

**Agreement No. CE 43/98**  
**TUEN MUEN SEWERAGE - EASTERN COASTAL SEWERAGE EXTENSION**

**ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE**

**Air Quality**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
4.5	Undertake all air pollution measures to prevent dust nuisance as a result of and during construction activities.	All unpaved haul roads, bulldozed material, exposed site areas / Throughout construction period	Contractor	TMEIA		<b>U</b>	
4.5	No debris or other materials shall be burnt on the works areas.	All areas / Throughout construction period	Contractor	TMEIA. Avoid smoke impacts and disturbance		<b>U</b>	
4.5	Dust suppression measures shall be provided and to be submitted to and approved by the Engineer.	All areas / Throughout construction period	Contractor	TMEIA		<b>U</b>	
4.5	Stockpiles of imported material kept on site shall be contained within hoardings, dampened and/or covered during dry and windy weather.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust generation		<b>U</b>	
4.5	Material stockpiled along side trenches should be covered with tarpaulins whenever works are within village boundaries.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust generation / visual impacts		<b>U</b>	
4.5	Water sprays shall be used during the delivery and handling of cement, sands aggregates and the like.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust generation		<b>U</b>	
4.5	No batching of concrete should be carried out on site. Concrete should be used in ready mixed form and off loaded adjacent to designated works areas.	All areas / Throughout construction period	Contractor	TMEIA		<b>U</b>	

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					Design	Construction	Operation
4.5	Any vehicle used for moving cement, sands, aggregates and construction waste and the like shall have properly fitting side and tail boards. Materials shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust and spillage of material		<b>U</b>	
4.5	No earth, mud, debris, dust and the like shall be deposited on public roads. Details of proposals for the wheel cleaning facilities shall be agreed with the Engineer. Such wheel washing facility shall be usable prior to any earthworks excavation activity on the Site.	All areas, particularly pumping station sites / Throughout construction period	Contractor	TMEIA Avoid spread/ deposition of mud		<b>U</b>	
4.6.9	Pumping station vent shafts should be located away from sensitive receivers	All pumping stations	DSD	TMEIA Avoid odour impacts	<b>U</b>		
4.6.18	Use a covered container to store and transport the screenings from the pump house.	All pumping stations / operational phase	DSD	TMEIA Avoid odour impacts			<b>U</b>
4.6.18	Undertake the collection of the screenings and transfer to the covered container within the confines of the pump house.	All pumping stations / operational phase	DSD	TMEIA Avoid odour impacts			<b>U</b>
11.2.8	EM&A in the form of 1 hour total suspended particulates monitoring once per week	All sensitive representative receivers / Throughout construction period	Contractor	EM&A Manual		<b>U</b>	

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Noise

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
5.7.1 & 5.8.1	Ensure silencers are installed on the exhaust pipes of the trucks, excavators, compactors, concrete lorry mixer, and cranes for all activities.	All areas / Throughout construction period	Contractor	TMEIA		U	
5.7.1 & 5.8.1	Use of mufflers on the breakers for all activities.	All areas / Throughout construction period	Contractor	TMEIA		U	
5.7.1 & 5.8.1	Use of temporary noise barriers for all activities at the pumping station sites and during main sewer construction. During main sewer construction, barriers should be used to screen the activities of mobile equipment including the crane and excavator.	All pumping stations and main sewer construction locations / Throughout construction period	Contractor	TMEIA		U	
5.7.3	Do not schedule construction activities for vibratory pokers during normal kindergarden hours.	Luen On San Tsuen Pumping Station / Kindergarden hours	Contractor	TMEIA		U	
5.7.4	Breaker, excavator, crane and vibratory poker activities shall be scheduled outside the exam periods at the kindergarden and vibratory poker activities shall be scheduled outside the exam periods of the Luen On San Tsuen school.	Luen On San Tsuen Pumping Station / Exam periods at the kindergarden and school	Contractor	TMEIA		U	
5.8.15	Schedule main sewer works adjacent to the Luen On San Tsuen School and kindergarden outside normal school hours where noise levels exceed the limits when all other measures have been exhausted and not within exam periods	Luen On San Tsuen school and kindergarden / Throughout construction period	Contractor	TMEIA		U	
5.5.10	Use of temporary noise barriers for all activities in the villages, where there is at least a 5m clearance	Village sewer alignments / Throughout construction period	Contractor	TMEIA		U	

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Noise

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
5.8.6 & 5.9.6	Manual breaking of concrete, where the concrete is less than 50mm thick	Sewer alignment construction / concrete breaking activities	Contractor	TMEIA		U	
5.8.6 & 5.9.6	Use of alternative pavement removal methods/equipment (kick ripper), where the concrete is less than 100mm thick	Sewer alignment construction / concrete breaking activities	Contractor	TMEIA		U	
5.8.6 & 5.9.6	Use of acoustic enclosure in place of a barrier where there is a 6m clearance	Sewer alignment construction / Throughout construction period	Contractor	TMEIA		U	
5.8.6 & 5.9.6	Scheduling the numbers and operating times of equipment, when noise levels cannot be reduced to within the standards by other means	Sewer alignment construction / Throughout construction period	Contractor	TMEIA		U	
5.8.11	The construction activities should be carried out in the daytime period (08.00-18.00) only and shall exclude Sundays and public holidays.	All areas	Contractor	TMEIA		U	
5.8.11	Powered mechanical equipment shall not be used within 5m of an NSR without the permission of the Engineer	All areas / Throughout construction period	Contractor	TMEIA		U	
5.8.11	Carry out good site practice to limit noise emission at source.	All areas / Throughout construction period	Contractor	TMEIA		U	
5.8.11	Avoid simultaneous noisy activities.	All areas / Throughout construction period	Contractor	TMEIA		U	

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Noise

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
11.2.8	EM&A in the form of noise monitoring.	All representative receivers / Throughout construction period	Contractor	EM&A Manual		U	

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**Water Quality**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
6.4.3	Stockpiles of excavated material should be kept to a minimum and covered during times of heavy rainfall.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.4.10	Pass any trench dewatering through a portable sand/silt removal traps prior to discharge.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.4.15	Disturbance to the So Kwun Wat Tsuen stream bed should be minimised to within the site boundary and carried out during periods of low water flow	So Kwun Wat Stream/ during bridging works	Contractor	TMEIA & ProPECC PN 1/94		U	
6.4.8 & 6.5.2	Excavation works should be carried out in the dry season	Main estuary and small tributary/ throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.2	Dredging to be carried out within a cofferdam	Main estuary/ pier construction	Contractor	TMEIA & ProPECC PN 1/94		U	

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**Water Quality**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
6.5.2	When works are carried out during the rainy season exposed slopes, stockpiles should be covered with tarpaulin and temporary access roads protected with a layer of gravel or crushed stone.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.2	Surface run off should be discharged to storm drains via sand/silt removal traps.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.2	Channels, bunds or sand bags should be used to direct any storm water to the traps and perimeter channels should be constructed before the main works begin to prevent external run off from crossing the site.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.2	Silt removal structures, channels and manholes should be maintained to remove accumulated material, specifically at the onset and end of rainy periods.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.2	Trenches for the sewer main should be dug and backfilled in short sections to minimise the quantities of rain water which will need to be pumped from them and upslope bunding provided to prevent surface water from flowing into the trenches.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.2	Rainwater pumped from the trenches should be discharged to storm drains via sand/silt removal traps.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	

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**Water Quality**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
6.5.2	Discharges to natural water courses should only take place when the effluent can be shown to comply with the relevant specified standards.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94 & Technical Memorandum on Standards for Effluent Discharged in Drainage and Sewerage Systems, Inland and Coastal Waters		U	
6.5.3	All plant should be in proper working order and maintained such that there is no leakage of fuel or oil. Any waste oils should be collected in designated tanks prior to disposal off site.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.3	All mechanical plant maintenance and refuelling areas shall be sited on paved areas. All storm water run-off from these areas should be discharged via oil separators/petrol separators and sand/silt removal traps.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.4	Groundwater pumped out of excavations for the construction of pump sumps should only be discharged following removal of silt by sand/silt removal traps.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.5	Water from drilling of rock should be discharged following removal of silt by sand/silt removal traps.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	



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**Water Quality**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
6.5.6	The wheels of all vehicles leaving the construction site should be washed before leaving the site to minimise the carry over of mud onto public roads. Wheel wash water should be recycled and only discharged following removal of silt by sand/silt removal traps.	All areas particularly pumping station sites / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.7	Run off from the roofs of site buildings should be conveyed in closed drains to the nearest surface water course to prevent the generation of excessive quantities of surface water run off carrying suspended solids.	Site Office areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.7	All spillages should be cleaned up immediately to prevent their downward migration into the groundwater.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.5.7	Sewage from toilets and any kitchens in the site facilities should be treated via a septic tank system or if this is not practicable chemical toilets should be provided and the waste from these together with 'grey water' removed from the site on a daily basis for disposal at an appropriate receiving point.	All areas / throughout construction period	Contractor	TMEIA & ProPECC PN 1/94		U	
6.6.2	Overflow bypasses to be used in emergency situations only and no effluent should be discharged during regular maintenance.	All pumping stations / Operation	DSD	TMEIA			U

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					Design	Construction	Operation
6.6.3 & 6.6.4	Supply pumping stations with stand-by pumps, emergency power supplies and telemetry system.	All Pumping Stations	DSD	TMEIA & ProPECC PN 1/94	U		
11.2.8	EM&A in the form of site supervision to ensure water quality protection measures are implemented	All areas/ Throughout construction period	Contractor	EM&A		U	

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**Waste Management**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
7.12.1	The Contractor shall identify a coordinator for the management of waste. The coordinator shall prepare a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. The Waste Management Plan shall be prepared with reference to Works Branch Technical Circular (WBTC) No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material and issued to the DEP and CED to confirm the availability for C&D and public fill waste.	Plan to be prepared prior to the start of construction, Implementation throughout construction period / All areas	Contractor	TMEIA. Works Branch Technical Circular (WBTC) No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material		<b>U</b>	
7.12.1	Stockpiled material should avoid vegetated areas where possible and covered by tarpaulins. Storage of material on site should be kept to a minimum.	All areas/ Throughout construction period	Contractor	TMEIA. Prevent windblown dust and/or surface run-off / avoid nuisance to local residents		<b>U</b>	
7.12.1	Surplus material should be sorted on site into C&D waste and that suitable for public fill	All areas /throughout construction period	Contractor	TMEIA. Maximise reusable material		<b>U</b>	
7.12.1	The contractor should provide a temporary storage area for general refuse during the construction phase which should be enclosed to avoid refuse being windblown and affected by rain. General refuse should be stored on site for a minimum period and disposed of at a licenced facility.	All areas / throughout construction period	Contractor	TMEIA		<b>U</b>	

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**Waste Management**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
7.12.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage.	All areas / throughout construction period	Contractor	TMEIA		U	
7.12.1	Suitable chemical waste storage areas shall be formed on the site for temporary storage pending collection. All chemical wastes shall be handled, stored, transported and disposed of in accordance with the relevant practices.	All areas / throughout construction period	Contractor	TMEIA/ Code of Practice on the Package, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme		U	
7.12.1	Nightsoil arising from chemical toilets and on site chemical treatment facilities shall be transported by a licensed contractor to government Sewage Treatment Works for disposal.	All areas / throughout construction period	Contractor	TMEIA/ Sanitation and Conservancy (Regional Council) By-laws		U	
7.12.1	Any screenings and grit that are removed during maintenance shall be disposed of at a landfill site. The material shall be suitably contained and covered.	All areas / operational phase	DSD	TMEIA			U
11.2.8	EM&A in the form of supervision of waste management practices	All areas / throughout construction period	Contractor	EM&A		U	

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**Ecology**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
Table 8.11 Drawing 8.7	Minimise predicted 5m <sup>2</sup> habitat losses by careful site practices and minor changes to alignment of sewer route to avoid loss of marshland habitat. Expected alignment changes will be minor. It is expected that the necessary changes can be made when the site boundary is being marked out before construction.  Reduce any drainage impact by collecting any water that seeps from the marsh into the open sewer trench during construction and returning it to the marsh.	Marsh, Area 2 / Throughout construction period	Contractor	TMEIA		<b>U</b>	
Table 8.11	Confine excavation works to the dry season in order to limit the impacts from the transportation of suspended materials and undertaken excavation for pipe bridge pier inside a cofferdam.	Main estuary and small nullah	Contractor	TMEIA		<b>U</b>	
Table 8.12 Drawing 8.8	Laying of the sewer across the stream should be confined to periods of low flow in order to limit the impacts from the transportation of suspended solids.	Stream east of So Kwun Wat Tsuen, Area 5 / During bridging works	Contractor	TMEIA		<b>U</b>	

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**Heritage**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
9.6.8 & Drawing 9.4 11.2.8	Monitoring of Ching Family Ancestral Hall (TMS-99-02) and Fung Shui shrine (TMS-99-03) during construction	So Kwun Wat, Ching Ka Tsuen  Periodic monitoring should not be less than once per week	Contractor	EM&A		<b>U</b>	
9.6.8 & Drawing 9.5 11.2.8	Monitoring of Chan family Ancestral Hall (TMS-99-04), small stone pigsty (TMS-99-06), two village houses (TMS-99-05 and TMS-99-07) and a row of terraced village houses (TMS-99-08) during construction	So Kwun Wat, east  Periodic monitoring should not be less than once per week	Contractor	EM&A		<b>U</b>	
9.6.8 & Drawing 9.6 11.2.8	Monitoring of Ching Ying Study Hall (TMS-99-12), Green brick house (TMS-99-13), Green Brick House (TMS-99-14), village house (TMS-99-15), terraced house (TMS-99-16), village house (TMS-99-19), former study hall/stables (TMS-99-20), storage shed (TMS-99-21), village house (TMS-99-22), village house (TMS-99-24), renovated gate (TMS-99-26), village house (TMS-99-28), village house (TMS-99-29), Tse Tong (TMS-99-30 a/b) and row of terraced houses (TMS-99-52) during construction.	So Kwun Wat, main village  Periodic monitoring should not be less than once per week	Contractor	EM&A		<b>U</b>	
9.6.8 & Drawing 9.7 11.2.8	Monitoring of row of village houses (TMS-99-33), village house (TMS-99-34), village house (TMS-99-35), village house (TMS-99-39), village house (TMS-99-40), village house (TMS-99-41) and the Wu's ancestral hall (An Ding Ga Suk) (TMS-99-43) during construction	Tai Lam Chung Tsuen  Periodic monitoring should not be less than once per week	Contractor	EM&A		<b>U</b>	

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**Heritage**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
9.6.8 & Drawing 9.8 11.2.8	Monitoring of Fung Shui Shrine (TMS-99-47) during construction	Tai Lam Chung Road  Periodic monitoring should not be less than once per week	Contractor	EM&A		<b>U</b>	
9.6.8 & Drawing 9.9 11.2.8	Monitoring of village house (TMS-99-49) and row of village houses (TMS-99-50) during construction	Wong UK  Periodic monitoring should not be less than once per week	Contractor	EM&A		<b>U</b>	
9.7.23 11.2.8	Supervision of excavation works in areas of high archaeological potential currently under concrete.	Wong Uk Tsuen Ching Ka Tsuen, So Kwun Wat  Periodic monitoring during excavation comprising an area of not less than 2.5% of the total area and undertaken once per week, with each visit being for a period of not less than three hours.	Contractor	EM&A		<b>U</b>	

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**Heritage**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
Table 9.3 11.2.8	Supervision during excavation of pumping station sites.	Tai Lam Chung Correctional Institution, Luen On San Tsuen  Periodic monitoring during excavation comprising an area of not less than 2.5% of the total area and undertaken once per week, with each visit being for a period of not less than three hours.	Contractor	EM&A		<b>U</b>	



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**Landscape and Visual**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
10.8.5, 10.9.15, 10.10.6, 10.10.11, 10.10.20, 10.11.6	Use of a suitable colour scheme to the pump station building to match the design of the adjacent properties.	All pumping stations	DSD & Contractor	Reduce visual intrusion of pumping stations	U	U	
10.8.5, 10.9.15, 10.10.11, 10.10.20, 10.11.6	Construction of boundary wall similar to the adjacent housing instead of standard chain link and barbed wire fence.	All pumping stations except Tai Lam Correctional Institution	DSD & Contractor	Screen pumping stations	U	U	
10.8.5, 10.9.15, 10.10.11, 10.10.20, 10.11.6	Planting of trees and shrubs to the boundary of the pumping station compound.	All pumping stations except Tai Lam Correctional Institution	DSD & Contractor	Screen pumping stations	U	U	
10.8.6	Minimise damage to the rootball of the tree east of the pumping station site.	East of Castle Peak Villas pumping station/ During excavation	DSD and Contractor		U	U	
10.9.7, 10.9.10, 10.10.9, 10.10.15, 10.11.15	Regrassing the areas disturbed during construction.	Tai Lam Valley, Tai Lam Chung Tsuen, So Kwun Wat Tsuen/After main construction works	Contractor	Avoids landscape and visual impacts through scarring		U	
10.10.9	Compensatory planting for loss of trees on Tai Lam Chung Road	Around pumping station sites / After main construction work	DSD and Contractor		U	U	
10.10.20 & Drawing 10.18	Retain existing mature trees bordering Luen Tai Street.	Luen On San Tsuen pumping station	DSD and Contractor		U	U	

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**Landscape and Visual**

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages		
					Design	Construction	Operation
10.11.15	Sewer trenching within the narrow, winding lanes of the older villages should be carefully supervised during construction to ensure the root systems of existing mature trees are not damaged, where practical.	Village areas of So Kwun Wat Tsuen / Throughout construction period	Contractor	Aviod damage to trees		<b>U</b>	
10.9.5	Pipebridge should be of simple design using neutral colours	Tai Lam Chung river	DSD & Contractor	Blend in with existing footbridge	<b>U</b>	<b>U</b>	
10.8.5, 10.9.5, 10.9.10, 10.9.15, 10.10.11, 10.10.20, 10.11.15	Any good excavated topsoil should be reused	West bank of Tai Lam Chung river / Throughout construction period	Contractor	Minimise waste materials		<b>U</b>	
10.10.15	Fine tune works boundary to minimise impacts on marsh and regrass verge of marsh.	Tai Lam Chung Tsuen marsh/ during construction and after main construction works	Contractor	Minimise landtake and reinstate		<b>U</b>	
11.2.8	EM&A in the form of site supervision of protection measures for trees and landscaping and compensatory planting establishment during the construction and operational phases respectively	All areas	Contractor	EM&A		<b>U</b>	<b>U</b>