

This Final Assessment Report has presented a detailed assessment of the potential environmental impacts associated with the construction and operation phases of the proposed San Tin Eastern Main Drainage Channel improvement works, based on the preliminary engineering information available.

Environmental issues assessed include ecology, water quality, solid waste, land contamination, noise, air quality, visual and landscape, and socio-economic, and a summary of individual issues is provided at the end of each section.

Environmental mitigation measures and monitoring and audit requirements have been recommended and listed in the Implementation Schedule in *Table 12.1a*, which will form the basis of the Environmental Permit under the EIA Ordinance.

The findings of the report indicate that with the implementation of the mitigation measures, checked by the monitoring and audit programme, the proposed San Tin Eastern MDC works will fulfill the requirements EIA Ordinance and comply with the established environmental guidelines and standards, and no significant residual environmental impacts are expected.

Table 12.1a Implementation Schedule of Environmental Mitigation Measures and Key EM&A Requirements

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
Air Quality							
1.	Dust	8.4.4.1	Vehicle washing facilities shall be provided at the exit point of the site.	Entrance/exit of site	All period during construction phase	The Contractor	APCR, LS2, Part III. 13
		8.4.4.1	Any debris or materials shall be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the 3 sides.	Whole site	All period during construction phase	The Contractor	APCR, LS2, Part IV. 18
		8.4.4.1	Water spray or dust suppression chemical shall be provided during material handling and excavation.	Whole site	All period during construction phase	The Contractor	APCR, LS2, Part IV. 24
		8.4.4.1	The load on the vehicle shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.	Whole site	All period during construction phase	The Contractor	APCR, LS2, Part IV. 21
2.	Odour	8.4.4.2	Any odorous dredged material shall be placed remote from air sensitive receivers.	Whole site	All period during construction phase	The Contractor	-
		8.4.4.2	Any odorous permitted stockpiled material shall be removed within 2 days of work to reduce the amount of time available for decomposition.	Whole site	All period during construction phase	The Contractor	-
		8.4.4.2	Any odorous permitted stockpiled material shall be covered with plastic tarpaulin sheets in the stockpile area.	Whole site	All period during construction phase	The Contractor	-
3.	Maintenance Dredging	8.5.2	Mitigation measures recommended for the construction phase shall apply to maintenance dredging of existing stream channel.	Whole site	All period during operation phase	The Contractor	-
4.	Monitoring	EM&A 2.7	The 24 hour TSP level monitored at the monitoring station shall be complied with the limit level 260 μgm^3 .	Whole site	All period during construction phase	ET Leader	-
		EM&A 2.7	The hourly TSP level monitored at the monitoring station shall be complied with the limit level 500 μgm^3 .	Whole site	All period during construction phase	ET Leader	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
Noise							
5.	Construction Activities	7.4.4.2 7.4.4.2 7.4.4.2 7.4.4.2 7.4.4.2 7.4.4.2 7.4.4.2	<p>Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the re-profiling works;</p> <p>Plant and mobile plant (ie trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum;</p> <p>Plant known to emit noise strongly in one direction, shall be orientated so that the noise is directed away from the NSRs;</p> <p>Silencers or mufflers on construction equipment shall be utilised and shall be properly maintained during the re-profiling works;</p> <p>Mobile plant shall be sited far away from the NSRs; and</p> <p>Material stockpiles and other structures shall be effectively utilised to screen noise from on-site construction activities.</p> <p>The contractor shall select the models of PMEs that are quieter than standard types given in GW-TM.</p>	Whole site Whole site Whole site Whole site Whole site Whole site Whole site	All period during construction phase All period during construction phase All period during construction phase All period during construction phase All period during construction phase All period during construction phase All period during construction phase	The Contractor The Contractor The Contractor The Contractor The Contractor The Contractor The Contractor	ProPECC PN2/93, EIAO-TM ProPECC PN2/93, EIAO-TM ProPECC PN2/93, EIAO-TM ProPECC PN2/93, EIAO-TM ProPECC PN2/93, EIAO-TM ProPECC PN2/93, EIAO-TM ProPECC PN2/93, EIAO-TM
6.	Operation Activities	7.5.4.1	<p>Considering sensitivity of the Deep Bay buffer zone area, it is recommended that a maximum noise level of $L_{eq,5min}$ 75 dB(A) be achieved at 1 m from the louvre of the pumping station through good engineering design.</p>	Pumping Station	Design and Operational Phases	DSD	NCO, IND-TM
7.	Monitoring	EM&A3 EM&A3 EM&A, Table 3.4a	<p>The baseline noise monitoring shall be carried out.</p> <p>Construction noise monitoring shall be carried out.</p> <p>Operational noise monitoring shall be carried out 1 m from the louvre of the pumping station during commissioning stage.</p>	Monitoring location, NM1 Monitoring location, NM1 Monitoring location NM2	Prior to the commencement of construction All period during construction Phase Commissioning/Operational Phases	ET Leader ET Leader ET Leader	- - -

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
Water Quality							
8.	Construction Excavation of Sediment	4.4.4.3-4	<p>If excavation on wet stream is not avoidable, the following shall be implemented:</p> <ul style="list-style-type: none"> • Minimise disturbance to the stream bed while excavating. • Minimise leakage of excavating material during lifting. • Prevent loss of material during transport of excavated material. • Prevent discharge of excavated material except at approved locations. • To minimise the leakage and loss of sediments during excavation, tightly sealed closed grab excavators shall be employed in river sections where material to be handled is wet. 	Stream Channel	All period during stream channel excavation	The Contractor	-
9.	Construction Works Timing	4.4.4.5	Excavation shall be undertaken during periods of low flow (dry season).	Stream Channel	All period during stream channel excavation	The Contractor	ProPECC PN1/94
10.	Construction Runoff and Drainage	4.4.4.6-8	Exposed soil areas shall be minimised to reduce the potential for increased siltation, contamination of run-off and erosion. In addition, no site run-off shall enter fishponds. Construction run-off impacts associated with above ground construction activities shall be controlled through the use of appropriate mitigation measures which include:	All works area	All period during construction phase	The Contractor	-
		4.4.4.6-8	Temporary ditches shall be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.6-8	The boundaries of earthworks shall be marked and surrounded by dykes or embankments for flood protection.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.6-8	Open material storage stockpiles shall be covered with tarpaulin or similar fabric to prevent material washing away.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
10. (cont'd)		4.4.4.6-8	Exposed soil areas shall be minimised to reduce the potential for increased siltation and contamination of runoff.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.6-8	Earthwork final surfaces shall be well compacted and subsequent permanent work shall be immediately preformed.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.6-8	The use of sediment traps.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.6-8	Adequate maintenance of drainage systems to prevent flooding and overflow.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.7	All temporary drainage pipes and culverts provided to facilitate runoff discharge shall be adequately designed to facilitate rapid discharge of storm flows. All sediment traps shall be regularly cleaned and maintained. The temporarily diverted drainage shall be reinstated to its original condition, when the construction work is completed or the temporary diversion is no longer required.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.8	Sand and silt in wash water from wheel washing facilities shall be settled out and removed before discharge into temporary drainage pipes or culverts. A section of the haul road between the wheel washing bay and the public road shall be paved with backfall to prevent wash water or other site run-off from entering public road drains.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.9	Oil interceptors shall be provided in the drainage system downstream of any significant oil and grease sources. They shall be regularly maintained to prevent the release of oils and grease into the storm water drainage system after accidental spillage. The interceptor shall have a bypass to prevent flushing during periods of heavy rain.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
11.	General Construction Activities	4.4.4.10	Debris and rubbish on site shall be collected, handled and disposed of properly.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		4.4.4.11	All fuel tanks and storage areas shall be provided with locks and placed on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching the downstream.	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
12.	Marine Disposal of Excavated Sediment	4.4.4.12	The decks of all marine dumping disposal barges and floating pontoons shall be kept tidy and free of oil or other substances or articles which might be accidentally or otherwise washed overboard.	Marine dumping route/area	All period during construction phase	The Contractor	-
		4.4.4.12	All off-site vessels and barges shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	Marine dumping route/area	All period during construction phase	The Contractor	-
		4.4.4.12	The works shall cause no visible foam, oil, grease, scum, litter or other objectionable matter to be present on the water at the loading berth or dumping grounds.	Marine dumping route/area	All period during construction phase	The Contractor	-
		4.4.4.12	Water tight trucks shall be used for transportation of marine disposal of excavated material.	Marine dumping route/area	All period during construction phase	The Contractor	-
		4.4.4.13	Additional provisions shall be required upon confirmation that marine sediments are contaminated. Locations and depths of areas of contaminated marine sediments shall be indicated in the construction contract. The Contractor shall ensure that contaminated sediments are excavated, transported and placed in approved special dumping grounds in accordance with relevant Technical circulars.	Marine dumping grounds	All period during construction phase	The Contractor	WBTC No. 22/92 & 6/92, EPD TC No. 1-1-92
		4.4.4.14	Transport of contaminated marine mud to the marine disposal grounds shall be by split barge of not less than 750 m ³ capacity, well maintained and capable of rapid opening and discharge.	Marine dumping grounds	Marine dumping	The Contractor	-
		4.4.4.14	The material shall be placed in the pit by bottom dumping, at a location within the pit specified by the Fill Management Committee.	Marine dumping grounds	Marine dumping	The Contractor	-
		4.4.4.14	Discharge shall be undertaken rapidly and the hoppers shall then immediately be closed, material adhering to the sides of the hopper shall not be washed out of the hopper and the hopper shall remain closed until the barge next returns to the disposal site.	Marine dumping grounds	Marine dumping	The Contractor	-
		4.4.4.14	The dumping vessel shall be stationary throughout the dumping operation.	Marine dumping grounds	Marine dumping	The Contractor	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
12. (con'd)		4.4.4.14 4.4.4.14 4.4.4.14 4.4.4.14	The Contractor must be able to position the dumping vessel to an accuracy of +/- 10 m. Barge loading shall be monitored 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 EPD. The Contractor shall follow procedures as outlined in the Guidance Note for Dumping and Additional Conditions on Disposal of Contaminated Marine Mud at East Sha Chau Contaminated Mud Disposal Pits.	Marine dumping grounds Marine dumping grounds Marine dumping grounds Marine dumping grounds	Marine dumping Marine dumping Marine dumping Marine dumping	The Contractor The Contractor The Contractor The Contractor	- - - -
13.	Sewage Effluents	4.4.4.15	Construction work force sewage is expected to be handled by portable chemical toilets along the alignment if connection to a public sanitary sewer system is not feasible. Appropriate and adequate portable toilets shall be provided by licensed contractors who shall be responsible for appropriate disposal and maintenance of these facilities.	All works area	All period during construction phase	The Contractor	ProPECC PN 1-94
14.	Maintenance Dredging	4.5.4.1 4.5.4.2	Maintenance dredging of existing stream channel shall be undertaken in dry season unless during emergency. For works involving maintenance dredging of existing stream channel (the removal of silt and other materials), a system of containment or isolation must be specified to prevent water, heavily contaminated with the removed material from being carried downstream into Deep Bay.	Whole Eastern MDC Whole Eastern MDC	All period during Operation phase Design and Operation phases	DSD DSD	- -
15.	Monitoring	EM&A 4.5 EM&A 4.6	The baseline water quality monitoring shall be carried out. Construction phase water quality monitoring shall be carried out.	Monitoring locations, WM1, WM2, WM3 and WM4 Monitoring locations, WM1, WM2, WM3 and WM4	Prior to the commencement of construction All period during construction Phase	ET Leader ET Leader	- -

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
Waste Management							
16.	General	5.4.5.2	<ul style="list-style-type: none"> Training and instruction shall be given to construction staff to increase awareness and draw attention to waste management issues and the need to minimise waste generation. The Contractor shall prepare an on-site waste management plan of the construction works which should take into account the recommended mitigation measures in the EIA report. Site specific factors such as the designation of areas of segregation and temporary storage of reusable and recyclable materials should be incorporated. 	<p>All works area</p> <p>All works area</p>	<p>All period during construction phase</p> <p>Before construction phase</p>	<p>The Contractor</p> <p>The Contractor</p>	-
17.	Storage, Collection and Transportation of Waste	5.4.5.3	<ul style="list-style-type: none"> Wastes shall be handled and stored in a manner to ensure that they are held securely without loss or leakage. 	All works area	All period during construction phase	The Contractor	Public Health and Municipal Services Ordinance (PHMSO)
		5.4.5.3	<ul style="list-style-type: none"> Licensed waste hauliers shall be used and they shall only collect wastes prescribed by their permits. 	Waste / Refuse Storage areas	All period during construction	The Contractor	-
		5.4.5.3	<ul style="list-style-type: none"> Wastes shall be removed. 	Waste Storage areas	Daily during construction phase	The Contractor	PHMSO
		5.4.5.3	<ul style="list-style-type: none"> Waste storage areas shall be maintained and cleaned on a daily basis. 	Waste Storage areas	All period during construction phase	The Contractor	-
		5.4.5.3	<ul style="list-style-type: none"> Windblown litter and dust during transportation shall be minimised by either covering trucks or transporting wastes in enclosed containers. 	Waste handling trucks	After waste collection & before trucks leaving the construction site	The Contractor	Public Cleansing & Prevention of Nuisances By-laws

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
17. (con'd)		5.4.5.3	<ul style="list-style-type: none"> The necessary waste disposal permits from the appropriate authorities. 	-	Before construction of the Eastern MDC	The Contractor	Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), the Land (Miscellaneous Provisions) Ordinance (Cap 28), Dumping At Sea Ordinance (Cap 466) and Works Branch Technical Circular No. 22/92, Marine Disposal of Dredged Mud
		5.4.5.3	<ul style="list-style-type: none"> Wastes shall be disposed of at licensed waste disposal facilities. 	-	All period during construction phase	The Contractor	
		5.4.5.3	<ul style="list-style-type: none"> develop procedures such as a ticketing system to facilitate tracking of loads, particularly for chemical waste, and to ensure that illegal disposal of wastes does not occur; and 	-	All period during construction phase	The Contractor & ET Leader	
		5.4.5.3	<ul style="list-style-type: none"> maintain records of the quantities of wastes generated, recycled and disposed. 	-	All period during construction phase	The Contractor & ET Leader	
18.	Construction and Demolition Waste	5.4.5.5	<ul style="list-style-type: none"> Careful design, planning and good site management shall be adopted to minimise over-ordering and generation of waste materials such as concrete, mortars and cement grouts. 	All works area	All period during construction phase	The Contractor	
		5.4.5.7	<ul style="list-style-type: none"> The handling and disposal of bentonite slurries shall be undertaken in accordance with <i>Practice Note for Professional Persons - Construction Site Drainage</i> (ProPECC PN 1/94) on construction site drainage. 	All works area	All period during construction phase	The Contractor	ProPECC PN 1/94
		5.4.5.8	<ul style="list-style-type: none"> Cover open stockpiles of construction and demolition materials, and temporarily exposed slope by tarpaulin or similar fabric, particularly during rainy season. 	All works area	All period during construction phase	The Contractor	

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
18 (cont'd)		5.4.5.9 and 5.4.5.6	<ul style="list-style-type: none"> Construction and demolition material shall be segregated to inert and non-inert parts. The inert portion shall be re-used at areas of reclamation or land formation, or to public filling area shall such allocation is deemed necessary. The non-inert portion shall be disposed of to landfill. 	All works area	All period during construction phase	The Contractor	Works Branch Technical Circular 5/98
19.	Chemical Waste	5.4.5.12	<ul style="list-style-type: none"> Chemical waste produced shall be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>. 	Chemical waste arising points	All period during construction and operation phase.	The Contractor	Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
		5.4.5.13	<ul style="list-style-type: none"> Containers used for the storage of chemical wastes shall be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 litres unless the specifications have been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in <i>Schedule 2 of the Chemical Waste Regulations</i>. 	Chemical waste arising points	All period during construction phase	The Contractor	
		5.4.5.14	<ul style="list-style-type: none"> The chemical waste storage area shall be clearly labelled and used solely for storage of chemical waste, enclosed on at least 3 sides; have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% of the total volume of waste stored in that area; have adequate ventilation; be covered to prevent rainfall entering; and be arranged so that incompatible materials are adequately separated. 	Chemical waste storage area	All period during construction phase	The Contractor	
		5.4.5.15	<ul style="list-style-type: none"> Disposal of chemical waste shall be via a licensed waste collector; and to a facility licensed to receive chemical waste; or to a re user of waste. 	Chemical waste storage area	All period during construction phase	The Contractor	Waste Disposal Ordinance (Chemical Waste) General Regulation
20.	General Refuse	5.4.5.17	<ul style="list-style-type: none"> General refuse generated on-site shall be stored in enclosed bins separate from construction and chemical wastes. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily or every second day basis to minimise odour, pest and litter impacts. The burning of refuse on construction sites is prohibited by law. 	All works area	All period during construction phase	The Contractor	PHMSO & Air Pollution Control (Opening Burning) Regulation

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
20. (cont'd)		5.4.5.18 5.4.5.19	<ul style="list-style-type: none"> General refuse shall be generated largely by food service activities on site, so reusable rather than disposable dishware shall be used if feasible. Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible; separate, labelled bins for their deposit shall be provided if feasible. Office wastes can be reduced through recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme shall be considered if one is available. 	All works area All works area	All period during construction phase All period during construction phase	The Contractor The Contractor	- -
21.	Dust	5.4.5.20	<ul style="list-style-type: none"> Wetting the surface of the stockpiled soil with water in dry season unless during emergency; covering the stockpile soil with sheets; minimising disturbance of the stockpile soil; and enclosure of the stockpiling area. 	All works area	All period during construction phase	The Contractor	-
22.	Water Quality	5.5.5.20	<ul style="list-style-type: none"> There shall be a separate surface water drainage system for the stockpiling area; silt traps shall be installed for surface water drainage system and the stockpile material shall be covered with tarpaulin during heavy rainstorm. 	All works area	All period during construction phase	The Contractor	-
23.	Excavated Materials/ Contaminated Sediment	5.4.5.21 5.4.5.21	<ul style="list-style-type: none"> Sampling and analysis of the sediment to confirm the level of contamination is required prior to construction of the MDC. A Sediment Quality Report shall be submitted to FMC and EPD for allocation of final disposal site and issuance of disposal permit. This is to ensure that specific disposal requirements and precautionary handling procedures can be determined; DSD to advice FMC on the quantity and quality of the contaminated sediment arising during the detailed design stage. The use of bulk earth-moving equipment to minimise the contact of contaminated material with construction workers; Minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities and preventing eating during excavation; 	Proposed sediment sampling points of MDC All excavation/dredging area All excavation/dredging area	Before construction phase During excavation/dredging of MDC During excavation/dredging of MDC	The Contractor The Contractor The Contractor	WBTC No. 22/92 and EPD TC NO. 1-1-92. - -

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
23. (cont'd)		5.4.5.21 5.4.5.21 5.4.5.21 5.4.5.21 5.4.5.21 5.4.5.21	<ul style="list-style-type: none"> Any contaminated mud or sediment excavated shall not be allowed to stockpile on site and shall be immediately removed from site once excavated; Excavated sediment shall be transported by water-tight trucks to potential marine barging points, then to sea going barges for transfer to designated marine disposal grounds; Permitted waste hauliers shall be used to collect and transport contaminated sediments for disposal; All vessels for marine transportation of excavated sediment shall be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and Loading of barges and hoppers shall be controlled to prevent splashing of excavated material to the surrounding water, and barges or hoppers shall under no circumstances to be filled to a level which shall cause the overflowing of materials or polluted water during loading or transportation. The decks of any off-site barges (for disposal to marine dumping grounds) and floating pontoons shall be kept tidy and free of oil or any other substances or articles which might be accidentally or otherwise washed overboard. 	All excavation/ dredging area All excavation/ dredging area All excavation/ dredging area All excavation/ dredging area All excavation/ dredging area All excavation/ dredging area	During excavation/ dredging of MDC During excavation/ dredging of MDC During excavation/ dredging of MDC During excavation/ dredging of MDC During excavation/ dredging of MDC	The Contractor The Contractor The Contractor The Contractor The Contractor	- Water Pollution Control Ordinance - Water Pollution Control Ordinance Water Pollution Control Ordinance
24.	Sediment excavated from Maintenance Dredging	5.5.3.1	<ul style="list-style-type: none"> Desilting of channel sediment shall be conducted in dry season unless during emergency. 	All excavation/ dredging area	During operational phase	DSD	ProPECC 3/94

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
Ecology							
25.	Habitat Mitigation	3.6.4.2	Isolate working area from remainder of TOAs and other temporarily affected ponds by constructing earth bund across ponds within the works boundary 50 m from the west edge of the Eastern MDC (see Figure 3.6e for location of bund). Do not drain pond areas outside the 50 m limit during bund construction, or refill them immediately following bund construction.	All TOAs and all other fish ponds drained down for project construction at Eastern MDC works site	Design and Construction Stage	The Contractor	-
		3.6.4.5	Remove bunds, reinstate and rewater the 50 m wide working area portion of the affected ponds upon completion of construction. Provision of access for operating fish ponds affected by the project.	Eastern embankment of Eastern MDC	Already accomplished (design stage)	DSD	-
		3.6.4.6	Design and construction of flood storage pond at San Tin Villages: grasscrete sides at 1 in 2 slope, concrete bottom.	Flood Storage pond, San Tin Villages	Design and construction stage	DSD	-
		3.6.4.6 - 3.6.4.8	Management of flood storage pond at San Tin Villages: Maintain water depth of 0.3 to 0.85m through pond design and pump operation except during maintenance or exceptional circumstances Allow up to 150 mm of sediment to accumulate on bottom Avoid dredging clear to bottom Allow vegetation to colonise banks Cut back vegetation only on maintenance-need basis Allow fish to colonise pond naturally	Flood storage pond, San Tin Villages	Throughout operational lifetime of pond	DSD	-
		3.6.4.9	Maintenance of Tsing Lung Tsuen drainage channel: Do not cut back vegetation along sides of channel except as required for channel maintenance	Channel outside San Tin Villages polder	Throughout operational lifetime of channel	DSD	-
		3.6.4.10	Design and construction of tidal portion of Eastern MDC: Grasscrete sides at 1 in 2 slope; earthen bottom in channel	Eastern MDC downstream of inflatable dam	Project design and construction phases	DSD and TDD (design) The Contractor (construction)	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
25. (cont'd)		3.6.4.10 3.6.4.11- 3.6.4.12; <i>Annex 3-J</i>	Maintenance of tidal portion of Eastern MDC: Minimise cutting back of vegetation to lowest levels compatible with maintaining flood capacity. Minimise dredging of channel bottom in this zone to lowest levels compatible with maintaining flood capacity Design, construction and management of constructed wetland area east of Eastern MDC: to provide wetland habitats useful to wildlife, with varied water depth, and planting of wetland vegetation and trees/bamboos; details as specified in <i>Annex 3-J</i>	Eastern MDC downstream of inflatable dam Location shown in EIA Report <i>Figure 3.6e</i> , east of Eastern MDC and west of San-Sham Road	Throughout operational lifetime of channel Construction of wetlands simultaneous with or immediately on completion of Eastern MDC construction. Management to begin upon completion of wetland construction and to continue throughout lifetime of channel.	DSD DSD and TDD (design) The Contractor (earthworks, vegetation) DSD (maintenance of outlet pipes and flag valves) Lands Dept. (lands administration) AFD (vegetation management)	- -
		3.6.4.13 3.6.4.15 and <i>Annex 3J</i>	Design of Eastern MDC upstream of inflatable dam: Grasscrete lining of channel except DWF channel; channel banks at 1 in 2 slope Hydroseeding of outer embankments of Eastern MDC Plant stands of bamboos and trees at sites along Eastern MDC embankments as shown in <i>Figure 3.6e</i> ; species and density as described in <i>Annex 3-J</i> Replace any dead plantings during one-year establishment period with species approved by TDD and AFD.	Eastern MDC upstream of inflatable dam At sites along Eastern MDC as marked in Final EIA Report, <i>Figure 3.6e</i>	Project design and construction phases Simultaneous with or immediately following completion of channel construction	DSD and TDD (design) and The Contractor (construction) DSD and TDD (design); The Contractor (implementation including establishment phase)	- -
26.	Water quality	3.6.4.20 - 3.6.4.21	Water quality control measures: Implement and enforce water quality control measures outlined in Implementation schedule for water section Dredging of existing stream channel shall only be undertaken in dry season unless during emergency conditions.	On works site	During construction phase	The Contractor	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
27.	Wildlife disturbance	3.6.4.22	Noise and disturbance control measures: Restrict movements of construction equipment and site workers to areas within the site boundary (including Temporary Works Areas) and approved entry/exit points under terms of contract; supervision by contractor. ET to brief site workers on the need to remain within the site and avoid disturbance to surrounding habitats. Tape off excavation areas. Implement and enforce measures recommended in Implementation Schedule item 5.	On works site	During construction phase	The Contractor and ET Leader	-
28.	Habitat mitigation	3.6.5.2	Maintenance of Eastern MDC: Minimise dredging frequency and clearance of in-channel vegetation without compromising flood capacity of channel to unacceptable levels. Conduct dredging of existing stream channel only in dry season except under emergency conditions; follow relevant guidelines in the Water section of the Implementation Schedule during dredging.	Eastern MDC	Throughout operational lifetime of channel	DSD	-
		3.6.5.4 and 3.6.4.19	Operation of inflatable dam in Eastern MDC: Periodic review of dam operation in relation to ecological value of the Eastern MDC, as specified in EM&A Manual Section 6.2.1.	Eastern MDC	Throughout operational lifetime of channel	DSD and TDD/Appointed ecologist (first three years); to be determined thereafter	-
29.	Habitat mitigation - Monitoring	EM & A 6.2.1 Task 1	Monitoring of bird use of San Tin Villages flood storage pond Methodology as per EM&A Manual.	San Tin Villages flood storage pond (see Final EIA Report, Figure 3.6c for location)	4 times per year for first 3 years of pond operation	Appointed ecologist /TDD	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
29. (cont'd)		EM & A 6.2.1 Task 2	Monitoring of bird use of tidal portion of Eastern MDC Methodology as per EM&A Manual.	Equal areas downstream and upstream of inflatable dam on Eastern MDC (see Final EIA Report, Figure 3.6e for location)	4 times per year for 3 years following completion of construction	Appointed ecologist /TDD	-
		EM & A 6.2.1 Task 3	Monitoring of fish and invertebrates in constructed wetland area east of Eastern MDC Methodology as per EM&A Manual.	As described in EM&A Manual Section 6.2.1.3, paras. 2-4	2 times per year for a period of 3 years following completion of construction of wetland	Appointed ecologist /TDD	-
		EM & A 6.2.1 Task 4	Monitoring of bird use of constructed wetland area and Eastern MDC Methodology as per EM&A Manual.	Transect alignment to extend the length of the eastern embankment of the Eastern MDC In Eastern MDC	4 times per year for 3 years starting from completion of the constructed wetland area	Appointed ecologist /TDD	-
		EM & A 6.2.1 Task 5	Monitoring of maintenance regime of Eastern MDC Methodology as per EM&A Manual.		1 time per year for first 2 years of channel operation, thereafter at appropriate intervals throughout operational lifetime of channel based on DSD experience during the first 2 years.	DSD	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
Land Contamination							
30.	General	6.4.3.1	Determine the potential extent of any land contamination by developing a current Contamination Assessment Plan (CAP) for sites to be investigated. This CAP will be prepared and approved by EPD prior to site investigation. Depending on the investigation requirements, a contamination assessment report (CAR) will be prepared after contamination investigation activities have concluded.	Selected portions of site(s) which require specific contamination investigation	Prior to construction phase (as required)	DSD	ProPECC PN3/94, EIAO TM,
		6.6.1.1-7	Prepare the CAP for approval prior to the construction phase. Upon completion of subsequent CAR, discuss the results and data with EPD to determine the most appropriate course of action (which may or may not include mitigation works).	Selected portions of site(s) which have specific contamination investigations	Prior to construction phase (as required); and prior to development as required	DSD	Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), Construction Sites (Safety) Regulations (Chapter 59)
		Annex 6-A	Perform the typical site investigation activities as per the CAP presented in Annex 6-A (to be approved by EPD), and in accordance with applicable guidelines such as the ProPECC PN3/94 Guidance note.	Selected portions of site(s) which require specific contamination investigation	Prior to construction phase (as required);	DSD	ProPECC PN 3/94
		6.6.1.8	No soils shall be stockpiled. If this cannot be avoided, they shall be covered with tarpaulin to minimise the potential for run-off and prevent any pollution, especially during heavy rainstorms	Whole Site	All period during construction phase	The Contractor	-
		6.6.1.8	Vehicles containing any contaminated materials shall be covered to limit potential dust emissions, or contaminated wastewater run-off during transportation or under wet conditions	Whole Site	All period during construction phase	The Contractor	-
		6.6.1.8	All appropriate licenses and permits shall be obtained for working with contaminated material in accordance with appropriate regulations.	Whole Site	Design phase	DSD	-
		6.6.1.8	All excavation activities in contaminated areas and the handling of contaminated groundwater shall be performed by the contractor and observed and directed, as required, by the environmental specialist.	Whole Site	All period during construction phase	The Contractor	-
		6.6.1.8	Only licensed contractors shall be utilised for hauling the contaminated soil to the specified disposal location, and specific operational procedures shall be implemented for the activities.	Whole Site	All period during construction phase	The Contractor	-

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
30. (cont'd)		6.6.1.8	Liaison shall be maintained with EPD to ensure that all excavation activities have been performed sufficient to EPD's requirements.	Whole Site	All period during construction phase	The Contractor	-
		6.6.1.8	If the size of the excavation increases, engineering and other concerns may limit the depth or extent of excavation along the property boundaries, as required. Decisions on this matter shall be addressed by appropriate works contractor's engineering personnel and the environmental specialist as required, based on field conditions.	Whole Site	All period during construction phase	The Contractor	-
		6.6.1.8	Procedures shall be developed to ensure that illegal disposal of wastes does not occur, and records of quantities of wastes generated and disposed of shall be maintained.	Whole Site	All period during construction phase	DSD/The Contractor	-
31.	Health & Safety/ Contamination Exposure During Construction Works	6.4.3.2	No unauthorised persons shall be allowed into the work area, and necessary precautions shall be taken to prohibit unauthorised entry to the Site or works areas.	Whole Site	All period during construction phase	The Contractor	ProPECC PN3/94 Construction Sites (Safety) Regulations (Chapter 59)
		6.4.3.2	Eating, drinking, smoking or any practice that increases the probability of hand to mouth transfer and ingestion of material is prohibited in any area designated as being contaminated.	Whole Site	All period during construction phase	The Contractor	
		6.4.3.2	Food, beverages, tobacco products, etc. are prohibited in any area designated as being contaminated. Adequate warning signs shall be posted to this effect.	Whole Site	All period during construction phase	The Contractor	
		6.4.3.2	Hands must be thoroughly washed upon leaving the work area, and before eating, drinking or any other activities.	Whole Site	All period during construction phase	The Contractor	
		6.4.3.2	Specific work areas for various operational activities shall be established. Any excavation shall be roped off or appropriately secured to prevent unauthorised entry.	Whole Site	All period during construction phase	The Contractor	
		6.4.3.2	Contact with contaminated surfaces or with surfaces suspected of being contaminated shall be avoided. Whenever possible, one shall not walk through puddles, mud or other discoloured surfaces; kneel on the ground; lean, sit or place equipment on drums, containers, vehicles or the ground.	Whole Site	All period during construction phase	The Contractor	
		6.4.3.2		Whole Site	All period during construction phase	The Contractor	

No.		Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
31.	(cont'd)		6.4.3.2	No trench or other excavation greater than 1m deep shall be entered unless the atmosphere has been tested and found to be safe, or the sides of the excavation have been shored up or prepared in such a way, as required, to remain stable. Personnel and equipment in the contaminated area shall be minimised, consistent with effective site operations.	Whole Site	All period during construction phase	The Contractor	
			6.4.3.2	During site operations with contaminated soil, all field personnel must be on the alert for potentially hazardous materials including odorous solids or liquids, and accumulations or seepages of liquids which are tarry, oily, fuming, bubbling, or discoloured. Adequate first aid kits shall be present on site.	Whole Site	All period during construction phase	The Contractor	ProPECC PN3/94 Construction Sites (Safety) Regulations (Chapter 59)
			6.4.3.2		Whole Site	All period during construction phase	The Contractor	
			8.4.5.1	The use of dust control measures, such as water sprays, shall be employed to minimise dust emissions and the possible spread of contamination during dry, dusty or windy conditions.	Whole Site	All period during construction phase	The Contractor	
			6.4.3.2	Prior to starting work workers shall determine the location of the nearest telephone and washing facilities. If accidental contact is made with hazardous or unknown chemicals the contact point shall immediately be washed, and if necessary, medical aid sought.	Whole Site	All period during construction phase	The Contractor	

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
32.	Contaminated Soil Disposal	6.6.1.8	All soil disposal activities shall be subject to the conditions and approval of the Facilities Management Group, under the authority of the EPD.	Whole Site	All period during construction phase	The Contractor	ProPECC PN3/94
		6.6.1.8	A record of all correspondence with the Facilities Management Group regarding the disposal of soils from this site shall be maintained.	Whole Site	All period during construction phase	The Contractor	EIAO TM, Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), Construction Sites (Safety) Regulations (Chapter 59)
		6.6.1.8	All contaminated soil shall be disposed of at the designated landfill subject to approval of the EPD and Facilities Management Group.	Whole Site	All period during construction phase	The Contractor	
		6.6.1.8	For contaminated soil disposal, trip tickets shall be issued to ensure proof of disposal at the landfill facility.	Whole Site	All period during construction phase	The Contractor	
		6.6.1.8	All trucks/lorries leaving the site containing contaminated materials shall be sheeted/covered to limit potential dust emissions in dry conditions, and contaminated waste water run-off under wet conditions.	Whole Site	All period during construction phase	The Contractor	
		6.6.1.8	Wheel washing of vehicles leaving the site shall be undertaken to ensure that any contaminated materials or dusts are not carried over onto the public highway.	Whole Site	All period during construction phase	The Contractor	
		6.6.1.8	Upon completion of the soil excavation activities, additional confirmatory soil samples shall be collected, as required, for analysis.	Whole Site	All period during construction phase	The Contractor	
		6.6.1.8	Upon completion of the soil excavation programme, clean fill material may be imported and placed in the excavations as required, to bring the site level to grade.	Whole Site	All period during construction phase	The Contractor	

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
33.	Contaminated Groundwater Disposal (if required)	6.6.1.8	<p>A discharge license shall be obtained from EPD for the disposal of any groundwater from the site in accordance with the appropriate protocols to meet applicable regulations.</p> <p>The contractor shall ensure that surface waters and run-off are diverted around any areas currently being worked, to minimise potential run-off into the excavation, thereby increasing the volume of groundwater requiring potential disposal. This includes blocking or protecting surface drains to prohibit any uncontrolled discharges.</p> <p>Surface run-off may contain increased sediment loads, suspended solids, or contaminants. The contractor shall control site run-off to prevent high levels of suspended solids from entering surrounding waters through the use of appropriate mitigation measures such as sediment traps.</p> <p>Groundwater shall be pumped at such a rate as to ensure that it does not create ground stability and subsidence problems for the surrounding work areas or any buildings. The actual rate of pumping, if required, shall be dependant upon field observations and following discussion with the environmental specialist and the contractor's engineers.</p> <p>Where the level of contamination of groundwater encountered is found to be below the specified levels in the WPCO required treatment, the groundwater shall be discharged, as required directly through a flexible hose or pipeline. Prior agreement with the EPD Local Control Office is required.</p>	Whole Site	All period during construction phase	The Contractor	ProPECC PN3/94, EIAO TM, Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), Water Pollution Control Ordinance (WPCO) Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM).
		6.6.1.8		Whole Site	All period during construction phase	The Contractor	
		6.6.1.8		Whole Site	All period during construction phase	The Contractor	
		6.6.1.8		Whole Site	All period during construction phase	The Contractor	
		6.6.1.8		Whole Site	All period during construction phase	The Contractor	

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
34.	Contaminated Groundwater Disposal (if required)	6.6.1.8	Where groundwater is found to exceed the requirements of the WPCO, the groundwater shall be pumped from the excavation, and such other treatment that may be necessary as required by the EPD, into a temporary storage tank via an oil water interceptor or via an oil boom to ensure that all floating product is removed from the surface of the water. While no measurable free product is not expected in groundwater at the site, any separated oil or product that is recovered during groundwater pumping activities shall be disposed of at a suitable oil recycling/disposal facility such as the Government Chemical Waste Treatment Centre at Tsing Yi.	Whole Site	All period during construction phase	The Contractor	ProPECC PN3/94, EIAO TM, Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), Water Pollution Control Ordinance (WPCO), The disposal of waste oil is controlled by the Waste Disposal (Chemical Waste) (General) Regulation.
		6.6.1.8	A sample of water shall be collected from any storage tank for appropriate chemical analysis (i.e. TPH) after passing through the oil water separator, prior to disposal, to confirm that there is no oil contamination. Further treatment shall be required if the water does not meet the WPCO standards.	Whole Site	All period during construction phase	The Contractor	
		6.6.1.8	Groundwater shall be pumped until an acceptable level of TPH or other contaminants, as warranted, is noted within the groundwater, as agreed with EPD prior to the commencement of any abstraction programme.	Whole Site	All period during construction phase	The Contractor	
35.	Future Issues	6.6.1.8	Follow appropriate protocols	Whole Site	All period during construction phase or operational phase, as necessary	The Contractor	Various

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Relevant Legislation and Guidelines
<i>Landscape and Visual</i>							
36.	Planting to eastern embankment and constructed wetland (and associated planting)	9.9.1.1, 3, 9.9.2.1	Planting to assist screening function of border crossing area and also to assist to provide an ecological and landscape resource within the constructed wetland, with consideration given to early planting. The PELBTC No. 3/94 Tree Preservation should be followed in the design process.	Eastern embankment to perimeter of Lok Ma Chau border crossing	During design and construction phase	The Contractor	-
37.	Planting to western embankment	9.9.1.2, 3, 9.9.2.1	Planting to reflect existing fish pond group/individual tree/shrub groupings and ecological mitigation in design and species selection, with consideration given to early planting.	Western embankment	During construction phase	The Contractor	-
38.	Pumping station design and detailing	9.9.1.4	Design pumping station building to reflect the scale of other buildings/structures in the local area.	Pumping station	Design stage of pumping station	DSD	-
39.	Soil Conservation	9.9.2.1	Considerations should be given to undertake landscaping works early in the construction phase, as well as to as conserve soil as a planting medium, such as from pond-bund materials.	Whole site	All period during construction	The Contractor	-
40.	Planting Work Monitoring	EM&A 6.2.1 Task 6	Monitoring of the planting work for the ecological and landscape mitigation shall be undertaken.	Planting to eastern embankment, constructed wetland and western embankment	Once per year for first 3 years of operation	TDD / Appointed consultant	-

Notes:

DSD = Drainage Service Department

EM & A = Agreement No CE 43/96 Main Drainage Channels and Poldered Village Protection Scheme for San Tin, NWNT: Environmental Impact Assessment Study - Environmental Monitoring and Audit Manual

ET Leader = Environmental Team Leader

EIA = Agreement No CE 43/96 Main Drainage Channels and Poldered Village Protection Scheme for San Tin, NWNT: Environmental Impact Assessment Study - Final Assessment Report

GW-TM = General Works Technical Memorandum

PELBTC = Planning Environmental Lands Bureau Technical Circular

PME = Powered Mechanical Equipments

TDD = Territory Development Department

Commitment given by responsible department to undertake the items in the Implementation Schedule as agreed in the meeting on 24 March 1999 attended by TDD, EPD, DSD and AFD, as well as in correspondence from Lands Department, Ref. (28) in DLOYL 141/YRN/61 AIII, dated 23 February 99, and Agriculture & Fisheries Department, Ref. () in AF DVL 12/34 IIJ, dated 5 March 99.