should be able to demonstrate low gas permeability and resistant to possible chemical attack and may incorporate aluminium wafers to improve performance; Other building materials, e.g. dense well-compacted concrete or steel shuttering which provide a measure of resistance to gas permeation; Creation of a clear void under the structure which is ventilated by natural air movements such that any emissions of gas from the ground are mixed and diluted by air; Synthetic composite geotextile which provides a free-venting cellular structure and provide preferential pathways for release of gas; Passive control measures may be used in low and medium risk situations where gas emissions are expected to be at relatively low rates and concentrations and venting to atmosphere is unlikely to cause a hazard or nuisance due to the low concentration or high dilution which will occur; and Semi active' control such as the use of wind driven cowls and other devices which assist in the ventilation of gas but do not rely on electrically powered fans. 	Within I-PARK2/ Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> LFG Hazard Assessment Guidance Note EPD/TR8/97) EIAO-TM
11.8.3.2.2	<p><u>Building Protection Design – Gas Detection System</u></p> <p>Gas detection systems include the following:</p> <ul style="list-style-type: none"> A series of sensors located in appropriate positions within a structure where gas has the potential to accumulate, e.g., near service entries, inside ventilation basements, cupboards or ducts. The sensors detect flammable gas by catalytic oxidation or infra-red principles, and pass data back to a control panel by electrical cabling. The control panel can be set to have two triggers activating alarms and may also be linked by 	Within I-PARK2/ Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> LFG Hazard Assessment Guidance Note EPD/TR8/97) EIAO-TM



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				D	C	O	
	<p>wireless telemetry or internet off-site.</p> <ul style="list-style-type: none"> A series of sampling tubes which are located in appropriate positions and run back to a single measurement station operating on infra-red measurement principles. A pump automatically draws samples of air/gas along each tube in a pre-set pattern such that measurements of flammable and/or other gases (e.g., CO₂) can be taken at regular and frequent intervals. Triggers, alarms, wireless telemetry and internet systems can be incorporated. Manual monitoring can be conducted using a range of portable instruments. Instruments used in areas where flammable gas may be present should be intrinsically safe. <p>The future I-PARK2 contractor shall maintain and calibrate the gas detection system if any on a regular basis and ensure that appropriate emergency action, to be taken in the event of the trigger levels being exceeded, are specified in the detailed qualitative risk assessment as mentioned above. These should include procedures for evacuation if necessary.</p>						
11.8.3.2.3	<p><u>Building Protection Design – Maintenance of Control Measures</u></p> <p>Fundamental to the success of gas protection measures is the means by which they are monitored, managed and maintained, and thus all designs must be accompanied by a statement or set of procedures showing how the measures proposed can be confidently expected to operate satisfactorily for the duration of the potential gas-producing lifetime of the landfill.</p>	Within I-PARK2/ Design and Operation Phases	I-PARK2 Contractor	√		√	• LFG Hazard Assessment Guidance Note EPD/TR8/97)
11.8.3.3	<p><u>Design Measures for Sub-Surface Building Services</u></p> <p>Generic protection measures for the sub-surface building services including the following are recommended:</p> <ul style="list-style-type: none"> A gas barrier used to prevent movement of gas through services may form part of a more extensive barrier to prevent general mitigation towards the Project development. The gas barrier may be made of clay (or clay-rich soils), bentonite or polymeric membranes (e.g. HDPE). In the case of water pipes and sewers which are 	Within I-PARK2/ Design and Operation Phases	I-PARK2 Contractor	√		√	• LFG Hazard Assessment Guidance Note EPD/TR8/97)



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				D	C	O	
	<p>not always fully filled, water traps e.g. U-bends, should be provided to effectively seal off the conduit and prevent gas-phase transport; and</p> <ul style="list-style-type: none"> Vent pipes or gridded manhole covers may be used to avoid build-up of gas in underground utilities manholes. Venting stacks may be built into inspection chambers or connected to collection pipes in high permeability drainage layers adjacent to gas barriers. Under all circumstances, care should be taken when accessing any manhole chambers especially those which are not fitted with vents and necessary safety procedures must be followed. 						
11.8.3.4	<p><u>Guidance for Entry into Manholes and Chambers</u></p> <p>During the operation phase, any service voids, manholes, chambers or culvert within the proposed site, which is large enough to permit access to personnel should be subject to entry safety procedures. Works in confined spaces are controlled by the Factories and Industrial Undertakings (Confined Spaces) Regulation of the Factories and Industrial Undertakings Ordinance and the Safety Guide to Working in Confined Spaces should be followed to ensure compliance with the above regulations.</p> <p>In general, when work is being undertaken in confined spaces, sufficient approved resuscitation equipment, breathing apparatus and safety torches should be made available. Persons involved in or supervising such work should be trained and practiced in the use of such equipment. A permit-to-work system for entry into confined spaces should be developed by an appropriately qualified person and the system should be consistently employed. The safety measures recommended in Chapter 7 of the Landfill Gas Hazard Assessment Guidance Note should also be strictly followed.</p> <p>All the access to confined spaces should be restricted only to authorized personnel who are aware of the landfill gas hazard. No general public should be permitted or allowed to access the service voids, manholes, chambers or wells.</p>	Within I-PARK2/ Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> LFG Hazard Assessment Guidance Note EPD/TR8/97)
11.8.3.5	<p><u>Landfill Gas Monitoring</u></p> <p>Regular monitoring of landfill gas should be done at the monitoring wells as well as at the underground service voids and manholes by the I-PARK2 contractor. The maintenance</p>	Within I-PARK2/ Design and	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> LFG Hazard Assessment Guidance Note EPD/TR8/97)



EIA Ref.	Environmental Protection Measures/Mitigation Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				D	C	O	
	and monitoring programmes shall be included in the detailed qualitative risk assessment as mentioned above to ensure the continued performance of the proposed control measures.	Operation Phases					
11.8.3.6	<p><u>Protection Measures for Community Facilities</u></p> <p>At I-PARK2, community facilities are currently under planning, and while the actual utilization and design of these facilities remain pending, the following safety measures will be enforced during the operational phase of the community facilities if necessary:</p> <ul style="list-style-type: none"> • All personnel who work on site and visitors will be made aware of the potential hazards relating to landfill gas. Safety notices in both Chinese and English shall be prominently displayed around the site to warn individuals of potential hazards. • Smoking and open fires will be strictly prohibited. • Regular monitoring of landfill gas and maintenance protocols will be conducted at the community facilities to ensure safety. • Specific precautions will be implemented for all rooms, including the use of air conditioning with natural and mechanical ventilation, application of gas-proofing coatings on ground floor slabs, installation of gas alarms, and restriction of access to invited or registered guests/visitors. 	Within I-PARK2/ Design and Operation Phases	I-PARK2 Contractor	√		√	<ul style="list-style-type: none"> • LFG Hazard Assessment Guidance Note EPD/TR8/97) • EIAO-TM
11.8.3.7	<p><u>Design of LFG Protection Measures</u></p> <p>As this Project is at the Preliminary Design Stage, a detailed design is not available yet and the qualitative landfill gas hazard assessment in this EIA report is just a preliminary one based on limited available information. When the detailed design of the I-PARK2 is available, the I-PARK2 contractor is required to undertake further landfill gas hazard assessment to take account of the more readily available detailed information to finalize the design of the landfill gas protection measures recommended in this report. During the detailed design stage, a review of this preliminary qualitative risk assessment should be carried out and a detailed qualitative landfill gas risk assessment as described in Section 1.15 and Chapter 6 of the Landfill Gas Hazard Assessment Guidance Note should be prepared. The detailed qualitative landfill gas risk assessment together with the</p>	Within I-PARK2/ Design Phase	I-PARK2 Contractor	√			<ul style="list-style-type: none"> • LFG Hazard Assessment Guidance Note EPD/TR8/97) • EIAO-TM



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	detailed design of landfill gas protection measures and a landfill gas monitoring programme should be submitted to EPD for vetting. The design of the landfill gas protection measures to be adopted on-site should be performed by a competent professional person who has knowledge on LFG protection measures appointed by the contractor of the I-PARK2. The detailed design of the landfill gas protection measures shall form part of the detailed qualitative risk assessment as stated above, which shall be certified by the Environmental Team Leader and verified by the Independent Environmental Checker before submission to EPD for vetting. The contractor should ensure that the required protection measures are implemented and constructed in accordance with the design and a maintenance and monitoring programme should be established to ensure the continued performance of the implemented protection measures. The above requirements should be included in the tender documents of the I-PARK2.						

*D = Design; C = Construction; O = Operation



Appendix 12.1

Sample Template for the Interim Notifications

Sample Template for Interim Notification 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: _____