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1 INTRODUCTION

1.1 Background

- 1.1.1 The proposed Revised Trunk Road T4 (hereinafter named as “the Project”) is part of the strategic road network connecting Sha Tin Road with Tsing Sha Highway and Shing Mun Tunnel Road. Traffic between Ma On Shan area and Tsuen Wan / West Kowloon areas have to travel through Tai Po Road (Sha Tin section) (TPR-ST) and other local roads in Sha Tin area currently. The Project, as a strategic route, would serve as a bypass route providing a direct connection for through traffic between Ma On Shan area and Tsuen Wan / West Kowloon without the need of travelling the existing major roads in Sha Tin Town Centre area, for example, TPR-ST, Tai Chung Kiu Road, etc., which are already very busy especially in peak hours. The Project will not only help to relieve traffic congestion on Tai Po Road (Sha Tin Section) and other major roads in Sha Tin area but it also improve the capacity of major local road junctions by directing traffic between Ma On Shan and Tsuen Wan / West Kowloon areas away from the local road network.
- 1.1.2 The Revised Trunk Road T4 connects with Shing Mun Tunnel Road (SMTR) and Tsing Sha Highway (TSH) at its western end and it will be mainly in form of viaducts at the north of Shing Mun River Channel (SMRC) to match with the road levels of existing carriageways of Shing Mun Tunnel Road and Tsing Sha Highway. After crossing SMRC, the viaduct of T4 descends at southern riverbank of SMRC and connects with an underpass passing underneath the farmland in front of Sha Tin Tau Village and Lion Rock Tunnel Road. It will then be ascending gradually to connect with the existing at-grade Sha Tin Road.
- 1.1.3 The Project comprises the following elements which are classified as Designated Projects (DPs) as per Schedule 2, Part I of the Environmental Impact Assessment Ordinance (EIAO):
- Item A.1 - A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing road;
 - Item A.8 - A road or railway bridge more than 100 m in length between abutments; and
 - Item Q.1 - All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing country park.
- 1.1.4 With reference to the Clause 1.4 and Clause 2.1 (xiv) of the EIA Study Brief, it is confirmed that the Project will not have changes to the Shing Mun River Channel (SMRC) that may constitute material changes to an exempted DP under Item I.1 (a), Part I, Schedule 2 of the EIAO with following explanation.
- 1.1.5 No river training or diversion works is required at SMRC for the construction of the Revised Trunk Road T4 vehicular bridges and an elevated cycle track and an elevated footpath across SMRC. The works at SMRC includes new bridge piers in bullet shape which will be placed aligning to those existing piers of the Lion Bridge, such that sectional area allowed for water flow through will not be worsen. Thus, it is confirmed that such construction activities will not constitute material changes to exempted DP.
- 1.1.6 Temporary removal of existing noise barriers and/or semi-noise enclosure at Tsing Sha Highway (Trunk Road T3) is required to facilitate the construction of the T4. The potential environmental issues due to this temporary removal have been conducted and addressed in this EIA report. Based on the findings, environmental impacts due to temporary removal of existing noise mitigation measures at Tsing Sha Highway is insignificant. Therefore, no material change to a designated project is anticipated.

1.2 Project Scope and Implementation Programme

1.2.1 The scope of the Project mainly comprises:

- i. Construction of dual two-lane elevated carriageways of approximately 1.4km long connecting Shing Mun Tunnel Road and Tsing Sha Highway to the proposed at-grade carriageways fronting the Riverpark;
- ii. Construction of dual two-lane at-grade carriageways and underpasses of approximately 600m long between the Riverpark and Tsang Tai Uk;
- iii. Construction of a slip road of approximately 80m long near the Riverpark connecting at-grade carriageway northbound and Lion Rock Tunnel Road northbound across Shing Mun River Channel;
- iv. Construction of a slip road of approximately 300m long near Tsang Tai Uk connecting Lion Rock Tunnel Road southbound and Sha Tin Road eastbound;
- v. Widening of a section of Sha Tin Road of approximately 150m long from a dual two-lane carriageway to a dual four-lane carriageway;
- vi. Modification of a section of the elevated carriageway of Shing Mun Tunnel Road eastbound near Chung Ling Lane of approximately 200m long to provide extra space for improved merging of traffic;
- vii. Modification and realignment of a section of Tung Lo Wan Hill Road, Chung Ling Road, Chung Ling Lane, Tai Po Road (Tai Wai Section), Shing Chuen Road, Shing Wan Road, Man Lam Road and Man Lai Road;
- viii. Construction of an at-grade and an elevated footpath of approximately 50m long across the proposed underpass near Sha Tin Tau Village;
- ix. Construction of an elevated cycle track and an elevated footpath of approximately 100m long across Shing Mun River Channel;
- x. Demolition of the existing subways across Lion Rock Tunnel Road fronting the Riverpark and construction of an elevated cycle track and an elevated footpath with lifts and staircases across Lion Rock Tunnel Road fronting the Riverpark;
- xi. Demolition of the existing pedestrian subway across Che Kung Miu Road and Lion Rock Tunnel near MTR Che Kung Temple Station and construction of an elevated footpath with lifts and staircases across Che Kung Miu Road;
- xii. Ancillary works including geotechnical, drainage, sewerage, water, utilities, lighting, landscaping, electrical and mechanical works, construction/reconstruction of noise barriers, retaining walls, slope improvement, mitigation works for natural terrain hazard near Shing Mun Tunnel Road and within Lion Rock Country Park and installation of street furniture and traffic aids; and
- xiii. Modification of Existing Noise Barrier/Enclosure at Tsing Sha Highway (Trunk Road T3).

1.2.2 Construction of the Project will tentatively commence in Q4 2023 for completion in Q3 2028.

1.2.3 The general layout plan of Revised Trunk Road T4 is shown in **Figure 1.1**, **Figure 1.2**, **Figure 1.3** and **Figure 1.4**.

1.3 Need for the Project

1.3.1 As revealed from the analysis of traffic flow data collected and the traffic impact assessment conducted in 2019, both traffic bounds of TPR-ST between Fo Tan Road and Sha Tin Rural Committee Road (STRCR) and the road junction of STRCR / TPR-ST were observed to be under manageable degree of traffic condition during morning and evening peaks in 2021. The traffic condition of this section of TPR-ST northbound is even worse in the evening peak before the completion of TPR-ST widening. It is anticipated that even with the implementation of proposed short-term road improvement works at some local road

junctions in Sha Tin area as well as the completion of the Widening of TPR-ST project in 2023 tentatively, TPR-ST and some major road junctions will still exceed their design capacities during peak hours beyond 2028. Medium-term mitigation measures should be carried out to alleviate the anticipated traffic condition of the road network in Sha Tin area before the implementation of any long-term solutions.

- 1.3.2 The Project is considered as one of the possible medium-term mitigation measures. With the introduction of the Project, traffic between Ma On Shan area and Tsuen Wan / Western Kowloon areas will no longer require to pass through those congested at-grade road sections in Sha Tin area such as TPR-ST, Tai Chung Kiu Road and STRCR but can travel on a dedicated road link at design speed of 70 km/hr bypassing the at-grade road traffic of Sha Tin Town Centre. The benefit of the Project is not only shortening the journey time of traffic between Ma On Shan and Tsuen Wan / West Kowloon areas, but it also helps to release part of the capacity of the trafficked roads and junctions in Sha Tin areas and hence to alleviate the traffic congestion problems of Sha Tin Central in peak hours. The increase in driving speed at local roads in Sha Tin Central would also help minimizing the cumulation of pollutants discharge from road traffic, thus minimise the air quality impact to nearby local residents.

1.4 Concurrent Projects

- 1.4.1 Concurrent projects identified in the vicinity of the Project include:

- Widening of Tai Po Road (Sha Tin)
- Improvement of Lion Rock Tunnel
- Revitalisation of Tai Wai Nullah

- 1.4.2 The cumulative effect of traffic flow due to the above concurrent projects has been taken into consideration for the environmental assessment in this EIA report. The construction programme of the Project is carefully scheduled to minimize the interface with other road work projects, e.g. Widening of Tai Po Road (Sha Tin) project and Improvement of Lion Rock Tunnel project by avoiding concurrent construction activities, thus no cumulative environmental impact during construction would be anticipated. In regard to the Revitalization of Tai Wai Nullah project, although solid information on the construction programme of the Revitalisation of Tai Wai Nullah project is not available at this stage, in accordance with the EIA Study Brief of Revitalisation of Tai Wai Nullah, excavation works within or close to the existing nullah bed would be carried out during dry seasons whenever possible. Besides, in view that the most dusty and noisy construction works of the Revised Trunk Road T4 within the site area of overlapping with the Revitalisation of Tai Wai Nullah project would be the foundation works for the Revised Trunk Road T4 viaducts, the tentative construction programme and works at the interface area between the two projects could be arranged through close liaison between DSD's and CEDD's contractors of the Revitalisation of Tai Wai Nullah project and the Project respectively in order to avoid construction works of respective works contracts to be carried out concurrently at the same interfacing areas and CEDD has agreed to include this requirement in the respective works contract. With such arrangement in place, cumulative environmental impacts during construction phase could be minimized.

1.5 Alignment Options

- 1.5.1 Several alignment options of the Project have been developed under a pre-construction traffic review study, which was managed by CEDD and completed in 2019, as well as under this Project. In the selection for a preferred alignment option of the Project, some basic criteria should be fulfilled and addressed, e.g. public concerns, functional requirement, etc. Furthermore, the impacts of the preferred road scheme in term of traffic and environmental should be the minimal among others. The primary criteria for determining the Project alignment option should be whether the proposed alignment can provide a direct connection for through traffic between Shing Mun Tunnel Road (SMTR)/Tsing Sha Highway

(TSH) at the western end and Sha Tin Road at the eastern end bypassing the heavily trafficked at-grade roads in Sha Tin area. Furthermore, the Project alignment option should be selected with most of the public concerns could be addressed, e.g. preservation of existing Old and Valuable Trees (OVTs) and resumption of private land/public facilities to be affected should be minimized as far as practicable. Other factors such as environmental impacts, engineering considerations and public perception have also been considered throughout the option evaluation process.

- 1.5.2 Striking the balance among different aspects, Option 1 is selected as the most preferred alignment option for the Project since this alignment can fully provide a direct connection for through traffic between SMTR / TCH and Ma On Shan areas by utilizing all the reserved road connection points at SMTR, TCH and Sha Tin Road. In addition, this alignment option can provide additional slip road connections between the Revised Trunk Road T4 and Lion Rock Tunnel Road, which provide extra merits for road users using the Project entering and leaving Sha Tin Central. The eastbound carriageway under this alignment option will be situated close to Tai Wai industrial area, which will avoid from affecting the existing OVTs along Chung Ling Road and will be away from the residential estates in Sha Tin Central such that the environmental impacts to the residents would be minimized.
- 1.5.3 Another merit of this road alignment option is the adoption of depressed road / underpass road section for the southern section of the Revised Trunk Road T4 after crossing SMRC. This would significantly reduce the height of bridge structure at SMRC and avoid having viaducts in the vicinity of Sha Tin Tau Village such that the adverse visual impact induced by the Project can be avoided and public concerns can be addressed.
- 1.5.4 Besides the merit in terms of environmental aspects, the section of alignment between the southern riverbank of SMRC and Che Kung Miu Road (CKMR) will be constructed on existing government lands, neither encroachment nor resumption of private lands is required. This road section will be close to and fronting the Riverpark, appropriate noise mitigation measures, e.g. noise semi-enclosure will be provided in accordance with EIAO-TM results in the maximum height of the depressed road together with the proposed noise mitigation measures would be lower than podium of the Riverpark.

1.6 Construction Methodology

- 1.6.1 The methodology for the construction of the Revised Trunk Road T4 has been conducted with due consideration for overcoming the difficult site condition/constraints as well as the complexity of the road alignment. As the Revised Trunk Road T4 will be situated along a corridor of well-developed Sha Tin Town Centre, which is surrounded by various industrial buildings, residential estates, railway and highway infrastructures, available working area is limited for the Project construction including fabrication and erection of bridge structures, excavation for depressed/underpass road sections, temporary storage area, re-provisioning of affected facilities during construction etc.
- 1.6.2 In this regard, use of precast segmental bridge by launching gantry method is a good choice for the construction of viaduct section of the Project since precast segments for bridge deck will be fabricated off-site, and construction work is mainly carried out by launching gantry which does not need to occupy too much space on ground. Besides, less C&D waste/materials will be generated by using steel mould as formwork for casting the precast segments off-site, the precast segments will then be delivered for assembling on-site which would minimize concrete mixing truck travelling in site area thus minimize potential air and noise impact to the surrounding environment. Whilst the foundation works of the proposed viaducts will only be confined at localized areas on ground, the piling works for the viaduct foundation would probably be carried out by conventional bored piling method.
- 1.6.3 For the depressed road/underpass sections of the Project, cut-and-cover method would likely be adopted with consideration of the complexity geometry for the Revised Trunk Road T4 underneath Lion Rock Tunnel Road and the limited cover depth to the Revised Trunk

Road T4 structure at the road junction of Tai Chung Kiu Road / Lion Rock Tunnel Road. In addition, owing to the close proximity of the existing village houses at Sha Tin Tau Village and Tsing Tai Uk Village, construction of the Project underpass structure by cut-and-cover method would be considered for better control of potential settlement and tilting of the existing building structures under tight allowable margins.

- 1.6.4 Possible construction methods which have been investigated for the construction of the Project and the reasons for selection are summarized in the table blow.

Table 1.1 Summary of Possible Construction Methods for the Revised Trunk Road T4

Section	Possible Construction Method	Selection Reason
Viaduct	Precast Segmental Bridge by Launching Gantry	<ul style="list-style-type: none"> • Transfer works off-site, thus minimize concrete mixing truck travelling in site area as a result of reducing potential air and noise impact to the surrounding environment • Better quality control • More efficient construction work thus shorten construction time as a result of minimizing on site potential environmental impacts and cumulative environmental impacts with concurrent projects • Require less temporary falsework for construction • Minimize disturbance to road users and public • Steel formworks can be reused to minimize generation of C&D waste/materials
Depressed Road / Underpass	Cut-and-Cover	<ul style="list-style-type: none"> • Method familiar by most labour thus minimize the risk for shortage of labour • facilitate construction of complex geometry of underpass • Better control complex geotechnical condition • Better control for underground work near building with foundation sensitive to underground soil condition • More flexible for dividing works areas within the site, thus allow flexibility for the contractor to co-ordinate with other concurrent projects in the vicinity for arrangement of respective construction programme to avoid cumulative environmental impacts

2 KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

2.1 Air Quality Impact

2.1.1 Potential air quality impacts associated with the construction and operation phases of the Project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.4 and Appendix B of the EIA Study Brief, as well as Annexes 4 and 12 of EIAO-TM. The assessment area for air quality impact assessment is within 500 m from the site boundary of the Project.

2.1.2 Potential air quality impacts from the construction works of the Project would mainly be related to construction dust from site clearance, utilities protection and diversion works, slope work, excavation, piling and roadworks, construction of underpass/depressed road sections and wind erosion of exposed work area. The prediction results concluded that cumulative TSP, RSP and FSP concentrations at all ASRs would comply with the criteria stipulated in EIAO-TM and AQOs. With the implementation of mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures and good site practices, no adverse dust impact at air sensitive receivers (ASRs) is anticipated due to the construction activities of the Project. No adverse residual dust impact arising from the Project is anticipated. Regular site inspections as well as dust monitoring should be undertaken routinely to inspect the construction activities and works area to ensure the recommended mitigation measures are properly implemented.

2.1.3 Cumulative air quality impact arising from the operation of the Project such as vehicular emission from open roads and nearby chimneys within 500 m study area has been assessed for the operation phase of the Project. The results conclude that the predicted cumulative NO₂, RSP and FSP concentrations at all ASRs would comply with Air Quality Objectives. No adverse air quality impact is anticipated arising from the operation of the Project.

2.2 Noise Impact

Construction Phase

2.2.1 Potential noise impacts associated with the construction and operation phases of the Project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.5 and Appendix C of the EIA Study Brief, as well as Annexes 5 and 13 of the EIAO-TM. The study area for noise impact assessment is defined by a distance of 300 m from the site boundary of the Project.

2.2.2 Potential source of noise impact during construction phase of the Project would be the use of Powered Mechanical Equipment (PME) for various construction activities. Major construction works of the Project include site clearance, removal or demolition of existing facilities, piling and foundation of the proposed road works and construction of underpass/depressed road sections within the Project boundary.

2.2.3 The construction noise levels during non-restricted hours at all representative noise sensitive receivers (NSRs) are predicted to comply with the noise standards stipulated in EIAO-TM with the implementation of the recommended mitigation measures and good site practices. NSRs EBI1 (Hong Kong Bible Research and Education Centre) and CC1 (Christ College) would exceed the noise criterion of 65 dB(A) during examination period. It is recommended that the Contractor shall liaise with the school representatives to obtain the examination schedule so as to avoid noisy construction activities during school examination periods. It is also recommended that the works area of these critical construction activities be restricted during the examination period of these schools. Minimum separation distance between the critical construction activities and the school has been recommended.

2.2.4 The construction noise levels during restricted hours at all representative NSRs are predicted to comply with the noise standards stipulated in EIAO-TM without mitigation measures. With the implementation of good site management practices, no adverse

construction noise impact arising from the Project would be anticipated. No adverse residual construction noise impact arising from the Project would be anticipated. Regular site inspections should be undertaken routinely to inspect the construction activities and works area to ensure the recommended mitigation measures are properly implemented.

Operation Phase

- 2.2.5 Road traffic noise in the worst-case scenario of Year 2043 and the prevailing scenario in Year 2023 have been adopted for traffic noise impact assessment. The road sections within 300 m study area have been included in the assessment. Under the unmitigated scenario, the overall predicted noise levels would exceed the noise criteria. With the implementation of the recommended noise mitigation measures, including low noise road surfacing (LNRS), noise barriers, semi and full enclosure, the noise levels at some of the representative NSRs would comply with the traffic noise criteria, while exceedance would still be predicted at some of the representative NSRs due to existing roads. The increase in road traffic noise level due to the Project is less than 1.0 dB(A) increase at all NSRs after provision of noise mitigation measures and all the predicted noise levels for Project Roads at the representative NSRs would comply with the noise criteria. As such, it is considered that the Project would not have significant contribution to the overall predicted noise levels.

2.3 Water Quality Impact

- 2.3.1 The water quality impact assessment was conducted in accordance with the requirements in Annexes 6 and 14 of the EIAO-TM and the requirements in Clause 3.4.6.2 and Appendix D of the EIA Study Brief. The Study area for water quality impact assessment covered the Tolo Harbour and Channel Water Control Zone (WCZ) as designated under Water Pollution Control Ordinance (WPCO), including inland water bodies within 500m from the site boundary.
- 2.3.2 Minor water quality impact would be associated with land-based construction. Impacts may result from construction works at Shing Mun River Channel and in close proximity to inland water, wastewater generated from general construction activities, construction site runoff, accidental spillage, and sewage from on-site construction workers. The potential impacts could be mitigated and controlled to comply with the WPCO standards by implementing the recommended mitigation measures. No unacceptable water quality impact would be expected during the construction phase of the Project with the recommended mitigation measures properly implemented. Regular site inspections should be undertaken routinely to inspect the construction activities and works area to ensure the recommended mitigation measures are properly implemented.
- 2.3.3 Potential water quality impacts associated with the operation phase were identified as surface runoff generated from the new paved areas and the potential hydrodynamic and water quality impact on Shing Mun River Channel due to the installation of permanent bridge piers. Provided that the recommended mitigation measures for the drainage system are properly implemented, the associated water quality impacts are expected to be minimal and acceptable. No significant change in flow regime and water quality associated with the permanent structures is predicted, therefore, no unacceptable water quality impact on Shing Mun River Channel is expected.

2.4 Waste Management Implication

- 2.4.1 The assessment of waste management implications was conducted in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.7 and Appendix E of the EIA Study Brief, as well as Annexes 7 and 15 of the EIAO-TM.
- 2.4.2 Construction and Demolition (C&D) materials will be generated from construction works of the Project such as demolition of the existing subway, site clearance, site formation and excavation for underpass and depressed roads. Based on the latest layout, the volume of C&D materials is estimated to be approximately 299,614 m³ of inert material and 23,850 m³ of non-inert material.

- 2.4.3 Inert C&D materials from the above construction works would be reused on-site as far as practicable subject to the review of detailed design stage before exported off site for or delivered to Public Filling Reception Facilities (PFRF) (Tseung Kwan O Area 137 Fill Bank) for beneficial use in other projects with potential fill demand. Non-inert waste will be recycled as far as possible before disposed of at landfill (South East New Territories (SENT)). Opportunities in minimisation of generation and maximisation of reuse would be continually investigated during the detailed design and construction phases. With the implementation of the recommended good site practices and mitigation measures for the handling, transportation and disposal of the identified waste types arising, no adverse environmental impacts associated with waste management is anticipated.
- 2.4.4 The quantities of marine-based sediment to be excavated are expected to be approximately 800 m³ from viaduct section across Shing Mun River Channel, which would require construction of piled foundation.
- 2.4.5 The excavated marine-based sediment will be treated using Stabilization/Solidification (S/S) technique and will be reused on site (e.g. as backfilling materials). With the implementation of the recommended mitigation measures, no adverse environment impacts would be expected from excavation and handling of marine sediment.
- 2.4.6 With the implementation of the recommended mitigation measures, no adverse environmental impacts would be expected from the transportation and treatment of excavated marine-based sediment.
- 2.4.7 Other waste materials, including general refuse and chemical waste will also be generated throughout construction. Provided that these identified wastes are handled, transported and disposed of using the recommended methods and that good site practices would be strictly followed, adverse environmental impacts are not expected. Regular site inspections should be undertaken routinely to inspect the construction activities and works area to ensure the recommended mitigation measures are proper implemented.
- 2.4.8 It is expected that no waste will be generated during operation phase of the Project. As such, it is considered that there would be no adverse environmental impacts associated with waste management implications during operation phase.

2.5 Land Contamination

- 2.5.1 The land contamination assessment is conducted in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.8 and Appendix F of the EIA Study Brief, as well as Clause 3.1 of Annex 19 of the EIAO-TM.
- 2.5.2 Based on the site appraisal, a potentially contaminated site (i.e. Caltex-Tai Wai Petrol Filling Station) was identified within the Project Area. No other potentially contaminating land uses / activities were identified within the Project Area. However, the proposed road works, including the piers, will not encroach into the petrol filling station and it will be retained under the Project. Therefore, no land contamination impact associated with the petrol filling station to the Project is anticipated.
- 2.5.3 Adverse land contamination impact arising from Project is not anticipated.

2.6 Ecology (Terrestrial)

- 2.6.1 The Ecological Impact Assessment was conducted in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.9 and Appendix G of the EIA Study Brief, as well as Annexes 8 and 16 of the EIAO-TM.
- 2.6.2 Literature review and 6-month ecological field surveys have been conducted. A total of 12 habitat types, including woodland, mixed woodland, shrubland, grassland, plantation, village/orchard, active agricultural land, abandoned agricultural land, developed area, pond, natural watercourse and modified watercourse, were recorded within the 500m assessment

area. A total of ten flora (Incense Tree, Butulang Canthium, Luofushan Joint-fir, Hong Kong Eagle's Claw, Small Persimmon, Hong Kong Pavetta, Ailanthus, *Rhododendron* spp., Hairy-fruited Ormosia and Ixonanthes), two butterflies (Forget-me-not and Metallic Cerulean), two reptiles (*Enhydryis* sp. and Four-clawed Gecko) and three mammal species of conservation importance (Short-nosed Fruit Bat, Japanese Pipistrelle and Pallas's Squirrel) were recorded within the Project boundary. Ardeid night roost with low to moderate abundance of roosting ardeids was recorded between HKHM and Man Lai Court.

- 2.6.3 Direct impact to ardeid night roost site between HKHM and Man Lai Court is avoided through carefully design of proposed works. Potential direct impacts included direct habitat loss, bird collision and direct harm or mortality to wildlife. Given the ecological value of the majority of affected habitats outside LRCP are low or low to moderate, and supported low diversity and abundance wildlife, no significant adverse impacts would be anticipated with proper implementation of mitigation measures.
- 2.6.4 Potential natural terrain landslide hazards are identified from the hillside catchments south to Sha Tin Road and debris resisting barriers (i.e. rigid and flexible barriers) are proposed as the preventative measures for the potential landslide hazards. Potential slope stabilization works (flexible barrier) would affect a small area of woodland and mixed woodland within LRCP. To minimize potential impact to LRCP, the location of flexible barrier is proposed at the fringe of LRCP closest to Sha Tin Road as far as practical. The extent of flexible barrier would be carefully designed to avoid / minimize tree felling and disturbance to understorey vegetation to the maximum practicable extent. Given the construction of proposed flexible barrier within LRCP would be small in scale, the Project footprint (e.g. anchors and footings) would be adjusted on site to further avoid/minimize direct impacts on trees and plant species of conservation importance, and any temporarily affected areas would be reinstated and landscaped after the construction works, the impact on LRCP is considered minor.
- 2.6.5 Potential direct impact on two floral species of conservation importance (Butulang Canthium and Ailanthus) within the proposed footprint of the Project is anticipated. Another six flora species of conservation importance (Butulang Canthium, Incense Tree, Luofushan Joint-fir, Small Persimmon, *Rhododendron* spp. and Hairy-fruited Ormosia) were recorded in the vicinity of the Project footprint of flexible and rigid barriers. A detailed vegetation survey at potentially impacted areas and effective implementation of suitable mitigation measures (e.g. preserve in-situ, transplanted) according to the Preservation and Transplantation Proposal are recommended to avoid or minimize adverse direct impact on these species.
- 2.6.6 Major indirect impacts include disturbance impacts (i.e. glare, noise, air/dust, deterioration of water quality and increased human disturbance) on nearby habitats and the associated wildlife. However, given the majority of recorded habitats were artificial in nature (i.e. plantation, developed area) and species within the assessment area were generalist species habituated to disturbed habitats, the disturbance impact is considered as minor. Also, restricted hours for construction works as 16:30-07:30 during dry season (October - March) and 17:00-07:00 during wet season (April - September) are proposed within 100 m from the ardeid night roost site to minimize construction impact to ardeid night roost site.
- 2.6.7 During construction and operation phases, some low-flying ardeids may be affected by the proposed dual 2-lane flyover near HKHM. No semi-enclosure is proposed at the northern part of proposed flyovers near HKHM. The height of the proposed semi-enclosure at Riverpark side has been carefully designed to minimize the disturbance on the bird flight paths as far as possible to minimize any potential disturbance.
- 2.6.8 With the implementation of the recommended mitigation measures, no unacceptable adverse residual impacts would be expected during construction or operation phase.

2.7 Landscape and Visual Impact

- 2.7.1 The Project will inevitably result in some landscape and visual impacts during construction and operation phases. These impacts have been minimized through careful consideration of alternatives to minimize works areas within the existing road system, and incorporation of sensitive and aesthetic external designs of noise mitigation structures with minimum disturbance to the ardeid night roost site along Shing Mun River Channel and appropriate landscape and visual treatments along the Project.
- 2.7.2 The Study Area of the Project is covered under the Approved Sha Tin OZP No. S/ST/34 (8.6.2018). The proposed road works mainly aligned adjoining or above the existing road networks. There is major change on the G/IC at the existing carparking and amenity areas outside Hong Kong Heritage Museum, involving the construction of elevated roads. For the south of Shing Mun River Channel, major changes include small portion of Open Space along the promenade and CDA(1) adjoining The Riverpark affected by the proposed roads, including the re-arrangement of pedestrian subway and cycle path system, and small portion of Village Type Development near Sha Tin Tau Village and near Tsang Tai Uk affected by the construction of depressed roads and slip road along Lion Rock Tunnel Road.
- 2.7.3 There are 6 nos. of registered OVTs in the vicinity of the project boundary will be retained in-situ and not be affected by the Project. Based on the broad-brush tree estimate with approximately 3,685 nos. of trees including 176 nos. of trees of particular interest surveyed, approximate 1,051 nos. of existing trees including 13 nos. of trees of particular interest will be unavoidably affected by the Project. One tree of particular interest *Ficus benjamina* with high amenity value and large size outside the Hong Kong Heritage Museum will be unavoidably affected and tree transplanting is proposed, subject to the review on technical feasibility and sensitivity analysis in detail design stage and further advice from the existing and future tree maintenance departments. In case removal of the subject tree of particular interest is considered unavoidable in later stage, the procedures as set out in Section 2.6 of the TRAM Guidelines and suitable initiatives to commemorate the tree (e.g. replanting) shall be considered in accordance with Para. 26 (d) of DEVB TC(W) No. 4/2020. For the remaining approximate 1,050 nos. of affected trees, tree felling will be proposed. The major affected tree species in the individual tree survey include *Ailanthus fordii*, *Canthium dicoccum*, *Ficus benjamina* and *Pterocarpus indicus*. The major affected tree species in tree group survey include *Acacia confusa*, *Bridelia tomentosa*, *Casuarina equisetifolia*, *Eucalyptus tereticornis*, *Ficus microcarpa*, *Melia azedarach*, *Polyspora axillaris*, *Sterculia lanceolata* and *Schima superba*.
- 2.7.4 Under the proposed scheme for the Revised Trunk Road T4, opportunities for tree compensation within the Project boundary has been fully explored and incorporated in the proposed mitigation measures as much as practicable. Due to the limited site areas within developed built-up areas in Sha Tin, tree compensatory planting in roadside and flat areas and woodland mix planting on slopes are proposed subject to the gradient of the proposed new slopes. A minimum of 250 heavy standard trees will be proposed at roadside flat areas, at the re-provided Sha Tin Tau Village Sitting-out Area and at the planting areas of elevated roads with shade-tolerant tree species. The proposed species are commonly used in urban environment so as to reinstate and enhance the surrounding landscape value. Reference could be made to Greening Master Plan issued by CEDD and Street Tree Selection Guide promulgated by DEVB. Total area of approximate 11,300m² will be proposed as compensatory woodland mix planting with approximately 3,400 nos. of tree whips to be planted. Mix of native tree species will be proposed in reference to Guiding Principles on Use of Native Plant Species in Public Works Projects promulgated by DEVB to improve the vegetation diversity, enhance ecological value and re-creation of vegetation habitat particular for areas adjoining the Lion Rock Country Park.
- 2.7.5 Appropriate landscape and visual mitigation measures are proposed during construction such as preservation of existing vegetation, preservation of old and valuable trees (OVTs), transplanting of affected trees, control of night-time lighting glare, erection of decorative screen hoarding, management of construction activities and facilities, reinstatement of temporarily disturbed landscape areas and reinstatement of affected watercourses, and

during operation such as compensatory planting for loss of existing trees, landscape treatment on slopes, provision of screen planting, maximization of roadside planting, re-provision of affected open space, visually pleasing aesthetic treatment on noise barriers and noise enclosures and aesthetically pleasing design for footbridges, pedestrian subways, cycle paths, carriageways and other highways structures. Regarding mitigated visual impact, it is predicted that there would be insubstantial to moderate residual impact on most of the Visually Sensitive Receivers (VSRs) during construction, and would be insubstantial to slight on day 1 of operation and be further reduced to insubstantial when the proposed tree planting becomes mature in year 10 of operation. For those VSRs (i.e. R-03 Residents in residential developments along Promenade, I-03 Occupants in GIC south of Tai Po Road, I-04 Occupants in Hong Kong Bible Research and Education Centre and O-01 Recreational Users in Sha Tin Park and Promenade) viewing to the proposed bridge with noise semi-enclosure at Shing Mun River Channel of VP3, VP4 and VP11, and the two VSRs (i.e. R-05 Residents in residential developments along Sha Tin Road and T-06 Traveller along Sha Tin Road) viewing to the full noise enclosure along Sha Tin Road of VP8, there are still slight residual visual impacts upon day 1 of operation and year 10 of operation. There would be insubstantial residual impact on other VSRs within the visual envelope during the construction and operation of the Project.

2.7.6 In sum, it is considered that the residual landscape and visual impact is acceptable with mitigation measures implemented during construction and operation phases.

2.8 Impact on Cultural Heritage

2.8.1 The Cultural Heritage Impact Assessment is conducted in accordance with Clause 3.4.11 and Appendix I of the EIA study brief, as well as Annexes 10 and 19 of the EIAO-TM.

2.8.2 Nine historic buildings, a new item pending for grading assessment, a nil grade building, and thirty-one buildings with no grade were identified within the 300m assessment area. Among the identified built heritage, the Gatehouse of Pok Ngar Villa, Tsang Tai Uk, Li Cottage, Ng Yuen, and OLD26 are located in close proximity to the proposed works. Potential direct impacts of damages through contacting with construction machineries and site negligence, indirect impacts of ground-borne vibration, tilting, settlement and dust nuisance would be anticipated for the five built heritage resources during construction phase. Lau Ancestral Hall, High Rock Christian Camp and No. 1, 2 and 3 First Street, Tai Wai and OLD1, OLD9, OLD11-21, OLD26-28 are situated in the vicinity of the site.

2.8.3 Pre and post condition survey of Gatehouse of Pok Ngar Villa, Tsang Tai Uk, Li Cottage and Ng Yuen shall be carried out by professional qualified building surveyor or engineer.

2.8.4 Monitoring of vibration, settlement and tilting, shall be employed for Tsang Tai Uk, Gatehouse of Pok Ngar Villa, Li Cottage, Lau Ancestral Hall, Ng Yuen, High Rock Christian Camp, No. 1, 2 and 3 First Street, OLD1, OLD9, OLD11-21, OLD26-28, including monitoring stations' positions, installation details, and relevant Alert, Alarm and Action (3As) system. Monitoring proposal should be submitted for AMO's consideration. Monitoring records should also be submitted to Antiquities and Monuments Office (AMO) on regular basis and alert AMO should the monitoring reach 3As levels.

2.8.5 Excavation works should not jeopardize stability of the historic buildings. Foundation information of the historic buildings shall be verified on site if needed, sufficient lateral support should be provided and de-watering (if required) should be carried out with great cautions.

2.8.6 Buffer zones with physical barriers should be employed for Tsang Tai Uk, the Gatehouse of Pok Ngar Villa, and OLD26. Substantial physical barriers, such as hoarding or water-filled barriers, should be set up between the project site and each of the three built heritage resources, Li Cottage, Ng Yuen, and OLD26. Regular site inspections should be undertaken routinely to inspect the construction activities and works area to ensure the recommended mitigation measures are proper implemented.

- 2.8.7 Vehicle parapets would be designed and installed in the roadway. Adverse impact arising anticipated from road accidents on Tsang Tai Uk and Gatehouse of Pok Ngar Villa would thus be controlled during operation.
- 2.8.8 A detailed design proposal including method of works and impact assessments for the four built heritage including (a) Gatehouse of Pok Ngar Villa (new item); (b) Li Cottage (Grade 1); (c) Ng Yuen (Grade 3); (d) Tsang Tai Uk (Grade 1) should be submitted for AMO's consideration. The impact assessment should also include an analysis of settlement for Tsang Tai Uk due to construction works.
- 2.8.9 No archaeological impact would be anticipated, and thus, no mitigation measure would be required during construction and operation phases. As a precautionary measure, AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.
- 2.9 Impact Summary**
- 2.9.1 A summary of the environmental impacts associated with the Project is presented in **Table 2.1**.

Table 2.1 Summary of Environmental Impacts.

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
Air Quality Impact					
Construction Impact					
Representative existing residential, commercial developments and government uses within 500m from the boundary of the Project Site	<p><u>RSP</u></p> <ul style="list-style-type: none"> 10th highest 24-hr average conc: 69 – 99 µg/m³ Annual average: 31 – 50 µg/m³ <p><u>FSP</u></p> <ul style="list-style-type: none"> 10th highest 24-hr average conc: 52 – 57 µg/m³ Annual average: 22 – 26 µg/m³ <p><u>TSP</u></p> <ul style="list-style-type: none"> 1st highest hourly average conc: 186 – 376 µg/m³ 	<p><u>RSP</u></p> <ul style="list-style-type: none"> 24-hr average conc.: 100 µg/m³ (Number of exceedances allowed: 9) Annual average conc.: 50 µg/m³ <p><u>FSP</u></p> <ul style="list-style-type: none"> 24-hr average conc.: 75 µg/m³ (Number of exceedances allowed: 9) Annual average conc.: 35 µg/m³ <p><u>TSP</u></p> <ul style="list-style-type: none"> 1st highest hourly average conc : 500 µg/m³ 	N/A	<p>The approved non-road mobile machinery (NRMMs) under NRMM Regulation (excluding exempted NRMMs) would be used on site and NRMMs supplied with mains electricity instead of diesel-powered should be adopted as far as possible to minimize the potential emission from NRMMs.</p> <p>Dust suppression measures and good site practices</p> <ul style="list-style-type: none"> Skip hoist for material transport should be totally enclosed by impervious sheeting. All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet. All stockpiles of aggregate or spoil should be covered and/or water applied. The height from which excavated materials are 	No adverse residual impacts anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
				<p>dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading.</p> <ul style="list-style-type: none"> • Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites. • The load of dusty materials carried by a vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle. • Erection of hoarding of not less than 2.4m high from ground level along the site boundary which adjoins a road, street, service lane or other area accessible to the public. 	
Operation Impact					
Existing and planned residential, commercial developments and government uses within 500m from the boundary of the Project Site	<u>NO₂</u> <ul style="list-style-type: none"> • 19th highest 1-hr average conc.: 92 – 145 µg/m³ • Annual average conc.: 13 – 37 µg/m³ 	<u>NO₂</u> <ul style="list-style-type: none"> • 1-hr average conc.: 200 µg/m³ (Number of exceedances allowed: 18) • Annual average conc.: 40 	N/A	No adverse air quality impact is anticipated during the operation phase of the Project, thus mitigation measure is deemed not necessary.	No adverse residual impacts anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<u>RSP</u> <ul style="list-style-type: none"> 10th highest 24-hr average conc: 69 – 72 µg/m³ Annual average: 31 – 33 µg/m³ <u>FSP</u> <ul style="list-style-type: none"> 10th highest 24-hr average conc: 52 – 54 µg/m³ Annual average: 22 – 24 µg/m³ 	µg/m ³ <u>RSP</u> <ul style="list-style-type: none"> 24-hr average conc.: 100 µg/m³ (Number of exceedances allowed: 9) Annual average conc.: 50 µg/m³ <u>FSP</u> <ul style="list-style-type: none"> 24-hr average conc.: 75 µg/m³ (Number of exceedances allowed: 9) Annual average conc.: 35 µg/m³ 			
Noise Impact					
Construction Impact					
Representative existing noise sensitive developments (e.g. residential) within 300m from the boundary of the Project Site	<ul style="list-style-type: none"> 58 – 99 dB(A) 	<ul style="list-style-type: none"> Annexes 5 and 13 of the EIAO-TM Leq_(30 min) 75dB(A) at 1m from the façade of residential dwellings Leq_(30 min) 70dB(A) at 1m from the façade of educational institutions which rely on openable window for ventilation (Leq_(30 min) 65dB(A) during examinations). 	<ul style="list-style-type: none"> 0 – 24 dB(A) 	<ul style="list-style-type: none"> - Quality PME prescribed in EPD's Quality Powered Mechanical Equipment (QPME) database. - Temporary movable noise barriers, full enclosure for PME. - Good site practices • Only well-maintained plant should be operated on site and plant should be serviced regularly. • Silencers or mufflers on construction plant should 	<ul style="list-style-type: none"> • No adverse residual impacts anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
				be utilized and should be properly maintained. <ul style="list-style-type: none"> • Mobile plant should be sited as far away from sensitive uses as possible. • Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. • Plant known to emit noise strongly in one direction should, where possible, be orientated so that noise is directed away from the nearby sensitive uses. • Material stockpiles and other structures should be effectively utilized to screen noise from on-site construction activities. 	
Operation Impact					
Representative existing and planned residential developments, educational institutions, clinic, etc. within 300m from the boundary of the Project Site	<ul style="list-style-type: none"> • Predicted overall noise levels: 45 – 82 dB(A) • Predicted noise levels of the Project roads: 0 – 80 dB(A) • Contribution from Project roads: 0 – 34 dB(A) 	<ul style="list-style-type: none"> • Annexes 5 and 13 of the EIAO-TM • L_{10(1 hour)} 70dB(A) at 1m from the façade of residential dwellings • 65 dB(A) at 1 m from the external façades of schools, places of public 	<ul style="list-style-type: none"> • Exceedance of the noise criteria by up to 17 dB(A) • The exceedances are dominantly contributed by the existing roads at some Representative 	<ul style="list-style-type: none"> • Low Noise Road Surfacing <ul style="list-style-type: none"> - Approx 180m at proposed slip road SR1-1 (LNRS1). - Approx 210m at proposed T4 (westbound) slip road (LNRS2). • Proposed Noise Barriers and Enclosures 	<ul style="list-style-type: none"> • No adverse residual impacts anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
		<p>worship, courts of law, places where unaided voice communication is required</p> <ul style="list-style-type: none"> 55 dB(A) at 1 m from the external façades of hospital and clinics. 	<p>NSRs, while at some other Representative NSRs, the exceedances are dominantly contributed by Project Roads</p>	<ul style="list-style-type: none"> - Approx 60m of 2m High Vertical Noise Barrier (N1). - Approx 130m of 5m High Vertical Noise Barrier (N2). - Approx 100m of 5.5m High with 1.5m Cantilever (at 45 degrees) Barrier (N3). - Approx 50m of 2.7m High with 3.7m Cantilever (at 20 degrees) Barrier (N4). - Approx 170m Semi-enclosure (SE1). - Approx 390m Full-enclosure (FE1). 	
Water Quality Impact					
Construction Impact					
<p>Representative WSRs within 500m from the boundary of the Project Site, including Shing Mun Main River Channel, Lion Rock Country Park, natural streams running from Hillside to Shing Mun River catchment and concrete channel near Sha Tin Tau Village and Shui Chuen O Estate.</p>	<p>The potential sources of water quality impact associated with the construction works include:</p> <ul style="list-style-type: none"> Construction works at Shing Mun Main River Channel; Wastewater from general construction activities; Construction site run-off; Construction works in close proximity to inland water; Sewage from construction workforce; Accidental spillage of chemicals; and Diversion of Sha Tin Tau 	<ul style="list-style-type: none"> Annexes 6 and 14 of the EIAO-TM Water Quality Objectives for the Tolo Harbour and Channel Water Control Zone (WCZ) Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS) Practical Note for Professional Persons 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Mitigation measures and good site practices in ProPECCPN 1/94 "Construction Site Drainage" Guidelines in DSD Technical Circular No. 14/200 "Temporary Flow Diversions and Temporary Works Affecting Capacity in Stormwater System" Practices in ETWB TC (Works) No. 5/2005 "Protection of natural streams / rivers from adverse impacts arising" 	<ul style="list-style-type: none"> No adverse residual impacts anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	Nullah.	(ProPECC) PN 1/94 <ul style="list-style-type: none"> • Environmental, Transport and Works Bureau (ETWB) Technical Circular (Works) No. 5/2005 • Hong Kong Planning Standards and Guidelines (HKPSG) Chapter 9 (Environment) 		<i>from construction works</i> <ul style="list-style-type: none"> • Waste Disposal Regulation • Provision of interim treatment facilities, such as chemical toilets, for construction workforce 	
Operation Impact					
Representative WSRs within 500m from the boundary of the Project Site, including Shing Mun Main River Channel, Lion Rock Country Park, natural streams running from Hillside to Shing Mun River catchment and concrete channel near Sha Tin Tau Village and Shui Chuen O Estate.	Potential water quality impacts associated with the operation phase include: <ul style="list-style-type: none"> • Non-point source surface runoff from new impervious areas; and • Hydrodynamic and water quality impact on Shing Mun River 	<ul style="list-style-type: none"> • Annexes 6 and 14 of the EIAO-TM • Water Quality Objectives for the Victoria Harbour (Phase Two) WCZ • Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS) • ProPECC PN 5/93 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Adequate design in silt trap for the new road drainage which take into account the guidelines in ProPECC PN 5/93. • Best Storm Water Management Practices and Storm Water Pollution Control Plan to reduce non-point source pollution. 	<ul style="list-style-type: none"> • No adverse residual impacts anticipated
Waste Management Implication					
Construction Impact					
C&D materials, excavated sediments, chemical wastes and general refuse	<ul style="list-style-type: none"> • Around 23,850 m³ of non-inert C&D materials and 299,614 m³ of inert C&D materials will be 	<ul style="list-style-type: none"> • Annexes 7 and 15 of the EIAO-TM 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Implementation of good site practices, waste reduction measures and 	<ul style="list-style-type: none"> • No adverse residual impact anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<p>generated from demolition of the existing carriageways, site clearance/set-up/plant mobilization, underground utilities protection and diversion works, piling works, pile cap/pier/abutment construction, falsework/deck construction, and drainage and pavement construction.</p> <ul style="list-style-type: none"> • Around 800 m³ of excavated marine-based sediment will be generated from construction of piled foundation for the viaduct section across the Shing Mun River Channel. • Small quantity of chemical wastes in the order of a few cubic meters per month. • Around 163 kg per day of general refuse will be generated from construction works and on-site staff and workers. 	<ul style="list-style-type: none"> • Waste Disposal Ordinance (Cap. 354) • Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N) • Land (Miscellaneous Provisions) Ordinance (Cap. 28) • Public Health and Municipal Services Ordinance – Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK) • Dumping at Sea Ordinance (Cap. 466) 		<p>proper storage, collection and transport of waste.</p> <ul style="list-style-type: none"> • The excavated sediment will be treated and reused on site. 	
Operation Impact					
N/A	<ul style="list-style-type: none"> • It is expected that no waste will be generated during the operation phase of the Project. 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • No mitigation measures to be provided as the Project would not cause adverse impacts. 	<ul style="list-style-type: none"> • No adverse residual impact anticipated
Land Contamination					

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
Onsite construction workers and future occupants	<ul style="list-style-type: none"> Adverse land contamination impact arising from the Project is not anticipated 	<ul style="list-style-type: none"> Annex 19 of the EIAO-TM Guidance Note for Contaminated Land Assessment and Remediation (EPD, 2007) Practice Guide for Investigation and Remediation of Contaminated Land (EPD, 2011) Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (EPD, 2007) 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> As adverse land contamination impact arising from the Project is not anticipated, no mitigation measures were considered necessary. 	<ul style="list-style-type: none"> No adverse residual impact anticipated
Ecology (Terrestrial)					
<p>Natural/Semi-natural habitats including woodland, mixed woodland, plantation and the associated wildlife (including species of conservation importance)</p> <p>Ardeid night roost site between HKHM and Man Lai Court</p>	<ul style="list-style-type: none"> Permanent loss of approximately 2.8 ha natural/semi-natural habitat Very small area of woodland (13 m²) and mixed woodland (153 m²) within LRCP would be permanently affected Potential direct injury/mortality to wildlife and bird collision Disturbance impact on bird flight path (including ardeids) 	<ul style="list-style-type: none"> Annexes 8 and 16 of the EIAO-TM EIAO Guidance Notes No. 7/2010 and No. 10/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Avoidance of direct impact to ardeid night roost site between HKHM and Man Lai Court Avoidance of direct impact to recognized sites of conservation importance as far as possible Minimization of direct impact to LRCP by proposing the flexible 	<ul style="list-style-type: none"> No adverse residual impact anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<ul style="list-style-type: none"> Indirect disturbance impact (e.g. dust, noise, glare, site runoff, groundwater infiltration) on ardeid night roost, natural/semi-natural habitats and associated wildlife in the vicinity 			<ul style="list-style-type: none"> barrier at the fringe of LRCP closest to Sha Tin Road as far as possible Carefully design the construction works to preserve the directly impacted flora species of conservation importance in-situ as far as possible. If direct impact is unavoidable, transplant the flora species of conservation importance, where possible, according to Plant Preservation and Transplantation Proposal Implementation of good site practices (e.g. provision of screening, direct lighting away from the night roosting site and LRCP, etc.) Restriction hours of construction works approximately 100 m from the nearest ardeid night roost site 	
Operation Phase					
Natural/Semi-natural habitats including mixed	<ul style="list-style-type: none"> Potential direct mortality to wildlife (e.g. road kill) and bird 	<ul style="list-style-type: none"> Same as construction phase 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Implementation of good site practices and 	<ul style="list-style-type: none"> No adverse residual impact anticipated

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
woodland, plantation and the associated wildlife (including species of conservation importance) Ardeid night roost site between HKHM and Man Lai Court	collision <ul style="list-style-type: none"> Disturbance impact on bird flight path (including ardeids) Disturbance impacts (e.g. dust, noise, glare) on ardeid night roost, natural/semi-natural habitats and the associated wildlife (including species of conservation importance) in the vicinity of Project site 			mitigation measures (e.g. planting of peripheral screening plants/vertical green, control of glare / lighting) measures <ul style="list-style-type: none"> Carefully design the noise barrier (e.g. location, use of tinted materials and superimposing dark patterns or strips on the noise barrier) 	
Landscape and Visual Impacts					
Construction Impact					
Landscape Resources (LRs)	<ul style="list-style-type: none"> Substantial landscape impact on Tree and Shrub Planting in Village Areas Near Tsang Tai Uk, Sha Tin Tau Village Sitting-Out Area, Landscape Areas in Urban Development Area near Lion Rock Tunnel Road, Agricultural Land Near Sha Tin Tau Village, Plantation on Engineered Slopes and Tree and Shrub Planting in Roadside Areas. Moderate landscape impact on Woodland and Mixed Woodland near Needle Hill and Sha Tin Road, Tree and Shrub Planting in Village Areas near Lai Chi Yuen and Shing Mun 	<ul style="list-style-type: none"> Annexes 10 and 18 of the EIAO-TM Environmental Impact Assessment Ordinance Guidance Note 8/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Preservation of Existing Vegetation Preservation of Old and Valuable Trees (OVTs) Transplanting of Affected Trees Control of Night-time Lighting Glare Erection of Decorative Screen Hoarding Management of Construction Activities and Facilities 	<ul style="list-style-type: none"> Moderate landscape impact on Tree and Shrub Planting in Village Areas Near Tsang Tai Uk, Sha Tin Tau Village Sitting-Out Area, Landscape Areas in Urban Development Area near Lion Rock Tunnel Road, Agricultural Land Near Sha Tin Tau Village, Plantation on Engineered Slopes, Tree and Shrub

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<p>River Promenade.</p> <ul style="list-style-type: none"> Slight landscape impact on Waterbodies in Shing Mun River Channel and Modified Watercourse in Sha Tin Tau. No discernible change in other LRs identified within the study boundary of the Project 			<ul style="list-style-type: none"> Reinstatement of Temporarily Disturbed Landscape Areas Reinstatement of Affected Watercourses 	<p>Planting in Roadside Areas, Woodland and Mixed Woodland near Needle Hill and Sha Tin Road, Tree and Shrub Planting in Village Areas near Lai Chi Yuen and Shing Mun River Promenade.</p> <ul style="list-style-type: none"> Slight landscape impact on Waterbodies in Shing Mun River Channel and Modified Watercourse in Sha Tin Tau.
Landscape Character Areas (LCAs)	<ul style="list-style-type: none"> Substantial landscape impact on Sha Tin Tau Residential Urban LCA. Moderate landscape impact on Sha Tin Upland and Hillside LCA, Tai Wai Miscellaneous Urban Fringe LCA and Tai Wai Residential Urban Fringe LCA. Slight landscape impact on Sha Tin Miscellaneous Urban Fringe LCA, Tai Wai Residential Urban LCA, Tai Wai Urban Peripheral Village LCA, Tai Wai Transportation 	<ul style="list-style-type: none"> Annexes 10 and 18 of the EIAO-TM Environmental Impact Assessment Ordinance Guidance Note 8/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Preservation of Existing Vegetation Preservation of Old and Valuable Trees (OVTs) Transplanting of Affected Trees Control of Night-time Lighting Glare Erection of Decorative Screen Hoarding 	<ul style="list-style-type: none"> Moderate landscape impact on Sha Tin Tau Residential Urban LCA, Sha Tin Upland and Hillside LCA, Tai Wai Miscellaneous Urban Fringe LCA and Tai Wai Residential Urban Fringe LCA. Slight landscape impact on Sha Tin Miscellaneous Urban Fringe LCA, Tai Wai Residential Urban

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<p>Corridor LCA and Sha Tin Road Transportation Corridor LCA.</p> <ul style="list-style-type: none"> No discernible change in other LCAs identified within the study boundary of the Project 			<ul style="list-style-type: none"> Management of Construction Activities and Facilities Reinstatement of Temporarily Disturbed Landscape Areas Reinstatement of Affected Watercourses 	<p>LCA, Tai Wai Urban Peripheral Village LCA, Tai Wai Transportation Corridor LCA and Sha Tin Road Transportation Corridor LCA.</p>
<p>Visually Sensitive Receivers (VSRs)</p>	<ul style="list-style-type: none"> Substantial visual impact on where the proposal would cause significant deterioration or improvement in existing visual quality (R-05, R-06, I-07). Moderate visual impact on immediately adjacent VSRs who have full overview of the project that cause a noticeable deterioration or improvement in existing visual quality (R-03, R-04, I-03, I-04, I-06, O-01, O-3, O-04, O-05, T-01, T-02, T-03, T-04, T-05, T-06). Slight visual impact on VSRs further away that cause a barely perceptible deterioration or improvement in existing visual quality (R-01, I-01, I-05, W-01). Insubstantial visual impact on long distant VSRs with no discernible change in the 	<ul style="list-style-type: none"> Annexes 10 and 18 of the EIAO-TM Environmental Impact Assessment Ordinance Guidance Note 8/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Preservation of Existing Vegetation Transplanting of Affected Trees Control of Night-time Lighting Glare Erection of Decorative Screen Hoarding Management of Construction Activities and Facilities Reinstatement of Temporarily Disturbed Landscape Areas Reinstatement of Affected Watercourses 	<ul style="list-style-type: none"> Moderate residual impact on where the proposal would cause significant deterioration or improvement in existing visual quality and immediately adjacent VSRs who have full overview of the project that cause a noticeable deterioration or improvement in existing visual quality (R-05, R-06, I-07, R-03, R-04, I-03, I-04, I-06, O-01, O-3, O-04, O-05). Slight visual impact on VSRs further away that cause a barely perceptible deterioration or improvement in existing visual quality (R-01, I-01, I-05, T-01, T-02, T-03, T-04, T-

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	existing visual quality (R-02, I-02, I-08, O-02).				05, T-06, W-01). <ul style="list-style-type: none"> Insubstantial visual impact on long distant VSRs with no discernible change in the existing visual quality (R-02, I-02, I-08, O-02).
Operation Impact					
Landscape Resources (LRs)	<ul style="list-style-type: none"> Substantial landscape impact on Tree and Shrub Planting in Village Areas Near Tsang Tai Uk, Landscape Areas in Urban Development Area near Lion Rock Tunnel Road, Agricultural Land Near Sha Tin Tau Village, Plantation on Engineered Slopes and Tree and Shrub Planting in Roadside Areas. Moderate landscape impact on Woodland and Mixed Woodland near Needle Hill and Sha Tin Road, Tree and Shrub Planting in Village Areas near Lai Chi Yuen, Sha Tin Tau Village Sitting-Out Area and Shing Mun River Promenade. Slight landscape impact on Waterbodies in Shing Mun River Channel and Modified Watercourse in Sha Tin Tau. 	<ul style="list-style-type: none"> Annexes 10 and 18 of the EIAO-TM Environmental Impact Assessment Ordinance Guidance Note 8/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Compensatory Planting for Loss of Existing Trees Landscape Treatment on Slopes Provision of Screen Planting Maximization of Roadside Planting Re-provision of Affected Open Space Visually pleasing aesthetic treatment on noise barriers and noise enclosures Aesthetically pleasing design for footbridges, pedestrian subways, cycle paths, carriageways and other highways structures 	<ul style="list-style-type: none"> Slight residual impact during day 1 of operation and insubstantial residual impact during year 10 of operation on all affected landscape resources.

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	<ul style="list-style-type: none"> No discernible change in other LRs identified within the study boundary of the Project 				
Landscape Character Areas (LCAs)	<ul style="list-style-type: none"> Substantial landscape impact on Sha Tin Tau Residential Urban LCA. Moderate landscape impact on Sha Tin Upland and Hillside LCA, Tai Wai Miscellaneous Urban Fringe LCA and Tai Wai Residential Urban Fringe LCA. Slight landscape impact on Sha Tin Miscellaneous Urban Fringe LCA, Tai Wai Residential Urban LCA, Tai Wai Urban Peripheral Village LCA, Tai Wai Transportation Corridor LCA and Sha Tin Road Transportation Corridor LCA. No discernible change in other LCAs identified within the study boundary of the Project 	<ul style="list-style-type: none"> Annexes 10 and 18 of the EIAO-TM Environmental Impact Assessment Ordinance Guidance Note 8/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Compensatory Planting for Loss of Existing Trees Landscape Treatment on Slopes Provision of Screen Planting Maximization of Roadside Planting Re-provision of Affected Open Space Visually pleasing aesthetic treatment on noise barriers and noise enclosures Aesthetically pleasing design for footbridges, pedestrian subways, cycle paths, carriageways and other highways structures 	<ul style="list-style-type: none"> Slight residual impact during day 1 of operation and insubstantial residual impact during year 10 of operation on all affected landscape character areas.
Visually Sensitive Receivers (VSRs)	<ul style="list-style-type: none"> Substantial visual impact on where the proposal would cause significant deterioration or improvement in existing visual quality (R-05, I-07). 	<ul style="list-style-type: none"> Annexes 10 and 18 of the EIAO-TM Environmental Impact Assessment Ordinance Guidance Note 8/2010 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Compensatory Planting for Loss of Existing Trees Landscape Treatment on Slopes 	<ul style="list-style-type: none"> Slight residual impact during day 1 of operation and insubstantial residual impact during year 10

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<ul style="list-style-type: none"> Moderate visual impact on immediately adjacent VSRs who have full overview of the project that cause a noticeable deterioration or improvement in existing visual quality (R-03, R-04, R-06, I-03, I-04, I-06, O-01, O-3, O-04, O-05). Slight visual impact on VSRs further away that cause a barely perceptible deterioration or improvement in existing visual quality (R-01, I-01, I-05, T-01, T-03, T-06, W-01). Insubstantial visual impact on long distant VSRs with no discernible change in the existing visual quality (R-02, I-02, I-08, O-02, T-02, T-04, T-05). 			<ul style="list-style-type: none"> Provision of Screen Planting Maximization of Roadside Planting Re-provision of Affected Open Space Visually pleasing aesthetic treatment on noise barriers and noise enclosures Aesthetically pleasing design for footbridges, pedestrian subways, cycle paths, carriageways and other highways structures 	<p>of operation on most of the affected visually sensitive receivers (R-01, R-04, R-06, I-01, I-05, I-06, I-07, O-03, O-04, O-05, T-01, T-03, W-01).</p> <ul style="list-style-type: none"> Slight residual impact during day 1 of operation and remain slight residual impact during year 10 of operation on several affected visually sensitive receivers (R-03, R-05, I-03, I-04, O-01, T-06)
Impact on Cultural Heritage					
Construction Impact					
Cultural heritage resources	<ul style="list-style-type: none"> Potential direct impacts on Gatehouse of Pok Ngar Villa, Tsang Tai Uk, Li Cottage, Ng Yuen, OLD26, due to damages through contacting with heavy construction machineries and site negligence Indirect impacts of ground-borne vibration, tilting and settlement on Gatehouse of 	<ul style="list-style-type: none"> Annexes 10 and 19 of the EIAO-TM Guidelines for Cultural Heritage Impact Assessment 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Conduct pre and post condition survey for Tsang Tai Uk, Gatehouse of Pok Ngar Villa, Li Cottage and Ng Yuen Implement monitoring of vibration, settlement and tilting incorporated with a set of Alert, Alarm and Action system for Tsang Tai Uk, Gatehouse of Pok 	<ul style="list-style-type: none"> N/A

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	Pok Ngar Villa, Tsang Tai Uk, Li Cottage, Ng Yuen, Lau Ancestral Hall, High Rock Christian Camp, No. 1, 2 and 3 First Street, Tai Wai, OLD1, OLD9, OLD11-21, OLD26-28			<p>Ngar Villa, Li Cottage, Lau Ancestral Hall, Ng Yuen, High Rock Christian Camp, No. 1, 2 and 3 First Street, OLD1, OLD9, OLD11-21, OLD26-28</p> <ul style="list-style-type: none"> • Verify foundation information of the historic buildings and provide sufficient lateral support and de-watering if necessary • Set up physical barriers for Li Cottage, Ng Yuen, OLD26, and buffer zones with physical barriers for Tsang Tai Uk, Gatehouse of Pok Ngar Villa, OLD26 • Provide protective covering of plastic sheets for Tsang Tai Uk, Gatehouse of Pok Ngar Villa, Li Cottage and Ng Yuen • As a precautionary measure, AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO. 	

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
Operation Impact					
Cultural heritage resources	<ul style="list-style-type: none"> No impact would be anticipated during the operation phase. 	<ul style="list-style-type: none"> Annexes 10 and 19 of the EIAO-TM Guidelines for Cultural Heritage Impact Assessment 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No mitigation measure would be required. 	<ul style="list-style-type: none"> N/A

3 ENVIRONMENTAL MONITORING AND AUDIT (EM&A)

- 3.1.1 Environmental Monitoring and Audit (EM&A) requirements for air quality, noise, water quality, waste management, ecological (terrestrial), landscape and visual impacts as well as cultural heritage have been recommended, with regular site inspection and audits during construction phase to ensure that the recommended mitigation measures are properly implemented. The EM&A requirements are specified and detailed in the EM&A Manual.

4 CONCLUSION

- 4.1.1 The findings of the EIA provided information on the nature and extent of the environmental impacts likely to arise from the construction and operation of the Project. The EIA has, where appropriate, identified mitigation measures to ensure compliance with environmental legislation and standards.
- 4.1.2 Overall, the EIA concluded that the Project would comply with the requirements of the EIA Study Brief and EIAO-TM with the implementation of the proposed mitigation measures during the construction and operation phases of the Project. The schedule of implementation of the proposed mitigation measures has been provided in the EIA Report. An EM&A programme has also been recommended to check the effectiveness of the proposed mitigation measures.