

ANNEX A ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains From West Kowloon to Sai Ying Pun -Investigation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Water Quality						
3.8.1	2.9	<p>Specific Mitigation Measures for Dredging</p> <p>Exceedances of WSD Seawater Intake criterion (10 mg L⁻¹) at Kowloon South Salt Water Pumping Station was predicted during both dry and wet seasons if dredging was undertaken near West Kowloon. To minimise the potential SS impact, implementation of the following mitigation measures is recommended:</p> <ul style="list-style-type: none"> - Dredging should be undertaken using one grab dredger only with a maximum production rate of 4,000m³ per day; - Deployment of frame type silt curtain to fully enclose the grab while dredging work are in progress. - Deployment of silt screen at the sea water intake at Kowloon South Salt Water Pumping Station while dredging works are in progress. <p>The frame type silt curtain should be designed to enclose local pollution caused by the grab dredger and suspended by a steel frame mounted on the grab dredger and floating on water. This frame type silt curtain should be fabricated from permeable, durable, abrasion resistant membrane like geotextiles and be mounted on a floating boom structure. The frame type silt curtain should also extend to the seabed to cover the entire water column. Steel chain or ballast should be attached to the bottom of the silt curtain. Mid-ballast may be added as necessary. The structure of the silt curtain should be maintained by metal grids. The frame type silt curtain should be capable of reducing sediment loss to outside by a factor of 4 (or about 75%). Silt screen is recommended for dredging near the seawater intake at Kowloon South Salt Water Pumping Station. The implementation of silt screen at the intake could reduce the SS level by a factor of 2.5 (or about 60%). These SS reduction factors have been adopted in the Wan Chai Development Phase II Environmental Impact Assessment Study in 2001. An illustration of a typical configuration of frame type silt curtain and silt screen at seawater intake is shown in Figure 3.9.</p>	WSD's Contractor	Construction Work Sites (Along the alignment of dredging)	During Marine Construction works	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO

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3.8.1	2.9	<p>Other Mitigation Measures for Dredging</p> <p>Good Site Practices are recommended to further reduce the potential water quality impacts from the construction works, especially during dredging.</p> <ul style="list-style-type: none"> • Tight-closing grabs should be used to minimize the loss of sediment to suspension during dredging works. For dredging of any contaminated mud, closed watertight grabs must be used; • 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 by turbulence from vessel movement or propeller wash; • the decks of all vessels should be kept tidy and free of oil or other substances that might be accidentally or otherwise washed overboard; • adequate free board shall be maintained on barges to ensure that decks are not washed by wave action; • all barges used for the transport of dredged materials should be fitted with tight bottom seals to prevent leakage of material during loading and transport; • construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present in the water within the site or dumping grounds; • loading of barges should be controlled to prevent splashing of material into the surrounding waters. Barges should not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation; 				
		<ul style="list-style-type: none"> • the speed of vessels should be controlled within the works area to prevent propeller wash from stirring up the seabed sediments; and • before commencement of dredging works, the holder of the Environmental Permit should submit detailed proposal of the design and arrangement of the frame type silt curtain to EPD for approval. 				

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3.8.1	2.9	<p>Effluent from Hydrostatic Tests of the Water Mains System</p> <p>To ensure compliance with the standards for effluent discharged into the inshore waters or marine waters of Victoria Harbour WCZ as shown in Tables 9a and 9b of the TM-DSS and Section 23.73 and 23.77 of the General Specification for Civil Engineering Works Volume 3, 1992 Edition, sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m³ capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity should be flexible and suited to applications where the influent is pumped. Pre-treatment including dechlorination such as by physical process e.g. adsorption by activated carbon filter, or chemical process e.g. neutralisation by dechlorination agent dosing should be carried out to ensure compliance with the discharge requirements stipulated in TM-DSS.</p>	WSD's Contractor	Construction Work Sites (General)	During Hydrostatic Tests	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO
3.8.1	2.9	<p>Surface Runoff, Sewage and Wastewater from Construction Activities</p> <p>Appropriate measures should be implemented to control runoff and prevent high loads of SS from entering the marine environment. Proper site management is essential to minimise surface runoff and sewage effluents.</p> <ul style="list-style-type: none"> Construction site runoff should be prevented or minimised in accordance with the guidelines stipulated in the EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). All discharges from the construction site should be controlled to comply with the standards for effluents discharged into the Victoria Harbour WCZ under the TM-DSS. Good housekeeping and stormwater best management practices, as detailed below, should be implemented to ensure all construction runoff complies with WPCO standards and no unacceptable impact on the WSRs as a result of construction of the proposed submarine watermain; Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m³ capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity should be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped; Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the storm runoff being directed into foul sewers; 	WSD's Contractor	Construction Work Sites (General)	During Construction works	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO

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		<ul style="list-style-type: none"> • All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and located wheel washing bay should be provided at every site exit, and wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfill toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains; • Precautions should be taken at any time of year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecast. Actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, particularly for areas located near steep slopes; • Fuel tanks and storage areas should be provided with locks and be located 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 coastal waters of the Victoria Harbour and Western Harbour WCZs; • Portable chemical toilets should be used to handle construction workforce sewage prior to discharge to the existing trunk sewer. Sufficient numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers. The Contractor shall also be responsible for waste disposal and maintenance practices. 				
Ecology						
4.8	3	Other mitigation measures suggested in the water quality impacts assessment such as the use of one grab dredger only with a maximum production rate of 4,000m ³ per day for dredging, deployment of frame type silt curtain to fully enclose the grab while dredging works are in progress, deployment of silt screen at the sea water intake at Kowloon South Salt Water Pumping Station while dredging works are in progress and good site practices to avoid silt runoff from construction works associated with the construction of the submarine watermain should be implemented to further reduce the impact on the marine ecology.	WSD's Contractor	Construction Work Sites (Along the alignment of dredging)	During Marine Construction works	EIAO
Noise						

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5.6.1	4.8	<p>Work Schedule Rearrangement</p> <p>Concurrent works should be such that necessary noisy works should be carried out at different time slots or spread around the construction sites. This will help to reduce the cumulative noise effect produced in the construction process.</p> <p>If night-time (2300 to 0700 hours) dredging is required, the work shall be scheduled to carry out at a distance as far as possible to the NSRs. It is determined that the dredging work should be carried out at a location 750m away from the Sai Ying Pun landfall site and 450m from the West Kowloon landfall site along the trench as shown in the Figure 5.5 of the EIA Report. The Contractor shall adhere to the restricted locations of dredging work at night-time to comply with relevant noise standard.</p>	WSD's Contractor	Construction Work Sites (Along the alignment of dredging)	During Marine Construction works	PN 2/93 Noise from Construction Activities & EIAO
5.6.2	4.8	<p>Using Quality PME</p> <p>The use of Quality PME recognized by the Noise Control Authority for the purpose of CNP application can effectively reduce the noise generated from the construction plants. Quality PME are construction plants and equipments that are notably quieter, more environmental friendly and efficiently. The noise level reduction ranges from 5 – 10 dB(A) depending on the type of equipment used. The Contractor shall note the required procedures involved in application of the QPME.</p>				
5.6.3	4.8	<p>Using Noise Barriers</p> <p>Mobile or movable noise barriers to be erected near to the construction plants would reduce the noise levels for commonly 5 – 10 dB(A) depending on the types of items of PME and materials of the barriers. It is recommended that the Contractor shall screen noisy works and noise from stationary items of PME whenever practicable.</p>				
5.6.4	4.8	<p>Good Site Practices</p> <p>Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed 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 works; 				

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		<ul style="list-style-type: none"> machines and plant 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, where possible, be orientated to direct noise away from the NSRs; mobile plant should be sited as far away from NSRs as possible; and material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 				
Waste Management						
6.6.1	5.3	<p>Good Site Practices</p> <p>Adverse impacts related to waste management are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; Training of site personnel in proper waste management and chemical handling procedures; Provision of sufficient waste disposal points and regular collection of waste; Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. 	WSD's Contractor	Construction Work Sites (General)	During Construction works	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste Management on Construction Site
6.6.2	5.3	<p>Waste Reduction Measures</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. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> Sort C&D material from demolition and decommissioning of the existing facilities to recover recyclable portions such as metals; 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 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 	WSD's Contractor	Construction Work Sites (General)	During Construction works	

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		<ul style="list-style-type: none"> Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste. 				
6.6.3	5.3	<p>C&D Material</p> <p>In order to minimise impacts resulting from collection and transportation of C&D material for off-site disposal, the excavated materials should be reused on-site as backfilling material and for landscaping works as far as practicable. In addition, C&D material generated from excavation works should be disposed of at public fill reception facilities for other beneficial uses. Other mitigation requirements are listed below:</p> <ul style="list-style-type: none"> A Waste Management Plan should be prepared; A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed; and In order to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) should be included. 	WSD's Contractor	Construction Work Sites (General)	During Construction works	ETWB TCW No. 31/2004
6.6.4	5.3	<p>General Refuse</p> <p>General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.</p>	WSD's Contractor	Construction Work Sites (General)	During Construction works	
6.6.5	5.3	<p>Chemical Waste</p> <p>Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility.</p>	WSD's Contractor	Construction Work Sites (General)	During Construction works	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, Waste Disposal (Chemical Waste) (General) Regulation

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6.6.6	5.3	<p>Marine Dredged Sediment</p> <p>During transportation and disposal of the dredged marine sediments, the following measures should be taken to minimise potential impacts on water quality:</p> <ul style="list-style-type: none"> • Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved; • 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 EPD; and • Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation. 	WSD's Contractor	Construction Work Sites (Along the alignment of dredging)	During Marine Construction works	ETWB TCW No. 34/2002
Air Quality						
7.5.1	6.30	<p>Dust Control</p> <p>Construction dust impacts should be controlled within the 1-hour TSP criterion of 500 g/m³ and 24-hour TSP AQO of 260 g/m³. Therefore, effective control measures and good site practices should be implemented :</p> <ul style="list-style-type: none"> • Any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading; • The working area of excavation should be sprayed with water immediately before, during and immediately after the operations so as to maintain the entire surface wet; • The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where a site boundary adjoins a road, streets or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length except for a site entrance or exit; • The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • Every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet; 	WSD's Contractor	Construction Work Sites (General)	During Construction works	EIAO-TM and Air Pollution Control (Construction Dust) Regulation

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		<ul style="list-style-type: none"> The portion of road leading only to a construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials; All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet; Vehicle speed should be limited to 10 kph except on completed access roads; and Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites. 				
Cultural Heritage						
8.7	7	No cultural heritage resources are identified within the Study Area and therefore, no mitigation measures are considered necessary.				
Fisheries						
9.7	8	Impacts to fisheries resources and fishing operations have largely been avoided during construction through constraints on the works operations for installation of the submarine watermain. Good construction practice and associated measures recommended for Water Quality to control water quality impacts to within acceptable levels and are also expected to control impacts to fisheries resources.	WSD's Contractor	Construction Work Sites (General)	During Marine Construction works	EIAO-TM