

Appendix 12.1 – Summary of Environmental Impact Associated with the Project

Sensitive Receiver / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards / Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures ⁽¹⁾	Residual Impacts (After Implementation of Mitigation Measures)
Air Quality (Construction Phase)					
Existing and planned ASRs within the 500m assessment area	Air quality at ASRs may be deteriorated with the following pollution sources: <ul style="list-style-type: none"> Excavation works and stockpiling of excavated materials associated with the construction of stormwater pumping station, diversion box culvert and river improvement works Piling works associated with the construction of stormwater pumping station Gaseous emission from fuel combustion may arise from the use of powered mechanical equipment (PME) for various construction works Odour emission from excavation of river sediment 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Air Quality Objectives Air Pollution Control (Construction Dust) Regulation Air Pollution Control (Nonroad Mobile Machinery) (Emission) Regulation 	None	<ul style="list-style-type: none"> Implement relevant dust control measures stipulated in the Air Pollution Control (Construction Dust) Regulation, and good site practices. Regular maintenance of construction equipment deployed on-site to prevent black smoke emission. Connect construction plant and equipment to mains electricity supply and avoid use of diesel generators and diesel-powered equipment as far as practicable. Proper storage, handling and timely disposal of odorous excavated materials. Non-road vehicles are required to meet the emission standards and smoke requirements as stipulated under the Air Pollution Control (Nonroad Mobile Machinery) (Emission) Regulation. 	No adverse residual impact
Air Quality (Operation Phase)					
Existing and planned ASRs within the 500m assessment area	Depending on the quality of the silt, the desilting work may cause odour impacts during the operation phase of the Project.	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Air Quality Objectives Air Pollution Control (Construction Dust) Regulation Air Pollution Control (Nonroad Mobile Machinery) (Emission) Regulation 	None	<ul style="list-style-type: none"> If temporary stockpiling of desilted material is necessary, the stockpiles will be covered by tarpaulin to avoid potential odour emission and avoided to be placed near the ASRs with close distance (i.e., <10m). Desilted material shall also be properly covered when placed on trucks or barges. 	No adverse residual impact
Noise Impact (Construction Phase)					
Existing and planned NSRs within the 300m assessment area	92dB(A) (During examination period) or 71dB(A) to 100dB(A)	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Leq (30 min) 75dB(A) for residential dwellings Leq (30 min) 70dB(A) for schools during normal teaching hour Leq (30 min) 65dB(A) for schools during examination period 	Exceedance of noise criteria up to 25 dB(A) for residential dwelling and up to 27 dB(A) for education institute	<ul style="list-style-type: none"> Good site practice. Use of quiet PME. Use of quieter construction method. Adoption of temporary noise barrier or noise enclosure. Scheduling of PME / construction activities to avoid work during sensitive time (e.g., school examination period) and reduce the concurrent operation of PMEs. 	No adverse residual impact
Noise Impact (Operation Phase)					
Existing and planned NSRs within the 300m assessment area	52dB(A) to 61dB(A)	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) 	Exceedance of noise criteria up to 16 dB(A)	<ul style="list-style-type: none"> The ventilation fan exhaust should be orientated to face away from the NSRs as far as practical, acoustic louvers are proposed to be adopted at all ventilation fans. Quieter equipment should be selected during procurement; and Noise level specifications for all equipment and silencers should be included when ordering equipment. 	No adverse residual impact
Water Quality Impact (Construction Phase)					
Existing and planned WSR including nearby watercourses (River Silver, Luk Tei Tong River, Tai Tei Tong River, Pak Ngan Heung River and Wang Tong River), gazetted beach (Silver Mine Bay Beach), and fish ponds (to the east of the Luk Tei Tong River) and, marshes nearby (Luk Tei Tong, Ha Tsuen Long, Tseung Tau San Tsuen, Pak Ngan Heung / Lim Po Tsuen, Tai Wan Yuen, Wang Tong River / Tai Wao Yuen) and upstream / downstream area of River Silver.	<ul style="list-style-type: none"> Construction site runoff, wastewater and sediment release from works into water bodies. Construction works within river channels. Sewage from workforce. 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Water Pollution Control Ordinance Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters Practice Note for Professional Persons, Construction Site Drainage 	None	<ul style="list-style-type: none"> Good site practice Implementing proper site management measures to control site runoff and drainage following the guidelines provided in ProPECC PN 1/94. Excavation works for the drainage improvements should be carried out in dry condition. Temporary storage of excavated riverbed material should be provided in the stockpile areas for dewatering by natural ventilation. Cofferdam would be first installed to create dry work area for part of the cross section without significantly impeding the flow to contain any loss of sediment into the water column. Regular monitor the construction plants in areas close to the water courses to avoid potential spillage to the adjacent watercourses. 	No adverse residual impact

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Water Quality Impact (Operation Phase)					
Existing and planned WSR including nearby watercourses (River Silver, Luk Tei Tong River, Tai Tei Tong River, Pak Ngan Heung River and Wang Tong River), gazetted beach (Silver Mine Bay Beach), fish ponds (to the east of the Luk Tei Tong River) and marshes nearby (Luk Tei Tong, Ha Tsuen Long, Tseung Tau San Tsuen, Pak Ngan Heung / Lim Po Tsuen, Tai Wan Yuen, Wang Tong River / Tai Wao Yuen).	<ul style="list-style-type: none"> Maintenance works of the drainage channels. Change in flow regime. 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Water Pollution Control Ordinance Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters Practice Note for Professional Persons, Construction Site Drainage 	None	<ul style="list-style-type: none"> Containment structures such as sandbags barrier should be used for the desilting works area to facilitate a dry and confined working area within the drainage channel. Channel maintenance works and debris/vegetation clearance should be undertaken in dry season when water flow is low. Light machinery and hand-held machine should be considered when undertake maintenance desilting works and debris clearance. Where no maintenance access is available for the channel, temporary access to the works site should be well planned to minimize disturbance caused to the drainage channel and nearby water quality sensitive receivers. The waste material /dredged materials should be temporary stored away from the channel and cover with tarpaulin sheet. These materials should be disposed of in a timely and appropriate manner. Disposal locations of the materials should be agreed with relevant departments before commencement of the maintenance works/dredging. Avoid and minimize the use of concrete or the like. 	No adverse residual impact
Waste Management (Construction Phase)					
C&D materials, sediment, general refuse, and chemical waste	<ul style="list-style-type: none"> Total of Inert C&D materials: 61,089m³ On-site reuse (i.e. backfilling) of Inert C&D materials: 4,155m³ Disposed of surplus at public fill reception facilities: 56,934m³ Total of Non-inert C&D materials: 6,018m³ Excavated river sediments for on-site reuse: 294m³ Chemical waste: Less than few hundred litres per month General refuse: 39kg/day 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Waste Disposal Ordinance Waste Disposal (Charges for Disposal of Construction Waste) Regulation Waste Disposal (Chemical Waste) (General) Regulation Land (Miscellaneous Provisions) Ordinance Public Health and Municipal Services Ordinance Dumping at Sea Ordinance 	None	<ul style="list-style-type: none"> Avoidance, minimization, recycling, treatment and safe disposal of waste. Good waste management and control practices to avoid generation of excessive amount of waste. All dump trucks for C&D materials transportation and disposal will be equipped with GPS or equivalent system for real time tracking and monitoring of their travel routings and parking locations to prohibit illegal dumping or landfilling of C&D materials. The data collected by GPS or equivalent system relating to travel routings and parking locations of dump trucks engaged will be recorded properly. Excavated river sediment will be reused on-site as backfill material. Proper storage, handling and disposal of chemical waste. Proper storage, recycling and disposal of general refuse. 	No adverse residual impact
Waste Management (Operation Phase)					
Screened debris	<ul style="list-style-type: none"> Desilted material: Around 72m³/year Screened debris: Around 2m³/year 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Waste Disposal Ordinance Waste Disposal (Charges for Disposal of Construction Waste) Regulation Waste Disposal (Chemical Waste) (General) Regulation Land (Miscellaneous Provisions) Ordinance Public Health and Municipal Services Ordinance Dumping at Sea Ordinance 	None	<ul style="list-style-type: none"> The screenings, silt materials and debris collected during operation and maintenance should be properly packed and transported to the designated landfill for disposal as soon as possible. All chemical waste should be properly stored, labelled and removed by licensed waste collectors in accordance with Waste Disposal (Chemical Waste) (General) Regulation. 	No adverse residual impact
Ecological Impact (Construction Phase)					
The works area within the Project site and 500m study area	<ul style="list-style-type: none"> Potential direct habitat loss is expected to occur within the Works Area along Tai Tei Tong River (TTTR) in the sections near Tai Tei Tong, Nam Bin Wai, Ma Po Tsuen and Ling Tsui Tau; Luk Tei Tong Bypass Channel and Luk Tei Tong River (LTTR); and River Silver (RS). TTTR and LTTR are mainly semi-natural watercourses while RS is a channelised watercourse. Bird species of conservation importance will not be significantly affected by the Project. 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Forests and Countryside Ordinance and its subsidiary legislation, the Forestry Regulations Wild Animals Protection Ordinance Country Parks Ordinance and its subsidiary legislation 	None	<ul style="list-style-type: none"> Avoid Direct and Indirect Impacts to Ecologically Sensitive Habitats. Minimisation of Habitat Disturbance and Impacts to Fauna Species of Conservation Importance. Minimization of disturbance to Tai Wai Yuen night roost. Measures and Good Site Practice for Minimization of Physical Disturbance to the Surrounding Habitats. 	No adverse residual impact

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	<ul style="list-style-type: none"> Direct impacts on odonate species of conservation importance are considered insignificant. Without mitigation measures, the recorded species of conservation of importance within the Works Area will be directly affected by the construction works. Minor impact to sites of conservation concern. Only the habitats and associated wildlife adjacent to the Works Area may be subject to indirect impacts resulting from increased disturbances caused by the Project. Indirect impact on other habitats, including plantation and shrubland/ grassland are not anticipated. Dust generated due to drainage improvement works, if not effectively controlled, could affect the health of adjacent vegetation. Excessive dust covering leaves can lead to reduction in their photosynthetic rates, abrasion and blocking of stomata. Improper dumping of construction materials and waste within and/or near to the Works Area may result in environmental degradation of the surrounding habitat, which is more sensitive for the retained flora species of conservation importance. Potential disturbance by construction noise and increased human activities may cause wildlife to avoid using areas adjacent to the Works Area, and thereby reduce wildlife density in the area. Increased human activities and disturbances due to the Project construction have the potential to affect ardeid's usage of the night roosting site. Only a low abundance of aquatic wildlife, including those species of conservation concern, has been recorded within or beyond the project sites and their population would be expected to restore through natural recruitment, as such the potential impact from this temporal habitat fragmentation would expected to be limited within the Works Area, If the polluted water is discharged accidentally/ uncontrolled into nearby watercourses and channels. Such pollution may deteriorate the watercourse water quality, and negatively impact the freshwater flora and fauna communities inhabiting the streams and the habitats connected with the streams. 	<ul style="list-style-type: none"> Protection of Endangered Species of Animals and Plants Ordinance and its subsidiary legislation EIAO Guidance Note No. 6/2010 EIAO Guidance Note No. 7/2010 EIAO Guidance Note No. 10/2010 Hong Kong Planning Standards and Guidelines Planning, Environment & Lands Branch Technical Circular (PELBTC) No. 1/97/Works Branch Technical Circular (WBTC) No. 4/97 Drainage Services Department Practice Note No.1/2005 Environment, Transport and Works Bureau Technical Circular (Works) No. 5/2005 New Nature Conservation Policy Hong Kong Biodiversity Strategy and Action Plan (2016-2021). List of Wild Animals under State Protection List of Wild Plants under State Protection Convention on International Trade in Endangered Species of Wild Fauna and Flora United Nations Convention on Biological Diversity 			
Ecological Impact (Operation Phase)					
<p>The works area within the Project site and 500m study area</p>	<ul style="list-style-type: none"> Minor disturbance from the operation of pumping station. No significant impact on ecological resources is expected during operation phase of the Project. 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Forests and Countryside Ordinance and its subsidiary legislation, the Forestry Regulations Wild Animals Protection Ordinance Country Parks Ordinance and its subsidiary legislation Protection of Endangered Species of Animals and Plants Ordinance and its subsidiary legislation EIAO Guidance Note No. 6/2010 EIAO Guidance Note No. 7/2010 EIAO Guidance Note No. 10/2010 Hong Kong Planning Standards and Guidelines Planning, Environment & Lands Branch Technical Circular No. 1/97/Works Branch Technical Circular No. 4/97 Drainage Services Department Practice Note No.1/2005 Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TCW) No. 5/2005 New Nature Conservation Policy Hong Kong Biodiversity Strategy and Action Plan (2016-2021). List of Wild Animals under State Protection List of Wild Plants under State Protection 	None	<ul style="list-style-type: none"> For maintenance desilting of the re-profiled river channels, temporary barrier walls shall be used to provide a dry zone for desilting work; The implementation of de-silting and other activities that could disturb aquatic fauna should be scheduled section by section and the works will be confined in a small works zone which is isolated from the rest of the channel by temporary barrier walls to ensure some areas of relatively undisturbed habitat remain available for resident aquatic fauna at all times; and Waste material produced during de-silting should be disposed of in a timely and appropriate manner. 	No adverse residual impact

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		<ul style="list-style-type: none"> Convention on International Trade in Endangered Species of Wild Fauna and Flora United Nations Convention on Biological Diversity 			
Landscape and Visual Impact (Construction Phase)					
Existing Landscape Resources (LRs) and Landscape Character Areas (LCAs) and Visually Sensitive Receivers (VSRs) within the assessment area	<p><u>Key Affected LRs</u></p> <ul style="list-style-type: none"> Slight Impact: LR4 Moderate Impact: LR5, LR9 <p><u>Key Affected LCAs</u></p> <ul style="list-style-type: none"> Moderate Impact: LCA3 <p><u>Key Affected VSRs</u></p> <ul style="list-style-type: none"> Slight Impact: R1, R3, R5-R7, R13, O1-O6, LC1, LC3-LC6, LC8-9, LC11, T1-T4 Moderate Impact: R2, R4, R8-R9, R11-R12, R14-R15 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) EIAO Guidance Note 8/2010 Hong Kong Planning Standards and Guidelines Town Planning Ordinance Forests and Countryside Ordinance and its subsidiary legislation the Forestry Regulations Country Parks Ordinance Territorial Development Strategy Review: 1995 DEVB TCW No.04/2020 DEVB TCW No. 05/2020 DEVB TCW No. 6/2015 ETWB TCW No. 5/2005 	None	<ul style="list-style-type: none"> CM1 – Minimise Disturbance CM2 – Tree Protection and Preservation CM3 – Tree Transplantation CM4 – Compensatory Tree Planting CM5 – Buffer Planting CM6 – Natural Bedding Substrate CM7 – Screening CM8 – Light Control CM9 – River Revitalization and Landscape Work for Infrastructure 	<p><u>Key Affected LRs</u></p> <ul style="list-style-type: none"> Slight Impact: LR5, LR9 <p><u>Key Affected LCAs</u></p> <ul style="list-style-type: none"> Slight Impact: LCA3
Landscape and Visual Impact (Operation Phase)					
Existing Landscape Resources (LRs) and Landscape Character Areas (LCAs) and Visually Sensitive Receivers (VSRs) within the assessment area	<p><u>Key Affected LRs (Operation Day 1)</u></p> <ul style="list-style-type: none"> Slight Impact: LR4, LR5 Moderate Impact: LR9 <p><u>Key Affected LCAs (Operation Day 1)</u></p> <ul style="list-style-type: none"> Slight Impact: LCA3 <p><u>Key Affected VSRs (Operation Day 1)</u></p> <ul style="list-style-type: none"> Slight Impact: R1, R3, R5-R7, R13, O1-O6, LC1, LC3-LC6, LC8-9, LC11, T1-T4 Moderate Impact: R2, R4, R8-R9, R11-R12, R14-R15 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) EIAO Guidance Note 8/2010 Hong Kong Planning Standards and Guidelines Town Planning Ordinance Forests and Countryside Ordinance and its subsidiary legislation the Forestry Regulations Country Parks Ordinance Territorial Development Strategy Review: 1995 DEVB TCW No.04/2020 DEVB TCW No. 05/2020 DEVB TCW No. 6/2015 ETWB TCW No. 5/2005 	None	<ul style="list-style-type: none"> OM1 – Colours of Structures OM2 – Tree Transplantation OM3 – Compensatory Tree Planting OM4 – Buffer Planting OM5 – Natural Bedding Substrate OM6 – Light Control OM7 - River Revitalization and Landscape Work for Infrastructure 	<p><u>Key Affected LRs (Operation Day 1)</u></p> <ul style="list-style-type: none"> Slight Impact: LR5, LR9 <p><u>Key Affected LRs (Operation Year 10)</u></p> <ul style="list-style-type: none"> All mitigated to insignificant <p><u>Key Affected LCAs (Operation Day 1)</u></p> <ul style="list-style-type: none"> Slight Impact: LCA3 <p><u>Key Affected LRs (Operation Year 10)</u></p> <ul style="list-style-type: none"> All mitigated to insignificant
Cultural Heritage Impact (Construction Phase)					
Cultural heritage resources within 300m study area	<ul style="list-style-type: none"> No archaeological potential area has been identified within proposed works area of the Project, no archaeological impact arising from the proposed work is anticipated. Therefore, no mitigation measure is required. All of the graded historic sites/buildings/structures are located over 70m from the works area of the Project. No direct and indirect impacts are anticipated. Potential direct impact to the majority of the built heritage items identified is not anticipated due to adequate separate distance (over 50m) between the proposed works and built heritage items. 2 agricultural weirs are located within works area of the proposed river reprofiling work (HB-22) and fish ladder works (HB-76) at Tai Tei Tong River. The agricultural weir (HB-76) will be modified with consideration of fish movement based on the reprofiled level while fish ladder will be construct at the agricultural weir (HB-76) to enhance the fish movement. The works will bring direct modification to the existing agricultural weirs. Another 18 built heritage items are located relatively closer to proposed works area (HB-10, HB12, HB13, HB-16, HB-17, HB-18, HB19, HB-21, HB-46, HB-47, HB-48, HB-64, HB-65, HB66, HB-67, HB-72, HB-73 and HB-75) are located approximately 10m to 45m from proposed works areas. Due to the minor construction nature of drain 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Antiquities and Monuments Ordinance Hong Kong Planning Standards and Guidelines Guidelines for Cultural Heritage Impact Assessment 	None	<ul style="list-style-type: none"> As a precautionary measure, the project proponent and his/her contractor are required to inform AMO immediately when any antiquities or supposed antiquities under the A&M Ordinance (Cap. 53) are discovered during the course of works. Special attention should be paid to avoid adverse physical impact arising from the proposed works to these graded historic sites/buildings/structures. Design proposal, method of works and choice of machinery should be targeted to minimize adverse impacts to them. Any vibration and building movement induced from the proposed works should be strictly monitored to ensure no disturbance and physical damages made to them during the course of works. Monitoring proposal for the heritage sites, including checkpoint locations, installation details, response actions for each of the Alert/ Alarm/ Action (3As) levels and frequency of monitoring should be submitted for AMO's consideration. Installation of monitoring checkpoints shall be carried out in great care and adequate protection shall be provided so as to avoid unnecessary disturbance / damage to nearby historic fabrics. Photo records of monitoring checkpoints shall be submitted upon installation for AMO's records; Monitoring records should be 	No adverse residual impact

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	<p>construction, modification and reconstruction of flood walls, no direct impact and vibration impacts to the mentioned 18 built heritage items are anticipated.</p> <ul style="list-style-type: none"> 3 cultural landscape features (CL-01, CL-03 and CL-05) are located relatively close to the proposed works area, at distances of 10m to 20m. As no works are proposed within the cultural landscape features, no direct or indirect impacts are anticipated. Chung Hau SAI is found within the CHAA, at a distance of about 20m from the proposed works area of the Project. No excavation works of the project will exist in or adjacent to the SAI, therefore no adverse archaeological impact due to the proposed development is anticipated and thus, no mitigation measure is required. 			<p>submitted to AMO on regular basis and alert AMO should the monitoring reach Alert/ Alarm/ Action levels; and pre and post condition survey should be carried out to record conditions of these graded historic sites/buildings/structures and survey reports should be submitted for AMO's record.</p> <ul style="list-style-type: none"> The cultural heritage significance of agricultural weirs (HB-22 and HB-76) are relatively low due to high level of modifications underwent. Although the modification of the agricultural weir and construction of fish ladder of this project will bring direct impact to the weirs, the impact would be acceptable with mitigation measures. It is recommended that cartographic and photographic records be conducted to record the weirs prior to commencement of modification works. 	
Cultural Heritage Impact (Operation Phase)					
Cultural heritage resources within 300m study area	<ul style="list-style-type: none"> No direct or indirect built heritage impacts are anticipated No excavation works of the Project will be involved in operational phase, no adverse archaeological impact is anticipated and thus, no mitigation measure is required. 	<ul style="list-style-type: none"> EIAO-TM EIA Study Brief (ESB-334/2020) Antiquities and Monuments Ordinance Hong Kong Planning Standards and Guidelines Guidelines for Cultural Heritage Impact Assessment 	None	<ul style="list-style-type: none"> None. 	No adverse residual impact