

13 IMPLEMENTATION SCHEDULE

Agreement No. CE 80/2001(DS) Drainage Improvement in Tsuen Wan and Kwai Chung – Tsuen Wan Drainage Tunnel

EIA 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 ?
Air Quality					
3.6.1	<p>Specific</p> <p>As mentioned in Section 3.5, exceedances of 1-hour and 24-hour average TSP guideline levels have been predicted at most of the ASRs. Hence, mitigation measures are considered necessary in order to suppress the potential dust impact.</p> <p>The dust suppression measures set out in the <i>Air Pollution Control (Construction Dust) Regulation</i>, in fact, are more extensive. Therefore, it is expected that with watering the construction site every four times daily together with strict implementation of dust suppression measures as stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i>, the dust level is expected to be reduced by over 75%.</p> <p>General</p> <p>To further ensure compliance with the guideline and AQO limit at the ASRs at all time, it is recommended to implement the <i>Air Pollution Control (Construction Dust) Regulation</i> and include good site practice in the contract clauses to minimize cumulative dust impact. In addition, a comprehensive dust monitoring and audit programme is recommended to ensure proper implementation of the identified mitigation measures. Details of the monitoring and audit requirements are provided in a separate EM&A Manual.</p> <ul style="list-style-type: none"> • effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level of the scaffolding where a scaffolding is erected around the perimeter of a building under construction; • dump truck for material transport should be totally enclosed by impervious sheeting; • 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; • stockpile of dusty materials should not extend beyond the pedestrian barriers, fencing or traffic cones; • dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; 	DSD's Contractor	Construction Sites	Work During Construction	Air Pollution Control (Construction Dust) Regulation

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3.6.1	<ul style="list-style-type: none"> • 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; • where a site boundary adjoins a road, street 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; • 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; • 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; • stockpile of dusty materials should be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet; • 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; • every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites; • 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; and • 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. 	DSD's Contractor	Construction Work Sites	During Construction	Air Pollution Control (Construction Dust) Regulation
Noise					
4.6.1	<p>During Construction</p> <p>Appropriate mitigation measures such as the use of quiet equipment and movable barriers will be developed to ensure that noise can be reduced to acceptable levels without causing programme delays.</p> <p><i>Good Site Practice</i></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; • machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; 	DSD's Contractor	Construction Work Sites	During Construction	PN 2/93 Noise from Construction Activities & EIAO

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4.6.1	<ul style="list-style-type: none"> 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. <p><i>For Drill and Blast Works</i></p> <ul style="list-style-type: none"> Charge mass per delay should be decreased by minimising the number of blastholes firing on each delay. Smaller blasthole patterns and longer delays should be used between dependent charges. Times of blasting should be established to suit the situation and firing blasts when neighbours are busy with their daily tasks (and at a regular time such as lunch time). <p><i>For TBM Tunnelling</i></p> <ul style="list-style-type: none"> For the tunnel excavation, it is anticipated that beyond the initial length (say within 30m), excavation will be carried out well within the tunnel and door should be provided to further minimize the noise nuisance to the nearby receivers. 	DSD's Contractor	Construction Work Sites	During Construction	PN 2/93 & EIAO
4.6.2	<p>During Operation</p> <p>Good site practice and noise management can significantly reduce the impact of maintenance 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; machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; and plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs. 	DSD's Contractor	Project Area	During Operation	NCO & EIAO
Water Quality					
5.9.1	<p>During Construction</p> <p>Mitigation measures and a spill control and response plan have been prepared for works at the intakes and work sites.</p> <p><i>Precautions to be taken at any time of year when rainstorms are likely:</i></p> <ul style="list-style-type: none"> Temporarily exposed surfaces should be covered e.g. by tarpaulin. Temporary access roads should be protected by crushed stone or gravel. Trenches should be dug and backfilled in short sections. Measures should be taken to minimize the ingress of rainwater into trenches. <p><i>Actions to be taken when a rainstorm is imminent or forecast:</i></p> <ul style="list-style-type: none"> Silt removal facilities, should be checked to ensure that they can function properly. 	DSD's Contractor	Construction Work Sites	During Construction	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO

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5.9.1	<ul style="list-style-type: none"> • Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric. • All temporary covers to slopes and stockpiles should be secured. <p><i>Actions to be taken during or after rainstorms:</i></p> <ul style="list-style-type: none"> • Silt removal facilities should be checked and maintained to ensure satisfactory working conditions. <p>Spill Control and Response Plan</p> <p>1. Prevention and Precaution Measures</p> <p><i>General Precautions</i></p> <ul style="list-style-type: none"> • No discharge of silty water into watercourses. • All materials to be used during construction and operation shall be identified and their hazard potential evaluated. • Maintenance of vehicles and equipment involving activities with potential for leakage and spillage shall only be undertaken with the areas appropriately equipped to control these discharges. • Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials. • Any construction plant which causes pollution to catchwaters or water gathering ground due to leakage of oil or fuel shall be removed off-site immediately. • Suitable containers shall be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. • Chemical waste containers shall be suitably labelled to notify and warn the personnel who are handling the wastes to avoid accidents. • Storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area. • Prevent obstructions and tripping hazards. <p><i>Storage Precautions</i></p> <ul style="list-style-type: none"> • All chemical storage containers shall be correctly labelled. • Solid and impermeable enclosure walls or storage shelves shall be used. • Only compatible chemical wastes shall be stored in the same storage area. • The storage areas shall be inspected to detect any leakages or defective containers on a regular basis. • The condition of the storage containers shall be checked regularly. • Suitable notices warning of hazards, emergency response plans, telephone numbers etc shall be posted around the site, including storage areas. • Large and heavy containers shall be stored at ground level. • Chemical waste containers shall be stored below eye level. 	DSD's Contractor	Construction Work Sites	During Construction	WQO

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5.9.1	<ul style="list-style-type: none"> • Adequate space for handling of the containers shall be provided. • Spill response kits shall be located adjacent/near to the storage areas. • A log of chemical wastes shall be maintained. • Incompatible chemicals shall be stored separately. <p>2. Responses/Action Plan</p> <p>All Workers shall be made aware of emergency telephone numbers and the location of all relevant pollution control equipment. Training be given in emergency response/action plans. The action include the following steps:</p> <ul style="list-style-type: none"> • Only trained personnel who are equipped with protective clothing and equipment shall be allowed to enter the spillage area for clean up. • Spills shall be transferred appropriate back into containers using suitable equipment. • Absorbent materials shall be used to clean up the spills and shall be disposed of as chemical wastes. • Where appropriate suitable solvents may be used to clean the contaminated area after removal of all contaminated materials. • All necessary protective devices, safety equipment, containers and clean up materials for emergency use shall be maintained to a high standard. <p>3. Spill Clean Up and Disposal</p> <p>Effect the response plan.</p> <p>Control the leakage and absorb the spillage using suitably absorbent materials.</p> <p>Provide safety equipment and personal protective equipment for handling of chemical wastes would be similar to that for handling of chemicals.</p> <p><i>Safety equipment includes but is not limited to:</i></p> <ul style="list-style-type: none"> • Fire extinguishers. • Spades, brushes, dustpan, mop and bucket (or similar readily available on site). • Absorbent material such as dry sand, tissues and toweling (all materials readily available on-site). • Containers including plaster bags, drums, etc. • Absorbing materials. • Pumps. <p><i>Personal protective equipment includes as appropriate:</i></p> <ul style="list-style-type: none"> • First-aid kits. • Safety helmet and goggles. • Gloves which can resist chemical reaction. • Protective boot and clothing. 	DSD's Contractor	Construction Work Sites	During Construction	WQO

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5.9.1	<ul style="list-style-type: none"> • Respirators and gas masks. • Face visor and masks. 	DSD's Contractor	Construction Work Sites	During Construction	WQO
5.9.2	<p>Emergency Responses to Spillages</p> <p>Emergency plans and clean up procedures will need to be provided by the Contractor recognising his specific working methods and construction programme, activities and sequences. Agreement must be sought prior to commencement of the construction work but the following principles should be considered.</p> <p><i>The emergency plans should include the procedures for:</i></p> <ul style="list-style-type: none"> • spill prevention and precaution; • response actions; and • spill clean up and disposal. <p><i>Spill prevention and precaution embraces good site practice and covers:</i></p> <ul style="list-style-type: none"> • good housekeeping practices; • chemical storage requirements; and • chemical transfer and transport. 				
5.9.3	<p>During Operation</p> <p>Regular inspection of the tunnels is essential to monitor the structural integrity and proper functioning of the drainage tunnel, which allows repairing of structural deterioration when it begins to develop. It is recommended that routine inspection shall be carried out at least two times per year for the drainage tunnel at the beginning and end of wet season from April to September.</p>	DSD's Contractor	Project Area	During Operation	
Waste Management					
6.5.1	<p>During Construction</p> <p><i>Vegetation Removed from Site Clearance</i> Wastes generated from site clearance shall be sorted and excavated topsoil segregated from roots for re-use in landscaping works, thus eliminating the need for off-site disposal.</p> <p><i>Construction and Demolition Materials</i> The Contractor should reuse any C&D material on-site. C&D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal. The use of wooden hoardings shall not be allowed. An alternative material, which can be reused or recycled, for example, metal (aluminium, alloy, etc) shall be used.</p>	DSD's Contractor	Construction Work Sites	During Construction	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste Management on Construction Site

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6.5.1	As referred to the section 6.4.1, the 317,936m ³ of inert surplus material generated by the project is suitable for public fill. The public fill reception facility at Tuen Mun Area 38 provides a suitable facility for the reuse of surplus inert C&D material generated from the project.	DSD's Contractor	Construction Work Sites	During Construction	WDO (Cap.354), ETWBTC No. 15/ 2003, ETWBTC No. 12/2002 and ETWBTC No. 31/2004
	Under the contract, the contractor will be required to minimise the generation of C&D material and reuse it on site through the following:				
	(a) to plan in the design and construction, methods to minimise the generation of C&D material;				
	(b) to submit a Waste Management Plan (WMP) in accordance with Environment Transport and Works Bureau Technical Circular (ETWBTC) No. 15/2003 or any superseding circular(s);				
	(c) to reuse recycled aggregates in accordance with ETWBTC No. 12/2002 or any superseding circular(s);				
	(d) to observe the requirements of the Trip-Ticket System, stipulated in ETWBTC No. 31/2004 or any superceding circular(s), for disposal of C&D material;				
	(e) to incorporate a Waste Management System into the WMP for effective management and control of C&D materials to avoid/reduce/minimise the generation of C&D material during construction.				
	The contractor will be required to properly sort into inert C&D materials, metals, timber and other non-inert C&D material in the workplace to prevent cross-contamination.				
	In addition, DSD will conduct site inspection to monitor the contractors' performance in the implementation of the WMP and other relevant specified requirements.	DSD	Construction Work Sites	During Construction	WDO (Cap.354) and ETWBTC No. 15/2003
	<i>Excavated Materials</i> Excavated materials should be segregated from other wastes to avoid contamination thereby ensuring acceptability at public filling areas and avoiding the need for disposal at landfill.	DSD's Contractor	Construction Work Sites	During Construction	WDO (Cap.354) and ETWBTC No. 15/2003
	<i>Municipal Waste</i> Temporary refuse collection facilities should be set-up by the contractor and wastes should be stored in appropriate containers prior to collection and disposal.				
	Domestic effluent generated by the workforce will be directed to foul sewer or chemical toilets if public facilities are not available.				
6.5.1	<i>Waste Management Plan</i> A Waste Management Plan (WMP) for the construction of the Project should be prepared as part of the contractors submission. It will provide recommendations for appropriate recycling or disposal route and should include method statement for stockpiling and transportation of the excavated material and other construction wastes should also be included in the WMP and approved before the commencement of construction. All mitigation measures arising from the approved WMP shall be fully implemented.	DSD's Contractor	Construction Work Sites	During Construction	WDO (Cap.354), ETWBTC No. 15/2003 and ETWBTC No. 33/2002

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	For the purpose of enhancing the management of C&D material including rock, and to minimize its generation at source, a C&D Material Management Plan (C&DMMP) has been prepared for this project and would be processed in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 - Management of Construction and Demolition Material Including Rock.				
Ecology					
7.7.1	<p>Avoidance</p> <p>The surface structures are located mainly on existing disturbed areas (ie pollution and urbanisation) and have generally avoided the natural stream sections of higher species diversity and abundance of aquatic organisms.</p> <p>The major construction activities at streams are scheduled to avoid wet season of high water flow which may adversely affect the downstream natural habitats due to the construction runoff.</p>	DSD's Contractor	Construction Sites	Work During Construction	EIAO
7.7.2	<p>Minimisation</p> <p>The previous discussion in Section 7.6.4 has indicated that the impacts on ecological resources due to the construction and operation of the proposed Project are generally expected to be low. The following mitigation measures to minimise impacts and disturbance to the surrounding habitats, are recommended.</p> <p><i>Measures for Construction Runoff</i></p> <p>Install sheet piles/cofferdam/weir along the boundary of the works area within the stream habitats in particular Sam Dip Tam Stream and Tso Kung Tam Stream before the commencement of works to prevent construction runoff during construction. Provision of adequate designed sand/ silt removal facilities such as sand traps, silt traps and sediment basin in the areas which could potentially be affected may be required.</p> <p><i>Good Construction Practice</i></p> <p>Erect fences along the boundary of the works area before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel onto adjacent areas, particularly the stream habitats.</p> <p>Avoid any damage and disturbance, particularly those caused by filling and illegal dumping, to the remaining and surrounding natural stream habitats.</p> <p>Regularly check the work site boundaries to ensure that they are not breached and that no damage occurs to surrounding areas.</p> <p>Prohibit and prevent open fires within the site boundary during construction and provide temporary fire fighting equipment in the work areas.</p> <p>Treat any damage that may have occurred to individual major trees in the adjacent area with surgery.</p>	DSD's Contractor	Construction Sites	Work During Construction	EIAO

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	<p>Reinstate temporary work sites/disturbed areas, particularly stream of natural bottom and bank, plantation, intertidal habitat, and the areas located within the proposed Ecological Park, immediately after completion of the construction works, ie through on-site tree/shrub planting and reprovion of natural or semi-natural bottom (also refer to Section 7.7.3), in order to facilitate the recolonisation of the wildlife recorded during the baseline surveys. Tree/shrub species used should make reference from those in the surrounding area.</p>	DSD's Contractor	Construction Work Sites	During Construction	EIAO
7.7.3	<p>Compensation</p> <p>Provide natural stream bed (approximately 0.03 ha) for the new Dry Weather Flow Channel (created from village-orchard) by laying natural stones at Intake I-2 (Figure 7.7). The reinstated stream bed shall mimic the existing natural conditions with certain portion of big boulders creating the lentic and lotic zones for the aquatic fauna, and while it will be developed during detailed design may draw on concepts shown in Figure 2.18.</p> <p>Provide natural stream bed (approximately 0.5 ha,) for the Approach Channel and Dry Weather Flow Channel by laying natural stones at Intake I-3 (Figure 7.8). The reinstated stream bed shall mimic the existing natural conditions (rocky bottom with very limited aquatic plants) with certain portion of big boulders creating the lentic and lotic zones for the aquatic fauna, and while it will be developed during detailed design may draw on concepts shown in Figure 2.18.</p> <p>Provide natural bottom (ie retain the existing stream bed or reinstate the stream bed by providing boulders/ rocks, riprap or gabion) for the temporarily affected stream sections (Figure 7.8) in order to allow natural colonisation of aquatic fauna.</p> <p>Provide at least 2.2 ha of compensatory planting on the permanent and temporary affected plantation areas, particularly the slopes along access road and adjacent to Intake I-3 and cascade at Outfall O-1, after construction to stabilise the slope to prevent soil erosion and consequent stream sedimentation. Among the 2.2 ha compensatory planting, at least 0.5 ha of compensatory tree planting on the new formed slope along the access road of the Intake I-3 and 0.5 ha of compensatory tree planting over the cascade (by constructing intermediate platform) at Outfall O-1 will be provided (location refer to Figures 7.4 – 7.6). Species used for planting should take reference from the species identified in Appendix F and be native to <u>Hong Kong</u> or <u>South China region</u>.</p> <p>Provide armour rocks for the affected intertidal habitat in order to allow natural colonisation of intertidal organisms.</p>				

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Cultural Heritage					
8.6	As no impacts on recorded archaeological sites or area with archaeological potential were identified within the Study Area, no mitigation measure for archaeological resources is considered necessary.				
	The construction methods to be employed should seek to avoid potential vibration impacts to Kuen Yuen Tung Monastery at Lo Wai, the Western Monastery, Yuen Yuen Home for the Aged, Hong Hoi Chee Hong Temple, Chiu Yum Tsing Yuen, Tse's Grave, Wan Lin Bridge and Sam Dip Tam Rock Carving in Sam Dip Tam and the Tin Hau Temple, Yam Kom Tau Village Rural Committee and the Yeung's Ancestral Hall in Yau Kom Tau as these sites fall within 50 m of the Preferred Option of the drainage tunnel alignment or associated Intakes/Outfall construction activities. Construction works that generates excessive vibration in close proximity to these sites should be restricted to protect the building from adverse vibration impacts and to ensure that the building structures will not be damaged as a result of these impacts.	DSD's Contractor	Construction Sites Work	During Construction	EIAO
	In order to ensure that no structural or superficial damage will be caused by the construction activities, a precautionary approach involving a pre-construction condition survey and establishment of appropriate vibration limits for the potentially impacted structures should be adopted. Protection measures for the potentially impacted structures, if considered necessary from the pre-construction condition survey, should be implemented prior to the commencement of construction works. Vibration monitoring during the construction phase should be undertaken as part of the EM&A programme.	Qualified archaeologist/ built heritage specialist	Construction Sites Work	Pre-construction	EIAO
Fisheries					
10.6	<p>In accordance with the guidelines in the <i>EIAO-TM</i> on fisheries impact assessment the general policy for mitigating impacts to fisheries, in order of priority are avoidance, minimization and compensation.</p> <p>Impacts to fisheries resources and fishing operations have largely been avoided during the construction and operation of the drainage tunnel through the avoidance of dredging, reclamation and filling activities. Good construction practice and associated measures were recommended in Water Quality Assessment in Section 5 to control water quality impacts to within acceptable levels and are also expected to control impacts to fisheries resources. Hence, no fisheries-species mitigation measures are required during construction and operation of the drainage tunnel.</p>	DSD's Contractor	Construction Sites Work	During Construction	EIAO