



Contract No. EP/SP/66/12

Integrated Waste Management Facilities, Phase 1

Appendix H

Environmental Mitigations Implementation Schedules (EMIS)



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EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*			Relevant Legislation and Guidelines
				Des	C	O Dec	
6b.5.1.2	<p><u>Good Site Practices</u></p> <p>Adverse environmental impacts in relation to waste management are not expected, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities would include:</p> <ul style="list-style-type: none"> • Obtain relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Provide staff training for proper waste management and chemical handling procedures; • Provide sufficient waste disposal points and regular waste collection; • Provide appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; and • Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Separate chemical wastes for special handling and disposed of to licensed facility for treatment; and • Employ licensed waste collector to collect waste. 	Work Site/ During Construction Period	Contractor	✓			WDO; LDO; ETWB TCW No. 19/2005; EIAO-TM
6b.5.1.3	<p><u>Waste Reduction Measures</u></p> <p>Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices.</p>	Work Site/ During Design & Construction Period	Contractor	✓			



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	<p>Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> • Design foundation works that could minimise the amount of excavated material to be generated. • Provide training to workers on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; • Sort out demolition debris and excavated materials from demolition works to recover reuseable/recyclable portions (i.e. soil, broken concrete, metal etc.); • Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage the collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force; • Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and • Plan and stock construction materials carefully to minimise amount of waste to be generated and to avoid unnecessary generation of waste. 						
6b.5.1.7	<p><u>Dredged Sediment – Application of Dumping Permit</u></p> <p>The project proponent should agree in advance with MFC of CEDD on the site allocation. The project proponent or contractor for the dredging works shall then apply for the site allocations of marine sediment disposal based on the prior agreement with MFC/CEDD. The project proponent or</p>	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓	✓		DASO ETWB TCW 34/2002



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6b.5.1.8	<p>contractor should also be responsible for the application of all necessary permits from relevant authorities, including the dumping permit as required under DASO from EPD for the disposal of dredged sediment prior to the commencement of the dredging works.</p> <p><u>Dredged Sediment – Sediment Quality Report</u></p> <p>The project proponent or contractor will need to satisfy the appropriate authorities that the quality of the marine sediment to be dredged has been identified according to the requirements of ETWB TCW 34/2002. This should be completed well before the dredging works and would include at least the submission of a formal Sediment Quality Report under Tier I of ETWB TCW No. 34/2002 to DEP for approval. Subject to advice from DEP, it is possible that further marine SI in accordance with ETWB TCW 34/2002 might be necessary for the application of dumping permit under DASO. In such case, a sediment sampling and testing proposal shall be submitted to and approved by DEP before the additional marine SI works.</p>	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓				DASO ETWB TCW 34/2002
6b.5.1.9	<p><u>Dredged Sediment – Sediment Transportation</u></p> <p>The barge transporting the sediments to the designated disposal sites should be equipped with tight fitting seals to prevent leakage and should not be filled to a level that would cause overflow of materials or laden water during loading or transportation. In addition, monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the DEP.</p>	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓				DASO ETWB TCW 34/2002

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6b.5.1.10	<p><u>Construction and Demolition Materials</u></p> <p>In order to minimise the impact resulting from collection and transportation of C&D materials for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below.</p> <ul style="list-style-type: none"> • A Waste Management Plan (WMP), which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW No.19/2005; • A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be adopted for easy tracking; and • In order to monitor the disposal of C&D materials at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to ETWB TCW No. 31/2004). 	Work Site/ During Design & Construction Period	Contractor	✓	✓			ETWB TCW No. 19/2005
6b.5.1.11 - 6b.5.1.12	<p>The Contractor should prepare and implement an EMP in accordance with ETWB TCW No.19/2005, which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval. The Contractor should implement waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor, preferably on a monthly basis.</p> <p>All surplus C&D materials arising from or in connection with</p>	Work Site/ During Design & Construction Period	Contractor	✓	✓			ETWB TCW No. 19/2005



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6b.5.1.13	<p>construction works should become the property of the Contractor when it is removed unless otherwise stated. The Contractor would be responsible for devising a system to work for on-site sorting of C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimize temporary stockpiling on-site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.</p> <p><u>Chemical Wastes</u> Should chemical wastes be produced at the construction site, the Contractor would be required to register with EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and inappropriate chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste (such as explosive, flammable, oxidizing, irritant, toxic, harmful, or corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the Chemical Waste Treatment Centre at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Work Site/ During Construction Period	Contractor	✓			Waste Disposal (Chemical Waste) (General) Regulation
6b.5.1.14	<p><u>General Refuse</u> General refuse should be stored in enclosed bins or compaction units separate from C&D materials. A licensed</p>	Work Site/ During Construction Period	Contractor	✓			Public Health and Municipal Services Ordinance



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6b.5.1.16	waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.						
6b.5.1.33	<p><u>Bioogas Generation</u></p> <p>The Contractor shall review the data and analysis results, and the data from further Site Investigation, if any. Subject to the review findings, the following gas protection measures may be considered if necessary:</p> <ul style="list-style-type: none"> - gas monitoring after reclamation; - passive ventilation; - gas impermeable membrane; - ventilation with "at risk" rooms; - protection of utilities or below ground services; - precautions during construction works; - precautions prior to entry of belowground services 	Reclamation site (if dredging at the reclamation site is not required) / Design & Construction Period	Designer and/or contractor	✓	✓		EPD/TR8/97
6b.5.2.1	<p><u>Good Site Practices</u></p> <p>It is recommended that the following good operational practices should be adopted to minimise waste management impacts:</p> <ul style="list-style-type: none"> • Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and Waste Disposal 	IWMF Site/During Operation Period	IWMF Operator			✓	Waste Disposal Ordinance (Cap. 354); Disposal (Chemical Waste) (General) Regulation; ETWB TCW No. 1/2004

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	<p>(Chemical Waste) (General) Regulation;</p> <ul style="list-style-type: none"> Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; Use of a waste haulier licensed to collect specific category of waste; A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at landfills, and to control fly tipping. Reference should be made to ETWB TCW No. 31/2004. Training of site personnel in proper waste management and chemical waste handling procedures; Separation of chemical wastes for special handling and appropriate treatment at a licensed facility; Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors; Provision of sufficient waste disposal points and regular collection for disposal; Adoption of appropriate measures to minimize windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and Implementation of a recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites). 							
6b.5.2.2	<p>Waste Reduction Measures</p> <p>Good management and control can prevent the generation of</p>	IWMF Site/ During Operation Period	IWMF Operator			✓		



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6b.5.2.3	<p>significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction:</p> <ul style="list-style-type: none"> Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; Encourage collection of aluminium cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force; and Any unused chemicals or those with remaining functional capacity should be reused as far as practicable. <p><u>Storage, Handling, Treatment, Collection and Disposal of Incineration By-Products</u></p> <p>The following measures are recommended for the storage, handling and collection of the incineration by-products:</p> <ul style="list-style-type: none"> Ash should be stored in storage silos; Ash should be handled and conveyed in closed systems fully segregated from the ambient environment; Ash should be wetted with water to control fugitive dust, where necessary; All fly ash and APC residues should be treated, e.g. by cement solidification or chemical stabilization, for compliance with the proposed Incineration Residue 	IWMF Site/ During Operation Period	IWMF Operator					Incineration Residue Pollution Control Limits



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6b.6.3.1	<p>Pollution Control Limits and leachability criteria prior to disposal;</p> <ul style="list-style-type: none"> The ash should be transported in covered trucks or containers to the designated landfill site. <p>The Contractor should provide EPD with chemical analysis results of the bottom ash, and treated fly ash and APC residues to confirm that the ash/residue can comply with the proposed Incineration Residue Pollution Control Limits before disposal.</p> <p><u>Fuel Oil Tank Construction and Test</u></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 structural engineer. Any potential problems identified in the test should be rectified as soon as possible. 	Fuel Oil Storage Tank/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓	
6b.6.3.1	<p><u>Fuel Oil Pipeline Construction and Test</u></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. 	Fuel Oil Pipelines/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓	

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6b.6.3.1	<ul style="list-style-type: none"> • 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. 							
6b.6.3.1	<p><u>Fuel Oil Leakage Detection</u></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. 	Fuel Oil Storage Tank and Pipelines/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓		
6b.6.3.1	<p><u>Fuel Oil Storage Tank Refuelling</u></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. 	Fuel Oil Refuelling Point/ During Operation Period	IWMF Operator			✓		
6b.6.3.1	<p><u>Fuel Oil Spillage Response</u></p> <p>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> <ul style="list-style-type: none"> • Training <ul style="list-style-type: none"> - Training on oil spill response actions should be given to relevant staff. The training shall cover the 	IWMF Site/ During Operation Period	IWMF Operator			✓		

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	<p>following:</p> <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. <ul style="list-style-type: none"> • Communication - 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. • Response Procedures - Any fuel oil spillage within the IWMF site should be immediately reported to the Plant Manager with necessary details including location, source, possible cause and extent of the spillage. - 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: <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. 						

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6b.6.3.2	<p> > Remove the oil spillage. > Clean up the contaminated area. > If the oil spillage occurs during storage tank refuelling, the refueling 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. </p> <p> <u>Chemicals and Chemical Wastes Handling & Storage</u> </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, Labeling 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 	Chemicals and Chemical Wastes Storage Area / During Operation Period	IWMF Operator				✓	

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6b.6.3.2	<p>➢ For liquid chemicals and chemical wastes storage, the storage area should be bunded 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.</p> <p>➢ Storage containers shall be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed.</p> <p>➢ Chemical handling shall be conducted by trained workers under supervision.</p> <p><u>Chemicals and Chemical Wastes Spillage Response</u></p> <p>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> <ul style="list-style-type: none"> • Training <ul style="list-style-type: none"> - Training on spill response actions should be given to relevant staff. The training shall cover the followings: <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. • Communication 	IWMF Site/ During Operation Period	IWMF Operator			✓	

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6b.6.3.3	<p> - Establish communication channel with FSD and EPD to report the spillage incident so that necessary assistance from relevant department can be quickly sought. • Response Procedures - Any spillage within the IWMF 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: > 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. </p> <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 </p>	Storage, Handling & Collection of Incineration Ash at IWMF/ During	IWMF Operator			✓	

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	<p>to the incineration by-products:</p> <ul style="list-style-type: none"> • Ash should be stored in storage silos; • Ash should be handled and conveyed in closed systems fully segregated from the ambient environment; • Ash should be wetted with water to control fugitive dust, where necessary; • All fly ash and APC residues should be treated, e.g. by cement solidification or chemical stabilization, for compliance with the proposed Incineration Residue Pollution Control Limits and leachability criteria prior to disposal; • The ash should be transported in covered trucks or containers to the designated landfill site. 	Operation Period					
6b.6.3.4 - 6b.6.3.6	<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 IWMF operator should be responsible for the cleanup of the affected area. The responses procedures described in Section 6b.6.3.1 and Section 6b.6.3.2 of EIA report should</p>	IWMF Site/ During Operation Period	IWMF Operator			✓	Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land Remediation.



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	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 and the Guidance Note for Contaminated Land and Remediation</i> .							

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning