

**APPENDIX C IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES**

**C.1 Introduction**

C.1.1 This chapter presents the implementation schedule of mitigation measures for the Project. **Table C.1** summarizes the details of the recommended mitigation measures for all works areas. For each recommended mitigation measures, both the location and timing for the measure have clearly been identified as well as the parties responsible for implementing the measure and for maintenance (where applicable).

**Table C.1 Implementation Schedule of Mitigation Measures**

EIA Ref.	Recommended Mitigation Measures	Location of the Measures	Implementation Agent	Implementation Phase			Relevant Legislation and Guidelines
				Detailed Design	Construction	Operation	
<b>Air Quality (Construction Phase)</b>							
4.7.1	<p>To ensure compliance with the relevant standards, dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices should be incorporated into the contract document to control potential dust emission from the site. The major dust suppression measures include:</p> <ul style="list-style-type: none"> <li>• Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.</li> <li>• Use of frequent watering for particularly dusty construction areas and areas close to ASRs.</li> <li>• Side enclosure and covering of any aggregate or stockpiling of dusty material to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines.</li> <li>• Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.</li> <li>• Establishment and use of vehicle wheel and</li> </ul>	All works areas	WSD/Contractor		✓		Air Pollution Control Ordinance and Air Pollution Control (Construction Dust) Regulation

	<p>body washing facilities at the exit points of the site.</p> <ul style="list-style-type: none"> <li>• Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit.</li> <li>• Imposition of speed controls for vehicles on site haul roads.</li> <li>• Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.</li> <li>• Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.</li> </ul>					
<b>Air Quality (Operation Phase)</b>						
N/A	N/A	N/A	N/A			
<b>Noise (Construction Phase)</b>						
5.6.4-5.6.6	<p><u>Recommended Mitigation Measures for Construction Noise</u></p> <p><i>Good Site Practice</i></p> <p>Although the noise mitigation effects are not easily quantifiable and the benefits may vary with site conditions and operating conditions, good site practices are easy to implement and do not impact upon the works schedule. The site practices listed below should be followed during each phase of construction:</p> <ul style="list-style-type: none"> <li>• Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program</li> </ul>	All works areas	WSD/Contractor		✓	Noise Control Ordinance

<ul style="list-style-type: none"> <li>• Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction phase</li> <li>• Mobile plant, if any, should be sited as far from NSRs as possible</li> <li>• Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum</li> <li>• Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs</li> <li>• Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.</li> </ul> <p><i>Adoption of Quiet PME</i></p> <p>In order to reduce the excessive noise impacts at the affected NSRs during normal daytime working hours, quieter PME are recommended. The Contractor may use other types of quiet plant instead of specific items of quiet plant adopted in this assessment, which have the same total SWL, to meet their needs. Quiet PME adopted in the assessment were taken from the BS5228: Part 1:2009 or the noise specification of the plant provided from the supplier, and the PME are known to be available in Hong Kong. Quiet PME that have been adopted in the assessment are summarised in Table 5.6 and the proposed mitigated plant inventory for the demolition/construction works of the Project is detailed in Appendix 5.6.</p>					
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	<p><i>Use of Movable Noise Barrier</i></p> <p>The use of movable noise barrier for certain PME could further alleviate the construction noise impacts. In general, 5 dB(A) reduction for movable PME and 10 dB(A) for stationary PME can be achieved depending on the actual design of movable noise barrier. The Contractor shall be responsible for design of the movable noise barrier with due consideration given to the size of the PME and the requirement of intercepting the line of sight between the NSRs and PME. Barrier material of surface mass in excess of 14 kg/m<sup>2</sup> is recommended to achieve the predicted screening effect.</p>						
<b>Noise (Operation Phase)</b>							
5.6.11	<p><u>Recommended Mitigation Measures for Fixed Plant Noise</u></p> <p>Provided that the fixed plants are properly designed to meet the maximum allowable SWLs, therefore, no adverse residual impacts would be predicted. However, it is still recommended that the following noise reduction measures be considered as far as practicable during the processes of detailed design and procurement:</p> <ul style="list-style-type: none"> <li>• Choose quieter plant such as those which have been effectively silenced;</li> <li>• Include noise levels specification when ordering new plant (including chillier and E&amp;M equipment);</li> <li>• Locate fixed plant/louver away from any NSRs as far as practicable;</li> <li>• Locate fixed plant in walled plant rooms or in specially designed enclosures;</li> </ul>	Fixed plants	WSD/ Detailed Design Consultant	✓		✓	Noise Control Ordinance

	<ul style="list-style-type: none"> <li>• Locate noisy machines in a basement or a completely separate building;</li> <li>• Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and</li> <li>• Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain controlled level of noise. The programme should be implemented by properly trained personnel.</li> </ul>						
<b>Water Quality (Construction Phase)</b>							
6.8.1 - 6.8.14	<p><u>Construction Site Run-off and General Construction Activities</u></p> <p>The site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” should be followed to minimise surface run-off and the chance of erosion. Effluent discharged from the construction site should comply with the standards stipulated in the TM-DSS. The following measures are recommended to protect water quality and sensitive uses of the inland and coastal waters, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <p><i>Construction Site Run-off</i></p> <ul style="list-style-type: none"> <li>• Surface run-off from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins. Channels or earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities.</li> </ul>	All works areas	WSD/ Contractor		✓		ProPECC PN 1/94 Construction Site Drainage  TM-DSS  Water Pollution Control Ordinance

<p>Perimeter channels at site boundaries should be provided where necessary to intercept storm run-off from outside the site so that it will not wash across the site. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.</p> <ul style="list-style-type: none"> <li>• Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding. Any practical options for the diversion and re-alignment of drainage should comply with both engineering and environmental requirements in order to provide adequate hydraulic capacity of all drains. Minimum distances of 100 m should be maintained between the discharge points of construction site run-off and the existing saltwater intakes. While the locations of the discharge points of construction site run-off have not been confirmed at the current stage, the discharge points are confirmed to be located within the construction site boundary. The nearest seawater intake from the construction site within the same watershed would be the Sha Tin WSD flushing water intakes, which is located at Sha Tin Hoi (5 km away). It is anticipated that the minimum separation between the discharge points of construction site effluent and the existing seawater intakes would be satisfied.</li> <li>• Construction works should be programmed to minimize soil excavation works in rainy seasons (April to September) as far as practicable. If excavation in soil cannot be avoided in these months or at any time of</li> </ul>					
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<p>year when rainstorms are likely, for the purpose of preventing soil erosion, temporary exposed slope surfaces should be covered e.g. by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest / edge of excavation) to prevent storm run-off from washing across exposed soil surfaces. Arrangements should always be in place in such a way that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm.</p> <ul style="list-style-type: none"> <li>• Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary.</li> <li>• Measures should be taken to minimize the ingress of rainwater into trenches. If excavation of trenches in wet seasons is necessary, they should be dug and backfilled in short sections. Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.</li> <li>• Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms.</li> <li>• Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting</li> </ul>					
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<p>into the drainage system.</p> <ul style="list-style-type: none"> <li>• Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.</li> </ul> <p><i>Wheel Washing Water</i></p> <ul style="list-style-type: none"> <li>• All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. The section of construction road between the wheel washing bay and the public road should be paved with backfall to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.</li> </ul> <p><i>Wastewater from Building Construction</i></p> <ul style="list-style-type: none"> <li>• Before commencing any demolition works, all drainage connections should be sealed to prevent building debris, soil, sand etc. from entering drains.</li> <li>• Wastewater generated from building construction activities including concreting, plastering, internal decoration, cleaning of works and similar activities should not be discharged into the stormwater drainage system. If the wastewater is to be tankered off site for disposal into foul sewers, it should undergo the removal of settleable solids in a silt removal facility, and pH adjustment as necessary.</li> </ul>					
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<p><i>Acid Cleaning, Etching and Pickling Wastewater</i></p> <ul style="list-style-type: none"> <li>Acidic wastewater generated from acid cleaning, etching, pickling and similar activities should be neutralized to within the pH range of 6 to 10. The neutralized wastewater should be tankered off site for disposal into foul sewers or treated to a standard acceptable to storm drains and the receiving waters.</li> </ul> <p><i>Effluent Discharge</i></p> <ul style="list-style-type: none"> <li>There is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge licence. All the run-off and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the TM-DSS. Minimum distances of 100 m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. The nearest seawater intake from the construction site within the same watershed would be the WSD flushing water intakes, which is located at Sha Tin Hoi (5 km away). It is anticipated that the minimum separation between the discharge points of construction site effluent and the existing seawater intakes would be satisfied. The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., can minimise water consumption and reduce the effluent discharge volume. If monitoring of the</li> </ul>					
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	<p>treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO licence which is under the ambit of regional office of EPD.</p>					
6.8.15-6.8.17	<p><u>Accidental Spillage</u></p> <ul style="list-style-type: none"> <li>• Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.</li> <li>• Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.</li> <li>• Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: <ul style="list-style-type: none"> <li>- Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage,</li> </ul> </li> </ul>	All works areas	WSD/ Contractor		✓	<p>Waste Disposal Ordinance</p> <p>Waste Disposal (Chemical Waste) (General) Regulation</p> <p>The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</p>

	<p>handling and transport.</p> <ul style="list-style-type: none"> <li>- Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents.</li> <li>- Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.</li> </ul>						
6.8.18-6.8.19	<p><u>Sewage Effluent from Construction Workforce</u></p> <ul style="list-style-type: none"> <li>• The construction workforce on site will generate sewage. It is recommended that all the sewage generated from the workforce should be properly treated by interim treatment facilities, such as chemical toilets. Interim treatment facilities should be properly maintained to avoid adverse impact upon the nearby water environment.</li> <li>• Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the surrounding environment. Regular environmental audit of the construction site will provide an effective control of any malpractices and can encourage continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the project would not cause water pollution problem after undertaking all required measures.</li> </ul>	All works areas	WSD/ Contractor		✓		Water Pollution Control Ordinance
6.8.20	<p><u>Construction Works in Close Proximity of Inland Water</u></p>	All works areas	WSD/ Contractor		✓		Water Pollution Control Ordinance

<ul style="list-style-type: none"> <li>• Construction works would be carried out in close proximity of inland water courses along Project site. To minimize the potential water quality impacts from the construction works near any water courses, the practices outlined in ETWB TC (Works) No. 5/2005 “Protection of Natural Streams/rivers from Adverse Impacts arising from Construction Works” should be adopted where applicable. Relevant mitigation measures are listed below:             <ul style="list-style-type: none"> <li>- Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any water courses during carrying out of the construction works.</li> <li>- Stockpiling of construction materials and dusty materials should be covered and located away from any water courses.</li> <li>- Shoring should be properly erected as appropriate to prevent soil/ mud from slipping into the watercourses. Stockpiles should be properly covered.</li> <li>- Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nearby water receivers.</li> <li>- Construction activities, which generate large amount of wastewater, should be carried out in a distance away from the waterfront, where practicable.</li> </ul> </li> </ul>					
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	- Hoarding should be erected along the site boundary to protect the nearby watercourses.					
6.8.21 - 6.8.22	<p><u>Groundwater</u></p> <ul style="list-style-type: none"> <li>No direct discharge of groundwater from contaminated areas should be adopted. Prior to any excavation works within the potentially contaminated areas, the baseline groundwater quality should be reviewed based on the relevant site investigation data and groundwater quality measurements with reference to Guidance Note for Contaminated Land Assessment and Remediation and the review results should be submitted to EPD for examination. If the review results indicate contamination for the groundwater to be generated from the excavation works, this contaminated groundwater should either be properly treated or properly recharged into the ground in compliance with the requirements of the TM-DSS. If wastewater treatment is to be deployed for treating the contaminated groundwater, the wastewater treatment unit shall deploy suitable treatment processes (e.g. oil interceptor / activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances to an undetectable range. All treated effluent from the wastewater treatment plant shall meet the requirements as stated in TM-DSS and should be tankered away for proper disposal.</li> <li>If deployment of wastewater treatment is not feasible for handling the contaminated groundwater, groundwater recharging wells</li> </ul>	All works areas	WSD/ Contractor		✓	Water Pollution Control Ordinance

	<p>should be installed as appropriate for recharging the contaminated groundwater back into the ground. The recharging wells should be selected at places where the groundwater quality would not be affected by the recharge operation as indicated in Section 2.3 of the TM-DSS. The baseline groundwater quality should be determined prior to the selection of the recharge wells, and a working plan should be submitted to EPD for agreement. Pollution levels of groundwater to be recharged shall not be higher than pollutant levels of ambient groundwater at the recharge well. Groundwater monitoring wells should be installed near the recharge points to monitor the effectiveness of the recharge wells and to ensure that no likelihood of increase of groundwater level and transfer of pollutants beyond the site boundary. Prior to recharge, free products should be removed as necessary by installing the petrol interceptor. The Contractor should apply for a discharge licence under the WPCO through the Regional Office of EPD for groundwater recharge operation or discharge of treated groundwater.</p>						
<b>Water Quality (Operation Phase)</b>							
<p>6.8.23 – 6.8.24</p>	<p><u>Emergency Overflow</u></p> <ul style="list-style-type: none"> <li>• Standby treatment facilities, such as parallel trains in flash mixing basins, backwash pumps and pumps in the inter-stage booster pumping station, would be provided to prevent the occurrence of overflow as a result of equipment failure or maintenance.</li> <li>• Dual power supply should be provided. Dual power supply could be in the format of ring</li> </ul>		<p>WSD/ Contractor</p>			<p>✓</p>	<p>Water Pollution Control Ordinance</p>

	<p>main, or an automatic-operated emergency generator with sufficient capacity to cope with the demand loading of the essential plant equipment. Inlet valve feeding raw water would be closed manually within 30 minutes by the operator-in-charge in case of equipment or power failure.</p>						
<b>Waste Management (Construction Phase)</b>							
<p>7.6.1- 7.6.3</p>	<p><u>Good Site Practices</u></p> <ul style="list-style-type: none"> <li>• Appropriate waste handling, transportation and disposal methods for all waste arisings generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.</li> <li>• It is anticipated that adverse impacts would not arise on the construction site, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:                         <ul style="list-style-type: none"> <li>- Nomination of approved personnel, such as a site manager, to be responsible for good site practices, and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility.</li> <li>- Training of site personnel in proper waste management and chemical waste handling procedures.</li> <li>- Provision of sufficient waste reception/ disposal points, of a suitable vermin-proof design that minimises windblown litter.</li> <li>- Arrangement for regular collection of</li> </ul> </li> </ul>	<p>All works areas</p>	<p>Contractor</p>		<p>✓</p>		<p>Waste Disposal Ordinance, DEVB TCW No. 6/2010, ETWB TCW No. 19/2005</p>

	<p>waste for transport off-site and final disposal.</p> <ul style="list-style-type: none"> <li>- Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.</li> <li>- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.</li> <li>- A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed.</li> <li>- A Waste Management Plan should be prepared and should be submitted to the Engineer for approval. One may make reference to <i>ETWB TCW No. 19/2005</i> for details.</li> </ul> <ul style="list-style-type: none"> <li>• In order to monitor the disposal of C&amp;D material at landfills and public filling areas, as appropriate, and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements to be implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. One may make reference to <i>DEVB TCW No.6/2010</i> for details.</li> </ul>						
<p>7.6.4- 7.6.5</p>	<p><u>Waste Reduction Measures</u></p> <ul style="list-style-type: none"> <li>• Good management and control of construction site activities/ processes can minimise the generation of waste. Waste reduction is best achieved at the planning</li> </ul>	<p>All works areas</p>	<p>WSD/ Contractor</p>	<p>✓</p>	<p>✓</p>		<p>Waste Disposal Ordinance, ETWB TCW No. 19/2005</p>



<p>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"> <li>- Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.</li> <li>- Provide separate labelled bins to segregate recyclable waste such as aluminium cans from other general refuse generated by the work force, and to encourage collection by individual collectors.</li> <li>- Any unused chemicals or those with remaining functional capacity shall be recycled.</li> <li>- Maximising the use of reusable steel formwork to reduce the amount of C&amp;D material.</li> <li>- Prior to disposal of C&amp;D waste, it is recommended that wood, steel and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill.</li> <li>- Adopt proper storage and site practices to minimise the potential for damage to, or contamination of, construction materials.</li> <li>- Plan the delivery and stock of construction materials carefully to minimise the amount of waste generated.</li> <li>- Minimize over ordering of concrete, mortars and cement grout by doing careful check before ordering.</li> </ul> <ul style="list-style-type: none"> <li>• In addition to the above measures, other</li> </ul>					
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	specific mitigation measures are recommended below to minimise environmental impacts during handling, transportation and disposal of wastes.						
7.6.6-7.6.11	<p><u>Construction and Demolition Material</u></p> <ul style="list-style-type: none"> <li>The C&amp;D material generated from demolition works of existing facilities of the South Works, construction works of new facilities for the North and the South Works, slope excavation works and construction works of new access roads should be sorted on-site into inert C&amp;D material (that is, public fill) and C&amp;D waste. To minimise the impact resulting from collection and transportation of C&amp;D material for off-site disposal, any excavated material should be reused on-site as backfilling material as far as practicable. C&amp;D waste, such as wood, plastic, steel and other metals should be reused or recycled and, as a last resort, disposed of to landfill. A suitable area should be designated within the site for temporary stockpiling of C&amp;D material and to facilitate the sorting process. Within the stockpile areas, the following measures should be taken to control potential environmental impacts or nuisance:                     <ul style="list-style-type: none"> <li>- Covering material during heavy rainfall;</li> <li>- Locating stockpiles to minimise potential visual impacts; and</li> <li>- Minimising land intake of stockpile areas as far as possible.</li> </ul> </li> <li>For the disposal of any surplus inert C&amp;D materials, the Project Proponent shall notify CEDD of the estimated spoil volumes to be generated, and liaise and agree with the PFC. The finalized C&amp;DMMMP has been</li> </ul>	All works areas	Contractor		✓		Waste Disposal Ordinance  Waste Disposal (Chemical Waste) (General) Regulation  Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of Nuisances Regulation  Land (Miscellaneous Provisions) Ordinance  Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes  Packaging, Labelling and Storage of Chemical Wastes

<p>endorsed by the WSD Vetting Committee on C&amp;DMM in its meeting on 12 November 2012. Consents on the endorsed C&amp;DMMP and EIA report were obtained from the PFC on 3 January 2013 and 26 August 2013. No construction work is allowed until consensus has been made on the overall management and disposal arrangements be endorsed by the relevant authorities such as PFC and EPD.</p> <p><u>General Refuse</u></p> <ul style="list-style-type: none"> <li>• General refuse should be stored in enclosed bins or compaction units separate from C&amp;D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&amp;D material. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.</li> </ul> <p><u>Chemical Wastes</u></p> <ul style="list-style-type: none"> <li>• All storage of asbestos waste should be carried out properly in a secure place isolated from other substances so as to prevent any possible release of asbestos fibres into the atmosphere and contamination of other substances. The storage area should bear warning panels to alert people of the presence of asbestos waste.</li> <li>• A licensed asbestos waste collector will be appointed to collect the asbestos waste and deliver to the designated landfill for disposal. The Project Proponent should notify EPD in advance for disposal of asbestos waste. After processing the notification, EPD will issue specific instructions and directions for</li> </ul>						
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	<p>disposal. The waste producer must strictly follow these directions.</p> <ul style="list-style-type: none"> <li>If chemical wastes were to be produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer, and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport the chemical wastes. The licensed collector shall deliver the waste to the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</li> <li>A summary of the various waste types likely to be generated during the construction works for the Project, together with the recommended handling and disposal methods is provided.</li> </ul>						
<b>Waste Management (Operation Phase)</b>							
N/A	N/A	N/A	N/A				
<b>Ecology (Construction Phase)</b>							
8.8.1	According to the EIAO-TM Annex 16 and EIAO Guidance Note. 3/2010, ecological impacts on important habitats and the associated wildlife caused by the proposed development should be mitigated by, in order of priority, avoidance, minimization, and compensation approaches to	All works areas in particular important habitats	WSD/Contractor	✓	✓		EIAO-TM

	the maximum practical extent.					
8.8.2	<p><u>Measures to Avoid/Minimize Impact to Woodland</u></p> <ul style="list-style-type: none"> <li>About 90% of the works area is situated within the existing Sha Tin WTW is of low ecological value. The impact to natural habitat is minimized. In addition, the design of the Project has been revised to avoid and minimize the impact to secondary woodland habitat. Retaining wall behind the future WTW Logistics Centre has been adopted under the current design to minimize impact to woodland. The presence of the bored pile wall would save about 1,400m<sup>2</sup> of woodland at the concerned location (Refer to Figure 8.5 as illustration). The slope stabilization work adjacent to the proposed access road at the northern boundary of works area would be constructed by retaining wall instead of soil nails. This would reduce the amount of vegetation removal required and thereby minimize the footprint of the slope at the woodland habitat.</li> </ul>			✓	✓	EIAO-TM
8.8.3-8.8.4	<p><u>Measures to Avoid/Minimize Impact to Flora Species of Conservation Importance</u></p> <ul style="list-style-type: none"> <li>Four flora species of conservation importance including Incense Tree, Ailanthus, Lamb of Tartary and Hong Kong Eagle's Claw were recorded within the works area. Prior to the commencement of the works being undertaken, a detailed vegetation survey would be conducted by a suitably qualified botanist/ecologist with over 7 years experience, for the works area requiring vegetation clearance, to confirm the location and health condition of flora species of conservation importance.</li> </ul>			✓	✓	EIAO-TM

	<p>Transplantation would be recommended as far as possible to minimize the direct impact to these important species. All the healthy and young individuals and seedlings suitable for transplantation would be identified and rescued. They would be transplanted directly to suitable receptor site within the woodland compensation area or temporarily kept in the nursery site until the receptor site is ready for planting of the rescued individuals. A transplantation proposal with location plan, details of the transplantation methodologies and programme along with post-transplantation monitoring would be submitted for approval prior to transplantation.</p> <ul style="list-style-type: none"> <li>Vegetation survey revealed that Incense Tree (<i>Aquilaria sinensis</i>) and Ailanthus (<i>Ailanthus fordii</i>) within the works area were relatively large in size (2 – 13 m in height) and grown on hillside. The affected individuals will be transplanted as far as practicable.</li> </ul>						
<p>8.8.5- 8.8.6</p>	<p><u>Measures to Avoid/Minimize Impact to Bat Roosting Site</u></p> <ul style="list-style-type: none"> <li>Evidence of Short-nosed Fruit Bat (<i>Cynopterus sphinx</i>) roosting activity was recorded within the works area. In order to avoid impacts on this species, trees showing evidence of roosting activity should be retained where possible. Where Chinese Fan-palm (<i>Livistona chinensis</i>) removal is required, these should be checked by suitably qualified ecologist with over 7 years relevant experience for roosting bats prior to their removal. If roosting bats are observed, a strategy for passive removal will be</li> </ul>			✓	✓		EIAO-TM

	<p>agreed with the AFCD and implemented. This could include undertaking the works just after the bats have left the roost (i.e. dusk).</p> <ul style="list-style-type: none"> <li>The inclusion of Chinese Fan-palm of similar size as the affected plant within the areas of compensatory planting or other suitable areas is recommended to replace affected specimens, and compensate for the impact to roosting opportunities for this bat species.</li> </ul>						
<p>8.8.7</p>	<p><u>Measures to Minimize Disturbance Impact</u></p> <p>In general, the disturbance impacts to terrestrial habitat and associated wildlife arising from the land-based construction activities could be minimized by adopting the following mitigation measures:</p> <ul style="list-style-type: none"> <li>Use of Quiet Mechanical Plant during the construction phase should be adopted wherever possible.</li> <li>Hoarding or fencing should be erected around the works area boundaries during the construction phase. The hoarding should screen adjacent habitats from construction phase activities, reduce noise disturbance to these habitats and also to restrict access to habitats adjacent to works areas by site workers.</li> <li>Regular spraying of haul roads to minimize impacts of dust deposition on adjacent vegetation and habitats during the construction activities.</li> </ul>			✓			<p>EIAO-TM</p>
<p>8.8.8</p>	<p><u>Measures to Avoid/Minimize Impact to Watercourse</u></p> <p>To minimize the contamination of wastewater</p>			✓			<p>EIAO-TM</p>

	<p>discharge, accidental chemical spillage and construction site run-off to the receiving water bodies, mitigation measures such as diverting the site runoff to silt trap facilities before discharging into storm drain, proper waste and dumping management and standard good site practice for land-based construction:</p> <ul style="list-style-type: none"> <li>• The works areas would be reinstated immediately after completion of works;</li> <li>• Waste skips should be provided to collect general refuse and construction wastes. The wastes should be disposed of in a timely and appropriate manner;</li> <li>• Drainage arrangements should include sediment traps to collect and control construction run-off;</li> <li>• Open burning on works sites is illegal, and should be strictly prohibited; and</li> <li>• Only well-maintained plant should be operated on site and plant should be serviced regularly during the construction programme.</li> </ul>						
<p>8.8.9- 8.8.11</p>	<p><u>Woodland Compensation</u></p> <ul style="list-style-type: none"> <li>• The Project would unavoidably result in permanent impact to approximately 0.69 ha of secondary woodland habitat with high ecological value. To compensate for the impact, potentially suitable location for woodland compensation within the Project site has been exhausted. On-site compensation of about 0.23 ha would be provided considering the site constraint of limited space for the proposed works. To further reduce the impact, off-site woodland compensation in the vicinity of the Project site has been extensively explored. The</li> </ul>			✓	✓		



<p>bare slope areas along Tai Po Road (Sha Tin Heights to the north of Sha Tin WTW) have been explored. It is understood that the gradient of the slope areas are steep and engineered slopes having concrete faced and slope retaining structure. Therefore, they are considered not suitable for tree planting purpose in accordance with GEO publication No. 1/2011 – Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls.</p> <ul style="list-style-type: none"> <li>• Approximately 0.29 ha off-site woodland compensation at Sha Tin South Freshwater Service Reservoir and Sha Tin West Service Reservoir would also be adopted. The impact to woodland would therefore be mitigated with provision of total woodland compensation area of about 0.52 ha (<b>Figure 8.5 and Figure 8.6</b> refer). The locations for woodland compensation are specifically chosen to increase the ecological and structural linkage with the nearby woodland. It also serves as a buffer area to screen out the disturbance arising from the Sha Tin WTW operation. Flora species used for woodland compensation would be similar to those native species recorded within the woodland nearby (<b>Table 8.23</b> refers). For the proposed offsite woodland compensation at Sha Tin South Freshwater Service Reservoir, planting would be applied on the existing flat area where the paved concrete surface would be removed for planting works. According to Appendix A of ETWB TCW No.2/2004 Maintenance of Vegetation and Hard Landscape Features, the proposed on-site and off-site compensation woodland will be managed</li> </ul>					
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	and maintained by the project proponent (i.e. WSD). <ul style="list-style-type: none"> <li>For some kind of whips, since lead time is required for native seedling production, local suppliers of native species such as Kadoorie Farm and Botanical Garden should be contacted in advance. The implementation details and management requirement of the woodland compensation area would be provided in Woodland Compensation Plan (WCP), which would be submitted for approval prior to commencement.</li> </ul>						
<b>Ecology (Operation Phase)</b>							
N/A	N/A	N/A	N/A				
<b>Landscape and Visual (Construction Phase)</b>							
9.8.1	Existing trees to be retained on site shall be carefully protected during construction. Trees unavoidably affected by the works shall be transplanted as far as possible in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	WSD		✓		DEVB TCW No. 10/2013, EIAO TM
9.8.1	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	WSD		✓		DEVB TCW No. 10/2013, EIAO TM
9.8.1	Control of night-time lighting glare.	All works areas	WSD		✓		EIAO TM
9.8.1	Erection of decorative screen hoarding compatible with the surrounding setting.	All works areas	WSD		✓		EIAO TM
9.8.1	Management of facilities on work sites which give control on the height and disposition/arrangement of all facilities on the works site to minimize visual impact to adjacent VSRs.	All works areas	WSD		✓		EIAO TM
<b>Landscape and Visual (Operation Phase)</b>							
9.8.1	Aesthetically pleasing design as regard to the form, material and finishes shall be incorporated to proposed permanent aboveground structures of the project so as to blend in the structures to the adjacent landscape and visual context.	Within the site boundary	WSD	✓		✓	ETWB TCW 2/2004

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9.8.1	Buffer Tree and Shrub Planting to screen the proposed structures.	Within the site boundary	WSD	✓		✓	ETWB TCW 2/2004, ETWB TC No. 7/2002
9.8.1	Landscape Enhancement of affected area with amenity planting where practical.	Within the site boundary	WSD	✓		✓	ETWB TCW 2/2004, ETWB TC No. 7/2002
9.8.1	Vertical Greening shall be incorporated to soften the proposed structures where practical.	Within the site boundary	WSD	✓		✓	ETWB TCW 2/2004
9.8.1	Green Roof shall be proposed to enhance the landscape quality of the structures and mitigate any potential visual impact on adjacent VSRs.	Within the site boundary	WSD	✓		✓	ETWB TCW 2/2004
9.8.1	Landscape Treatments on slope to enhance the landscape and visual amenity value of the proposed man made slopes.	Within the site boundary	WSD	✓		✓	ETWB TCW 2/2004, ETWB TC No. 23/93, ETWB TC No. 12/2000 and GEO Publication No. 1/2011
9.8.1	Woodland mix planting (within the site and off-site) (refer to Figures 8.5 and 8.6)	Within the site boundary and off site in Sha Tin South Freshwater Service Reservoir and Sha Tin West Service Reservoir at Po Fook Shan	WSD	✓		✓	ETWB TCW 2/2004, ETWB TC No. 23/93, ETWB TC No. 12/2000 and GEO Publication No. 1/2011
<b>Cultural Heritage (Construction Phase)</b>							
10.6.1- 10.6.2	As no impact is anticipated for the three graded historic buildings in Hin Tin village, no mitigation measure is therefore required for them.  It is noted that the nearest Works Area to the Ex KCR Beacon Hill Tunnel would involve only refurbishment works for four existing staff quarters as construction site office without major construction works (Refer to <b>Figure 2.1</b> and <b>Figure 10.1</b> ) during construction phase (Refer to Section 10.5.3). The possible piling and drilling activities of the new administration building	Work site	WSD/Contractor			✓	EIAO-TM

	would take place at approximately 120 m away (horizontally) (and 8 m vertically) from the tunnel portal (Refer to <b>Figure 10.1</b> ). As a precautionary measure, a peak particle velocity (ppv) limit of 7.5mm/s is recommended, measuring at the façade wall of tunnel portal and inside the tunnel where it is closest to the Works Area during piling and drilling works.						
<b>Cultural Heritage (Operation Phase)</b>							
N/A	N/A	N/A	N/A				
<b>Land Contamination (Construction Phase)</b>							
11.7.1-11.7.6	<p><u>Review of Remediation Options, Methods and Targets</u></p> <ul style="list-style-type: none"> <li>• Based on the findings of SI, if contamination is found, appropriate remediation methods should be investigated. The following factors should be considered when evaluating different remediation methods: <ul style="list-style-type: none"> <li>- Nature and level of contamination;</li> <li>- Extent of contamination;</li> <li>- Site characteristics (such as site hydrogeology, soil and groundwater chemical characteristics);</li> <li>- Site constraints (such as available space, surrounding areas); and</li> <li>- Time available for remediation.</li> </ul> </li> <li>• Remediation options applicable to the Project site should be addressed based on the following criteria: <ul style="list-style-type: none"> <li>- Technical and cost effectiveness;</li> <li>- Technology development status;</li> <li>- Environmental benefits and disbenefits;</li> <li>- Commercial availability;</li> <li>- Experience; and</li> <li>- Expertise requirement.</li> </ul> </li> <li>• According to the CAP, the potential</li> </ul>	Within the site boundary where signs of contamination are identified	WSD/ Contractor		✓		<p>Guidance Note for Contaminated Land Assessment and Remediation</p> <p>Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Guidance Manual)</p>

<p>contaminants at the Project site will be determined after site investigation works. Towards the potential contaminants, the applicability and limitations of potential remediation techniques for soil and groundwater for this Project are listed.</p> <ul style="list-style-type: none"> <li>• For any contamination found, in-situ remediation measures and possible recycling and reuse of remediated materials should be considered as the preferred remediation options whereas ex situ remediation the second. Due to limited space in landfills, offsite disposal to landfill will only be considered as the last resort. For any soil or groundwater contaminated with both organic carbon and heavy metals, the remediation method should be chosen with caution as certain contaminants present may affect the effectiveness of other remediation methods.</li> <li>• Closure assessment should be carried out to confirm the completion of remediation of the Project site and ensure that the soil and groundwater are treated to meet the cleanup targets. Confirmatory samples should be collected to analyze for the targeted contaminants. RR shall be submitted to EPD to report on the remediation process and demonstrate that contaminated soils and groundwater are all treated to meet the relevant standards or properly handled. All relevant information, including details of closure assessment, sampling results, photographs and certification of independent checker, the quantities of treated soil and recovered free product, final backfill site of treated soil and disposal site of free product shall be included in the RR.</li> </ul>					
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	<ul style="list-style-type: none"> <li>According to the findings from desktop review and site appraisal, if land contamination was identified, the impact should not be insurmountable as the remediation options recommended in the Practice Guide would be applicable.</li> </ul>					
11.7.7-11.7.8	<p><u>Proposed Precautionary Measures to Be Undertaken during Construction</u></p> <ul style="list-style-type: none"> <li>Although no SI is proposed for other areas (e.g. Administration Building and Bungalow) within the Project site, to be conservative, precautionary measures such as visual inspection are recommended to be undertaken during soil excavation and handling activities. The inspection process shall involve a visual observation of excavated soils for discolouration and the presence of oils, together with identifying the presence of odours, which may also indicate soil and/or groundwater contamination.</li> <li>If soil materials suspected to be contaminated are encountered during excavation, sampling and testing shall be undertaken to verify the presence of contamination. The soil extracted during demolition and excavation shall be temporary stockpiled. Should the concentrations of contaminants of concern (COCs) exceed relevant RBRGs as indicated by laboratory analyses, remediation works shall be undertaken with reference to the CAR and RAP.</li> </ul>	Other site areas with no SI proposed			✓	
11.7.9-11.7.10	<p><u>Recommended Health and Safety Measures and Environmental Mitigation Measures during Remediation</u></p> <ul style="list-style-type: none"> <li>In order to minimise the potentially</li> </ul>	Within the site boundary where signs of contamination are identified			✓	Occupation Safety and Health Ordinance

<p>environmental impacts arising from the handling of potentially contaminated materials, the following environmental mitigation measures are recommended during the course of the Project site remediation:</p> <ul style="list-style-type: none"> <li>- Excavation profiles must be properly designed and executed with attention to the relevant requirements for environment, health and safety;</li> <li>- Excavation should be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils;</li> <li>- Supply of suitable clean backfill material is needed after excavation;</li> <li>- In case chemicals are used in remediation, they should be stored securely, separately and away from sources of ignition or oxidizable items. Handling should be undertaken by persons specifically trained and wearing appropriate PPE.</li> <li>- Vehicles containing any excavated materials should be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates should be sealed to prevent any discharge during transport or during wet conditions;</li> <li>- Speed control for the trucks carrying contaminated materials should be enforced;</li> <li>- Vehicle wheel and body washing facilities at the Project site's exit points should be established and used; and</li> <li>- Pollution control measures for air emissions, noise emissions, and water discharges should be implemented and</li> </ul>					
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	<p>complied with relevant regulations and guidelines.</p> <ul style="list-style-type: none"> <li>• In order to minimise the potential adverse effects on health and safety of construction workers during the course of site remediation, the Occupation Safety and Health Ordinance (OSHO) (Chapter 509) and its subsidiary Regulations should be followed by all site personnel working on the Project site at all times. In addition, basic health and safety measures should be implemented, but not limited to the followings:             <ul style="list-style-type: none"> <li>- Set up a list of safety measures for site workers;</li> <li>- Provide written information and training on safety for site workers;</li> <li>- Keep a log-book and plan showing the contaminated zones and clean zones;</li> <li>- Maintain a hygienic working environment;</li> <li>- Avoid dust generation;</li> <li>- Provide face and respiratory protection gear to site workers if necessary;</li> <li>- Provide personal protective clothing (e.g. chemical resistant jackboot, liquid tight gloves) to site workers if necessary; and</li> <li>- Provide first aid training and materials to site workers.</li> </ul> </li> </ul>						
<b>Land Contamination (Operation Phase)</b>							
N/A	N/A	N/A	N/A				
<b>Hazard to Life (Construction Phase, Onsite Hazards)</b>							
Table 12.22	<u>Good Practice Measures to Protect Re-provisioning Workers</u>				✓		EIAO-TM
	1. Ensure speed limit enforcement is specified in the contractor's Method Statement to limit the speed of	All works areas	Engineer/WSD				



<p>construction vehicles on site;</p> <p>2. Develop an audit procedure to ensure enforcement of speed limits and to ensure adequate site access control;</p> <p>3. Ensure construction Method Statement is endorsed by the Engineer and WSD;</p> <p>4. Ensure designated manoeuvring area for the new access road construction to be away from the Chlorination House;</p> <p>5. Provide training for both chlorine delivery vehicle drivers and construction vehicles drivers to ensure the right access route is used at any stage during the re-provisioning activities;</p> <p>6. Ensure that the emergency response plan and procedures (including drills) cover the re-provisioning activities;</p> <p>7. Safety training to be provided to construction workers and WSD/Engineer staff regarding evacuation procedures;</p> <p>8. Ensure communication protocol is in place between construction and operation staff with regard to the change of chlorine delivery route and the switchover from the existing to new chlorinated water piping;</p> <p>9. Ensure temporary suspension of crane operation and construction truck movements during chlorine delivery;</p> <p>10. Provide a crash barrier between the construction site and the north side of the Chlorination House;</p> <p>11. Conduct vibration monitoring at the Chlorination House during piling activities to ensure vibration levels are acceptable and will not lead to any damage of the Chlorination House;</p> <p>12. Dedicated person to supervise the</p>	<p>All works areas</p> <p>All works areas</p> <p>New access road area</p> <p>All works areas</p> <p>All works areas</p> <p>All works areas</p> <p>All works areas</p> <p>All works areas</p> <p>All works areas</p> <p>Chlorination House area</p> <p>Chlorination House area</p> <p>Site gate and any other</p>	<p>Engineer/WSD</p> <p>Engineer/WSD</p> <p>WSD/Engineer/ Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>Engineer/WSD</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer</p>				
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<p>crossover between the construction access and operational access routes;</p> <p>13. Civil engineering calculation to be performed to confirm differential settlement from excavation work is within acceptable limits for the Chlorination House;</p> <p>14. Provide settlement monitoring for the Chlorination House to ensure no subsidence occurs from nearby excavation works;</p> <p>15. Confirm the chlorine concentration for the chlorinated water before the switchover from the existing to new piping. This is to avoid the potential for chlorine gas vapours being released if the concentration is too high and there is spillage during switchover ;</p> <p>16. Develop an operating procedure for performing the chlorinated water switchover from the existing piping to new piping;</p> <p>17. Ensure the location/height of the tower crane is such there is no impact on Chlorination House/chlorine delivery route in case of falling, swinging or dropped load;</p> <p>18. Ensure the location/height of the lifting equipment is such there is no impact on Chlorination House/chlorine delivery route in case of falling, swinging or dropped load;</p> <p>19. Implement the controlled demolition of the existing E&amp;M workshop to ensure that any steel structural elements can only fall away from the Chlorination House;</p> <p>20. Confirm whether slope/boulder stabilisation is required along the</p>	<p>potential crossover areas</p> <p>Chlorination House area</p> <p>Chlorination House area</p> <p>Chlorinated water piping</p> <p>All works areas</p> <p>Chlorination House area</p> <p>Chlorination House area</p> <p>Existing E&amp;M Workshop and Chlorination House areas</p> <p>Work areas along the chlorine delivery route</p>	<p>/Contractor</p> <p>Engineer/WSD</p> <p>WSD/Engineer /Contractor</p> <p>WSD</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer/ Contractor</p> <p>Engineer/WSD</p>				
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<p>chlorine delivery route;</p> <p>21. Conduct vibration monitoring at the slopes with potential for slope/boulder disturbance located close to chlorine delivery route;</p> <p>22. Stop any construction activities which may lead to vibrations and potential slope/boulder disturbance during the chlorine deliveries;</p> <p>23. Installation of chlorine gas monitors with audible alarms in the relevant re-provisioning work areas;</p> <p>24. Provision of an accompanying vehicle for the chlorine truck on the WTW site and ensuring that during the chlorine drums delivery construction works are stopped and the construction workers moved away from Chlorination House;</p> <p>25. Establish a liaison between the contractor and HKCG and develop a chlorine/town gas emergency plan to ensure gas safety during the Construction Phase;</p> <p>26. Temporarily suspend chlorine delivery during the short period of construction of the concerned section of elevated walkway to avoid mobile crane impact on the chlorine truck;</p> <p>27. Instruct the construction team and chlorine delivery team to suspend operation in case of concurrent operation and this clause will be added to the respective contractor's contract;</p> <p>28. Provide clear road signs for site vehicles</p> <p>29. Large equipment/plant movement should be controlled by "Permit-to-move" system</p>	<p>Work areas along the chlorine delivery route</p> <p>All works areas</p> <p>Re-provisioning works areas</p> <p>Chlorine delivery route and all works areas</p> <p>Beacon Hill North Gas Offtake Station and Gas Pipelines in Old Beacon Hill Tunnel</p> <p>Not applicable</p> <p>All works areas</p> <p>Chlorine Delivery Route and re-provisioning works access roads</p> <p>All works areas</p>	<p>WSD/Engineer /Contractor</p> <p>WSD/Engineer/ Contractor</p> <p>WSD/Engineer/ Contractor</p> <p>WSD/Engineer/ Contractor</p> <p>WSD/Engineer /Contractor/HKCG</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p>				
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	<p>30. Define restricted zone for the equipment (i.e. keep the equipment from the Chlorination Building at a safe distance). The extent of the restricted zone would be determined by the size of the equipment</p> <p>31. Locate the construction site office at or near property boundary away from the Chlorination House as far as possible</p> <p>The number of workers on-site should be kept to the minimum required to maintain the construction programme. Entry of non-authorized personnel to the construction site to be prohibited</p>	<p>Chlorination House area</p> <p>Construction Office area</p> <p>All works areas</p>	<p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p> <p>WSD/Engineer /Contractor</p>				
<b>Hazard to Life (Operation Phase, Onsite Hazards)</b>							
N/A	N/A						
<b>Hazard to Life (Construction and Operation Phases, Offsite Transport of chlorine)</b>							
12.15.4, 12.18.1, 12.22.9	<p>1. GPS fleet management system with driver training to help enforce truck speeds</p> <p>2. Improved clamps with independent checks to prevent load shedding</p> <p>3. Installation of fire screen and larger fire extinguishers to prevent engine and wheel fires from spreading to the cargo area</p> <p>4. Adoption of the chlorine delivery route from Sham Shui Kok Dock to Sha Tin WTW (as described in Section 12.18)</p> <p>5. Provision of emergency repair kit</p> <p>Note: the above improvements are either already implemented or are currently in progress and will be in place before commencement of the project. These formed the basis of the assessment.</p>	<p>Chlorine delivery trucks, fleet management centre</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery route</p> <p>Chlorine delivery trucks</p>	<p>WSD/Relevant Authorities/Chlorine Supply Contractor</p>		<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	EIAO-TM
Section 12.34.3, Tables 12.37	<p>1. It is recommended to ban the use of retreaded tyres and perform regular visual checks on the tyres. This measure should be implemented before the start of the</p>	<p>Chlorine delivery trucks</p>	<p>WSD/Relevant Authorities/Chlorine Supply Contractor</p>		<p>✓</p>	<p>✓</p>	EIAO-TM

and 12.38	<p>reprovisioning project (Item 2.8 of Table 12.37).</p> <p>2. It is recommended to have a vehicle accompanying chlorine truck along critical road sections in Sha Tin. The vehicle should be equipped with emergency kit, fire extinguisher, radio set for communication (Item 4.4 of Table 12.37). The accompanying vehicle will be ahead of the chlorine truck after the vehicles entering the water treatment works site. - An accompanying vehicle may provide rapid response to an incident (collision, fire, etc.) but any action would be limited to containing a small leak.</p> <p>3. It is recommended to limit fuel tanks capacity at the beginning of the Project (Item 2.3 of Table 12.37 – advance measure).</p> <p>4. It is recommended to further review the practicality of reducing combustible materials or use of fire retardant materials in the cab. (Item 2.3 of Table 12.37 – further measure)</p> <p>5. Annual periodic radiography or ultrasonic test inspections of the chlorine drums should be considered for implementation as soon as feasible (Item 3.8 of Table 12.37).</p> <p>6. It is recommended to implement side, front and rear crash guards with high energy absorption in coordination and accordance with the relevant authorities.</p> <p>7. It is recommended to implement a sturdy steel frame to minimise the potential for chlorine release due to truck rollover.</p>	<p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine drums</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p>			<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	
12.34.4	The following additional recommendations relating to the transport of Chlorine from SSK dock to Sha Tin WTW have been made to ensure the risk remains in the ALARP region:		WSD/Relevant Authorities/Chlorine Supply Contractor		✓	✓	EIAO-TM

	<ol style="list-style-type: none"> <li>1. WSD will continue to keep under review the latest development of use of alternative disinfectants in water supply industry to aim at minimising on-site chlorine storage.</li> <li>2. Training should be provided for the use of the GPS fleet management and improved safe driving.</li> <li>3. It should be ensured that independent checks are performed to ensure proper chlorine drum latching and clamping.</li> <li>4. Chlorine truck drivers or driver attendants should be further trained to check and detect potential chlorine leaks during transport. This should include the timely application of the emergency kit.</li> <li>5. Training should be provided to driver and driver attendant for the emergency use of the new 2 x 9L AFFF extinguishers.</li> <li>6. Induction training for new drivers and driver attendant should include familiarisation with the route, familiarisation with chlorine risks, defensive driving, application of emergency kits, use of fire extinguishers and emergency response.</li> <li>7. Provision of a fire screen between the cab and cargo as well as fire retardant materials for the wheel arches on the chlorine truck should be planned and provided; and</li> <li>8. To keep under review alternate chlorine receiving dock in Sha Tin/Tai Po area for chlorine delivery to STWTW.</li> </ol>	<p>Chlorine Delivery Route</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p> <p>Chlorine delivery trucks</p>					
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