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14 Summary of Environmental Outcomes

14.1 General

14.1.1.1 This section summarises the overall environmental outcomes due to the construction and operation of the Project in accordance with Section 3.6.1 of the Environmental Impact Assessment Study Brief (EIA SB) (No.: ESB-329/2020). With reference to **Section 1** and **Section 2**, environmental considerations have been the key considerations throughout the Project. Alternative options for designs and construction methodologies have been duly considered in response to the public aspirations collated during the public engagement process in an appropriate manner. Besides, all the options considered have ensured that environmental impacts could be avoided or minimised where practicable and mitigated by implementation of suitable mitigation measures to fulfil all the statutory requirements. The technical assessment conducted (see **Section 3** to **Section 12**) have demonstrated that all the statutory requirements in EIA SB (No.: ESB-329/2020) and Technical Memorandum on Environmental Impact Assessment Ordinance (EIAO-TM) have been complied with.

14.1.1.2 The following sections summarise the approaches that have been adopted to either avoid or minimise various environmental impacts throughout the design process, and the associated environmental enhancements.

14.2 Environmentally Friendly Options Considered and Incorporated to Avoid and Minimise Environmental Impact

14.2.1.1 As described in **Section 2.6**, avoidance and minimisation of environmental impacts have been one of the key considerations throughout the entire project development and design. For those impacts that could not be avoided, due considerations have been given to minimise those impacts as much as practicable so that all the residual impacts would comply with the statutory requirements. Given the views and opinions collated from the public engagement process, much emphasis has been given to address natural resources such as Tung Chung River, Wong Lung Hang, Ma Wan Chung, etc. A summary of these avoidance and minimisation approaches is given in **Table 14.1** below.

Table 14.1 Key design considerations and the associated environmental benefits

Design Approach	Key Design Considerations and the Associated Environmental Benefits
Avoidance of marine works (see details in Section 2.6.2)	<ul style="list-style-type: none"> Adopt flat top barge arrangement to avoid dredging and marine works for the setting up of the barging point Adopt Tunnel Boring Machine (TBM) tunnelling at Ma Wan Chung to avoid any marine works

Design Approach	Key Design Considerations and the Associated Environmental Benefits
	<ul style="list-style-type: none"> Avoid direct impacts on the important marine/ intertidal ecological resources in the vicinity such as Tung Chung River and Ma Wan Chung
Avoidance of works within / direct impact upon Tung Chung River and its estuary, and Tai Ho Wan (see details in Section 2.6.3)	<ul style="list-style-type: none"> Avoid marine works in the current design Avoid direct impacts to ecologically important areas such as Tung Chung River and Tai Ho Wan
Avoidance of works within the intertidal zone (see details in Section 2.6.4)	<ul style="list-style-type: none"> Allow a setback from the coastline of Tung Chung Bay in the current design Limit construction works beyond the tidal influence zone and above the high-water mark at the abandoned drainage channel at the west of Yat Tung Estate Avoid direct impacts to the intertidal zone in Tung Chung Bay and Wong Lung Hang estuary
Avoidance of works within Country Parks, Site of Special Scientific Interest (SSSI), Conservation Area (CA) and Coastal Protection Area (CPA) (see details in Section 2.6.5)	<ul style="list-style-type: none"> Strategically locate the above-ground structures at areas of low ecological values Avoid any impacts to Lantau North (Extension) Country Park, Tai Ho Stream SSSI, Tai Ho Priority Site, CA and CPA
Avoidance of works within secondary woodland (see details in Section 2.6.6)	<ul style="list-style-type: none"> Strategically relocate the Emergency Access Point (EAP)/ Emergency Egress Point (EEP) to an artificial slope consisting of plantation of low ecological value at Shun Tung Road Avoid or minimize loss of secondary woodland
Avoidance of re-diversion of Wong Lung Hang nullah (see details in Section 2.6.7)	<ul style="list-style-type: none"> Avoid any re-diversion of the Wong Lung Hang nullah due to the overrun tunnel Avoid any direct impacts on the Wong Lung Hang estuary
Avoidance of works within SAI (see details in Section 2.6.8)	<ul style="list-style-type: none"> Adopt TBM tunnelling within the granite layer underneath Ma Wan Chung Avoid any direct impacts to Ma Wan Chung Site of Archaeological Interest (SAI) No excavation works would be conducted within Ma Wan Chung SAI and the engineering works would be conducted at least 10m below ground, which would be the granite layer
Minimisation of surface runoff and provision of necessary treatment facilities (see details in Section 2.6.9)	<ul style="list-style-type: none"> Adopt special enhancement measure such as sheet piles or hoarding with concrete footing along the western boundary of the construction site/works areas for Tung Chung West (TCW) Station Minimise any untreated surface runoff into the Tung Chung River estuary and the Wong Lung Hang estuary
Minimisation of noise disturbance during construction (see details in Section 2.6.10)	<ul style="list-style-type: none"> Adopt noise mitigation measures such as use of Quality Powered Mechanical Equipment (QPME), noise enclosure at TBM launching shaft/ retrieval shaft and screen cover at EAP/ EEP during construction phase Adopt temporary movable noise enclosures for the D-wall construction of TCW Station Minimise construction noise impacts to large water birds at Tung Chung River and Wong Lung Hang as well as many Noise Sensitive Receivers (NSRs) in close proximity

Design Approach	Key Design Considerations and the Associated Environmental Benefits
Minimisation of air quality impacts during construction (see details in Section 2.6.11)	<ul style="list-style-type: none"> • Adopt mitigation measures for fugitive dust such as regular spray, exposed earth surface covered by tarpaulins, standard wheel washing facilities at the construction site exits, vehicle washing at the exit of the barging facility with the provision of vehicle washing facilities • Provision of 3-side with top cover and spraying system at unloading points at the barging facility • Blasting to be carried out in a fully enclosed environment • Avoid using exempted Non-Road Mobile Machinery (NRMM) where practicable • Use power supplied from power utilities when practicable
Minimisation of human disturbance during construction (see details in Section 2.6.12 and Figure 5.2)	<ul style="list-style-type: none"> • Install site hoarding of appropriate height along site boundaries during construction phase • Confine construction activities and material storage within the construction sites • Do not provide dedicated access to the nearby ecological sensitive areas outside the construction sites • Minimise unnecessary human access and disturbance to nearby areas as far as practicable
Minimisation of the risk of unauthorised filling activities (see details in Section 2.6.13)	<ul style="list-style-type: none"> • Adopt trip-ticket system to monitor the disposal of construction and demolition materials • Provide warning signs to deter any illegal dumping activities • Adopt marine transport at the proposed barging facility and proposed land-based transport through Tuen Mun – Chek Lap Kok (TM-CLK) Link for transportation routes of C&D materials
Provision of Global Positioning System (GPS) for dump trucks to prevent illegal dumping (see details in Section 2.6.14)	<ul style="list-style-type: none"> • Install GPS or equivalent system at all dump trucks for delivery of inert C&D materials from the site to disposal locations to track down their instant locations • Ensure the transportation routes of dumps trucks to use existing roads • Avoid direct impacts to all the ecological habitats in Tung Chung Valley
Maintain the Visual Corridor Planned in TCNTE	<ul style="list-style-type: none"> • Design the TCE Station to maintain the north-south corridor as one of the planning considerations during the preparation of RODP adopted in the approved EIA report.

14.3 Estimated Population Protected from Various Environmental Impacts

14.3.1.1 The Project has been carefully designed to protect the populations from various environmental impacts. The protected populations include the following:

- Existing ASRs and NSRs at Le Bleu Deux, Yat Tung Estate, Mun Tung Estate, Tung Chung Crescent and Ying Tung Estate by implementation of good site practices during the construction phase of the Project;
- Planned ASRs and NSRs at future Tung Chung New Town Extension (TCNTE) (East) and TCNTE (West) development by implementation of good site practices during the construction phase of the Project; and

- All existing and planned NSRs as mentioned above during the operational phase of the Project.

14.4 Environmental Benefits of Environmental Protection Measures Recommended

14.4.1.1 Mitigation measures/ good site practices have been recommended to further reduce the environmental impacts due to the construction and operation of the Project. Key recommended mitigation measures/ good site practices/ enhancement measures and their associated benefits are summarised in **Table 14.2** below.

Table 14.2 Key recommended mitigation measures/ good site practices/ enhancement measures and their associated benefits

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Benefits
Air Quality	<ul style="list-style-type: none"> • Adopt dedicated spoil transportation routes away from the identified Air Sensitive Receivers (ASRs) as practicable • Install 3-sided screen with top cover and provide water sprays at the unloading point to barges at the barging facility • Avoid using exempt NRMM as much as practicable and when alternatives are available from the local market at the time of construction. • Implement watering system for areas with heavy construction • Adopt CLP power during the construction as much as practicable • The impermeable blast covers at TCW Station and the shaft for EAP / EEP are closed prior to blasting in order to ensure blasting to be carried out in a fully enclosed environment • Vehicle washing at the exit of the barging facility with the provision of vehicle washing facilities 	<ul style="list-style-type: none"> • Protect ASRs by reducing fugitive dust emissions
Noise	<ul style="list-style-type: none"> • Install noise enclosure for the TBM launching and retrieval shafts • Install temporary movable enclosure for D-wall construction at TCW area • Adopt QPME • Adopt temporary noise barriers to screen noise from relatively static Powered Mechanical Equipment (PME) • Use plant items alternatively within one worksite, wherever practicable • Adopt speed reduction of railway at certain sections in TCE during night-time period during the construction period 	<ul style="list-style-type: none"> • Protect NSRs by reducing construction and rail noise impact

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Benefits
	<ul style="list-style-type: none"> Provide noise barriers along at-grade railway tracks 	
Water Quality	<ul style="list-style-type: none"> Install a barrier in the form of sheet pile/ hoarding with concrete footing along the western boundary of construction site/ works areas for TCW Station for preventing uncontrolled discharge of untreated construction site runoff to the nearby Tung Chung Bay Follow Best Management Practices (BMPs) of mitigation measures in controlling water pollution and good site management as specified in the Professional Persons Environmental Consultative Committee (ProPECC) Practice Note (PN) 1/94 “Construction Site Drainage” Size all vessels to maintain adequate clearance between vessels and the seabed in all tide conditions Control loading of barges and hoppers to prevent splashing of materials into the surrounding water 	<ul style="list-style-type: none"> Protect the neighbouring Water Sensitive Receivers (WSRs) during construction phase
Waste Management	<ul style="list-style-type: none"> Adopt good waste management and control practices to avoid generation of excessive amount of waste materials Employ waste collectors for disposal of general refuse to prevent potential nuisance caused by mistreating general refuse, such as windblown, vermin, water pollution and visual impact Employ licensed chemical waste collectors for collecting chemical waste Good management practices for handling and disposal of marine sediment at dedicated marine disposal sites Equip GPS or equivalent system at all dump trucks engaged on site for delivery of inert C&D materials from the site to PFRFs Follow the designated land-based transportation routes for different types of wastes before and after the commencement of barging facility Carry out on-site sorting of C&D material Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate Implement a trip-ticket system for each works contract in accordance with DEVB TCW No. 06/2010 to ensure that the disposal of C&D materials is properly documented and verified 	<ul style="list-style-type: none"> Minimize waste generation Ensure proper handling of chemical waste Ensure the C&D materials are disposed to the designated outlets

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Benefits
Land Contamination	<ul style="list-style-type: none"> Recommend site re-appraisal to assess the latest site situation prior to the commencement of the construction 	<ul style="list-style-type: none"> Ensure any new changes in land use activities that might cause land contamination issue after the agreement of the Land Contamination Review (LCR) but before commencement of the construction could be addressed
Ecology	<ul style="list-style-type: none"> Provide a barrier in the form of sheet pile/ hoarding with concrete footing along the western boundary of construction site/ sites areas for TCW Station for preventing uncontrolled discharge of untreated construction site runoff to the nearby Tung Chung Bay 	<ul style="list-style-type: none"> Minimize the indirect impacts during construction phase
Fisheries	<ul style="list-style-type: none"> Mitigation measures/ good sites practices/ enhancement measures for water quality would help to minimize fisheries impact 	<ul style="list-style-type: none"> No impact to fisheries anticipated
Landscape and Visual	<ul style="list-style-type: none"> Preserve existing trees, transplant and compensate unavoidably affected trees where practicable Reinstate affected landscape, optimise green provision on structure and provide landscape integration and screen planting Adopt architectural aesthetic design and roof greening for above-ground facilities Implement aesthetic design on noise barrier at TCE area 	<ul style="list-style-type: none"> Minimize landscape and visual impact during construction and operational phases
Cultural Heritage	<ul style="list-style-type: none"> Conduct field scan, additional test pits and auger tests at the northern end of the TCW Station which are inaccessible at the EIA stage prior to construction stage 	<ul style="list-style-type: none"> Verify the presence of any archaeology remains and identify measures if necessary prior to construction
Hazard to Life	<ul style="list-style-type: none"> No overnight storage of explosives Provide impermeable blast covers if blasting is adopted 	<ul style="list-style-type: none"> Protect nearby sensitive receivers from adverse impacts due to blasting
General	<ul style="list-style-type: none"> Implement a comprehensive Environmental Monitoring System throughout the entire construction period Employ an Environmental Team (ET) and Independent Environmental Checker (IEC) 	<ul style="list-style-type: none"> Ensure compliance with all statutory requirements and those recommendations in the EIA