

IMPLEMENTATION SCHEDULE OF THE PROPOSED MITIGATION MEASURES

Table 1 Implementation Schedule of Terrestrial Ecological Impact Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation & Guidelines
					D	C	O	
Terrestrial Ecology - Construction Phase								
4.6.3		During the detailed design stage, the following issues should also be considered as possible to further minimise the impacts: <ul style="list-style-type: none"> Adjustment of site boundary to minimise temporary loss of natural stream habitat during construction. Adjustment of site boundary to minimise use of mixed woodland as temporary works area. In particular, the woodland habitat in temporary works area of the Eastern Portal will be avoided, thereby greatly reducing the area of temporary loss of woodland habitat. Minimizing felling of large trees. About 20% of trees within the works area will be transplanted. The individual of <i>Artocarpus hypargyreus</i> recorded within the temporary works area of HKU1, if to be encroached, would also be transplanted. 	Work sites / during detailed design	DSD (Project Proponent)	√			
4.6.4		Standard site practices including the following, should be enforced to minimise the disturbance to the surroundings: <ul style="list-style-type: none"> Treat any damage that may occur to large individual trees in the adjacent area using materials and methods appropriate for tree surgery. Reinstate work sites/disturbed areas immediately after completion of the construction works, in particular, through on-site tree/shrub planting along the woodland and shrubland section within the temporary works area. 	Work sites/during construction phase	Contractor		√		

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					D	C	O	
		<p>Tree/shrub species used should make reference from those in the surrounding area.</p> <ul style="list-style-type: none"> Regularly check the work site boundaries to ensure that they are not exceeded and that no damage occurs to surrounding areas. 						
4.6.5 & Table 4.6		A total of 1.02 ha would be replanted with woodland species, reaching almost a 1.5:1 ratio for compensatory planting. Tree/shrub species used should be based on those in the surrounding areas, including those which are commonly recorded during the baseline surveys.						
4.6.6		A low-flow channel would be provided within the channelised section to maintain a deeper water depth in the expanded channel, in particular during dry season as well as a basin at the end of the channelised section to provide living space for aquatic life. Step chute in the form of a series of descending water pools would be constructed between the low flow channel and the undisturbed stream course. There would also be openings for aquatic fauna between each chute step (pool). These could work like a “ladder” to help avoid isolating the aquatic fauna in the channelised section from natural habitats.	Work sites / during detailed design	DSD (Project Proponent)	√			
4.6.7		Measures are also needed to maintain the flow of all affected streams/nullahs during the construction stages. Temporary bypass should be provided if the stream/nullah flows will be cut off by the construction works. After the construction works are finished, sections of temporary loss should be reinstated. Construction materials, wastes, and equipment should be cleared from the sites.	Works area / during construction	Contractor		√		
4.6.8		Surveys of amphibians at E4(P), PFLR1(P), W12(P), MB16, E5(B)(P), TP789(P) and P5(P) prior to commencement of construction is recommended. Frogs, including Hong Kong Cascade Frog and Lesser Spiny Frog, and tadpoles found at work areas of these proposed intake points will be collected and translocated to nearby streams that will not be affected by the project. These procedures should be performed by	at E4(P), FLR1(P), W12(P), MB16, E5(B)(P), TP789(P) and P5(P) prior to commencement of construction	DSD (Project Proponent)	√	√		

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					D	C	O	
		experienced herpetologists. A detailed translocation proposal will be submitted during the detailed design stage.						
4.6.9		Measures should also be taken to avoid runoff to streams and marine habitats. Stream/channel which could potentially be affected during construction should be prevented from sedimentation by erection of sediment barriers. Site runoff should be desilted by siltation traps in streams/channels or diverted, to reduce the potential for suspended sediments, organics and other contaminants to enter the local stream environment.	Works area / during construction	Contractor		√		
Terrestrial Ecology - Operational Phase								
4.6.11		N/A						

* All recommendations and requirements resulted during the course of EIA Process, including ACE and/or accepted public comment to the proposed project.
 ** D=Design, C=Construction, O=Operation
 N/A Not applicable

Table 2 Implementation Schedule of Noise Mitigation Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location/Timing	Implementation Agent	Implementation Stages**			Relevant Legislation & Guidelines
					D	C	O	
Noise - Construction Phase								
5.4.15		<p><u>Air borne noise</u></p> <p>In general, potential construction noise impact can be minimized or avoided by imposing a combination of the following mitigation measures:</p> <p>(a) Noisy equipment and activities should be sited by the Contractor as far from close-proximity sensitive receivers as practical. Prolonged operation of noisy equipment close to dwellings should be avoided.</p> <p>(b) The Contractor should minimise construction noise exposure to the schools (especially during examination periods). The Contractor should liaise with the school and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the works contract and to avoid noisy activities during these periods.</p> <p>(c) Noisy plant or processes should be replaced by quieter alternatives. Silenced diesel and gasoline generators and power units, as well as silenced and super-silenced air compressors, can be readily obtained.</p> <p>(d) Noisy activities should be scheduled to minimise exposure of nearby sensitive receivers to high levels of construction noise. For example, noisy activities can be scheduled for midday, or at times coinciding with periods of high background noise (such as during peak traffic hours).</p> <p>(e) Idle equipment should be turned off or throttled down. Noisy equipment should be properly maintained and used</p>	Work site/ during construction phase	Contractor		√		PN 2/93 & EIAO

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					D	C	O	
		<p>no more often than is necessary.</p> <p>(f) The power units of non-electric stationary plant and earth-moving plant should be quietened by vibration isolation and partial or full acoustic enclosures for individual noise-generating components.</p> <p>(g) Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided, thus reducing the cumulative impacts between operations. The numbers of operating items of powered mechanical equipment should be minimised. Noise can be reduced by increasing the distance between the operating equipment and the NSRs or by reducing the number of items of equipment and/or construction activity in the area at any one time.</p> <p>(h) The use of quiet plant and working methods can further reduce noise level. Quiet plant is defined as Powered Mechanical Equipment (PME) whose actual sound power level is less than the value specified in the TMs for the same piece of equipment. To allow the Contractor some flexibility to select equipment to suit his needs, it is considered too restrictive to specify which specific items of silenced equipment to be used for the construction operations. It should be noted that various types of silenced equipment can be found in Hong Kong and are readily available on the market. BS 5228 also provides examples of quiet construction plant and their SWL.</p> <p>(i) Construction plant should be properly maintained (well-greased, damage and worn parts promptly replaced) and operated. Construction equipment often has silencing measures built in or added on, e.g. bulldozer silencers, compressor panels, and mufflers. Silencing measures should be properly maintained and utilised. Rubber or damping materials should be introduced between metal panels to</p>						

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		<p>avoid rattle and reverberation of noise.</p> <p>(j) Equipment known to emit sound strongly in one direction should be oriented so that the noise is directed away from nearby NSRs.</p> <p>(k) Material stockpiles and other structures (such as site offices) should be effectively utilised to shield construction noise. Noise can also be reduced by construction of temporary noise barriers which screen the lower floors from viewing the sites. Temporary noise barriers should be installed at active parts of construction areas where construction equipment is being operated in close proximity to NSRs.</p> <p>(l) It is noted that under the WBTC No. 19/2001, all construction sites are required to use metallic site hoarding to reduce the amount of timber. This metallic hoarding can be slightly modified (with the addition of steel backings) into temporary noise barriers. These barriers should be gap free and have a surface mass density of at least 7 kg/m².</p> <p>(m) All hand-held percussive breakers and air compressors should comply the Noise Control (Hand-held Percussive Breakers) Regulations and Noise Control (Air Compressors) Regulations respectively under the NCO (Ordinance No. 75/88, NCO Amendment 1992 No.6).</p>						
5.4.16		The Contractor shall devise, arrange methods of working and carry out the works in such manner as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these measures are implemented properly.	Work site/ during construction phase	Contractor		√		PN 2/93 & EIAO
5.4.19		<p><u>Level 1 Use of Quiet Plant</u></p> <p>Level 1 mitigation measures include limiting the concurrent use of construction equipment and using silenced and quiet equipment without delay to the construction programme.</p>	Work site/ during construction phase	Contractor		√		PN 2/93 & EIAO

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5.4.23		<u>Level 2 Use of Barriers</u> Level 2 mitigation measures include providing movable barriers for sites which have sufficient space for installation, full enclosures during the drilling activities at Eastern Portal and at muck pit areas for Eastern portals and cantilever-typed high rise noise barrier for intake W5(P) and W8.	Work site / during construction phase	Contractor		√		PN 2/93 & EIAO
5.4.32		Before construction of the full enclosure at muck pit area, the use of full enclosure noise barrier (Stage A) for the drilling activities at the Eastern Portal area is required. A full enclosure for the muck pit area will then be constructed at this later stage (Stage B). The full enclosure shall be gap free apart from necessary entrance/exits, which shall face towards the entrance of eastern portal to minimize the amount of noise generated from affecting the nearest RNSRs especially school (True Light Middle School of Hong Kong).	At the Eastern Portal / during construction	Contractor		√		PN 2/93 & EIAO
5.4.23 & 5.4.29		5m high cantilever-typed hoarding barrier to be built at W5(P) and W8. These enclosures/barriers should have no gaps and have a superficial surface density of at least 10 kg/m ² . Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period. To schedule the noise barrier erection and dismantling to the non sensitive periods of school to avoid adverse impact to W8/3.	At the Eastern Portal and muck pit areas of both portal, W5(P) and W8 / during construction	Contractor		√		PN 2/93 & EIAO
5.4.24		Movable barriers of 3 to 5 m height with a small cantilevered upper portion and skid footing to be located within about 5 m or more for mobile equipment such that the line of sight is blocked. To provide purpose-built noise barriers or screens constructed of appropriate materials (minimum superficial density of 10 kg/m ²) located close to the operating PME.	At the Eastern Portal, E7(P), WO(P), E5(A)(P), GL1(P), MB16, P5(P), W10 and W12(P) during construction	Contractor		√		PN 2/93 & EIAO
5.4.31		Pre-drilling followed by chemical splitting instead of using large excavator mounted breaker should be used as mitigation measure for rock breaking and rock drilling.	At intakes BR7(P), E5(A)(P), W12, E7(P), W5(P) and W8 during rock	Contractor		√		PN 2/93 & EIAO

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					D	C	O	
			breaking and rock drilling					
5.4.32		No construction activity is recommended during the examination period.	At Eastern Portal, DG1(P), E7(P), RR1, W0(P), W5(P) and W8.	Contractor		√		Annex 5 of EIAO-TM & Noise Control Ordinance
5.5.29-50 & Table 5.19		<u>Ground borne noise</u> The noise level should be measured on the ground floor inside the nearest building during the TBM construction work in the daytime. If the daytime monitored ground borne noise exceeds the relevant evening/night ground borne noise criteria, evening/night construction work would not be carried out for the concerned tunnel section. Evening/night time construction work is subject to CNP application under the control of NCO.	Ground floor inside the nearest building in proposed NSR	Contractor		√		Annex 5 of EIAO-TM & Noise Control Ordinance
5.4.55-5.4.56		Public relationship strategy with 24-hour hotline system	At all works areas throughout the construction phase	Contractor		√		
Noise - Operation Phase								
5.6.1		N/A						

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N/A Not applicable

Table 3 Implementation Schedule of Air Quality Mitigation Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation & Guidelines
					D	C	O	
Air Quality - Construction Phase								
6.5.9		<p><i>Dust Mitigation Measures</i></p> <p>(i) The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. Effective dust suppression measures should be installed to minimize air quality impacts, at the boundary of the site and at any sensitive receivers.</p> <p>(ii) No blasting shall be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted (unless prior permission of the Commissioner of Mines is obtained).</p> <p>(iii) Effective water sprays shall be used during the delivery and handling of all raw sand, aggregate and other similar materials, when dust is likely to be created, to dampen all stored materials during dry and windy weather. Watering of exposed surfaces shall be conducted as often as possible depending on the circumstances.</p> <p>(iv) A watering programme of once every 2 hours in normal weather conditions, and hourly in dry/windy conditions.</p> <p>(v) Any stockpile of dusty material cannot be immediately transported out of the Site shall be either: a) covered entirely by impervious sheeting; b) placed in an area sheltered on the top and the three sides; or c) sprayed with water or a dust suppression chemical so as to maintain the entire surface wet.</p> <p>(vi) Should a conveyor system be used, the Contractor shall implement the following precautionary measures. Conveyor belts shall be fitted within windboards. Conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors under control of the Contractor, and carrying materials</p>	Work site / during construction	Contractor		√		Air Pollution Control Ordinance, Air Pollution Control (Construction Dust) Regulation

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					D	C	O	
		<p>which have the potential to create dust, shall be totally enclosed and fitted with belt cleaners.</p> <p>(vii) Any dusty materials being discharged to vehicle from a conveying system at fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust fans shall be provided for this enclosure and vented via a suitable fabric filter system.</p> <p>(viii) The heights from excavated spoils are dropped should be minimise to reduce the fugitive dust arising from unloading/loading.</p> <p>(ix) The Contractor shall confine haulage and delivery vehicles to designated roadways inside the site. If in the opinion of the Engineer, any motorised vehicle is causing dust nuisance, the Engineer may require that the vehicle be restricted to a maximum speed of 15 km per hour while within the site area.</p> <p>(x) Areas within the site where there is a regular movement of vehicles shall have an approved hard surface, be kept clear of loose surface materials and / or be regularly watered.</p> <p>(xi) Wheel cleaning facilities shall be installed for both portals and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel cleaning facilities shall be usable prior to any earthwork excavation activity on site. The Contractor shall provide a hard-surfaced road between any cleaning facility and the public road.</p> <p>(xii) Chemical wetting agents shall only be used on completed cuts and fills to reduce wind erosion.</p>						

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					D	C	O	
		(xiii) No vehicle exhausts shall be directed towards the ground or downwards to minimize dust nuisance. (xiv) Ventilation system, equipped with proprietary filters, should be provided to ensure the safe working environment inside the tunnel. Particular attention should be paid to the location and direction of the ventilation exhausts. The exhausts should not be allowed to face any sensitive receivers directly. Consideration should also be given to the location of windows, doors and direction of prevailing winds in relation to the nearby sensitive receivers. (xv) In the event of any spoil or debris from construction works being deposited on adjacent land, or stream, or any silt being washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Engineers						
6.5.10		In addition, based on the <i>Air Pollution Control (Construction Dust) Regulation</i> , any works involved regulatory and notifiable works, such as stockpiling, loading and unloading of dusty materials, shall take precautions to suppress dust nuisance. <ul style="list-style-type: none"> The working area of any excavation or earthmoving operation shall spray with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet; Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies; and Any stockpile of dusty materials (greater than 20 m³) shall be either covered entirely by impervious sheeting or placed 	Work site / during construction	Contractor		√		Air Pollution Control Ordinance, Air Pollution Control (Construction Dust) Regulation

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					D	C	O	
		in an area sheltered on the top and three sides; and sprayed with water or a dust suppression chemical so as to maintain the entire surface wet. • Other suitable dust control measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, where appropriate, should be adopted.						
Air Quality - Operational Phase								
6.6.1		N/A						

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N/A Not applicable

Table 4 Implementation Schedule of Water Quality Control Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
					D	C	O	
Water Quality - Construction Phase								
7.11.1-7.11.2		<p><u>Precautionary measures for construction work near natural streams</u></p> <p>The government provides guidelines (ETWB TCW NO. 5/2005 and DSD TC 2/2004) are providing guidelines to minimize impacts when there is construction work carried out at near natural streams course. Relevant mitigation measures for the intakes are summarised as follows:</p> <ul style="list-style-type: none"> • Temporary site access to the work sites should be carefully planned and located to minimize disturbance caused to the substrates of streams/streams and riparian vegetation by construction plant. • Locations well away from the rivers/streams for temporary storage of materials (e.g equipment, filling materials, chemicals and fuel) and temporary stockpile of construction debris and spoil should be identified before commencement of works. • Proposed works site areas inside, or in the proximity of, natural rivers and streams should be temporarily isolated to prevent adverse impacts on the stream water qualities. • Stockpiling of construction materials, if necessary, should be completely properly covered and located away from any natural stream/river. • Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby rivers/streams by rain and local runoff. 	Construction works sites / during construction of portals and intakes	Contractor		√		ETWB TCW No. 5/2005 and DSD TC No. 2/2004
7.11.3 – 7.11.6		<p><u>Construction of temporary berthing point at the Western Portal</u></p> <p>A refuse collection vessel shall be provided to collect refuse or materials lost into the sea.</p>	Marine works sites / during construction of berthing point	Contractor		√		Water Pollution Control Ordinance (WPCO)

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					D	C	O	
		<p>The respective areas of the marine works will be completely enclosed by the silt curtain. The curtain shall be extended from water surface down to the seabed where it is anchored using sinker blocks. The Contractor shall inspect the silt curtain on regular basis to ensure its integrity and it is serviceable for all times</p> <p>Transfer of armour rock onto the seabed from barge at the temporary pier location should be conducted by careful grabbing and unloading to the seabed (to minimize sediment migration).</p> <p>The conveyor belt should be completely covered and muddy effluent from the temporary barge should be contained, treated and disposed. Where there is transfer of excavated wastes, the Contractor should provide appropriate measures to ensure that the waste is free from floatables, putrescibles, organic wastes and toxic materials and when required a refuse collection vessel be provided to collect float refuse.</p>	and armor rock based panel					
7.11.7 – 7.11.15		<p><u>Construction of stilling basin at Western Portal outfall</u></p> <p>All construction for the basin should be carried out inside the temporary cofferdam which is a temporary watertight enclosure built in the water and pumped dry to expose the bottom so that construction of stilling basin can be undertaken.</p> <p>During the dewatering process, appropriate desilting/sedimentation devices should be provided on site for treatment before discharge. The Contractor should ensure discharge water from the sedimentation tank meet the WPCO/TM requirements before discharge.</p> <p>The cofferdam will remain on site until after the construction of stilling basin has been completed. The coffer dam shall be regularly inspected and maintained to ensure no spillage of waste or wastewater into the sea. Conveyance of dredged materials from the coffer dam shall be</p>	Marine works sites / during construction of stilling basin	Contractor		√		WPCO

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					D	C	O	
		<p>carried out cautiously to avoid spillage into the sea.</p> <p>The filled material for the stilling basin should be contained inside the temporary cofferdam. The top level of the cofferdam shall be constructed higher than the final backfilled level.</p> <p>The Contractor shall be responsible for the design, installation and maintenance of the silt curtains to minimize the impacts on the water quality and the protection of water quality. The design and specification of the silt curtains shall be submitted by the Contractor to the Engineer for approval.</p> <p>Silt curtains shall be formed from tough, abrasion resistant, permeable membranes, suitable for the purpose, supported on floating booms in such a way as to ensure that the sediment plume shall be restricted to within the limit of the works area. The silt curtain shall be formed and installed in such a way that tidal rise and fall are accommodated, with the silt curtains always extending from the surface to the bottom of the water column and held with anchor blocks. The removal and reinstallation of such curtains during typhoon conditions shall be as agreed with the Director of Marine Department. The contractor shall regularly inspect the silt curtains and check that they are moored and marked to avoid danger to marine traffic. Any damage to the silt curtain shall be repaired by the Contractor promptly and the works shall be stopped until the repair is fixed to the satisfaction of the Engineer.</p> <p>Transfer of rock fill material (armour rock) from the barge onto the site location should be conducted by grabbing and placement on the seabed to minimize sediment migration. No free dropping of the material will be allowed.</p> <p>Prior to the construction of armor rock based panel, a silt curtain shall also be installed prior to carry out any marine works as a preventive</p>						

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		mitigation measure.						
7.11.16 – 7.11.20		<p><u>Construction of TBM tunnel at both portals and intakes</u></p> <p>Recycled water will be used at the cutter face for cooling purposes. Used water will be collected and discharged to a settling tank for settlement. Excess water from the settling tank will be transferred to the water treatment plant on site where the addition of flocculants will assist in settlement of solids. The Contractor should ensure discharge water from the sedimentation tank meet the WPCO/TM requirements before discharge.</p> <p>During the drilling process, all flushing water will be recycled for use. Discharge of the treated water to nearby drainage system shall be allowed provided that it has been treated to a level meeting with statutory requirements.</p> <p>Water flow at streams should be maintained by a temporary diversion system during the construction phase of intakes and manhole drop shafts.</p>	Construction works sites / during construction of portals and intakes	Contractor		√		WPCO
7.11.21 – 7.11.33		<p><u>General Construction Activities and Workforce</u></p> <p>A. Surface runoff</p> <p>Effluent produced from construction activities are subjected to WPCO control. Effluent produced from sites should be diverted away from stream courses. Construction works near stream course should be scheduled in the dry season as far as practical to avoid excessive site runoff discharge.</p> <p>Under the <i>Water Pollution Control Ordinance</i> (WPCO), turbid water from construction sites must be treated to minimize the solids content before being discharged into storm drains. The suspended solids load can be reduced by directing the runoff into temporary sand traps or other silt-removal facilities, and other good and appropriate site</p>	Construction works sites / during construction of portals and intakes	Contractor		√		ProPECC PN 1/94

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		<p>management practices. Advice on the handling and disposal of construction site discharge is provided in the ProPECC Paper (PN 1/94) on <i>Construction Site Drainage</i>.</p> <p>A drainage system layout should be prepared by the Contractor for each of the works areas (portals and intakes), detailing the facilities and measures to manage pollution arising from surface runoff from those works areas. The drainage layout and an associated drainage management plan to reduce surface runoff sediments and pollutants entering watercourses, should be submitted to the Engineer for approval and to EPD for agreement.</p> <p>The system should be capable of handling stormwater from the site and directing it to sediment removal facilities before discharge. If oil and grease is used on the site or brought to the site, the stormwater should pass through oil interceptors before discharge. The interceptors should have a bypass to prevent washout in heavy storms.</p> <p>A temporary channel system or earth bunds or sand barriers should be provided in works areas on site to direct stormwater to silt-removal facilities. Stockpiled materials, if susceptible to erosion of rain or wind, should be covered with tarpaulins (or /similar fabric) or hydroseedings as far as practical especially during the wet season.</p> <p>Silt removal facilities should be checked and the deposited silt and grit should be removed regularly to ensure these facilities are in good working condition and to prevent blockages.</p> <p>Vehicle washing areas should be drained into a settlement basin to settle out the suspended solid before discharging to storm water drains. The water should be recycled on site whenever possible. It is suggested that the wash water from the wheel wash basin is either reused for road watering or pumped to the on-site settling tanks for treatment. Water used for dust depression purposes should be minimized and an</p>						

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		<p>alternative soil holding agent should be considered.</p> <p>B. Spillage, Oil and Solvents</p> <p>Any contractor generating waste oil or other chemicals as a result of his activities should register as a chemical waste producer and provide a safe storage area for chemicals on site. Oil interceptors need to be regularly inspected and cleaned to avoid wash-out of oil during storm conditions. A bypass should be provided to avoid overload of the interceptor's capacity.</p> <p>Any spillage should be cleaned up immediately and the resulting contaminated absorbent material should be properly managed according to Waste Disposal Regulations. Spills should be contained to avoid spreading and contaminating the water resources.</p> <p>Oil and fuels should be used and stored properly in designated area. All fuel tanks and storage areas should be provided with locks and be sited on within sealed areas within surrounded by bunds of with a capacity equal to 110% of the storage capacity of the largest tank.</p> <p>Good housekeeping practices are required to minimize careless spillage and keep the work space in a tidy and clean condition. Appropriate training, including safety codes and relevant manuals, should be given to the personnel who regularly handle the chemicals on site.</p> <p>C. On-Site Effluent Generation</p> <p>Sewage arising from the additional population of workers on site should be collected in a suitable storage facility (chemical mobile toilets). Most of the work site locations are close to the public sewerage system, and therefore the use of septic tanks isare, therefore, not encouraged. Portable toilets should be used coupled with tickering away services provided by a licensed collector. They should be positioned at</p>						

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					D	C	O	
		<p>appropriate locations across the site to ensure no direct discharge of foul water off-site.</p> <p>D. Protection of Existing Flora and Fauna</p> <p>The Contractor should provide details of the plant and operation plans at each site for approval by the Engineer before commencing construction. The plans should include how the existing flora and fauna will be protected. Locations required for groundwater levels monitoring are Eastern Portal, PFLR1(P), THR2(P), TP5, TP789 and W12.</p>						
7.12.2		<p>The construction and demolition of the temporary pier may create short term impacts on the local marine water quality. The situation will be restored once the work is finished by proper phasing of the works programme and implementation of the adequate mitigation measures (e.g. silt curtain) the impacts will be minimized.</p>	<p>Construction works sites / during construction of portals and intakes</p>	<p>Contractor</p>		√		<p>WPCO</p>
7.16.1		<p><u>Maintaining Baseflow in Downstream Watercourses</u></p> <p>The final design will be developed during the detailed design stage. The exact base flow rates to be maintained at each of the intakes will be subject to detailed site investigation at design stage.</p> <ul style="list-style-type: none"> • Purpose of the by-pass device is to maintain the base-flow of the affected stream course. • The by-pass system comprises an approach link and a trapezoidal channel. • The approach link is section with inclined profiled surface at a gradient of 1 in 100. It is used to direct the base flow to the by-pass trapezoidal channel at its down stream end during the normal days. • The trapezoidal channel is sized such that it could handle the base flow in the affected stream course which is estimated to be no more than 20 l/s. 	<p>Detail design / Construction works sites / during construction of portals and intakes</p>	<p>DSD (Project Proponent) / Contractor for the construction stage</p>	√	√		<p>WPCO</p>

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation and Guidelines
					D	C	O	
		<ul style="list-style-type: none"> Whenever the flow in the stream course exceeding the base flow rate, the excessive flow will overflow into the intake structure via the bottom rack structure. The bottom rack structure has bar screen on the top and inclined channel at the bottom. The top level of the bar screen is level with the by-pass channel with an aim to receive the overflow from the by-pass channel. The by-pass channel is designed requiring minimum maintenance. However, it is recommended that the maintenance authority carry out regular maintenance inspection prior to onset of seasons and after significant rainstorm event to prevent blockage of the by-pass and bottom rack structure. 						
Water Quality - Operation Phase								
7.11.33		As part of the groundwater monitoring programme groundwater levels at intake sites on key natural watercourses shall be monitored during the first year that the tunnel scheme is operational, to ensure that the groundwater regime, and its interaction with existing flora and fauna, is not adversely affected.	Intakes near key natural stream	DSD (Project Proponent)			√	
7.17.8		Maintenance, including the removal of leaves and other potential floating material, will be carried out on the water courses above the intakes and within the tunnel system itself before the onset of every wet season to minimise the amount of leaves and floating objects that may discharge to the sea. A refuse collecting barge will also be employed to collect leaves and other debris floating within the discharge plume should it be necessary following large storm events.	Portals and intakes	DSD (Project Proponent)			√	

* All recommendations and requirements resulted during the course of EIA/EA Process, including ACE and/or accepted public comment to the proposed project.

** Des - Design, C = Construction, O = Operation

N/A Not applicable

Table 5 Implementation Schedule of Waste Management Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages **			Relevant Legislation & Guidelines
					D	C	O	
Waste - Construction Phase								
8.7.2		<u>General</u> A proper waste management plan should be implemented to promote waste minimisation at source. Where waste generation is unavoidable then the potential for recycling or reuse should be explored and opportunities taken. If wastes cannot be recycled then the recommended disposal routes should be followed.	Work sites / During construction	Contractor		√		Waste Disposal Ordinance ETWB TCW No. 15/2003
8.7.3		All waste materials shall be segregated into categories covering: <ul style="list-style-type: none"> • Excavated material or construction waste suitable for reuse on-site • Excavated material or construction waste suitable for public filling areas • Remaining C&D waste for landfill • Chemical waste, and • General refuse 						
8.7.4		Proper segregation and disposal of construction waste should be implemented. Separate containers for inert and non-inert wastes should be provided. The inert waste should be taken to public filling area and the non-inert waste should be transported to strategic landfills.						
8.7.5		A trip-ticket system on the solid waste transfer/disposal operations should be included as one of the contractual requirements (ETWB TCW No. 31/2004). The Independent Environmental Checker (IEC) should be responsible for auditing this system.	Work sites/ During construction	Contractor		√		Waste Disposal Ordinance ETWB TCW No. 31/2004
8.7.6		IEC should also be responsible for auditing the well-documented record system which includes: (i) quantity of waste generation, (ii) quantity of recycled material, (iii) quantity of disposed material, (iv) disposal methods and (v) sites should be implemented during construction phase.	Work sites/ During construction	Contractor / IEC		√		Waste Disposal Ordinance ETWB TCW No. 31/2004
8.7.7		Regular cleaning and maintenance of the waste storage area should be conducted throughout the construction stage.	Work sites/ During construction	Contractor		√		Waste Disposal Ordinance

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages **			Relevant Legislation & Guidelines
					D	C	O	
8.7.8		<p><u>Excavated spoil</u> Control measures for soil temporarily stockpiled on-site should be taken in order to minimize the noise, generation of dust, pollution of water and visual impact. Key impacts include:</p> <ul style="list-style-type: none"> • Surface of stockpiled soil should be wetted with water when necessary especially during dry season • Disturbance of stockpiled soil should be minimized • Stockpiled soil should be properly covered with tarpaulins especially heavy rain storms • Stockpiling areas should be enclosed if possible • Stockpiling location should be away from the shoreline • An independent surface water drainage system equipped with silt traps should be installed at the stockpiling area. 	Work sites/ During construction	Contractor		√		Waste Disposal Ordinance (Cap. 54)
8.7.9		<p><u>Chemical wastes</u> For those processes that generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste.</p>	Work sites/ During construction	Contractor		√		Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Packaging Labelling and Storage of Chemical Waste
8.7.10		<p>Construction processes produce chemical waste, the contractor must register with EPD as a Chemical Waste Producer. Wastes classified as chemical wastes are listed in the Waste Disposal (Chemical Waste) (General) Regulation (CWR). It should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste published by the EPD. A producer of chemical wastes should be registered as chemical waste producer and registered with EPD.</p>						
8.7.11		<p>The chemical waste generated shall be properly labelled, stored and disposed of according to the CWR. Proper storage area shall be allocated on site for storage of chemical waste. The chemical waste should only be collected by a licensed collector. An updated list of licensed chemical waste collector can be obtained from EPD.</p>						
8.7.12		<p>In case of spillage, spill absorbent material and emulsifiers should be available on site. This material should be replaced on a regular basis and</p>						

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages **			Relevant Legislation & Guidelines
					D	C	O	
		the contaminated material stored in a designated, secure place.						
8.7.13		<u>General refuse</u> A reputable waste collector should be employed by the contractor to remove general refuse from the site, separate from C&DM and chemical wastes, and on regular basis in order to minimize odour, pest and litter impacts. The burning of refuse at site is not permitted under the Air Pollution Control Ordinance (Cap 311).	Work sites/ During construction	Contractor		√		Waste Disposal Ordinance (Cap. 54)
8.7.14	Office waste can be reduced through recycling of paper if volumes are large enough to warrant collection.							
8.7.15	Good management practices should be implemented to ensure that refuse is properly stored and is transported for disposal of at licensed landfills.							
Waste - Operation Phase								
8.8.1		N/A						

* All recommendations and requirements resulted during the course of EIA Process, including ACE and/or accepted public comment to the proposed project.

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

N/A Not applicable

Table 6 Implementation Schedule of Cultural Heritage Impact Assessment

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages **			Relevant Legislation & Guidelines
					D	C	O	
Cultural Heritage - Construction Phase								
9.8.1 & Table 9.4		<p>The Cultural Heritage Impact Assessment has identified the following resources which will require mitigation measures during the construction stage;</p> <p><u>Haw Par Mansion (including boundary wall and gate)</u></p> <p>A condition survey must be undertaken by a qualified professional prior to the commencement of construction works for the tunnel portal in order to assess the structural integrity of the mansion, wall and gate (with special attention paid to any fragile architectural features). A report containing description of the types of construction, identification of fragile elements, an appraisal of the condition and a photographic record must be prepared. The report must also provide an assessment indicating whether further precautionary measures will be necessary during the construction phase, and if so provide details for sufficient protective measures, including monitoring for vibration control to ensure that no damage to the structure and fabric of the house, wall and gate results from the construction works. The report must be submitted to AMO for approval before construction activities commence. Upon approval the appropriate monitoring and precautionary measures shall be put into place.</p> <p>A buffer zone with a minimum width of 3 metres and an obstruction free access point must be maintained between the boundary wall/gate and the temporary works area (during construction works associated for both the tunnel portal and the permanent vehicle access ramp). This is to enable access for routine maintenance works on the wall and to ensure that the wall is not damaged by machinery operation or related construction activities. The temporary works area will be enclosed by standard DSD site hoarding.</p>	Haw Par Mansion (including boundary wall and gate)	Contractor		√		EIAO

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages **			Relevant Legislation & Guidelines
					D	C	O	
9.8.1		<p><u>Former Explosive Magazine of Victoria Barracks</u></p> <p>A condition survey must be undertaken by a qualified professional prior to the commencement of construction works in order to assess the structural integrity of the retaining wall and the extent of damage from cracks and vegetation growth. A report containing a description of the wall's construction materials, identification of fragile and/or endangered elements, an appraisal of the condition and a photographic record of the retaining wall must be prepared. The report must also provide an assessment indicating whether further precautionary measures will be necessary during the construction phase, and if so provide details for sufficient protective measures, such as monitoring for vibration control, to ensure that no damage to the retaining wall results from the construction works. The report must be submitted to AMO for approval before construction activities commence. Upon approval the appropriate monitoring and precautionary measures shall be put into place.</p> <p>A buffer zone with a minimum width of 3 metres and an obstruction free access point must be maintained between the retaining wall and the temporary works area (for the duration of the construction phase). The works area will be enclosed by standard DSD site hoarding.</p>	Former Explosive Magazine of Victoria Barracks	Contractor		√		EIAO
Cultural Heritage - Operational Phase								
9.8.2		N/A						

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

N/A Not applicable

Table 7 Implementation Schedule of Landscape and Visual Impact Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages **			Relevant Legislation & Guidelines
					D	C	O	
Landscape and Visual - Construction Phase								
10.9.14		The proposed landscape and visual mitigation measures during the construction phase include: CM1 - Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical. CM2 - Existing trees to be retained on site should be carefully protected during construction. The detailed proposal for any trees felling and transplantation is subject to Lands Department's approval on tree felling application at the detailed design stage. CM3 - Trees unavoidably affected by the works should be transplanted where practical. CM4 - Compensatory tree planting should be provided to compensate for felled trees. CM5 - The extent of disturbance on the existing stream course should be minimized. Any temporary works areas within the stream course shall be reinstated after construction. CM7 - Control of night-time lighting CM8 - Erection of decorative screen hoarding	All sites / During construction	Contractor / DSD (Project Proponent)		√		WBTC No. 14/2002, 19/2001
Landscape and Visual - Operational Phase								
10.9.15		The proposed landscape and visual mitigation measures during the operation phase include: OM1 - Aesthetic design of above ground structures OM2 - Toe planter with tall tree and shrub planting shall be provided to screen the Eastern Portal Tunnel and the retaining wall for access road. OM3 - Buffer tree and shrub planting shall be provided to screen above ground structures and blend in the structures with the surrounding landscape setting. OM4 - Existing hard and soft landscape areas to be affected by temporary works shall be reinstated.	All sites / during construction	DSD (Project Proponent)			√	WBTC No. 14/2002, 12/2000, 25/92 & 29/93 ETWB TCW No. 2/2004

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** D=Design, C=Construction, O=Operation; N/A Not applicable

Table 8 Implementation Schedule of Marine Ecology Impact Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages			Relevant Legislation & Guidelines
					D	C	O	
Marine Ecology - Construction Phase								
11.8.4		Silt curtains will be deployed during the construction and demolition of the temporary berthing point. Deployment of silt curtains around the berthing point area would effectively avoid adverse water quality impacts due to barge filling. No significant ecological impact is anticipated.	Work sites/during construction phase	Contractor		√		
11.8.5		The invert of the stilling basin would be at -5.4 mPD. A cofferdam in the form of pipe-pile wall is to be constructed outside the stilling basin prior to the construction of basin. The cofferdam will be dewatered to provide a working area for construction of the stilling basin. The boulders from the seawall will then be removed by landbased grabs.	Work sites/during construction phase	Contractor		√		
11.8.6		Although the speed of the working vessels to be used in the Project (mainly barges) would not be high, a speed limit for marine traffic is proposed as a precautionary measure. A speed limit of 10 knots should be strictly enforced in the works area, in particular in the waters between the outfall location and the navigation channel in East Lamma Channel.	Marine traffic between the outfall location and the navigation channel in East Lamma Channel / During construction	Contractor		√		
Marine Ecology - Operational Phase								
11.10.1		N/A						

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 ** D=Design, C=Construction, O=Operation
 N/A Not applicable

Table 9 Implementation Schedule of Fisheries Impact Measures

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation & Guidelines
					D	C	O	
Fisheries - Construction Phase								
12.8.3		Silt curtain will be deployed during the construction and demolition of the temporary berthing point. With the deployment of silt curtains around the berthing point area, adverse water quality impact associated with the filling would not be anticipated. No significant fisheries impact is anticipated.	Work sites / during construction phase	Contractor		√		
12.8.4		The invert of stilling basin will be found at -5.4 mPD. A cofferdam in the form of pipe-pipe wall is to be constructed outside the stilling basin prior to the construction of basin. The cofferdam will be dewatered to provide a working space for the construction of stilling basin. The boulders from the seawall will then be removed by landbased grabs.						
Fisheries - Operational Phase								
12.10.1		N/A						

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

N/A Not applicable

Table 10 Implementation Schedule of Hazard to Life

EIA Ref	EM&A Ref	Environmental Protection Measures*	Location / Timing	Implementation Agent	Implementation Stages**			Relevant Legislation & Guidelines
					D	C	O	
Hazard to Life - Construction Phase								
13.4.1		There will be no overnight storage of explosives for this project. Transportation of explosives to site for the construction of adit will be undertaken on a daily basis. The contractor is required to destroy any unused explosives before nightfall. If contractor wishes to set up magazines for overnight storage of explosives, it is necessary to carry out risk assessment and seek the relevant approval following the EIAO process.	Work sites where blasting is required / during construction phase	Contractor		√		
Hazard to Life - Operational Phase								
		N/A						

* All recommendations and requirements resulted during the course of EIA Process, including ACE and/or accepted public comment to the proposed project.

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

N/A Not applicable